The concept of mechanical animals have existed in popular culture in the West for about as long as there's been popular culture in the West; versions of mechanical animals have existed in reality for only a little less time.

Arguably the earliest mention of a mechanical animal takes place in Homer's Odyssey (700-675 B.C.E.). In scroll 7, line 88, we are told that in the palace of Alcinous is the following:

On each side stood mastiffs of gold and silver wrought by the skilled hands of Hephaestus, the lame god, to stand guard and keep death and age from invading the house.

As best as can be told at this remove, what Homer (or the writers who cumulatively produced Iliad and Odyssey) intended by the use of gold and silver dogs was simply a flourish of the imagination. Homer et al. had no contemporary who was skilled in the art of mechanical invention, nor any contemporary tradition of mechanical invention to which the writer(s) would be referring to. The ancient Greeks were not without inventors, as the case of Archimedes (circa 287-circa 212 B.C.E.) and the Antikythera Mechanism (circa 205 B.C.E.) shows. And the world of civilization at the time of Odyssey's composition was not without the occasional invention; the water screw was known to the Assyrians of the eighth century B.C.E. and used famously in the palace gardens of Sennacherib (705-681 B.C.E.).

But there is a significant conceptual leap between real, primitive mechanisms used for irrigation and watering and fictional, complicated mechanisms in the shape of animals, and Homer et al. deserve credit for their invention of the concept of the mechanical animal. Similarly, while the Iliad had Hephaestus creating mobile tripods which would assist him (18.371 ff), there is some distance between mechanical helpers and mechanical animals; again, credit for the inspiration of later writers of myth and fiction belongs to Homer et al.

For the next several centuries, Greek writers made use of the concept of mechanical beings, usually ascribing them to Hephaestus. In the seventh of the Olympic Odes (467 B.C.E.) of Pindar (circa 522-circa 443 B.C.E.), Pindar describes how Athena/Minerva

Her favor'd Rhodians deigned to grace

Above all else of mortal race,

With arts of manual industry.

Hence framed by the laborious hand,

The animated figures stand,

Adorning every public street,

And seem to breathe in stone, or move their marble feet.

Hephaestus was responsible for the bronze man Talos (from circa 400 B.C.E., in the Argonautica, first half of third century B.C.E.). Hephaestus was likewise responsible for the fire-breathing bronze bulls which guarded the golden fleece (Argonautica). Hephaestus was responsible for the bronze eagle which tore out Prometheus' liver every night (Pseudo-Apollodorus, Bibliotheca, circa 100 C.E.). And Hephaestus was responsible for the four bronze horses which draw the chariot of the Cabeiri (Nonnus, Dionysiaca, circa 400 C.E.). While automata played a lesser role in Greek myth, they were certainly present and used in myth, popular romances and dramas.

Aristotle (384-322 B.C.E.), meanwhile, wrote about Daedalus' wooden Venus and wooden guards of the Labyrinth, which moved because of quicksilver poured into its interior, and Callistratus (second half of the fourth century B.C.E.) says that Daedalus' statues moved because of internal mechanisms. And the Muslims who wrote about the myths surrounding Alexander of Macedon (356-323 B.C.E.) in the decades and centuries following his death embroidered the legends and added naphtha-filled, fire-breathing mechanical horses of iron.

Mechanisms' roles in the lives of the Greeks are another matter. The first recorded mechanical inventor of antiquity is Archytas (428-347 B.C.E.), who is soberly reported, by Plato among others, to have created a wooden pigeon which flew either through counterweights and air pressure, through a miniature hot-air balloon, or (according to Aulus Gellius (circa 125-180 C.E.) through an internal mechanism and the application of a "layered membrane of gold" as the pigeon's outer covering. Aristotle, in his Physics, describes a silver doll which moved like a living being, and writes about it as if it were a not-uncommon automaton for the time period.

Although our image of antiquity is of somewhat primitive Bronze Age civilizations, there were clearly individual moments and possibly even traditions of mechanical inventions, and while these inventions were uncommon and not accessible to ordinary citizens, the inventions were nonetheless present and a part of the general consciousness of what humanity was capable of inventing. The most notable of these inventions is the Antikythera Mechanism, created at some point between 205 and 65 B.C.E., but the Antikythera Mechanism was far from the only one. Archimedes (circa

287-circa 212 B.C.E.) invented a famous planetarium on the island of Syracuse as well as wrote a now-lost book on astronomical mechanisms. Ctesibius (circa 285-222 B.C.E.), the “father of pneumatics,” created a water organ and a water clock. And Hero of Alexandria (10-70 C.E.), the greatest inventor of antiquity, created the “aeolipile,” a steam-powered turbine, and a number of mechanical objects, including a programmable cart.

But these mechanists’ work was much more often oriented toward basic mechanisms which performed basic tasks rather than those which were shaped like animals and were made for amusement’s sake. To a large degree the ancient Greeks were not concerned with material luxuries of the mechanical animals type, and the ancient Romans, though wearing silks and happily consuming banquets, were more concerned with bodily indulgence rather than object indulgence. The inventors of antiquity who claimed to have invented mechanical animals, or were known to, are relatively small. Besides Archytas and the silver doll which Aristotle described, there was the Roman architect Vitruvius (circa 80-circa 10 B.C.E.), whose discoveries of air pressure and hydraulic pressure allowed him to make mechanical blackbirds sing and other animals drink and move by the power of waterworks. Hero of Alexandria also made water-powered mechanical animals drink. These, though, were isolated examples, notable by their rarity.

To find the first culture to regularly make mechanical animals, we must turn our attention to China. Long before the Greeks and Romans were creating mechanical automata, the Chinese were using mechanical puppets in puppet-plays and shadow-plays. By the turn of the millennium the Chinese had created and were making use of mechanical cats, doves, eagles, angels, insects, fish, and dragons as toys and amusement-pieces. Unlike the Greeks and Romans, the Chinese were open to mechanical innovations of this sort, and contrary to the popular stereotype of traditional Chinese cultural stagnation and immutability, there was a continually evolving technology which was made use of by Chinese mechanists for centuries.

Back in the West, the long fall of Rome led to the Byzantines being the main producers of automata and mechanical animals. Emperor Constantine II (316-340 C.E.) ordered a variety of automata, from birds to lions to gryphons, to be rebuilt based on their traditional (and lost) forms. The Roman Senator and philosopher Boethius (circa 480-524) had a set of singing bronze birds sent to him from Byzantium, and the bronze birds would later enter popular folklore and myth as part of legendary antiquity. During the rule of Emperor Theophilos (800-842) the emperor had Leo the Mathematician construct various automata to impress foreign visitors, including the famous Throne of Solomon, which via hidden ropes and pulleys would abruptly raise the emperor nearly to the ceiling of the throne room. One traveler, Bishop Liutprand of Cremona (circa 920-972), reported that when the throne elevated, bronze lions beside the throne opened their jaws and roared, moving their tongues and beating their tails upon the ground, while mechanical birds fluttered and sang from a golden

tree, each singing a different tune.

The Byzantines were not the only ones in the West to construct mechanical animals during these centuries. Around the turn of the ninth century the Abbasid Caliph Harun al-Rashid sent Charlemagne a water-clock which featured mechanical knights on mechanical horses. The Arabs of the time were known for their mechanical toys, which if not on the level of the Chinese at least equaled if not surpassed the efforts of the Greeks and Romans. As with the Byzantines, mechanical automata played a significant role in Arab imperial pageantry.

A significant, even momentous, change came over western society beginning in the tenth century and running for the next four hundred years. These centuries were the West's first industrial revolution, a period of technical and mechanical development unmatched in the West's history. Wind, water, and the tide began to be used as engines of power. Mills, mines, melting furnaces, and smithies sprouted across the European landscape. Refining metal was discovered and flourished to such a degree that its enormous cost in fuel clear-cut much of western Europe's forests for a few centuries. This in turn led to the first energy crisis, which when combined with the worsening climate, general economic stagnation, and the advent of the plague resulted in a breakdown of the medieval technological culture in the 14th century—a time, in William Manchester's memorable phrase, "lit only by fire."

During these four centuries of mechanical progress, mechanical animals were, if not common, then at least commonly known. Travelers' tales of the courts of the Byzantines and Arabs contained stories of mechanical automata, with notable travelers like Marco Polo (1254-1324) and Friar Odoric (1286-1331) casually mentioning them. Romances like the Livre d'Artus (circa 1275) told of copper lions which guarded the passes which led into the kingdom of Gorre, and The Travels of John Mandeville (1357-1371) described the mechanical, singing beasts and birds in the palace of the Old Man of the Mountain. Chaucer's "Squire's Tale," in Canterbury Tales (1387-1400), describes a teleporting brass horse. Clockwork automata began appearing in European cathedrals—automata ranging from crowing roosters and bears which shook their heads.

But cultural changes as well as the aforementioned breakdown in the developing medieval mechanical culture affected not just the production of mechanical animals but how they were portrayed and seen. Automata never fully went away—they were often featured as part of the between-the-main-courses dishes in banquets—but by the sixteenth century automata had acquired a somewhat sinister taint of being associated with sorcery. The primary cause of this association came from the then-popular story of Thomas Aquinas' (1225-1274) destruction of the "oracular head" of Albertus Magnus; the head was supposedly created through either the harnessing of astral influences or through black magic. Automata became primarily the province of the producers of that most lowly and despicable of art forms, theater. Automata were

produced for the stage in the fifteenth century in Italy, and migrated from there to France, and from there to England, so that by the end of the sixteenth century mechanical animals often joined or replaced real animals on stage during plays, a trend that continued into the seventeenth century in England. Some of these mechanical animals were merely made of “broune paper,” but others were much more mechanical in composition.

While the automata, especially the mechanical animal, was flourishing in European theater—again, a venue that respectable people thought little of—apologists for automata, including respectable and esteemed philosophers and churchmen, were making the case that mechanical animals, and self-moving automata more generally, were worthy of respect and of being studied and taught, and that they were real rather than the province of fiction. The German mathematician and astronomer Johannes Müller von Königsberg, aka Regiomontanus (1436-1476), was reliably reported to have constructed a flying mechanical eagle for the Emperor Maximilian in 1470. A few decades later the well-respected Italian painter and art theorist Gian Paolo Lomazzo (1538-1592), in a 1584 work on art and artists, described a mechanical lion that Leonardo da Vinci (1452-1519) made in 1509 for the French king Francis I. The lion could walk, and made the king and his courtiers believe that “Architas Tarentinus his wooden dove flew; that the brasen Diomedes, mentioned by Cassiodorus, did sound a trumpet; that a serpent of the same material was heard to hiss; that certain birds sang; and that Albertus his brasen head spoke to St. Thomas Aquinas.” And in his later years Emperor Charles V (1500-1558) was entertained by figures of armed men and horses which worked mechanically and performed various tasks. Inventors and mechanists like da Vinci were forced to produce real mechanical animals before the doubters would believe in their existence.

Proponents of mechanical animals and automata went on to argue that they were part of a tradition dating back to antiquity, that the creators of mechanical animals and automata were no different from the artisans of the Greek and Roman era, and that, though they were vulgarly mechanical, there was nothing inherently sinister or evil about them. In the seventeenth century in Venice, as in England the century before, mechanical animals shared the stage with real animals: “flying horses, horses that dance, the most superb machines, presented in air, on land, and on the sea with extravagant artifice and praiseworthy invention.” Mechanical elephants and camels were also common, though mechanical horses were the most frequently seen.

By 1733 mechanical animals and automata were not rarities—on stage. Being the product of a great deal of time, effort, and materials, they were not common, nor were the tasks the mechanical animals could do particularly varied. But the prevailing cultural sentiment of the time was materialism, seeing no evidence for the existence of supernatural things like the soul and insisting that all the body’s vital and mental processes were produced solely by the “animal machinery” of the body’s parts. With animals seen as machinery, albeit sensitive and passionate machinery, machinery

began to be viewed as animal, and machines were designed accordingly. Mechanical animals in particular were designed to try to simulate living animals' physiology, a divergence from previous mechanical animals. In 1733 a French mechanist named Maillard submitted to the Academy of Sciences plans for a carriage drawn by a mechanical horse and also for a mechanical swan which would be capable of swimming in water. In 1738 the French mechanist Jacques Vaucanson put on display two android musicians and a mechanical duck that swallowed corn and grain and, after an interval, relieved itself of realistic-looking dung. And in 1773 the British inventor James Cox debuted his silver swan, which "swam" along a surface of glass rods, preened its feathers, moved its head, and caught silver fish from its pond, which it swallowed.

After the French Revolution the majority of the mechanical animals were made outside of France, in Great Britain and Germany, and usually as toys or amusements for adults like Vaucanson's mechanical duck. Their construction continued apace throughout the nineteenth century with the Industrial Revolution in the first half of the century and the development of advanced machinery in the second half. By the time science fiction was a fully-developed genre of literature mechanical animals were seen as something that could be a part of both reality and fiction (as with the perfect giant mechanical turtles in Godfrey Sweven's Riallaro [1903]). By 1939 animal automata were a part of science fiction and a part of reality, as seen in 1939 New York World's Fair, which featured "Elektro, the Moto-Man" and his mechanical dog "Sparko," which was capable of simple independent movements. The mechanical animals which followed Sparko, in fiction and in real life, no longer were special or unusual, but rather were the inheritors and embodiments of a millennia-long tradition, and familiar rather than strange.