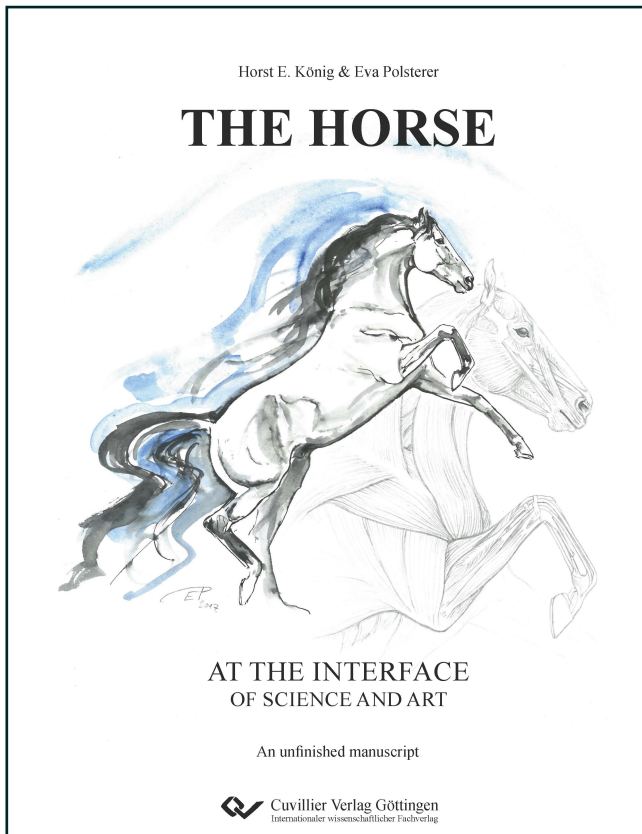




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THE HORSE at the interface of science and art
An unfinished manuscript



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Germany
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INTRODUCTION

The development history of humans and horses have always been linked.

Since prehistoric times, humankind has not only used the power and speed of the horse as a draft and riding animal, but is still fascinated by its beauty and particular charisma.

Thus, the horse has been the subject of many artistic representations even long before it was domesticated. In the Stone Age and during the last Ice Age, drawings, paintings and sculptures of the horse were made with a unique beauty.

At this time, nobody knew anything about art and culture, but apparently the urge to be creative has always been a human need. Therefore, it is not surprising that artists of all eras portrayed the horse in the most diverse ways.

Since the horse was essentially both for the armed forces of former rulers and for transport and labor before motorization, it was of great economic importance to keep it healthy and have it serve for a long period of time. As a result, equine medicine and academic interest in horses progressively developed, with anatomy, primarily bones, muscles and tendons, providing artists with a foundation for powerful depictions of horses.

Extraordinary works emerged in particular when scientists simultaneously had an artistic interest, or when the artists themselves became involved in the scientific questions. At this point, art and science come together.

We would like to present some of these connections, among others, in this book.



Fig. 4: Przewalski foal in Mongolia

ANCESTRY AND DOMESTICATION OF HORSES

Thanks to fossil findings, we know nowadays that the ancestor of the horse, Hyracotherium (Eohippus), existed in Europe approximately 55 million years ago (Eocene) and crossed the land bridges back then to North America as well. The earliest evidence of the equine evolution has been found in Silveirinha in Portugal.

With a shoulder height of 20 to 30 centimeters, that small mammal had hardly any resemblance to the modern horse. An arched, flexible back, a short neck and a tail with a tassel characterized its appearance. It had four toes on its forelimbs and three toes on its hind limbs. Each of these ended in a small hoof, which, moreover, had a larger paw pad, resembling a dog's paw. This allowed the animal to walk easily on soft, swampy ground. Judging by its dentition, its diet consisted of leaves and fruits, and they presumably hid in damp and wooded habitats. While these prehistoric horses disappeared from Europe in the late Eocene, they continued to thrive in North America.

Mesohippus were slightly taller, measuring roughly 40 centimeters, and no longer had more than three toes on the forelimbs. As the climate became warmer in the Miocene, about 25 million years ago, large expanses of dry grassy plains slowly spread across North America. Animals had to adapt to the open landscape, the now missing opportunities to hide, and the resulting change in food supply. The neck and legs became longer and fitted for quick escapes. This is how Miohippus and finally Meryhippus emerged, another ancestor of our horses, measuring already almost one meter and possessing a slender physique and a set of teeth typical for grazers.

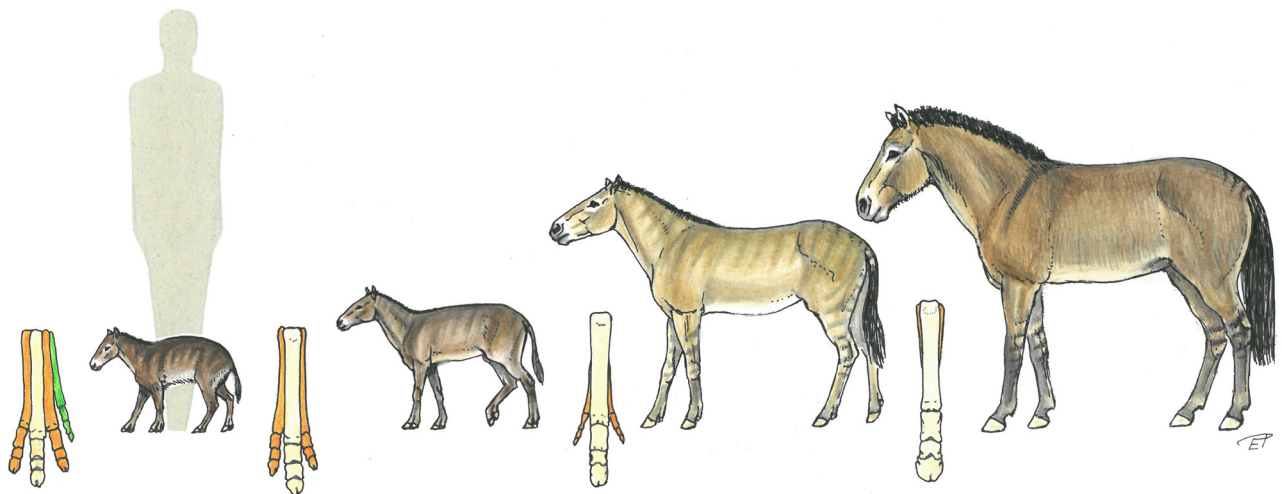


Fig. 5: Hyracotherium (Eohippus), Mesohippus, Meryhippus, Pliohippus showing the toe and metacarpal bones of the forelimb in comparison

While *Meryhippus* still had three toes attached to each foot, the middle, third toe was built sturdier and provided support. The two secondary toes were significantly smaller and without contact to the ground on even terrain. Indeed, this ancestor of the horse inhabited the primeval steppe landscapes.

Finally, the first true equid, *Pliohippus*, originated from them about ten million years ago over several intermediate stages. Its second and fourth toes were degenerated to tender metatarsal bones (grip bones). These already very equine animals reached a height of about 115 centimeters and were slender, herbivorous steppe inhabitants.

Their descendants migrated from Alaska over land bridges back to Asia around 2.5 million years ago, and later on to Europe and Africa. The oldest fossilized remains of equines in Europe date back about one million years.

In Central Asia, the genus *Equus* and its various species evolved from them around 10,000 years ago, including the horse (*Equus caballus*), which subsequently moved on to Europe, and various half-asses (*Equus hemionus*). Several species of zebras (*Equus hippotigris*, Quagga) and wild asses (*Equus asinus*) originated in Africa.

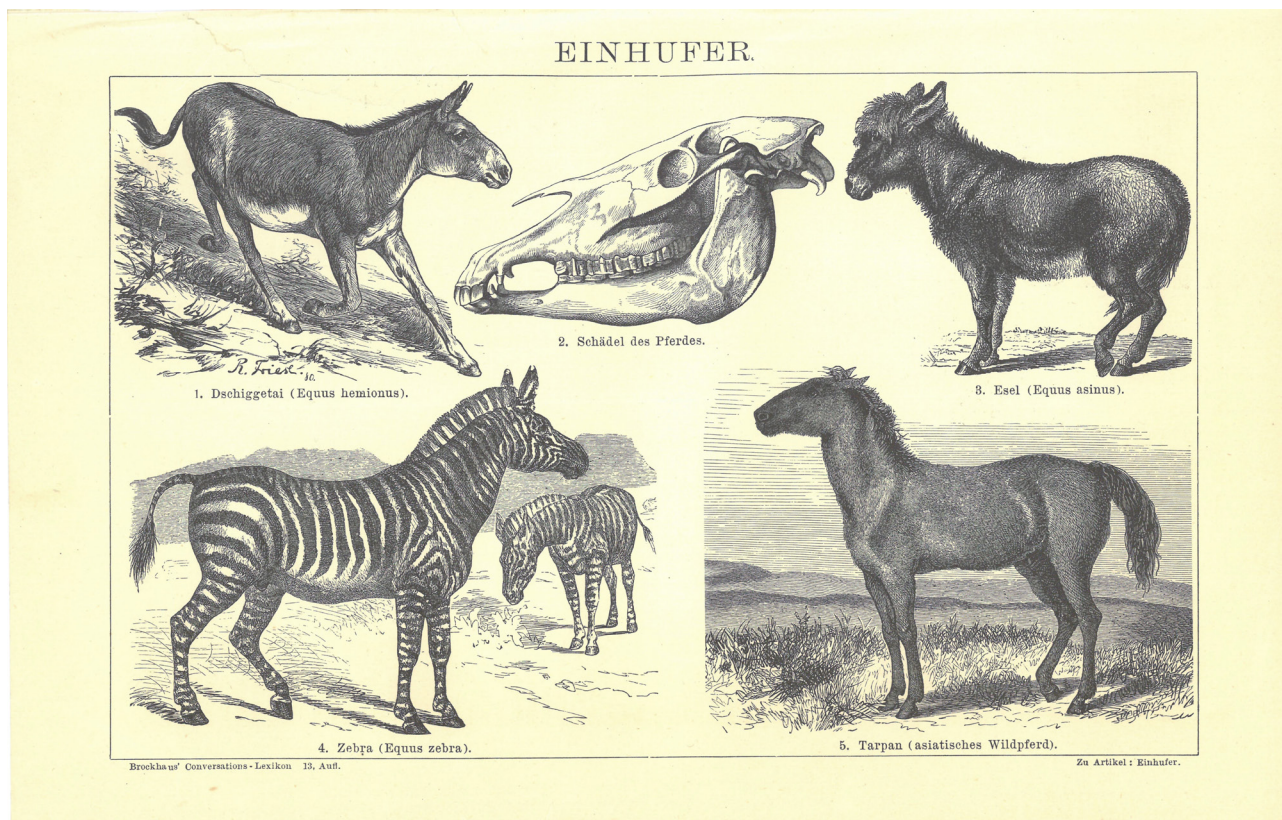


Fig. 6: Equidae, from Conversations-Lexikon Brockhaus, 1883

In North America, horses became extinct about 8,000 to 10,000 years ago due to unknown circumstances. It was not until the 15th century that horses returned to the continent along with Christopher Columbus and the Conquistadors. Numerous of these animals ended up being left behind, becoming wild and spreading further throughout North and South America. They formed the genetic basis for

the mustangs that still live in the wild today and all the horse breeds originating in America, such as the Quarter Horse, Appaloosa, Paso and Criollos.

In fact, even ice age people came into contact with these wild horses, as their impressive rock art (for example, in the caves of Lascaux) proves. They probably valued and revered the horse as hunting prey.

It was not until many years later that humans domesticated horses and began to breed them selectively according to their desired characteristics. To this day, it is not possible to say for sure when this process was initiated. Discoveries of bones belonging to the presumably first domestic horses date back to the third millennium B.C. and have been found in the territory of today's Iran and the Iberian Peninsula. These early domestic horses probably evolved from indigenous wild horse populations through domestication (Benecke, Weber, and Burger in *Pferdestärken*, 2007).

Until recent years, it was assumed that about 5,500 years ago the first wild horses, possibly Tarpan, were tamed by the early nomadic people of the Botai culture in the steppes of Eurasia and that all present-day horse breeds are the descendants of these horses. Contradicting this assumption, genetic studies have shown that the Botai horse may not be the ancestor of today's horses, yet it is related to the Przewalski horse. For a long time it was believed that the Przewalski horse, called Takhi by the Mongols, was the last living wild horse breed and is the ancestor of all domestic horses. However, the latest research suggests that the Przewalski horses are the descendants of the Botai horses, which ran wild again several millennia ago. In addition, with 66 chromosomes, they do not qualify as ancestors of modern horses, since the latter only possess 64. Despite this, Przewalski and domestic horses can be interbred without restriction and their offspring can reproduce.

It seems more likely at the moment that the early humans found some other wild horse breed that was easier to tame. Domestication may have also taken place in several places simultaneously. This appears to be confirmed by the wide variability in the genetic heritage of modern horses.

In any case, the sentence, "The origin of the horse and the roots of horse husbandry are still in the dark," as Von den Driesch and Peters wrote in 2003, is still valid today.

In various places in Europe, there are still very primitive horse breeds that are close to wild ones in appearance, robustness and behavior. Concerning the color of the coat, the dun horse often prevails in different variations. In most cases, the animals show a dark eel line on the back as well as more or less distinctive transverse stripes on the legs. Worth to mention are the Sorraia horse in Portugal, the Exmoor pony in Great Britain, the Konik in Poland as well as the Dülmen wild horses in Germany. Over the last few years, some of these horse breeds have been gaining popularity as landscape keepers within nature parks. Even among the robust Icelandic horses, dun horses are common.



Fig. 7: The brown dun, Przewalski's horse (left) and the mouse dun, Icelandic horse (right)

There are no genuine wild horses left in the wild. However, there are ongoing reintroduction projects in Mongolia with Przewalski's horses taken from various zoos. In addition, there are successful re-breeding projects of the Tarpan.

It is believed that the horse was initially utilized as a draft animal and only later for horseback riding. Over thousands of years, man shaped the horse by selective breeding, with the result that nowadays around 300 horse breeds exist in different colors and sizes. With their 30 to 70 centimeters height at the withers, representatives of the miniature Argentine horse breed Falabella could easily fit under the belly of the Shire Horse, measuring up to more than two meters in height.



Fig. 8: Shire Horse, Falabella, Arabian horse

The noblest horses originate from regions in the Middle East and North Africa. The Arabs already owned horses in ancient times, which probably descended from Persian, Babylonian or even Egyptian animals. The pure breeding of the Arabian horse came into existence in the 7th century, during the time of the Prophet Muhammad. What a deep connection the Arabian peoples had with their noble

animals is very poetically expressed by a Bedouin legend about the origin of the horse: “And Allah took a handful of the south wind, imbued it with his breath, and thus created the horse.” To this day, these graceful breeds are distinguished by their exceptional human orientation, speed, and tremendous endurance and toughness, and have participated in the creation and refinement of many other breeds.



Fig. 9: Horse breeds, from Conversations-Lexikon Brockhaus, 1883



Fig. 10: Knight festival in Laxenburg

THE ROLE OF HORSES DURING CONQUERING EXPEDITIONS

The Sumerians started using two- and four-wheeled horse carriages across the Asian steppes back in the 3rd millennium B.C., although they were equipped with disc wheels and relatively cumbersome. During the 2nd millennium B.C., the horse began to gain importance among the Near Eastern peoples. Initially, horses enjoyed popularity among the nobility as a prestigious object, but quickly people recognized the new possibilities that opened up in warfare thanks to the horse.

Single-axle chariots with lighter spoked wheels soon became popular. These chariots carried swordsmen and archers and were usually pulled by two or three horses, later also by four horses. Being a perfect weapon, it allowed the elite troops of entire cultures to accomplish their conquests. It facilitated the movement of peoples and also initiated political, cultural and social changes.

Only a few examples of the numerous chariot nations should be mentioned here. Thus, the Italics reached Italy, the Ionians and Achaeans Greece, the Mitannians and Hittites came to Asia Minor and the Hyksos to Syria and Egypt. Splendid representations of combat scenes involving chariots have survived, preserved in the tomb of Pharaoh Tut-anch-Amun.

The oldest surviving hippological writing dates back to the 14th century B.C., by a Mitannian named Kikkuli. The Mitannians migrated from the Iranian plateau to Mesopotamia, Syria and Palestine throughout the 16th century B.C. and are considered to be excellent horse experts. Later on, their equestrian expertise was appreciated and inherited by the Hittites, who subjugated the Mitannians. Kikkuli texts, written in cuneiform, have been discovered during excavations performed in the Hittite capital in present-day central Anatolia, and are also known in translation as “Hippologia hethitica”. They contain instructions for horse training with detailed guidance on feeding, training, and conditioning chariot horses to serve in the military army.

After the downfall of the Hittite Empire around 1200 B.C., warlike Assyrians established their supremacy in Mesopotamia in the 9th century B.C. in the form of their chariots and mounted fighters. While chariots were primarily reserved for kings and military leaders, they were also used for hunting. Many artistically crafted stone reliefs in the Assyrian kings’ palaces show detailed and lifelike hunting and war scenes with powerful, high-legged noble horses.

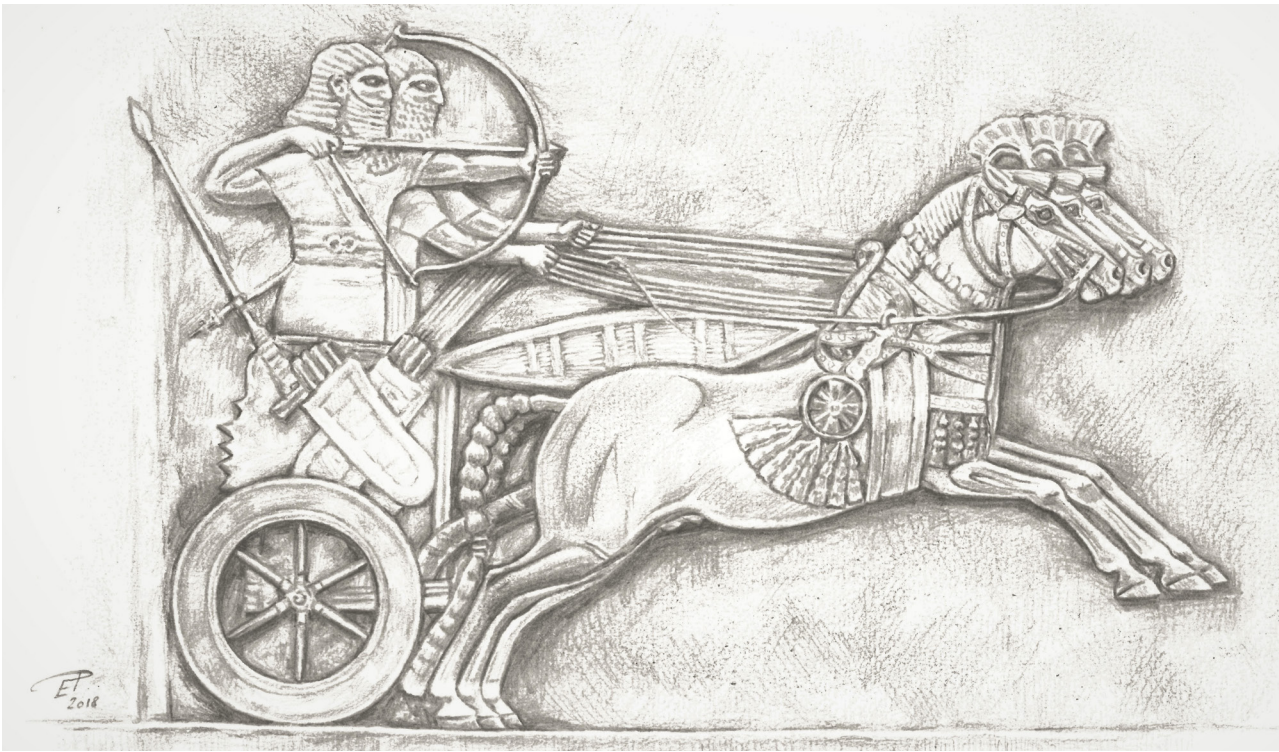


Fig. 11: An Assyrian chariot, drawing based on stone reliefs in Nineveh, Iraq

Whereas in the 2nd millennium B.C. the ancient Orient and Egypt were dominated primarily by tribes with well-equipped chariot armies, the cavalry gradually began to displace the chariots from about 1000 B.C. onward, since horsemen outperformed chariots when it came to maneuverability in combat. Consequently, nomadic equestrian peoples in particular dominated the areas ranging from Central Asia through the Near East and Asia Minor to Europe and North Africa throughout this period. Again, only a few will be mentioned, such as the Assyrians, Medes and Persians or the Scythians, Sarmatians and Huns as well as the Numidians, Moors and Saracens. Most of these cultures considered the horse to be far more than just a mounted animal. The horse was often more valued than the wife and was the man's partner in battle and hunting. It also provided the locals with milk, meat, hides, leather, and mane and tail hairs, which were braided into durable ropes. The horse was praised, adorned and almost divinely revered, made its way into myths and legends, and was often even buried alongside its owner by certain tribes, such as the Scythians.

The legendary Scythians used to be feared by the Persians and Greeks because of their ruthlessness. Since the 19th century, the discovery of well-preserved burial mounds in central Siberia, we have known that they were a highly cultured tribe as well. The horses they bred were noble, long-legged, resembling today's Arabs, with a height of 142 to 152 centimeters, whom they even fed with grain. They developed the first real leather saddle and made use of richly decorated colorful saddle cloths made of felt. In addition, numerous ornately crafted gold objects, such as brooches, belt buckles and vessels, with horse motifs were found.