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DEATH IN THE DUNES. THE CASE OF THE DISASTROUS CHARGE OF MILITARY ORDERS AT LA FORBIE (AD 1244)

Śmierć na wydmach. Przypadek katastrofalnej szarży zakonów rycerskich pod La Forbie (1244 n.e.)

Abstract

Using the battle of La Forbie as an example, the author investigates how European knights responded to the feigned retreat tactics of Muslim horse archers. The study utilises speed data from modern horse breeds and knightly cavalry performance data derived from Renaissance-era Italian horse training manuals to interpret surviving written accounts. By noting that horse biomechanics have remained largely unchanged over the centuries, with the speed of an animal being influenced by limb length, the author proposes a novel method for analysing battle dynamics. Simulations of cavalry movements indicate that the defeat at La Forbie was largely caused by the necessity of charging through deep dunes.

Keywords: crusades, knights, warhorses, Muslim and Mongol horse archers, horse biomechanics, La Forbie, withers height, stride length

Abstrakt

Na przykładzie bitwy pod La Forbie autor próbuje zrozumieć, jak europejscy rycerze reagowali na taktykę pozorowanej ucieczki muzułmańskich łuczników konnych. Do interpretacji źródeł pisanych wykorzystano pomiary prędkości koni współczesnych ras oraz dane o jeździe rycerskiej zaczerpnięte z włoskich renesansowych podręczników układania koni. Wykorzystując fakt, że biomechanika koni nie zmieniła się na przestrzeni wieków, gdyż prędkość poruszającego się zwierzęcia zależy od długości kończyn, autor zaproponował nową metodę analizy przebiegu walki. Wyniki symulacji działań konnicy sugerują, że przyczyną porażki pod La Forbie była konieczność szarżowania przez głębokie wydmy.

Słowa kluczowe: krucjaty, rycerze, konie bojowe, muzułmańscy i mongolscy łucznicy konni, biomechanika koni, La Forbie, wysokość w kłębie, długość wykroku

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1. The battle at La Forbie

The battle at La Forbie was one of the greatest setbacks in the history of crusading states, comparable to the defeat at Hattin.[2] The battle emerged as a consequence of internal strife among the Ayyubid family. The Kingdom of Jerusalem took the side of breakaway Ayyubid branches from Damascus, Homs and Kerak. Their foe, the Ayyubid sultan of Egypt as-Salih Ayyub received the support of Khwarazmian freebooters – pillaging the Holy Land at the time. The battle itself took place on October 17-18, 1244, near the old Palestinian village of Harbiyah. The Egyptian forces consisted of well-trained Mamluk slave soldiers and Khwarazmian horse archers – both groups relying on Central Asian military traditions.[3] The Kingdom of Jerusalem fielded a typical crusading army consisting of knights supported by squires, foot sergeants, and crossbowmen.

On the second day, the knights of the Military Orders charged in a futile attempt to penetrate the Muslim centre and suffered enormous losses.[4] The Templars lost 312 combatants, with only 33 survivors; the Hospitallers lost 325 combatants, with 26 survivors. The losses sustained by the Teutonic Order were catastrophic: 400 knights perished, with only three survivors recorded.[5] Moreover, the Teutonic Marshall Conrad von Nassau disappeared in the attack.[6] All knights of the Leper Order and the Order of Saint Lazarus perished in the battle.[7] According to Ilya Berkovich, the disaster at La Forbie ended the Frankish military

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[2] S. Lotan, *The Battle of La Forbie (1244) and its Aftermath – Re-examination of the Military Orders Involvement in the Latin Kingdom of Jerusalem in the mid-Thirteenth Century*, "Ordines Militares. Yearbook for the Study of the Military Orders," 17/2012, p. 54.

[3] J. Prawer, *Histoire du royaume latin de Jérusalem*, vol. 2, Paris 1975: Centre national de la recherche scientifique, pp. 310-313; I. Berkovich, *The Battle of Forbie and the Second Frankish Kingdom of Jerusalem*, "Journal of Military History," 75/2011, pp. 9-14; D. Campbell, *Templar Knight versus Mamluk Warrior*, Oxford 2015, pp. 41-54; W.E. Welsh, *The Battle of La Forbie – Crusader Catastrophe*, "Medieval Warfare," 6/2016, no. 5, pp. 32-33.

[4] S. Lotan, *The Battle of La Forbie*…, p. 59.

[5] *Matthaei Parisiensis, monachi Sancti Albani, Chronica majora*, vol. 4, ed. H. Richards Luard, London 1877: (referred below as *Chronica Majora*), p. 342: "Et cum essent respectu inimicorum paucissimi, proh dolor, succubuerunt in bello, hostibus proeliorum adversitate cedente[s], ita quod de conventibus domus militiae Templi, Hospitalis Sancti Johannis, et Sanctae Mariae Theutonicorum, tantum modo triginta tres Templarii, viginti sex Hospitalarii, et tres fraters Theutonici evaserunt, aliis peremptis et captis. Optimates etiam terrae et milites, proi majori parte capti et interfecti fuerunt, praeter stragem balistariorum et peditum infinite". A similar relation was made by an anonymous author of the *Continuation de Guillaume de Tyr de 1229 à 1261, dite du manuscript de Rothelin*, in: *Recueil des Historiens des Croisades. Historiens Occidentaux*, vol. 2, ed. Académie des Inscriptions et Belles-Lettres, Paris 1859 (referred below as *Continuation de Guillaume de Tyr*), p. 564: "Lorz assembla encontr'elx de cex Babiloinne et des Coraminz. En la fin li nostre ne porent soffrir cele grant planté de mescreanz, ainz furent desconfist en tel maniere que des frerez del Temple n'en eschapa, que xxxvi Templierz, et des Hospitalierz jusqu-à xxvi et iii frerez de l-Ospital Nostre Dame des Alemanz. Tuit li autre furent ou priz ou occis, et prez que tuit li grant seigneur, qui furent priz a la bataile. Li arbalestierz et la gent a pié furent prez que tuit pardu". More enigmatic relation in *Regesta Regni Hierosolymitani*, ed. R. Röhricht, Innsbruck 1893, p. 299, no. 1125 (1244): "Christianos vero apud Gazam fugatos esse". See also S. Lotan, *The Battle of La Forbie*…, p. 59 and note 24.

[6] *Chronica Majora*, p. 342: "et praeceptore Sanctae Mariae Teutonicorum […] cum non apparuerint, plurimum dubitatur utrum adhuc in bello obierint"; See also N. Morton, *The Teutonic Knights in the Holy Land 1190-1291*, Woodbridge 2009, pp. 166, 204 and S. Lotan, *The Battle of La Forbie*…, p. 59 note 25.

[7] R. Röhricht, *Geschichte des Königreichs Jerusalem (1100-1291)*, Innsburck 1898, repr. Amsterdam 1966, p. 865 – citation to the 1966 edition; M. Barber, *The Order of Saint Lazarus and the Crusaders*, "Catholic Historical Review," 80/1994, no. 3, July, p. 449; S. Lotan, *The Battle of La Forbie*…, p. 59 note 26.

potential. After the defeat, the Kingdom of Jerusalem was unable to launch forces capable of full-scale campaigns and became increasingly dependent on Western European support.[8]

But why did the charge of Military Orders fail? The 14th-century Egyptian historian al-Maqrisi provides only a brief account of the final charge at La Forbie: "the Franks, who for some time defended themselves, but were soon surrounded by the Kharesmiens: the greater part perished on this occasion, except a few that had the good fortune to escape".[9]

Only one source, the so-called *Eracles* Continuation, states that the unruly behaviour of some non-knightly combatants caused the defeat: "the Christians began milling about, the squires and foot sergeants pushed in amongst the ranks and the knights could not spur forward to get at the Turks".[10] This passage may hold the key to understanding the defeat: the inability to deliver a proper charge at a consistent pace and in a straight line might have been caused by the unruly behaviour of lesser-status combatants. Though this narrative could have been fabricated later – given the medieval contempt for fighters of humble origins – it offers a plausible explanation for the collapse of the charge.[11]

It is essential to investigate whether, in normal circumstances, the knights of the Military Orders would have been able to engage the Muslim horse archers. It is also important to consider how the disorganized behaviour of lesser-status combatants acted as an obstacle, potentially hindering the charge's effectiveness. Such conduct contradicts the strict protocols of the Templars. Under normal conditions, the brother knights would charge in close formation, following their banner, with the other combatants trailing behind. The timing was crucial: the most experienced knight, usually the Marshall, would give the signal for the attack.[12] The horsemen charged arrayed in one or two lines, without hesitation or rashness. If the signal for the attack was given too early, the horsemen could scatter in disorder, losing the line's integrity; if given too late, the horses would not reach the necessary speed. The chronicler Ralph of Diss described the charge of Templar knights at Montgisard in AD 1177: "Odo (de Saint Amand), the Master of Knighthood of the Temple, like another Judas Maccabaeus, had 84 knights of his order with him in his personal company. He took himself into battle with his men, strengthened by the sign of the cross. Spurring all together, as one

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[8] I. Berkovich, *The Battle of Forbie*..., p. 14-44.

[9] Al-Maqrisi, an English translation of *Al-Suluk li Ma'rifat Duwal Al-Muluk* (The Road to Knowledge About the Countries of Kings), in: *Chronicles of the Crusades Being Contemporary Narratives of the Crusade Richard Coeur de Lion*, *by Richard of Devizes and Geoffrey de Vinsauf; and of the Crusade of St. Luis, by Lord John de Joinville*, London 1848, p. 539.

[10] Anonymous, *L'Estoire de Eracles, empereur, et la conqueste de la Terre d'Outre-Mer*, in: *Recueil des Historiens des Croisades*: *Historiens Occidentaux*, vol. 2, ed. Académie des Inscriptions et Belles-Lettres, Paris 1859 (referred below as *L'Estoire de Eracles*), p. 429: "Li Crestien comencerent lors a forboilier; li escuier et si sergent a pié se boutoient par mi les escheles, por quoi li chevalier ne pocent poindre ni avenir as Turs"; translation after J. Shirley, *Crusader Syria in the Thirteenth Century: The Rothelin Continuation of the History of William of Tyre with Part of the Eracles or Acre Text*, London and New York 1999, p. 133.

[11] According to popular medieval myth, the lower-class combatants, such as "carpenters and stonemasons who could give great blows in battle; but their courage and resolve failed, as did that of the next group, the butchers, chosen because they were inured to blood and slaughter", lacked knightly prowess and virtues, cf. R.W. Kaeuper, *Chivalry and Violence in Medieval Europe*, Oxford 1999, p. 201.

[12] M. Bennett, *La Régle du Temple as a Military Manual or How to Deliver a Cavalry Charge*, in: *Studies in Medieval History Presented to R. Allen Brown*, ed. Ch. Harper-Bill, Ch.J. Holdsworth, J.L. Nelson, Woodbridge 1989, pp. 7-19.

man, they made charge, turning neither to the left nor to the right."[13] The Military Orders' charge at La Forbie should have followed a similar pattern.

2. Battle tactics and the performance of medieval warhorses

The Crusader knights fought in small echelons arrayed in close order called *conrois* in French.[14] They charged together at a canter, accelerating only before contact with the enemy to maintain the line's cohesion. A firm seat was essential for the energy transfer needed for lance thrusts capable of penetrating armour.[15] Giordano Rufo of Calabria, in his equestrian manual written at the court of emperor Frederic II, advised riding at canter.[16] No doubt, the cavalry training in crusading states was conducted exactly at canter,[17] and the main part of La Forbie charge should have been delivered in such a way. The knights would move in a straight line, spurring their mounts into a gallop only in the final moments to maintain the integrity of the formation. If the horses became too excited by speed, the charge would lose its effectiveness.

Medieval warhorses stood around 155 cm at the withers.[18] Heavier animals, products of late medieval crossbreeding, are represented in artworks, such as those painted by Paolo Uccello.[19] Modern Lithuanian draught horses, which measure about 157 cm at the withers, were used as models for exhibition mannequins at the Royal Armoury in Leeds.[20] By contrast, the 13th-century manuscripts, such as Matthew Paris' *Chronica Majora*, often depict warhorses that are more slender,[21] similar in build to present-day hunters.[22]

The Turkish foes of crusaders usually responded to charges with feigned retreat,[23] a classical Muslim tactic combined with archery harassment in a Parthian style. Surviving sources

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[13] Quoted after H. Nicholson, *Knight Templar 1120-1312*, Oxford 2004, p. 48.

[14] Ch.J. Marshall, *The Use of the Charge in Battles in the Latin East 1192-1291*, "Historical Research," 53/1990, pp. 221-226; D. Nicolle, *Crusader Warfare. Volume I: Byzantium, Western Europe and the Battle for the Holy Land*, vol. 1, London 2007, p. 66.

[15] A. Williams, D. Edge, T. Capwell, *An Experimental Investigation of Late Medieval Combat with the Couched Lance*, "Journal of the Arms and Armour Society," 22/2016, pp. 2-29.

[16] G.B. Tomassini, *The Italian Tradition of Equestrian Art. A Survey of the Treatises on Horsemanship from the Renaissance and the Centuries Following* (pl. of pr. unknown), Xenophon Press 2014, p. 52.

[17] D. Nicolle, *Knight of Outremer 1187-1344 AD*, London 1996, p. 14.

[18] M. Bennett, *The Medieval Warhorse Reconsidered*, in: *Medieval Knighthood V. Papers from the sixth Strawbery Hill Conference 1994*, ed. S. Church, R. Harvey, Woodbridge 1995, p. 22.

[19] Paolo Ucello, *Equestrian Monument to Sir John Hawkwood*, 1436. Fresco, Cattedrale di Santa Maria del Fiore, Florence.

[20] A. Hyland, *Warhorse 1250-1600*, Stroud 1998, p. 30.

[21] The Masters and Fellows of Corpus Christi College, Cambridge, MS 16, f.170v – cited after Ch. Gravett, *English Medieval Knight 1200-1300*, Oxford 2002, p. 22.

[22] A. Hyland, *The Medieval Warhorse from Byzantium to the Crusades*, Stroud 1996, p. 58.

[23] *Chronicles of the Crusades. Eye-witness Accounts of the Wars Between Christianity and Islam*, ed. E. Hallam, Godalming, Surrey 1996, p. 120; N. Morton, *The Crusader States and their Neighbours. A Military History, 1099-1187*, Oxford 2020, pp. 232-233.

record the "hail of arrows" that met the crusaders.[24] The Turks trained their horses "to run straight, swerving aside only on command".[25]

To understand the reasons for the La Forbie disaster, we should examine contemporary tactics and the abilities of medieval warhorses. The size of horses used by both sides can be identified by scientific methods and this data can be compared with the characteristics of modern horses.

3. Mongol invasion analogies

We should also consider other events where knightly cavalry successfully confronted fleeing enemies. In AD 1241, the Mongols invaded Central Europe and the knights of the Military Orders met them on battlefields. The Mongols employed feigned retreat tactics in a Turkish style mounted on steppe ponies, as retreating in an intricate pattern would increase the risks of being caught. According to the chronicle of Jan Długosz, on April 9, 1241, at Legnica in present-day Poland, the Templars and Hospitallers managed to engage Mongol horsemen: "The crusaders and foreign knights smashed the Tatar front ranks with lances and pressed forward. But when hand-to-hand combat with swords began, the Tatar archers surrounded the crusaders and foreign knights from all sides so the other Polish echelons could not come to aid without putting themselves in danger".[26] The passage clearly indicates that the charging knights were lured into a pursuit by the feigned retreat tactics, separated from the main forces and surrounded. It also makes clear that the European knights were able to catch the fleeing Mongol horsemen likely because their opponents were mounted on short-legged steppe ponies which were slower than the European horses.

The average Mongol horse stood about 134-137 cm at the withers, though taller animals were likely used in war.[27] The estimation set at 140 cm for a Mongol warhorse sounds plausible. To get an idea about their battle performance we should use data recorded for similar animals: German scholar Marcus Junkelmann conducted experiments on Roman cavalry using Camargue horses (130-145 cm at the withers), recording the following speeds at various gaits: canter – 20-30 km/h (5.5-8.3 m/s) and gallop – 45-52 km/h (12.5-14.4 m/s).[28]

The biomechanics of a horse do not change: the speed of a moving animal is determined by stride length and frequency. These are conditioned by variable phenotypic features – mostly

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[24] *Continuation de Guillaume de Tyr*, p. 544: "a traire saietes et quarriaux, que pluic ne gresil ne peust pas faire greigneur oscurté"; see also Ch.J. Marshall, *The Use of the Charge*…, p. 221. The phrase "drawing the arrows and bolts from which the rain had born a fine hail that they could not make [the heavens] more obscured" is a rhetorical exaggeration but gives a taste of the charging knight's experience.

[25] A. Hyland, *The Medieval Warhorse*…, p. 109.

[26] Jan Długosz, *Annales seu cronicae incliti Regni Poloniae, libri VII-VIII*, ed. D. Turkowska, Warszawa 1975, p. 21: "Magno impetu ab utraque partie concursum est et crucesignati atque peregrini milites primos Thartarorum ordines lanceis confecerant gradumque promovebant. Sed cum gladiis cominus agi res cepissent, crucisignatorum et peregrinorum militum a Thartarorum sagittariis undique circumacta (acies) adeo, ut illi per ceteras Polonorum acies succurri sine discrimine non possent" – author's translation.

[27] 134 cm: C.J. Johnstone, A. Hammon, *Mammal and bird bones*, in: *The Transition to Late Antiquity on the Lower Danube: Excavations and survey at Dichin a Late Roman to early Byzantine fort and a Roman Aqueduct*, ed. A. Poulter, Oxford 2019, p. 646. The Mongol horse remains were used as a reference group for the Roman period animals. For 137 cm, see B. Hendricks, *International Encyclopedia of Horse Breeds*, Norman 1995, p. 287.

[28] M. Junkelmann, *Die Reiter Roms*, Teil 1: *Reise, Jagd, Triumph und Cicusrennen*, Mainz am Rhein 1990, p. 46.

by the length of the limbs,[29] so the results recorded for Camargue mounts can be applied to model Mongol warhorse performance. Smaller Mongol horses (around some 130 cm at the withers) could likely reach speeds of 44 km/h (12.5 m/s).[30] So the results recorded for the Camargue breed perfectly correspond with the performance of taller steppe animals. However, we should use the mean values recorded for Camargue horses as estimates for medieval Mongol warhorses as taller and faster animals were less common (Chart 1).

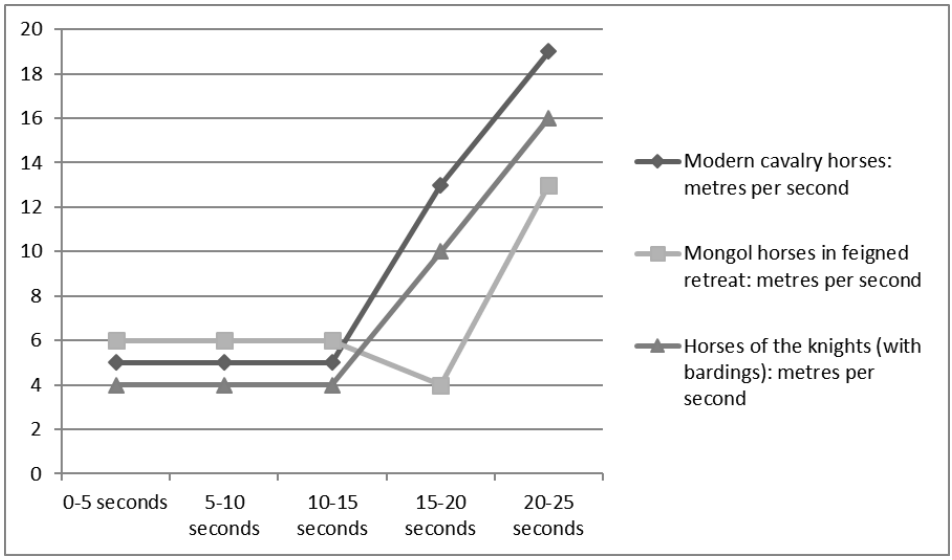

Chart 1. Hypothetical reconstruction of horse battle performance during the Mongol invasion of AD 1241

The horsemen on both sides began the battle by advancing toward the enemy at a canter. The Mongols used their bows and should have been moving faster than their foes due to the lightness of their equipment. The knights countercharged when the Mongol horse archers came within killing range. The effectiveness of the Mongol composite bow remains a mystery. An inscription from AD 1225 on the so-called Genghis Khan's Stone (found on the Onon River) records an archery feat by his nephew Jinsüngke.[31] He was able to shoot "an arrow to a distance of 335 'alds' (a Mongolian unit of measurement which translates to five and a half feet), or over 600 yards".[32] However, such exceptional shooting should be regarded as an anomaly, and an arrow fired at such a distance would have lost all its penetrating power.

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[29] H.M. Clayton, S.-J. Hobs, *The role of biomechanical analysis of horse and rider in equitation science*, "Applied Animal Behaviour Science," 190/2017, p. 126.

[30] K. Roy, *Military Transition in Early Modern Asia, 1400-1750. Cavalry, Guns, Government and Ships*, London 2015, p. 16.

[31] W. Świętosławski, *Arms and Armour of the Nomads of the Great Steppe in the Times of the Mongol Expansion*, Łódź 1999, p. 58.

[32] Ch. Peers, *Genghis Khan and the Mongol War Machine*, Barnsley 2015, p. 55.

"The Secret History of the Mongols" distinguishes between *qo'chaq* arrows, used for long-range shooting, and *odora* arrows, which were reserved for close-range combat.[33] The dart-like arrows called *keyibür* resembled European bodkin examples, though they were not very common: only one example has been recovered from the Karakorum site.[34] These were used at long distances to penetrate mail armour. The large, heavy arrows intended for close range are better represented in the archaeological record.[35] A heavy Mongol war arrow could have been lethal at a range of 28 metres. It was a close-range precision shooting with much emphasis on penetration power.[36]

When the horse archers reached killing range, the knights would have spurred horses into a gallop at a pre-arranged signal: the secular knights used customary battle cries for that purpose.[37] The battle cry could have been used to facilitate synchrony in dragging spurs into the horses' sides to assure an even start of the acceleration phase, as the charging knights should have been moving at even pace and in a straight line. That was critical for the success of the attack. The steppe horsemen responded by executing a half-pirouette at a collected canter to turn and flee. The author's equestrian experience shows that it takes about 4-5 seconds and four *foulées*.[38]

The pre-war Polish military manuals contained detailed calculations that helped cavalry commanders estimate the remaining reserves of strength. The weight of the battle kit (with spare rounds) was somewhat similar to the weight of an armoured knight.[39] The horses used by Polish cavalry stood some 150-160 cm at the withers, as heavier and taller animals were unsuited for bad quality roads of eastern Poland.[40]

These manuals recorded speed results for cavalry horses: at an extended field canter the cavalry horse should cover 1 km in 180 seconds (5.5 m/s) and at a gallop the speed was increased to 19 m/s.[41] If these estimates reflected the realities of the medieval battlefield, the knights should have been able to catch any Mongol horseman with ease – provided they covered the entire distance at a canter and accelerated for 10 seconds before engaging the enemy. At the same time, the opponents tried to escape from danger, still using their bows to disrupt the enemy's line integrity. The need for turning should have caused deceleration and the fleeing steppe ponies should have had problems building their speed again (Chart 1).

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[33] M. Holeščák, *Mongol Archery Equipment through the Prism of the Secret History of the Mongols*, "Mongolica," 52/2018, p. 42.

[34] Ibidem, pp. 41-42.

[35] W. Świętosławski, *Arms and Armour…*, p. 63.

[36] J.M. Smith, *Ayn Jālūt: Mamlūk Success* or *Mongol Failure?*, "Harvard Journal of Asiatic Studies," 44/1984, p. 316. Yet J.M. Smith had reconsidered his calculations, later he stated that the Mongols should have started their shooting at a distance of about 45 metres and then turned to flee, see idem, *Mongol Society and Military in the Middle East: Antecedents and Adaptations*, in: *War and Society in the Eastern Mediterranean: 7th-15th Centuries*, ed. Y. Lev, Leiden 2012, p 258.

[37] As in Wolfram von Eschenbach's *Parzifal*, London 1894, p. 217. In von Eschenbach's narrative the battle cry "Nantes !" was used as a sign of identity among Arthur's knights. Such custom was also used during real battles.

[38] *Foulée* – a "jump" of the horse in a canter consisting of three beats followed by a suspension phase.

[39] A. Nowakowski, *Konie wierzchowe i zwierzęta pociągowe*, in: *Polska technika wojskowa do 1500 roku*, ed. A. Nadolski, Warszawa 1994, pp. 272-273.

[40] W. Hofman, *Hipologia. Podręcznik dla oficerów kawalerii i artylerii*, vol. 1, Warszawa 1931 – repr. Oświęcim 2013, pp. 352-353.

[41] Ibidem, p. 429.

The fleeing Mongol horses were able to accelerate only after completing the turn. At the same time, the knights should have been moving at a full gallop, covering much of the killing zone.

Archaeological data from medieval Poland provides some insight into the size of horses used during the charge: horses measuring some 144-152 cm at the withers account for 6.1% of the collected material, while the bones of exceptionally large animals (152-160 cm tall) constitute only 2% of the analyzed material.[42] Such animals were taken into service as destriers. The finds from Silesia indicate that during the 13th century the size of horseshoes considerably increased.[43] Thus, the Silesian gentry had suitable horses to deliver a crushing charge against their Mongol adversaries.

However, the knights' charge should have been delivered at a slower pace. At least some warhorses would have carried substantial coverings of quilted fabric and mail.[44] The earliest references to horse armour appear in Western European iconography in the last quarter of the 12th century. Pictorial evidence from the first half of the 13th century often depicts destriers with full coverings. At the end of the century the English king Edward I insisted that only a knight who goes to war on an armoured warhorse will receive the full payment.[45]

How this situation applied to the Templar knights remains a mystery. The fresco from San Bevignate church, Perugia, dated to the 1240s, depicts horse coverings without any metal armour, though the fabric shown in the fresco may conceal mail.[46] We should consider the dangers imposed by Mamluk archery and the fact that crusading states were always short of good quality horses.[47] Moreover, the wealthy Military Orders had sufficient resources to invest in protecting their valuable warhorses, thus reducing the potential for battle casualties and partially resolving the problem with remounts. But even the ablest destrier encumbered with horse armour could slow the pace of any attacking line. The need to maintain formation integrity would have necessitated a reduced charge speed. The pace of the entire group would have been adjusted to match the slowest horse in the line. Surviving sources emphasize that the knights of the Military Orders managed to engage their Mongol opponents, as occured at Legnica. Thus, the battle speed estimations for the medieval destriers should be set above the values assigned to the Mongol horses and below the abilities of modern cavalry mounts (Chart 1).

At Legnica, the turning maneuver of the Mongol horse archers would have saved the charging knights approximately five seconds. Even if the attackers were still building their speed, i.e., accelerating from about 6 m/s to 10 m/s, they should have covered about 30 meters of the killing zone in four seconds (Chart 1). The European warhorses had longer limbs – our estimations show that they were about 3 m/s faster than the Mongol steppe ponies. Drawing on her equestrian experience, Ann Hyland sets the speed of a charging knight to 32 km/h (8.8 m/s).[48] That value is in the middle of our estimations. So, the charging knights should

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[42] H. Kobryń, *Zmiany niektórych cech morfologicznych konia w świetle badań kostnych materiałów wykopaliskowych z obszaru Polski*, Warszawa 1984, p. 49, table 29.

[43] J. Kaźmierczyk, *Podkowy na Śląsku w X-XIV wieku*, Wrocław 1978, pp. 153-154.

[44] D. Nicolle, *Knight of Outremer*..., pp. 54-55, 58-59.

[45] M. Bennett, *Medieval Warhorse*..., p. 39; R.H.C. Davis, *The Medieval Warhorse*, London 1989, p. 88.

[46] H. Nicholson, *Knight Templar*..., p. 31.

[47] D. Nicolle, *Knight of Outremer*..., p. 14.

[48] A. Hyland, *The Medieval Warhorse*..., p. 57.

have caught the enemy in 4-5 seconds after the initial signal for acceleration. Then, upon contact, the lances would have demonstrated their lethal potential…

4. Back to La Forbie: possible reasons for the disaster

At La Forbie, the brethren knights should have used warhorses similar in size to their European counterparts, despite the crusading states' persistent difficulties in acquiring remounts.[49] Otherwise, the presence of smaller horses would shave disrupted formation integrity, as any cavalry unit mounted on motley assortment of randomly sized animals would be nothing more than an armed rabble, incapable of executing a charge in an ordered line.

The crusaders' foes were skilled in a different kind of archery rooted in Persian traditions: long-distance volley shooting that created a "killing zone".[50] They fired their bows from a greater distance, perhaps beginning their attack at approximately 68 metres, trying to put in the air as many arrows as possible.[51] The arrows were lighter and had less penetration effect: "even the feared composite bow of Muslim horse-archers normally had to be shot from close range to penetrate armour to any great depth".[52] There was no need for earlier rapid acceleration during the charge of the brethren knights, as the lighter arrows presented a lesser threat and the fast volley of shooting prevented precise aiming. The acceleration phase of the charge should begin some 30-45 metres before the target.

At La Forbie the Saracens were mounted on lighter horses of an oriental type. The Mamluk mounts should have looked like modern Arabian horses, reaching some 142-152 cm at the withers, though only the taller animals were used for war.[53] According to Ann Hyland who quotes Ibn Battuta, the best warhorses were of mixed Arabian and Turcoman stock.[54] The enhanced growth of hybrids phenomenon should make these animals quite high. The estimation set at 145 cm for a Mamluk warhorse sounds plausible. The speed results of modern Arabian horses – recorded for the distance of 1006 m – look as follows: 37.3 km/h (10 m/s) at the beginning, 54.6 km/h (15 m/s) at the middle and 46.1 (12 m/s) at the finial.[55]

In battle conditions, these animals should have carried not only the rider but also his arms, armour and equipment. David Cambell estimates the weight of the Mamluk battle kit to be 54-74 lb (about 24-33 kg).[56] That would have significantly slowed the Mamluk horses, as they lacked the carrying capabilities of the stockier European warhorses.

In normal circumstances, the knights of the Military Orders would have caught their foes with ease if only the Saracen horsemen had to decelerate to make a turn (Chart 2). But at La Forbie the conditions were far from normal. The sandy dunes from the place would have

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[49] See above note 47.

[50] D. Nicolle, *Saracen Faris 1050-1250 AD*, London 1994, pp. 52-53; idem, *Mamluk 'Askari 1250-1517*, Oxford 2014, p. 46.

[51] J.M. Smith, *Ayn Jālūt: Mamlūk Success*…, pp. 314-316; idem, *Mongol Society and Military*…, p. 258.

[52] D. Nicolle, *Knight of Outremer*…, pp. 27-28.

[53] B. Hendricks, *International Encyclopedia of Horse*…, p. 37.

[54] A. Hyland, *The Medieval Warhorse*…, p. 106.

[55] B.D. Nielsen, K.K. Turner. B.A. Ventura, A.D. Woodward, C.I. O'Connor, *Racing Speeds of Quarter Horses, Thoroughbreds and Arabians*, "Equine Exercise Physiology 7 Equine Vet.," J. Suppl. 36/2006, p. 130, table 2.

[56] D. Campbell, *Templar Knight versus Mamluk*…, p. 16.

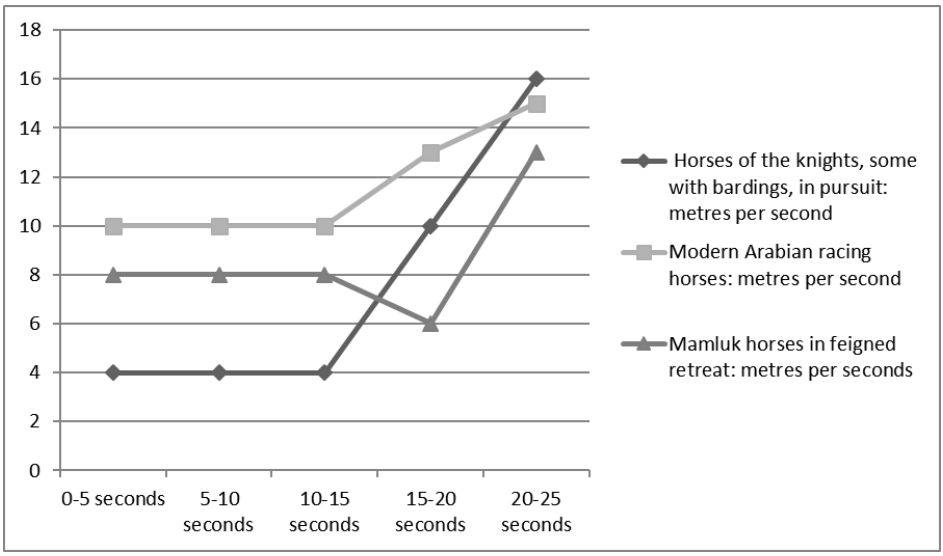

Chart 2. Hypothetical reconstruction of horse battle performance in the Latin East. The conditions are ideal, and the animals run on the even ground

slowed the heavy European warhorses.[57] The present-day sandy area is located to the south-west of the old Palestinian village of Harbiyah.[58] The expansion of sand dunes began after the Arab conquest and can be linked to a drier and warmer climatic period.[59] A drop in the Mediterranean Sea levels and dendrochronological data from ancient pine trees (*Pinus nigra*) in Cyprus further supports that the crusading era was characterized by cooler and more humid conditions,[60] so the sand dunes were less prominent at that time.

At La Forbie, the heavier European warhorses would have had more problems on sand as such areas can slow horses when the layer of sand is relatively thin. Yet the dunes had places where the sand layer was thicker. The author's equestrian experience suggests that the deeper sand slows the speed of horses by one-third. The proposed estimations for the lighter oriental horses should also be reduced by one-third. With only one second advantage the knights of the Military Orders would have struggled to make contact with the enemy (Chart 3).

What happened when the charging knights failed to reach their targets remains a mystery? In 1550, the Neapolitan nobleman Federico Grisone published *Gli ordini di cavalcatore* (*Rules of Riding*). Grisone's methods help us understand the principles of mounted medieval combat, as the fighting styles of the Renaissance knights were likely similar to medieval practices. The basic exercises focused on riding fast in a straight line. However, knights also acquired other skills that could help restore the disrupted battle formation: Grisone's straight rides

[57] Ch. Marshall, *Warfare in the Latin East 1192-1291*, Cambridge 1996, p. 91.

[58] K.F. Ubeid, A.S. Albatta, *Sand dunes of the Gaza Strip (southwestern Palestine): morphology, textural characteristics and associated environmental impacts*, "Earth Sciences Research Journal," 18/2014, no. 2, p. 132, fig. 1.

[59] A.S. Isaar, M. Zohar, *Climate Change – Environment and History of the Near East*, Berlin 2007, pp. 15-18.

[60] Ibidem, pp. 220, 225.

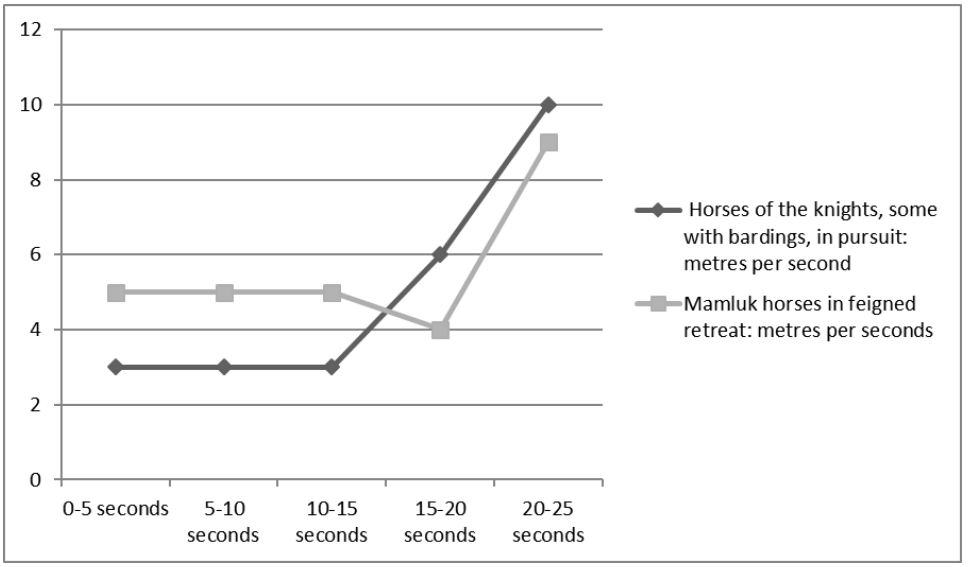

Chart 3. Hypothetical reconstruction of horse battle performance during the battle of La Forbie in AD 1244. The speed of horses of both sides is modified by sandy terrain

were interspersed with volts, half-volts, pirouettes, and half-pirouettes. A properly trained destrier was expected to execute a sequence of quick charges. Besides, the horse had to be well prepared to make rapid stops or turns, skills that could be used to rejoin a re-formed battle line. Grisone also devised special geometric figures to facilitate performing these maneuvres – such as turns and stops – in the *manège*.[61]

These skills would have helped the scattered knights restore the formation's integrity and repeat the charge. The fact that horses were already exhausted would have caused problems and the next charge would have been slower. The overall effect would have been disappointing and such efforts could not have been sustained for long. Nowadays, polo horses work only for 7 or 14 minutes per match, and that is already considered a significant strain on their health.[62] The burden of such increased effort enforces a need for changing horses in Polo matches. The demands of combat were similar, though medieval warhorses also had to bear the weight of armoured riders. Thus, medieval battles must have been even more exhausting. A failed first charge seriously reduced the potential of knightly cavalry due to battle fatigue. If the charging knights failed to decide that battle in their initial attack, their fate was grim.

The results of the charge at La Forbie illustrate how serious that threat was. According to the already-mentioned passage in *L'Estoire de Eracles*, at La Forbie "the squires and foot sergeants pushed in amongst the ranks". This suggests that the foot soldiers were able to keep up with the horsemen and disrupt their formation. During the Crusading era,

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[61] Ibidem, pp. 92-94.

[62] R. Zobba, M. Ardu, S. Niccolini, F. Cubeddu, C. Dimauro, P. Bonelli, C. Dedola, S. Visco, M.L. Pinna Parpaglia, *Physical, Hematological, and Biochemical Responses to Acute Intense Exercise in Polo Horses*, "Journal of Equine Veterinary Science," 31/2011, p. 545.

mounted knights were protected by infantrymen and crossbowmen who kept the Muslim horse archers at bay.[63] However, once the knights charged, the infantry was left behind, as sand slowed both running men and horses. Foot soldiers could only overtake the cavalry after the initial attack had failed. Unable to reach their targets, the knights of the Military Orders were forced to halt and attempt to restore their formation before attacking again. It appears that difficult terrain was a major factor in the failure of the charge and the ensuing chaos was a direct consequence. A key conclusion is that knightly horsemen required a significant speed advantage to counter feigned retreat tactics. At La Forbie, poor terrain conditions hindered the execution of a proper cavalry charge, which was likely the primary cause of the disaster that followed.

The height of warhorses was also a critical factor in medieval warfare. Taller horses had a greater ability to catch fleeing opponents and delivered a more powerful impact during the charge. Riding smaller animals was always a disadvantage. Rapid acceleration should be recognized as the most important quality of a good destrier. These animals resembled modern American Quarter horses, famous for their sprinting abilities. The success of a cavalry charge depended on this capability. A well-executed cavalry attack could significantly influence the outcome of an entire battle, but at La Forbie this did not happen.

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[63] D. Nicolle, *Knight of Outremer*…, p. 6; D.E. Quellen, T.F. Madden, *The Fourth Crusade. The Conquest of Constantinople*, Philadelphia 1997, p. 115.

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