

## Introduction

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This volume of essays has been assembled to honour our esteemed colleague Joost Crouwel, emeritus professor of Aegean Archaeology at the University of Amsterdam. Since the 1970s, Joost has been a leading expert on wheeled transport in antiquity. He has published extensively, often in collaboration with the late Mary Aiken Littauer (1912–2005), on chariots and other vehicles, riding and harnessing in the Near East, Egypt, Cyprus, Greece and Italy. He was also instigator and director of a long-term field project at Geraki in Laconia (Greece) and is an authority on Mycenaean pictorial pottery.

Having just earned a degree in classical archaeology from the University of Amsterdam and beginning his doctoral thesis on chariots and other means of land transport in Bronze Age Greece under Hector Catling (1924–2013) in Oxford, he was introduced to Mary Littauer in 1969 – a meeting which led to a fruitful collaboration lasting three decades. Not long ago Joost summarised his collaboration with her:<sup>1</sup>

In 1968, at the mature age of 56, Mary published her first scholarly paper “The function of the yoke saddle in ancient harnessing”, which appeared in the widely read British journal *Antiquity*.<sup>2</sup> I read this article and was struck by its unusual, common-sense approach and her ideas on “how things actually worked”. At that time I was in Oxford, where I was writing my doctoral dissertation on early chariots in Greece. I had gone there after finishing my university studies in Classical Archaeology at the University of Amsterdam, The Netherlands. It was in Oxford in the spring of 1969 that she and I were introduced to each other. This meeting marked the beginning of our close collaboration on ancient

chariots, other vehicles, riding and horse equipment, which lasted for over 30 years. Together we wrote two books: *Wheeled Vehicles and Ridden Animals in the Ancient Near East* (1979)<sup>3</sup> and *Chariots and Related Equipment from the Tomb of Tut ‘ankhamūn* (1985).<sup>4</sup> We also published many articles, a selection of which was prepared by Peter Raulwing for another book: *Selected Writings on Chariots and Other Early Vehicles, Riding and Harness* (2002).<sup>5</sup> Our last joint paper was published in 2001—Mary was then 89.<sup>6</sup>

Of particular note are Joost’s masterly studies of chariots and other wheeled vehicles in Bronze Age Greece (his PhD thesis),<sup>7</sup> Iron Age Greece,<sup>8</sup> and Italy Before the Roman Empire.<sup>9</sup> Joost’s friend, the late Jaap Morel, prepared the detailed line drawings which enhanced these books with great skill and patience. Joost is now embarking on a companion volume focussing on the Roman Imperial period.

Joost’s interests range far more widely than the vehicles themselves to include the horses that drew them, their harness and equipment, the people who rode in them, the societies to which they belonged, even the environment in which they were used. This volume celebrates his contributions in the field of early vehicles and their equipment

<sup>3</sup> Mary A. Littauer and Joost H. Crouwel, *Wheeled Vehicles and Ridden Animals in the Ancient Near East*. Handbuch der Orientalistik, 7. Abteilung, I. Band, 2. Abschnitt, Lieferung 1. Leiden and Cologne: Brill, 1979. Now out of print: See e-book Brill, Leiden 2022. <https://brill.com/display/title/169?language=en>.

<sup>4</sup> Mary A. Littauer and Joost H. Crouwel, *Chariots and Related Equipment from the Tomb of Tut ‘ankhamūn*. Tut ‘ankhamūn’s Tomb Series 8. Oxford: Griffith Institute, 1985.

<sup>5</sup> See n. 2 above. *Selected Writings on Chariots and Other Early Vehicles, Riding and Harness* also contains a full bibliography in this field up to 2002.

<sup>6</sup> Mary A. Littauer and Joost H. Crouwel, “The Earliest Evidence for Metal Bridle Bits,” *Oxford Journal of Archaeology* 20 (2001): 329–238.

<sup>7</sup> Joost H. Crouwel, *Chariots and Other Means of Land Transport in Bronze Age Greece*. Allard Pierson Series 3. Amsterdam: Allard Pierson, 1981.

<sup>8</sup> Joost H. Crouwel, *Chariots and Other Means of Land Transport in Iron Age Greece*. Allard Pierson Series 9. Amsterdam: Allard Pierson, 1992.

<sup>9</sup> Joost H. Crouwel, *Chariots and Other Wheeled Vehicle in Italy Before the Roman Empire*. Oxford: Oxbow, 2012.

<sup>1</sup> Joost H. Crouwel, “Mary Aiken Littauer and Our Study of Ancient Horse-Drawn Vehicles.” In: *Equids and Wheeled Vehicles in the Ancient World. Essays in Memory of Mary A. Littauer*, edited by Peter Raulwing, Katheryn M. Linduff and Joost H. Crouwel, 3–4. BAR International Series 2923. Oxford: BAR Publishing, 2019.

<sup>2</sup> Mary Aiken Littauer, “The Function of the Yoke Saddle in Ancient Harnessing,” *Antiquity* 42 (1968): 27–31, reprinted in: Mary A. Littauer and Joost H. Crouwel, *Selected Writings on Chariots and Other Early Vehicles, Riding and Harness*, edited by Peter Raulwing, 479–484. Culture and History of the Ancient Near East 6. Leiden: Brill, 2002.

by including essays that reflect his inspiration on the work of others and on the field at large. The topics addressed in the chapters are as diverse as the authors themselves, representing many areas of expertise: a museum curator from Taiwan, a former student, art historians, archaeologists and university professors from Russia, Ukraine, Germany, Kazakhstan, Canada and the USA, a master wheelwright, a horse expert from the UK, the director of an archaeological visitor centre from Germany. Such a combination of essays makes an innovative and wide-ranging contribution to research across a wide spectrum of interests and areas of the world. As a result, they differ in style, content and presentation, but most are centred around the expansion and influence of the chariot – defined by Joost Crouwel and Mary Littauer as “a light, fast, usually horse-drawn vehicle with two spoked wheels, used for warfare, hunting, racing and ceremonial purposes. Its crew usually stood.”<sup>10</sup>

After this introduction, **Part I** of this volume continues with recollections from a former student of Joost’s, Tess Doorewaard (**Chapter 2**), in which she describes the careful and attentive nature of his teaching. Always willing to give help and advice and constructive criticism to others, he has always sought clarity of expression and the correct use of terminology. His enthusiasm and keen interest in the ideas of others will be evident in this volume in the development of ideas, research, and practical experiments across the field.

In **Chapter 3** Stefan Burmeister and Peter Raulwing provide “In Search of the Origins of the Chariot: Wrong Turns, Dead Ends, and Long and Winding Roads”. Studies on horses and chariots in antiquity cover a wide range of topics which have established a broad, independent field of research, although recognised as a contributing part of several academic disciplines. Of special interest is so-called chariotry research, i.e., investigations into a special type of chariot defined as a light, fast, two-wheeled vehicle with two spoked wheels, usually horse-drawn, used for warfare, hunting, racing and ceremonial purposes that has been used since the early second millennium BCE and is documented in various types of sources: archaeological remains, written evidence and images. From today’s perspective, chariotry research is an amalgam of several interdisciplinary research areas: including, among others, archaeological disciplines, prehistory, philological disciplines, linguistics, ancient history, comparative religious studies, Old Testament studies, the history of technology, archaeozoology, paleobotany, metallurgy and the history of scholarship. Those considered in this overview are: Near Eastern Archeology and Philology (with its specialised disciplines of Sumerology, Assyriology, Hittitology (and others), Egyptology, Historical-Comparative Linguistics (Indo-European Studies), Eurasian Archaeology, Sinology, Indology (Vedic Studies), Mycenaean Studies, Old Testament Studies, experimental archaeology and others. The focus of this contribution lies in the methodologically

problematic amalgamation of speakers of Indo-European languages, their proposed “homeland” and the question of the starting point of the so-called “classic” chariot. At present, the authors advise researchers to restrict themselves to investigation of the horse-and-chariot evidence in their respective find contexts and not to overload the discussion with the question of the origin of the classical chariot. This question, as well as the contribution of speakers of individual Indo-European languages to its development and spread, cannot be answered at present.

**Chapter 4** by Elena Izbitser examines “Chariots in Slavic Studies”. The discovery of the remains of actual chariots in burials of the Late Bronze Age in the Trans-Ural region and the establishment of the connection of cheekpieces, long known in the Pontic–Caspian steppe, with draught horses in the 1970s have intensified the studies of chariot-related topics. Among those discussed are the geographical location of the earliest conception of the chariot – the Near East or the Ural steppes – and the problematic hypotheses of Indo–European migrations; issues of the time and place of horse domestication, and use as a draught animal; the functions of the early steppe vehicles, their military use and the social status of those buried with them. In a search for proof for the steppe origin of chariots, some scholars link the chariots with spoked wheels to the wagons with four solid wheels of the Early Bronze Age, but the cited examples make reference to the graves that were erroneously interpreted as containing vehicles with two wheels and cannot be seen as the predecessors of chariots. This article provides an overview of chariots as a topic in Slavic-speaking studies.

**Part II** of this *Festschrift* focuses on Egypt, the Near East, the Balkans, the Steppes, China in the second millennium BCE and later developments. In **Chapter 5** André Veldmeijer and Salima Ikram discuss “Leather: An Integral Part of Chariots”. Several chariots are known from the archaeological record in Egypt, with six from the tomb of Tutankhamun being the most famous. Texts and imagery in temples and tombs provide us with a body of additional knowledge about these ‘racing cars,’ however, due to the perishable nature of the leather and rawhide components of chariots, the importance of these particular elements has until recently been little understood. The find of the so-called Tano chariot leatherwork has considerably increased our understanding of leather and rawhide as an integral part of chariot technology and also enabled us to recognize hitherto unidentifiable leather finds, especially from Amarna. This essay focuses on some major leather elements of chariots.

In **Chapter 6** Miriam Bibby shares her “Observations on Horse Care in Ancient Egypt”. Although the introduction of horse and chariot technology into the early nation state of Egypt inevitably resulted in social, economic and military changes, Egypt was able actively to embrace the new technology and to develop it in an identifiably “Egyptian” way. The horse and chariot were also indubitably used as status objects to reinforce the authority of the elite in ways that reflected attitudes that had existed for millennia. This

<sup>10</sup> Crouwel 1981:23. The same definition was also used in Littauer and Crouwel 1979a: 4-5, and Crouwel 1992: 16.

meant that horses themselves, as living beings that also provided power to the chariot, were entangled in concepts of kingliness and authority. Bibby discusses how this complex role affected the care and management of horses in Egypt using evidence for the nature of the horse-human relationship in texts, imagery and artefacts. By applying practical knowledge of horse care and how horses learn and relate to humans, this chapter encourages further interest in the way horses were treated in ancient Egypt and the range of behaviours they exhibited. Discussion of reward and punishment of horses forms a major theme of the chapter.

In **Chapter 7** Gail Brownrigg proposes a new interpretation of the purpose of “The Egyptian ‘Check Rowel’”. “Check rowels” are spiked discs fitted on to decorated rods, of which a few examples survive, now recognised as part of eighteenth dynasty chariot harness. Their function is discussed, and a new suggestion for their purpose is proposed.

In **Chapter 8** Theo van den Hout discusses the motif of “Another Storm God Mounting his Vehicle? A Note on the Drawing on KUB 20,76”. Although Hans Ehelolf published the Hittite cuneiform tablet KUB 20,76 in the series *Keilschrifturkunden aus Boghazköi* no. 20,<sup>11</sup> he did not include a rare hand-drawn copy of the cuneiform text, which dates to the thirteenth century BCE. On the preserved section of the drawing a dextroverse male wearing a pointed helmet is shown with tassels hanging down from the tip with a horn or knob on the front of the helmet. Although the face and shoulders are not preserved, the torso is presented *en face* and shows the right arm bent at the elbow and overlapping with the chest, but the left arm is gone. The right hand holds an object, and around the waist is a belt above a kilt or skirt. The right leg below the hip and the left foot are not preserved. This contribution re-evaluates previous interpretations of the drawing—based on an interpretation with other scenes in Hittite art and endorses Hans Gustav Güterbock’s interpretation from 1957 that the scene most likely depicts a Hittite Storm God mounting his two-wheeled vehicle showing a cross-bar wheel.

In **Chapter 9** Nikolaus Boroffka explores “Bone Cheek-Pieces and Spoked Wheels – Chariots in the Carpathian Region”. In this study, the evidence for the existence and use of chariots in the Carpatho-Danubian Region is reviewed. A brief account of the necessary preconditions shows that most requirements existed from at least the first half of the third millennium BCE: wheeled transport, the domesticated horse and, at least in some areas, suitable terrain. The light spoked wheel is documented in models and/or images, from at least some time between 2000 and 1750 BCE, while bone or antler cheekpieces as parts of horse harness may reach back to the last centuries before 2000 BCE. Overall, the archaeological evidence shows surprisingly little unequivocal evidence for chariots during the entire Bronze Age in the Carpatho-Danubian Region, even

when Late Bronze Age or Early Iron Age finds are taken into account. Early documentation of horse harnessing, with cheekpiece-systems original to the Carpatho-Danubian region, indicate the necessity to control the draught animals. They are largely contemporary with those found further south or southeast in the Aegean or eastern Mediterranean, and are clearly later than those known from the southern Urals. Even then they are very rare and their function in warfare is doubtful, while the (symbolic) use of chariots in racing and/or ceremony appears likely.

In **Chapter 10** Igor Chechushkov and Andrey Epimakov provide an overview of “The Earliest Spoked-Wheeled Vehicles: Archaeological Evidence from the Eurasian Steppes”. They present a comprehensive overview of the archaeological evidence for Late Bronze Age two-wheeled vehicles from the Eurasian steppes. Such finds are considered by many scholars to be evidence for the world’s earliest known chariots. According to the series of radiocarbon analyses, the materials under review are dated to cal. 2000–1850 BCE. Whenever possible, the authors update the original published information with the latest available data on each site and describe related horse-control equipment – cheekpieces – which came from the same graves as two-wheeled vehicles and provide technical details on their manufacture and use-wear analysis to support the hypothesis that the vehicles were used for transportation.

In **Chapter 11** Pavel Kuznetsov and Vadim Bochkarev investigate “Early Cheekpieces in Eurasia”. Their paper presents the results of study and analysis of Bronze Age cheekpieces across northern Eurasia (Volga-Urals, Don and Dnieper), the Carpathian-Danube region, Southern Greece, and Western Asia, supported by extensive illustrations. These items are an integral part of burial complexes along with chariots and weapons. A few were found in pairs *in situ* at the horse’s jaw. They classify cheekpieces according to various features and consider their typological development in terms of chronology, regional and cultural links to understand borrowing and exchange across the region as well as pointing out independent local contributions.

In **Chapter 12** Viktor Novozhenov reviews the topic of “Chariots on the Central Asian Rocks: The Dating Problem”. Recently, in Central Asian rock art, new multi-figure compositions including chariots, different in design and in their probable purpose, have been published. Their pictorial execution—shallow dotted carvings with polishing of the patina—made it possible to depict many significant details and features. This made it possible to highlight important typological and iconographic features that determine a more accurate dating and ethno-cultural affiliation and to clarify design features of the vehicles depicted. Early chariot petroglyphs are associated with the initial stage of the Andronovo pictorial tradition (APT) already identified in Central Asian rock art. Analysis of the chariot images enables us to distinguish two artistic layers in the petroglyphs of the Middle (the first part of second millennium BCE) and Late Bronze Age (end of the second/first half of the first millennium BCE) of Central Asia, associated re-

<sup>11</sup> Hans Ehelolf, *Hethitische Festrivale*. Keilschrifturkunden aus Boghazköi 20. Berlin: Akademie-Verlag, 1927.

spectively with the Andronovo and the Karasuk (Begazy-Dandybai) archaeological cultures.

In **Chapter 13** Hsiao-yun Wu discusses “When Chariots Were First Used in China: The Development of Cheek-pieces in the late Shang dynasty c. 1250 BCE” Horse drawn chariots appeared in burials at the late Shang dynastic capital of Anyang, Henan, around 1200 BCE along with splendid bronze ornaments and weapons. The large number of Shang style items and weapons indicates that chariots became accoutrements of war and marks of royal prestige soon after their introduction. Previous studies have focussed on the role of chariots as war and prestige items in Shang society and their association with the steppes, but this essay investigates harness technology by examining the earliest Shang cheekpieces found at Anyang, dating to the twelfth century BCE and argues that contemporary groups in the eastern Eurasian steppes provided sources of chariot knowledge.

In **Chapter 14** Robin D. S. Yates evaluates “Early Chinese Chariots and Carriages in War and Peace: Evidence from New Textual and Archaeological Sources”. Chariots, carriages and carts played central roles in the lives of those living in Warring States, Qin and Han China, roughly fifth century BCE to the second century CE, both in war and in peace. They marked status, rank and official position; they were a main means of communication on land; they accompanied the elite into the afterlife in burials, sometimes in enormous numbers, and were later represented in murals in tombs; chariots were important machines employed on the battlefield. They feature prominently in the pits of terracotta warriors to the east of the First Emperor of China’s mausoleum. Carts, pulled either by horses, oxen, or even by human beings, carried essential supplies, both in military campaigns and in peacetime. Horses were both worshipped as deities and butchered in sacrifices in ceremonies. Wheeled vehicles had symbolic, religious, and practical functions and cost their owners immense financial and other resources to build, maintain, and destroy. This essay includes discussion of some of the wide range of new textual sources, especially legal and administrative documents, pertaining to chariots, carriages and carts that have been discovered in the last fifty years within the confines of the current People’s Republic of China.

In **Chapter 15** Xiaolong Wu and Katheryn M. Linduff take a closer look at “Majiyuan Chariots and the Lustre of Eurasia”. This essay investigates dozens of lavishly decorated chariots recently excavated from the Majiyuan cemetery in northwestern China located in a contact zone between the Chinese dynasties and Eurasian pastoralist groups. The ongoing excavations at Majiyuan have already revealed thousands of artefacts made from a variety of materials. The tombs were dated by excavators to the third century BCE and considered to belong to one of the Rong (non-Han) groups dominated by the Qin State during the Warring States period (fifth-third centuries BCE) of the Zhou Dynasty. The extravagance of these tombs suggests to the authors that their remote and topographically circumscribed location aided in bringing them wealth

and giving them a strategic role in Qin history. The authors examine the various chariot designs as well as the rich chariot ornaments and trace the hybrid and innovative features of the Majiyuan chariots and ornaments as signifiers of socio-political independence. Located at the gate to the outside world, the site and the chariots enabled the local Majiyuan elite to flaunt their economic abundance as well as affording them political advantage within the fading Zhou confederation.

**Part III** of this *Festschrift* is dedicated to “Chariots in Action, Their Construction and Experimental Archaeology”. In **Chapter 16** Robert Hurford shares his knowledge of making wheels and building chariots in “The Ancient V-Spoked Chariot Wheel: Why Was it Made that Way? Some Thoughts Based on Observations and the Experience of Making Chariot Reconstructions”. He contends that the ancient Egyptians did not make chariots themselves, but that they imported them, in parts, or sometimes perhaps as complete vehicles, and embellished and refined them. For over a thousand years the wheels of these beautifully light chariots were made using a unique design, which is explained and illustrated. The author describes how craft manufacturers in areas of the Near East making and often exporting chariot parts may have worked in economic alliance with vine-growers to produce chariots for the elite to use in display and warfare.

In **Chapter 17** Gail Brownrigg provides an overview on “Jean Spruytte – Horseman, Scholar, Chariot Builder”. Jean Spruytte (1919–2007) was a French riding teacher and carriage driver who constructed first scale models and then full-sized chariots based on his study of visual evidence for vehicles and harnessing in antiquity. His practical experiments demonstrated clearly that the long-held theory that ancient harness choked the draught horses was untrue and was based on confusion between two harness systems. Bringing to bear the eye and knowledge of a horseman, he analysed the relationship between the type of harness used and the design and balance of chariots in the ancient world. He published numerous articles and two books, one of which was translated into English as *Early Harness Systems* in 1983. Jean Spruytte’s studies and working reconstructions have made a substantial contribution to the history of chariots and harnessing.

In **Chapter 18** Steve Weingartner investigates “Chariotry and Chariot Warfare in the Near Eastern Late Bronze Age and the Battle of Kadesh” from the perspective of military history. His paper analyses the technological development and combat employment of chariots and chariotry in the Eastern Mediterranean lands while focussing on the Middle–Late Bronze Age from the point of view of military history. The approach is holistic insofar as it explores and scrutinises the diverse aspects of chariotry and chariot warfare individually and in relation to each other based in the following premises: The chariot was an Ground Combat Vehicle (GCV) designed and built to incorporate a trio of essential attributes (or capabilities) collectively known in contemporary military engineering as the “Iron Triangle” or “Iron Trinity,” and consisting of (1) protection,

(2) firepower and (3) mobility. Like modern GCVs, it was not technically possible to maximise the performance levels of all attributes at the same time due to the natural conflict that exists between them – one attribute, per force, always takes precedence over the others. The decision as to which will be dominant arises from the complex interplay between technology and tactics and is determinative in formulating a warfighting methodology that will maximise the combat strengths of a particular chariot design while minimising its weaker aspects. Based on these principles, this paper evaluates the three principal factors that were key to determining chariotry's tactical employment, namely: machines, men, and horses, and how they interact, pursuant to presentation of how chariotry was employed based on their respective technical characteristics. The Battle of Kadesh is analysed as a paradigmatic example of a clash of chariot forces involving two technologically different types of chariots with different tactical objectives, predicated by their respective technical characteristics, governing their combat employment.

The contributors to this volume share their ideas, thoughts, observations, research and conclusions. We hope that the general reader interested in ancient cultures, as well as scholars and specialists will enjoy exploring the many facets associated with chariots – their equipment, horses and harness, cultural exchanges and affiliations – reflected in the variety of essays in this collection compiled to celebrate the 80th birthday of Joost Crouwel, who has been a mentor, a voice of authority and an inspiration to so many. The editors wish to thank the immense assistance provided by Adriana Maguiña-Ugarte who patiently and carefully not only formatted each of the individual chapters, but also meticulously entered the edits of each author. Her willingness to assist us to produce this special publication is greatly appreciated.

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### **Joost H. Crouwel** **Bibliography on Wheeled Vehicles** **and Ridden Animals**

- 1972 A Chariot Sherd from Mycenae. *The Annual of the British School at Athens* 67: 99–101.
- 1973 Appendix. The Parasol Krater, in: Ken A. Wardle, A Group of Late Helladic III B 2 Pottery from within the Citadel at Mycenae: The Causeway Deposit, *The Annual of the British School at Athens* 68: 343–347.
- 1976 A Note on Two Mycenaean Parasol Kraters. *The Annual of the British School at Athens* 71: 55–56.
- 1978 Aegean Bronze Age Chariots and Their Ancient Background. *Bulletin of the Institute of Classical Studies* 25: 174–175.
- 1981 *Chariots and Other Means of Land Transport in Bronze Age Greece*. Allard Pierson Series 3. Amsterdam: Allard Pierson.
- 1985 Carts in Iron Age Cyprus. *Report of the Department of Antiquity of Cyprus* 1985: 203–221. [Reprinted in Littauer and Crouwel, *Selected Writings* (2002): 211–237].
- 1987 Chariots in Iron Age Cyprus. *Report of the Department of Antiquity of Cyprus* 1987: 101–118. [Reprinted in Littauer and Crouwel, *Selected Writings* (2002): 141–173].
- 1990 A Chariot from Salamis Newly Reconstructed. *Report of the Department of Antiquity of Cyprus* 1990: 101–105.
- 1991a Another Mycenaean Horse-Leader? *The Annual of the British School at Athens* 86: 65–68.
- 1991b A Group of Terracotta Chariot Models – Cypriote or Phoenician? In: *Cypriote Terracottas. Proceedings of the First International Conference of Cypriote Studies, Brussels, Liège, Amsterdam, 29 May–1 June 1989*, edited by Frieda Vandenaabeele and Robert Laffineur, 115–129. Bruxelles and Liège: A.G. Leventis Foundation. [Reprinted in Littauer and Crouwel, *Selected Writings* (2002): 190–210].
- 1992 *Chariots and Other Means of Land Transport in Iron Age Greece*. Allard Pierson Series 9. Amsterdam: Allard Pierson.
- 1995 Chariots in Homer and in Early Iron Age. In: *Homeric Questions*, edited by Jan Paul Crielaard, 309–312. Publications of the Netherlands Institute at Athens 2. Amsterdam: Gieben.
- 1997a Il mondo Greco. In: *Carri da guerra e principi etruschi. Catalogo della mostra*, edited by Adriana Emiliozzi Morandi. Rome: L'Erma di Bretschneider.
- 1997b Review of Jean Spruytte “Attelages Antiques Libyens. Archéologie saharienne expérimentale. Paris: Editions de la Maison des Sciences de l'Homme, 1996”. *American Journal of Archaeology* 101: 814.
- 1998 Fighting on Land and Sea in Late Mycenaean Times. In: *Polemos. Le contexte guerrier en Égée à l'âge du Bronze. Actes de la 7<sup>e</sup> Rencontre Egéenne Internationale, Université de Liège, 14–17 avril 1998*, vol. 2, edited by Robert Laffineur, 455–459. Liège: Université de Liège. [Reprinted in Littauer and Crouwel, *Selected Writings* (2002): 100–105].
- 2001a Vervoermiddelen over land. *Hermeneus* 73: 115–121.
- 2001b Review of “Silvia Penner, Schliemanns Schachtgräber und der europäische Nordosten. Studien zur Herkunft der frühmykenischen Streitwagenausstattung. Bonn: Habelt, 1998”. *American Journal of Archaeology* 105 (3): 545–546.

- 2004a Der alte Orient und seine Rolle in der Entwicklung von Fahrzeugen. In: *Rad und Wagen. Der Ursprung einer Innovation. Wagen im Vorderen Orient und Europa*, edited by Mamoun Fansa and Stefan Burmeister, 69–86. Beiheft der Archäologischen Mitteilungen aus Nordwestdeutschland 40. Mainz: von Zabern.
- 2004b Bronzezeitliche Wagen in Griechenland. In: *Rad und Wagen. Der Ursprung einer Innovation. Wagen im Vorderen Orient und Europa*, edited by Mamoun Fansa and Stefan Burmeister, 341–346. Beiheft der Archäologischen Mitteilungen aus Nordwestdeutschland 40. Mainz: von Zabern.
- 2005 Early Chariots in the Aegean and their Near Eastern Connections. In: *Emporia. Aegeans in the Central and Eastern Mediterranean. Proceedings of the 10th International Conference, Athens, Italian School of Archaeology, 14–18 April 2004*, vol. 1, edited by Robert Laffineur and Emanuele Greco, 39–44. Aegaeum 25. Liège: Université de Liège.
- 2006 Chariot depictions – from Mycenaean to Geometric Greece and Etruria. In: *Pictorial Pursuits. Figurative Painting on Mycenaean and Geometric Pottery. Papers from Two Seminars at the Swedish Institute at Athens in 1999 and 2001*, edited by Eva Rysted, 165–170. Skriftser utgivna av Svenska Institutet i Athen 53. Stockholm: Åström.
- 2009 Unharnessed chariots in Attic Black- and Red-Figured Vase-Painting. In: *Shapes and Images. Studies on Attic Black Figure and Related Topics in Honour of Herman A. G. Brijder*, edited by Eric M. Moormann, 135–152. Babesch, Supplement 14. Leuven: Peeters.
- 2010 The Chariots. In: *Il tempio arcaico di Caprifico di Torrecchia (Cisterna di Latina). I materiali e il contest*, edited by Domenico Palombi, 123–131. Rome: Edizione Quasar.
- 2011 Bronzen riemophanger uit de Romeinse tijd. In: *Kennis en Passie. Geralda 33 Jaar Conservator!* edited by René van Beek, Ben van den Bercken and Laurien de Gelder, 145–149. Leiden: Sidestone Press.
- 2012a *Chariots and Other Wheeled Vehicle in Italy Before the Roman Empire*. Oxford: Oxbow.
- 2012b Metal Wheel Tyres from the Ancient Near East and Central Asia. *Iraq* 74: 89–95.
- 2013 Studying the Six Chariots from the Tomb of Tutankhamun – An Update. In: *Chasing Chariots. Proceedings of the International Chariot Conference, Cairo 2012*, edited by André J. Veldmeijer and Salima Ikram, 73–93. Leiden: Sidestone Press.
- 2019a Mary Aiken Littauer and Our Study of Ancient Horse-Drawn Vehicles. In: *Equids and Wheeled Vehicles in the Ancient World. Essays in Memory of Mary A. Littauer*, edited by Peter Raulwing, Katheryn M. Linduff and Joost H. Crouwel, 3–4. BAR International Series 2923. Oxford: BAR Publishing.
- 2019b Wheeled Vehicles and their Draught Animals in the Ancient Near East – An Update. In: *Equids and Wheeled Vehicles in the Ancient World. Essays in Memory of Mary A. Littauer*, edited by Peter Raulwing, Katheryn M. Linduff and Joost H. Crouwel, 29–48. BAR International Series 2923. Oxford: BAR Publishing.
- 2002a printed in Littauer and Crouwel, *Selected Writings* (2002): 38–44].
- 1973b Early Metal Models of Wagons from the Levant. *Levant* 5: 102–126. [Reprinted in Littauer and Crouwel, *Selected Writings* (2002): 336–379].
- 1973c The Dating of a Chariot Ivory from Nimrud Considered Once Again. *Bulletin of the American Schools of Oriental Research* 209: 27–33.
- 1973d Evidence for Horse Bits from Shaft Grave IV at Mycenae? *Prähistorische Zeitschrift* 48: 207–213.
- 1974 Terracotta Models as Evidence for Wheeled Vehicles with Tilts in the Ancient Near East. *Proceedings of the Prehistoric Society* 40: 20–36. [Reprinted in Littauer and Crouwel, *Selected Writings* (2002): 380–402].
- 1977a The Origin and Diffusion of the Cross-Bar Wheel? *Antiquity* 51: 95–105. [Reprinted in Littauer and Crouwel, *Selected Writings* (2002): 272–288].
- 1977b Chariots with Y-Poles in the Ancient Near East. *Archäologischer Anzeiger* 1977: 1–8. [Reprinted in Littauer and Crouwel, *Selected Writings* (2002): 238–245].
- 1977c Appendix I. Terracotta Chariot Model. In: *Two Cypriote Sanctuaries of the End of the Cypro-Archaic Period*, edited by Vassos Karageorghis, 67–73. Serie Archeologica 22 Pubblicazioni del Centro di Studio per la Civiltà Fenicia e Punica 17. Rome: Consiglio Nazionale delle Ricerche.
- 1979a *Wheeled Vehicles and Ridden Animals in the Ancient Near East*. Handbuch der Orientalistik, 7. Abteilung, I. Band, 2. Abschnitt, Lieferung 1. Leiden and Köln: Brill. Now out of print: See e-book Brill, Leiden 2022. <https://brill.com/display/title/169?language=en>.
- 1979b An Egyptian Wheel in Brooklyn. *Journal of Egyptian Archaeology* 65: 107–120. [Reprinted in Littauer and Crouwel, *Selected Writings* (2002): 296–313].
- 1980 Kampfwagen (Streitwagen) B. Archäologisch. *Reallexikon der Assyriologie und vorderasiatischen Archäologie* 5: 344–351. [Reprinted in Littauer and Crouwel, *Selected Writings* (2002): 26–37].
- 1982a Chariots and Harness in Mycenaean Vase Painting. In: *Mycenaean Pictorial Vase Painting*, edited by Emily Vermeule and Vassos Karageorghis, 181–187. Cambridge, MA: Harvard University Press.
- 1982b A Bridle Bit of the Second Millennium B.C. in Jerusalem. *Levant* 14: 178.
- 1983 Chariots in Late Bronze Age Greece. *Antiquity* 57: 187–192. [Reprinted in Littauer and Crouwel, *Selected Writings* (2002): 53–61].
- 1984 Ancient Iranian Horse Helmets? *Iranica Antiqua* 19: 41–51. [Reprinted in Littauer and Crouwel, *Selected Writings* (2002): 534–544].
- 1985 *Chariots and Related Equipment from the Tomb of Tut'ankhamūn*. Tut'ankhamūn's Tomb Series 8. Oxford: Griffith Institute.
- 1986a The Earliest Known Three-Dimensional Evidence for Spoked Wheels. *American Journal of Archaeology* 90: 395–398. [Reprinted in Littauer and Crouwel, *Selected Writings* (2002): 289–295].
- 1986b A Near Eastern Bridle Bit of the Second Millennium B.C. in New York. *Levant* 18: 163–167. [Reprinted in Littauer and Crouwel, *Selected Writings* (2002): 505–514].
- 1987 Unrecognized Linch Pins from the Tombs of Tut'ankhamūn and Amenophis II: A Reply. *Göttinger*

**Mary A. Littauer and Joost H. Crouwel**

- 1973a The Vulture Stela and an Early Type of Two-Wheeled Vehicle. *Journal of Near Eastern Studies* 32: 324–329. [Re-

*Miszellen. Beiträge zur ägyptologischen Diskussion* 100: 57–61.

- 1988a New Light on Priam's Wagon? *Journal of Hellenic Studies* 108: 194–196. [Reprinted in Littauer and Crowel, *Selected Writings* (2002): 545–549].
- 1988b New Type of Bit from Iran. *Iranica Antiqua* 23: 323–327.
- 1988c A Pair of Horse Bits of the Second Millennium B.C. from Iraq. *Iraq* 50: 169–171. [Reprinted in Littauer and Crowel, *Selected Writings* (2002): 515–518].
- 1989 Metal Wheel Tyres from the Ancient Near East. In: *Archaeologia Iranica et orientalis. Miscellanea in honorem Louis Vanden Berghe*, vol. I, edited by Leon de Meyer and Ernie Haerincx, 111–121. Gent: Peeters. [Reprinted in Littauer and Crowel, *Selected Writings* (2002): 261–271].
- 1990a A Terracotta Wagon Model from Syria in Oxford. *Levant* 22: 160–162. [Reprinted in Littauer and Crowel, *Selected Writings* (2002): 403–407].
- 1990b Ceremonial Threshing in the Ancient Near East. I. Archaeological Evidence. *Iraq* 52: 15–19. [Reprinted in Littauer and Crowel, *Selected Writings* (2002): 329–335].
- 1991a 'The Trundholm Horse's Trappings: A Chamfrein?' Reasons for Doubting. *Antiquity* 65: 199–222. [Reprinted in Littauer and Crowel, *Selected Writings* (2002): 530–533].
- 1991b Assyrian Trigas and Russian Dvoikas. *Iraq* 53: 97–99. [Reprinted in Littauer and Crowel, *Selected Writings* (2002): 258–260].
- 1992 Chariot. In: *The Anchor Bible Dictionary*, vol. 1, edited by David Noel Freedman, 888–892. New York: Doubleday.
- 1996a The Origin of the True Chariot. *Antiquity* 70: 934–939. [Reprinted in Littauer and Crowel, *Selected Writings* (2002): 45–52].
- 1996b Robert Drews and the Role of Chariotry in Bronze Age Greece. *Oxford Journal of Archaeology* 15: 297–305. [Reprinted in Littauer and Crowel, *Selected Writings* (2002): 66–74].
- 1996c Chariot. In: *The Dictionary of Art*, vol. 6, edited by Jane Turner, 477–482. New York: Grove.
- 1997a Antefatti nell'Oriente mediterraneo. Vicino Oriente, Egitto e Cipro. In: *Carri da guerra e principi etruschi. Catalogo della mostra*, edited by Adriana Emiliozzi Morandi, 5–10. Rome: L'Erma di Bretschneider.
- 1997b Chariots and Early Horse Equipment. In: *Furusiyya. The Horse in the Art of the Near East*, vol. I, edited by David Alexander, 17–21. Riyadh: King Abdulaziz Public Library.
- 1997c Chariots. In: *The Oxford Encyclopedia of Archaeology of the Near East*, vol. 1, edited by Eric M. Meyers, 485–487. New York and Oxford: Oxford University Press.
- 1997d Wheel. In: *The Oxford Encyclopedia of Archaeology of the Near East*, vol. 5, edited by Eric M. Meyers, 72–74. New York and Oxford: Oxford University Press.
- 2001 The Earliest Evidence for Metal Bridle Bits. *Oxford Journal of Archaeology* 20 (4): 329–238.
- 2002 *Selected Writings on Chariots and other Early Vehicles, Riding and Harness*, edited by Peter Raulwing. Culture and History of the Ancient Near East 6. Leiden and Boston: Brill.

**Dominique Collon, Joost H. Crowel,  
and Mary A. Littauer**

- 1976 A Bronze Age Chariot Group from the Levant in Paris. *Levant* 8: 71–79. (Dominique Collon: The Figures, 79–81). [Reprinted in Littauer and Crowel, *Selected Writings* (2002): 174–189].

**Joost H. Crowel and Gail Brownrigg**

- 2017 Developments in Harnessing and Draught in the Roman World. *Oxford Journal of Archaeology* 36: 197–220.

**Joost H. Crowel and Veronica Tatton Brown**

- 1988 Ridden Horses in Iron Age Cyprus. *Report of the Department of Antiquities Cyprus* 1988: 77–87. [Reprinted in Littauer and Crowel, *Selected Writings* (2002): 411–429].
- 1989 A Horseback-Rider and his Companion. *Report of the Department of Antiquities Cyprus* 1989: 109–110.
- 1992 A Terracotta Horse and Rider in Brussels. In: *Αφιέρωμα στο Βάσο Καραγιώργη / Studies in Honour of Vassos Karageorghis*, edited by Georgios K. Ioannides, 291–295. Εταιρείας Κυπριακών Σπουδών 54–55. Nicosia: Anastasios G. Leventis Foundation. [Reprinted in Littauer and Crowel, *Selected Writings* (2002): 430–438].

**Mary A. Littauer, Joost H. Crowel,  
and Harald Hauptmann**

- 1976 Ein spätbronzezeitliches Speichenrad vom Lidar Höyük in der Südost-Türkei. *Archäologischer Anzeiger* 1991: 349–358. [Reprinted in Littauer and Crowel, *Selected Writings* (2002): 314–326].

**Peter Raulwing, Katheryn M. Linduff,  
and Joost H. Crowel**

- 2019 (eds.). *Equids and Wheeled Vehicles in the Ancient World. Essays in Memory of Mary A. Littauer*. BAR International Series 2923. Oxford: BAR Publishing.

**Gail Brownrigg, Joost H. Crowel,  
and Katheryn M. Linduff**

- 2023 Developments in Equid Harnessing and Draught in the Roman Empire and Han China: Independent or Interconnected? *Oxford Journal of Archaeology* 42(2): 166–182.

**Joost H. Crowel and Robert Hurford**

- 2022 New Light on Chinese Chariots. *Eurasia Antiqua* 24: 57–66.

**Joost H. Crowel, Gail Brownrigg,  
and Katheryn Linduff**

- Forthcoming* From Chariot to Carriage: Wheeled Vehicles and Developments in Draught and Harnessing in Ancient China. *Sino-Platonic Papers*.

