



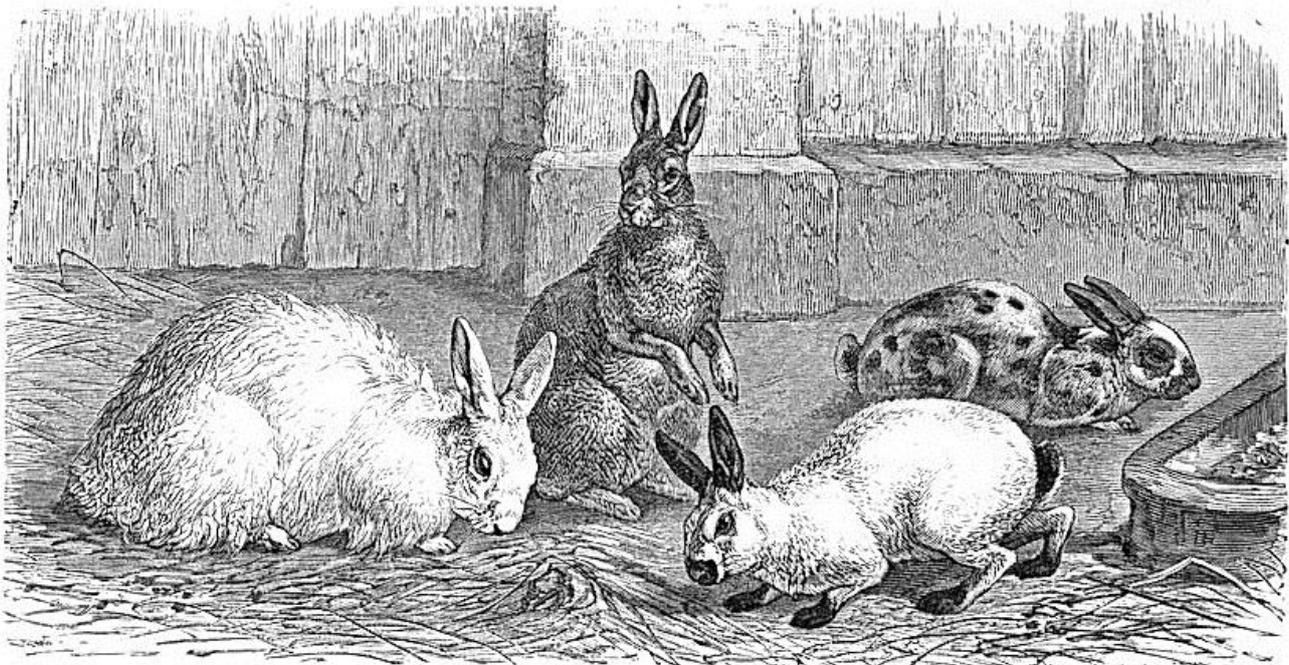
Unusual rabbit happenings, celebration of the human spirit or scientific realities?

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Domestic rabbits are descendants of the wild European rabbit *Oryctolagus cuniculus*. Phoenicians, an ancient civilization living along the eastern coast of the Mediterranean Sea, were the first to discover wild rabbits and to mention them in their writings.

The Phoenicians were amazed by the abundant population of these small digging mammals after landing on the coast of Iberia around 1100 B.C. Those small

mammals reminded them of the hyrax (*Hyrax* sp.) found in their native country (today's Lebanon and Israel). They started to capture these animals and released them



2. Angorakaninchen oder Seidenhase. 3. Silberkaninchen. 4. Chinesisches oder russisches Kaninchen. 5. Japanisches Kaninchen.

Figure 1: Engravings of 18 and 19th centuries allow to better understand the history of rabbit breeds and their evolution. Some breeds are now extinct, others are still bred.

in other Mediterranean regions, e.g., in North Africa or the Island of Malta.

Since that period of time, the expansion of the rabbit throughout Europe is strongly linked to human activity.

The Romans propagated rabbits throughout their empire as play animals, without domesticating them. Wild rabbits were captured and kept in a *leporarium*, a vast enclosure surrounded by stone walls, ancestor of the Middle Ages' game enclosures. Animals kept in such enclosures were allowed to reproduce freely, forming "local populations".

The use of leporaria continued long after the decline of the Roman Empire and beyond the Roman borders. In the Middle-Ages, rabbits were still kept in such game enclosures in France, England and Germany, without attempt of domestication. Wild rabbits were indeed not selected for their character, like for instance dogs, but for their meat and fur qualities.

The right to own such enclosures was the sole privilege of noblemen and monks in France. Monks started to keep wild rabbits in paved courtyards, so that these could be caught more easily. Manuscripts at the end of the Middle-Ages mention a beginning of domestication, of breeding with a controlled selection of wild rabbits in order to obtain animals that were more submissive and of different sizes.

During the 16th century, several rabbit breeds spread in France, Italy, Flanders and England. In 1595, Agricola mentions the existence of a breed of rabbit breeds with agouti (wild), white, blue, furs, piebald black and white, black and grey coloration.

During the 17th century, at least 7 breeds of rabbits are known to exist (Figure 2).

The privileges of noblemen and monks

were abolished at the beginning of the 19th century. As a result, domestic rabbit rapidly spread throughout rural areas and suburbs of European cities. These animals were kept in enclosures, in gardens or in hutches, and less in groups. This led to the decline of "local populations" of rabbits living in barnyards or in confined warrens and being allowed to reproduce freely.

Man controlled more and more the reproduction of rabbits in order to preserve particular characteristics of fur, size, or shape of body, e.g., dwarf rabbits or



Figure 2: The hare, the wild rabbit and different breeds of domestic rabbits, print from the 1^{re} "Histoire naturelle" by Buffon (1754).

hanging ears. New breeds appeared at regular intervals, like the Flemish Giant, who weighs up to 5 times the weight of a wild rabbit.

The making of new rabbit breeds and consanguinity have, unfortunately, decreased the genetic diversity and have favored the appearance of diseases and undesirable inheritable traits such as malocclusion of the incisors or megacolon.

The ultimate step of domestication has been the appearance of "strains" of rabbits with a scientific or commercial aim during the 20th century. Rabbit strains allow the breeder to obtain a collection of homogenous individuals: similar size at birth, same fur, and same growing rate. These animals are predominantly New Zealand, Californian and Burgundy Fawn Rabbits.

Here, we will discuss unusual rabbit happenings, as illustrated in antique prints of 17th and 18th centuries. When the human imagination met a certain scientific reality...

Hooded rabbit

The hooded rabbit is mentioned in ancient books depicting different species belonging to the genus *Lepus*, but it is not possible to know nowadays whether this was a wild or a domestic rabbit

(Figure 2A). The first mention of this rabbit is in "A General History of Quadrupeds" by Thomas Bewick and Ralph Beilby, published in 1791 in Newcastle upon Tyne. It is based on a report from G. Edwards for the British Museum. Other illustrations of this singular rabbit have been published in the 19th

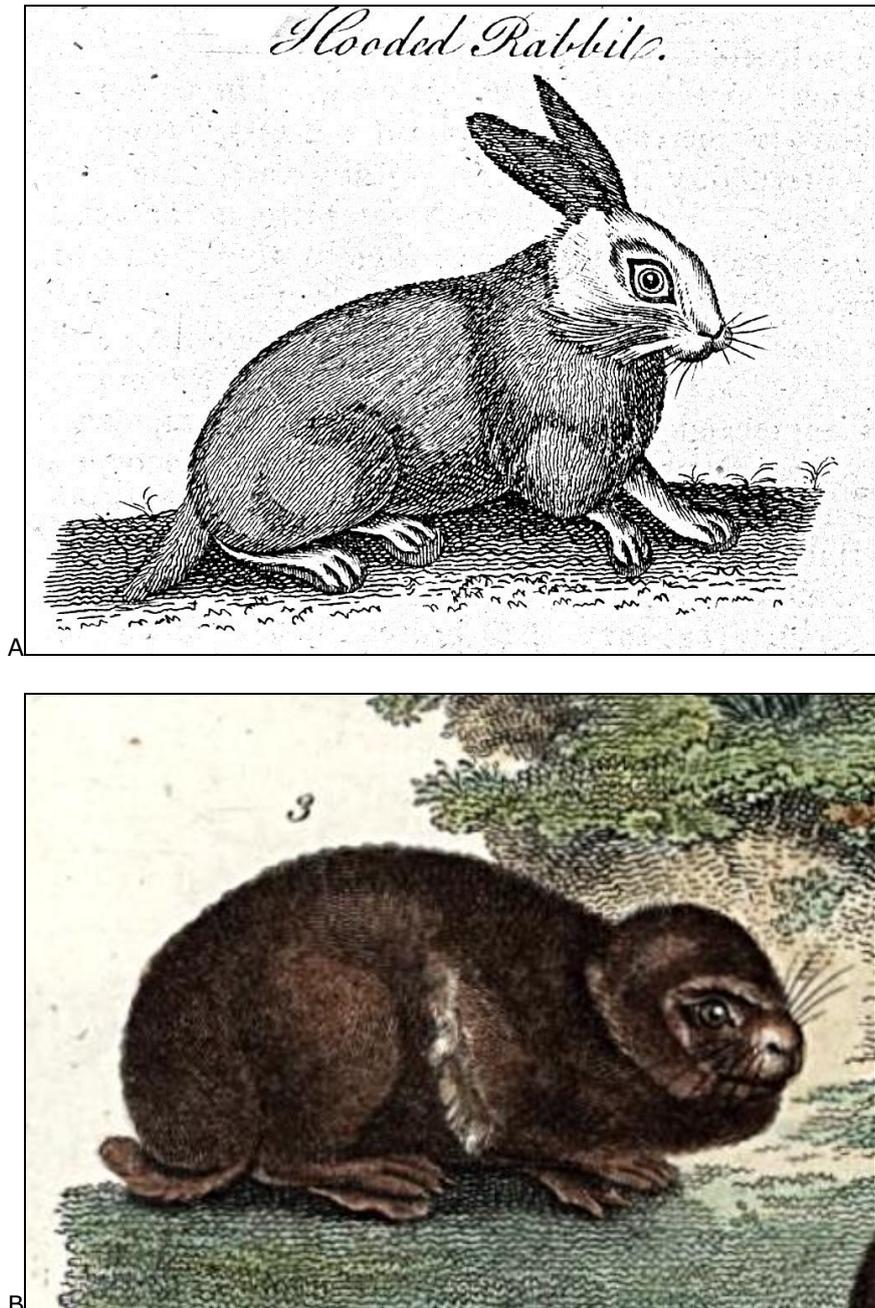


Figure 3: Hooded rabbit with palmate feet. A: Etching by Andrew Bell (1726–1809), Scottish engraver and printer, cofounder with Colin Macfarquhar of the "Encyclopædia Britannica". B: Etching by John Pass (1813), published by George Jones of London, showing the hooded rabbits with its head hidden in the dorsal skin pocket.

century (Figure 2B).

The hooded rabbit has a fold of skin on its back into which it can hide its ears and its head. The skin of this pocket is pierced with small holes on the dorsal part to let light pass for the eyes. Another skin pocket is present under the chin and it would help keep feet warm. Feet which, moreover, are palmate !!!

The fur of the hooded rabbit is ash color all over its body, while the ears and head are brown.

The hooded rabbit is also referred to as the Moscow rabbit even though it is said to be have been imported into Europe from the Western Indian islands.

Unicorn rabbit

The horned rabbit is described in Islamic poetry of the 13th century in the "*Marvels of Things Created and Miraculous Aspects of Things Existing*" by Zakariya Ibn Muhammad al-Qazwini (1203-1283 AD). Al-miraj (المعراج) is a rabbit with yellowish fur and black spots, with normal ears and a horn on its forehead. Figure 4 shows a peaceful scene with the unicorn rabbit in its natural environment, and different kind of

vegetation. The legend says, however, that this rabbit is ferocious and has a huge appetite. It kills animals as well as man with its horn. The population, terrified by rumors of the presence of al-mi'raj, would go to witches in order to bewitch the monster and chase it away of their lands.

The legend about such a predatory and carnivorous rabbit is a celebration of the human spirit. It can, nevertheless, not be excluded that this myth is the result of a disease that affects rabbits and causes the formation of one or more horn-shaped growths, e.g. viral infections causing the development of papilloma's or fibromas. The behavior without fear may, furthermore, be a sign of disease in rabbits.

Unicorn rabbits have also been observed in agouti colored domestic rabbits living in outdoor enclosures in England during the 18th century. This particular rabbit was bred to increase its population. Apart from a certain appeal related to the myth of the unicorn, the rabbit had little commercial value and its breeding was abandoned. According to the handful available descriptions, the sole ear was not placed laterally at the back of the head, but in the middle of the forehead. No illustrations exist



Figure 4: Illustration of the mythical Al-mi'raj animal that lived in Jezîrat al-Tennyn, a region of the Indian Ocean.

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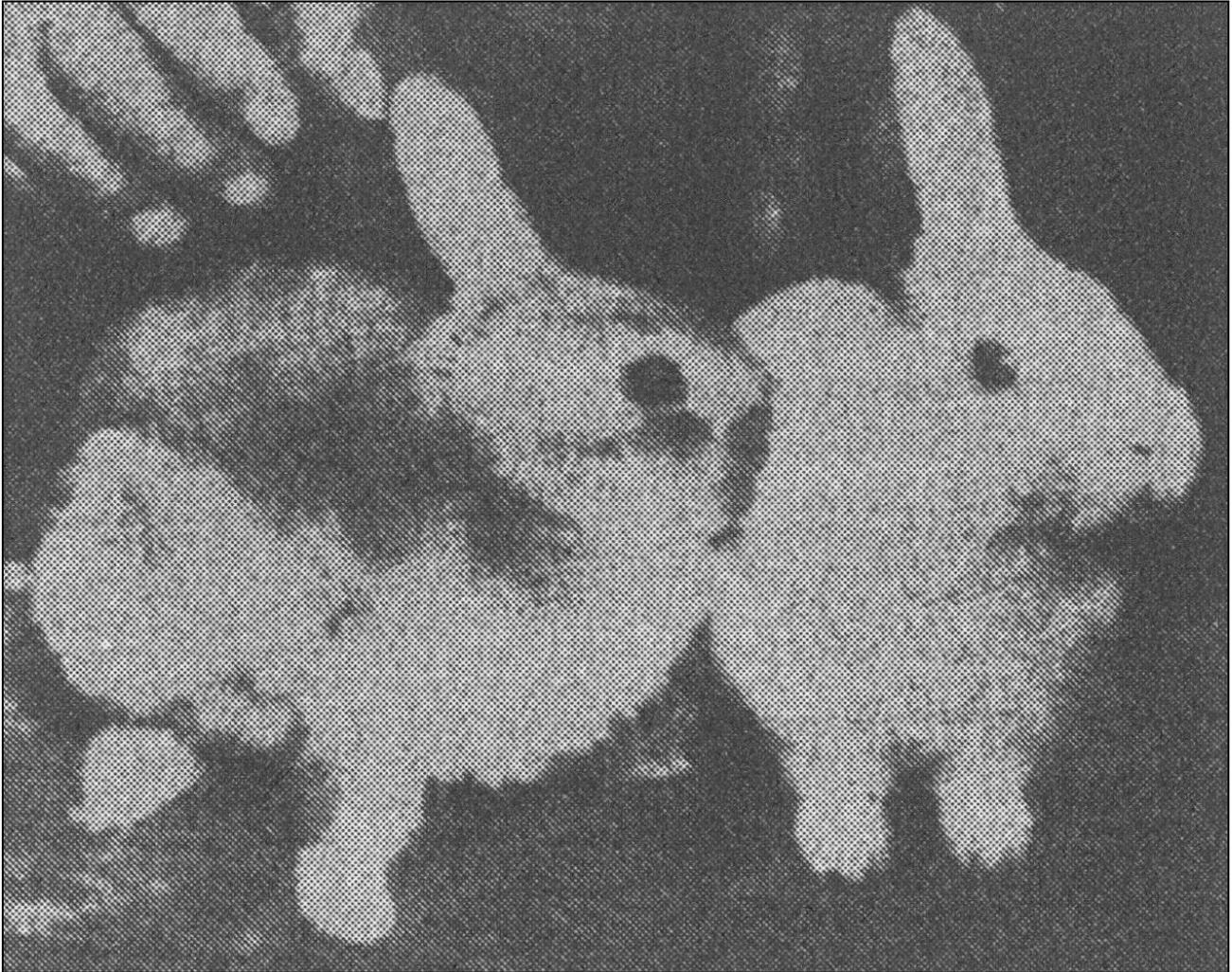


Figure 5: Picture of “unicorn rabbits” in the US magazine *National Rabbit Raiser* magazine of February 1959. These rabbits were born at an amateur breeder in the state of Indiana (USA). Picture taken from the book B. Whitman. *Domestic Rabbit and their Histories. Breeds of the World*, 2004.

on the horned rabbit, except this picture taken in 1958 (Figure 5).

Unicorn rabbits appear sporadically in different breeds to this day. No details on the morphology of the head are available and no genetic studies have been performed on these animals. It is, therefore, impossible to confirm that the presence of one ear in the middle of the forehead is linked to a genetic mutation. Indeed, it could also be the result of mutilation of newborn rabbits by the doe. In some rabbit lineages, females are very nervous or have reduced maternal instinct with a tendency to ignore or eat their newborn. It also happens that a female

has an extreme maternal instinct and injures her newborn by biting or by excessive licking (Figure 6). The extent of the mutilation and the number of newborn of a nest affected by the mutilating behavior of the nursing does vary: one to several or all young rabbits may be affected.

Horned hares and rabbits

Many manuscripts describe a legendary hare with several horns. These stories seem to exist all over the world (Figure 7). Nevertheless, it is in Europe that literature, engravings, mural decoration or paintings are richest about this animal, starting from



Figure 6: The degree of mutilation of the ear pinna varies from one victim to another. In all cases, the remaining ear is placed laterally, at the back of the head. Picture: Michel Gruaz

the Elder (1525 - 1569) in "The Virgin and Child in a fruit garland."

Horned hares and horned rabbits were unknown in Europe before the 16th century. Starting this century, scientific descriptions attest to their presence on the European continent. Observations and records of horned hares coincide with the development of trade with the North American continent. It is, thus, speculated that boats and travelers may have been passive carriers of the Shope papilloma virus, bringing the virus from North America to Europe.

Naturalists and scientists of that time, such as Conrad Gessner (1516-1565) or Hoefnagel (1575-1580) began to study this particular hare and described it in their bestiary with the Latin name *Lepus cornutus*. Others followed (Bonnaterre, 1789. John Jonston (1655); Schott, 1667) (Figures 8, 9). It is interesting to note that this hare looks more like a rabbit than a hare in most old illustrations...

In the 19th century, scientists take advantage of advances in scientific zoology

the 16th century (Figure 8, 9, 10).

The observation of cottontails and hares affected by papillomas or fibromas has become a fertile ground for the imagination and fantasy of hunters and country people. Many popular legends describe this animal as a hybrid, for example, a hypothetical cross between an antelope and a hare. This animal has received many names like "rasselbock" and "raurackl" in Europe and "jackalope" in the USA. Some authors like Rabelais (1494 - 1553) mentions the horned hare in their books but speculate that it is mythical. Other paint it in their works, like the Flemish baroque painter Jan Brueghel



Figure 7: Persian miniature from 1717. It illustrates the dragon that devoured cattle and men. It was killed by Alexander the Great. To thank him, the local population of Tannin, the dragon Isle, gave him a horned rabbit.
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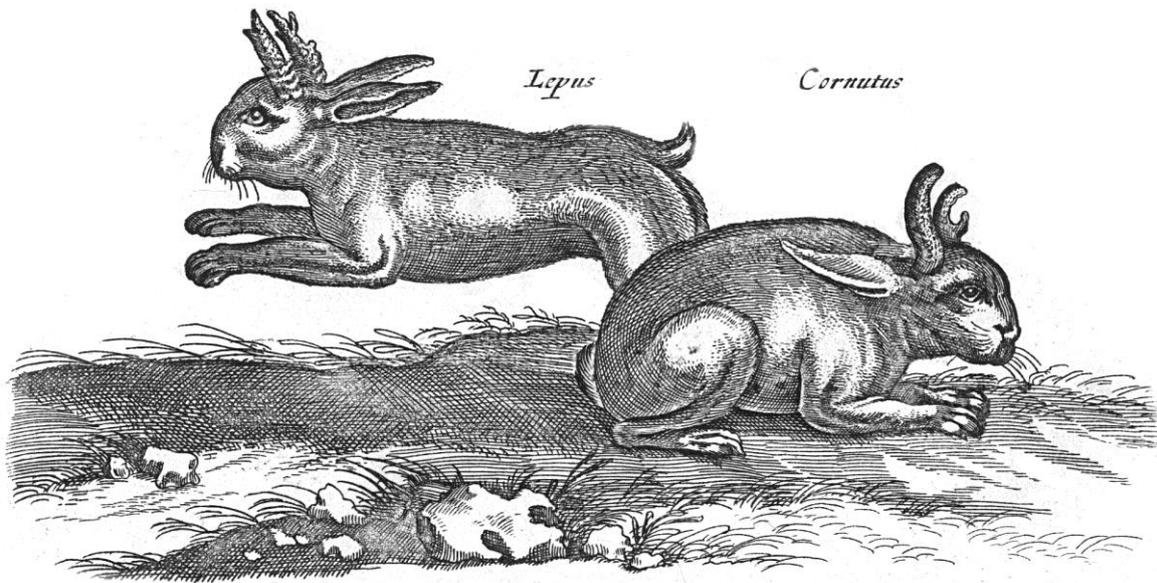


Figure 8 : Illustration of the horned hare by John Jonston in 1665 in his "*Historiae naturalis de quadrupetibus libri*".

and scientific animal medicine to elucidate the mystery of the horned rabbit. For them it was nonsense and even a fraud. They discovered that taxidermists of past centuries manipulated hares by adding deer or antelope horns. Despite this discovery, legends about the horned hare continued, nevertheless, to flourish among people of the countryside.

Nowadays, it is thought that the "horned" head of the hare *Lepus cornutus* was not only the fruit of the human imagination, but that it may be the consequence of papilloma or fibroma tumors on the head these animals (Figure 11). These tumors develop after infection of a cell by the Shope papillomavirus or fibroma virus.

Conclusion

While discoveries in medicine and human surgery were taught since

several centuries already, knowledge about animals and veterinary medicine remains poor. Some human medicine physicians did



Figure 9 : Detail of a print signed by Benard showing a horned hare. it was published in 1789 in the "*L'Histoire Naturelle, générale et particulière, avec la description du Cabinet du Roi* ». This work is part of the encyclopedic collection written by Buffon.



Figure 10: Detail of a ceiling painting in the castle of Oiron (France), painted during the 17th century, showing a horned hare.

surgical procedures that facilitated the keeping of domestic animals such as



Figure 11: Horned cottontail with papilloma's, observed in Mankato (Minnesota, USA) in 2012. Picture: Tiffany Adams

castration, but the scientific understanding about animals remained poor.

Human doctors were consulted in case of diseases, but their knowledge and skills to recognize animal disease were limited. This led Buffon to write this paragraph in the Volume IV of his "*Histoire naturelle générale et particulière, avec la description du cabinet du Roi*": Je ne puis terminer l'histoire du cheval, sans marquer quelques regrets de ce que la santé de cet animal utile et précieux a été jusqu'à présent abandonnée aux soins et à la pratique, souvent aveugles, de gens sans connoissance et sans lettres. La Médecine que les Anciens ont appelée "Médecine vétérinaire", n'est presque connue que de nom : Je suis persuadé que si quelque Médecin tournoit ses vues de ce côté-là, et faisoit de cette étude son principal objet il en seroit bientôt dédommagé par d'amples succès... » ("I cannot finish the story of the horse, without showing some regret that the health of this useful and valuable animal was hitherto abandoned to the care and practice, often blind, of people without knowledge and without letters. The medicine that Ancients called "Veterinary Medicine", is hardly known only by name: I am sure that if any doctor would turn his views on this side –and would make the main purpose of this study, he will soon be compensated by large success... "

Many conflicts lead to devastation over the European continent during the 17 and 18th century. Countries were ruined. There were not enough horses for the cavalry. The exodus of civilian populations and their livestock could not supply food to the armed forces. Finally, many animal epizootic diseases appeared and their magnitude decimated herds: foot and mouth disease (FMD), peripneumonia or parasitic infections.



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Thank you

These tragedies made scholars aware of the needs to understand animals and their diseases. Zoology was born and many detailed etching about animals and their anatomy were published. This science has evolved into scientific animal medicine over the next centuries and, nowadays, into veterinary medicine.

References

- Bonnaterre JP. Tableau encyclopédique et méthodique des trois règnes de la nature. Paris, Fr: Panckoucke; 1789.
- Clutton-Brock J. A Natural History of Domesticated Mammals. Cambridge University Press, 1999.
- Davis S.E., Demello M. Stories Rabbits Tell: A Natural and Cultural History of a Misunderstood Creature. Lantern Books, 2003.
- Flux J.E.C., Angermann R. The hares and jackrabbits. Pages 61–94 in J.A. Chapman and J.E.C. Flux, editors, Rabbits, hares and pikas. Status Survey and Conservation Action Plan. International Union for the Conservation of Nature and Natural Resources, Gland, Switzerland, 1990. Giri I, O Danos O, Yaniv M. Genomic structure of the cottontail rabbit (Shope) papillomavirus. Proc Natl Acad Sci USA 1985;82:1580-1584.
- Hagen KW. Spontaneous papillomatosis in domestic rabbits. Bull Wildl Dis Assoc 1986;2:108-110.
- Harel J, Constantin T. Malignant tumors provoked by Shope fibroma virus in newborn rabbit and adult rabbit treated with cortisone. C R Hebd Seances Acad Sci 1954;239:681-683.
- Hoefnagel J. Animalia Qvadrupedia et Reptilia (Terra). 1575-1580.
- Hudson JR, Mansi W, Rowe B. The use of fibroma virus (Shope) for the protection of rabbits against myxomatosis. J Comp Pathol 1956;66:290-298.
- Jeanjot-Emery P. Les origines de la médecine des animaux domestiques et la création de l'enseignement vétérinaire. Bull. soc. fr. hist. méd. sci. vét. 2003;2 :64-77. http://sfhmsv.free.fr/SFHMSV_files/Textes/Activites/Bulletin/Txts_Bull/B2/Jeanjot_B2.pdf
- Kato S, Miyamoto H, Takahashi M, Kamahora J. Shope fibroma and rabbit myxoma viruses. II Pathogenesis of fibromas in domestic rabbits. Biken J 1963;6:135-143.
- Keller RL, Hendrix DV, Greenacre C. Shope fibroma virus keratitis and spontaneous cataracts in a domestic rabbit. Vet Ophthalmol 2007;10:190-195.
- Kidd JG, Rous P. Cancer deriving from virus papillomas of wild rabbits under natural conditions. J Exp Med 1940;71:469-493.
- Kreider, JW, Bartlett GL. The Shope papilloma-carcinoma complex of rabbits: A model system of neoplastic progression and spontaneous regression. Adv Cancer Res 1981;35:81-110.
- Larson CL, J.E. Schillinger JE, Green RC. Transmission of rabbit papillomatosis by the rabbit tick, Haemaphysalis leporispalustris. Biol Med 1936;33:536-538.
- Omori M, Banfield WG. Shope fibroma and rabbit myxoma factories: electron microscopic observations. J Electron Microsc 1970;19:381-383.
- Pokorny E. 2004. Herrlich Wild – Höfische Jagd in Tirol. Wien, A: Kunsthistorisches Museum Wien; 2004.
- Rous P, Beard JW. The progression to carcinoma of virus-induced rabbit papilloma. J Exp Med 1935;62:523-548.
- Schott G. De Lupo, & variis ejus speciebus, Physica curiosa. 2nd ed, 1667.
- Seton, ET. Lives of game animals. Vol. IV:787, New York, USA: Literary Guild of America; 1937.
- Shope RE. A transmissible tumor-like condition in rabbits. J. Exp. Med 1932;66:793.
- Shope RE. Serial transmission of the virus of infectious papillomatosis in domestic rabbits. Proc Soc Exp Biol Med 1935;32:830-832.
- Shope R. The relationship between the viruses of infectious myxoma and the Shope fibroma.

HYDE Am J Epidemiol 1936;23:278-297.

Shope RE. Immunization of rabbits to infectious papillomatosis. J Exp Med 1937;65:607-624.

Shope RE, Hurst EW. Infectious papillomatosis of rabbits. J Exp Med 1933;58:607-624.

Smith JW, Tevethia SS, Levy BM, Rawls WE. Comparative studies on host responses to Shope fibroma virus in adult and newborn rabbits. J Natl Cancer Inst 1973;50:1529-1539.

Thompson HV, King CM. The European rabbit. The history and biology of a successful colonizer. Oxford, UK: Oxford Press University; 1994.

Van Praag E, Maurer A, Saarony T. Skin Diseases of Rabbits. MediRabbit.com edition, Switzerland, 2010. pp. 406.

von Bomhard W, Goldschmidt MH, Shofer FS, Perl L, Rosenthal KL, Mauldin EA. Cutaneous neoplasms in pet rabbits: a retrospective study. Vet Pathol 2007;44:579-588.

Whitman BD. Domestic Rabbits & Their Histories: Breeds Of The World. Leathers Publishing, 2004. pp. 456.