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Animals in the Book of Mormon: An Annotated Bibliography

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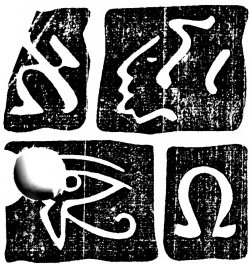

FOUNDATION FOR ANCIENT RESEARCH AND MORMON STUDIES

John L. Sorenson

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An Annotated Bibliography

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John L. Sorenson

Introduction

How the animal names in the Book of Mormon text are to be understood by contemporary readers is not clear. In two cases, names were given for which Joseph Smith's version of the English language had no equivalent, so the name used by the Book of Mormon writer was transcribed. In other cases, although English words are used, the precise equivalent for them in modern zoological terms is problematic. Moreover, scientists studying the natural history of the New World usually suppose that certain animals seemingly denoted by English terms in the scripture were not present in ancient America during the period when the scriptural account refers to them.

Exactly the same kinds of problems occur when we try to read the Old Testament text in zoological terms, although the number of conundrums are fewer in that case. Careful students of the Old Testament and ancient texts have already demonstrated several methods for clarifying these semantic issues.

This bibliography makes accessible to students of the Book of Mormon a range of information previously not available to apply to the matter. In an appendix, a comprehensive listing is presented of all significant Book of Mormon statements about animals. Linguistic materials are also referred to that suggest novel alternatives to our naive readings of ancient labels for the fauna. Furthermore, data are provided showing that zoological experts have missed obscure but important facts about the presence of certain animals in the ancient American world. Together the sources treated allow us to formulate better answers to the following basic queries:

- What may the Book of Mormon text mean when it mentions various Jaredite, Nephite, or Lamanite uses of animals? Were any of them "domesticated" (a term which does not occur in the Book of Mormon)?

- What may be learned by comparing the usage of animal terms in Semitic languages, one of the background languages of the Book of Mormon writers? What may be learned by comparing the usage of animal terms in Mesoamerica, the likely scene of the chief Book of Mormon events?

- What actual animals were used, tamed, domesticated, etc., in ancient Mesoamerica? When and where were which species present? What other fauna were potentially exploitable, whether demonstrated yet or not?

- What information is available about cultural processes involved in valuing and managing animals among cultures in this area? What did animals signify?

Annotated Bibliography

Anderson, Arthur J. O., and Charles E. Dibble, trans. *The War of Conquest: How It Was Waged Here in Mexico*. Salt Lake City: University of Utah Press, 1978.

How the Aztecs spoke about the Spaniards' horses: Page 20: "the deer—horses—which the Spaniards rode." Page 35: "the deer—that is, the horses." Page 55: "the deer-which-carried-men-upon-their-backs, called horses." Page 57: "the deer they rode, that is, the horses."

Arriola, Jorge Luis. *El Libro de las Geonimías de Guatemala. Diccionario Etimológico.* Seminario de Integración Social Guatemalteca Publicación No. 31. Guatemala City, 1973.

Page 342: Under the entry "Mazatenango" (from Mazatl-tenan-co): "Inside the fence or wall of the deer." Perhaps the name originated in the custom of fencing or corralling deer to care for them.

Ashley Montagu, M. F. "The earliest account of the association of human artifacts with fossil mammals in North America." *Science* 95 (1942): 380-81.

Reprints an 1839 newspaper article by A. C. Koch, fossil-hunter of St. Louis, which reports a find (in Missouri) of a mammoth skeleton. Remains of fire (burned bones, burned wood), artifacts (broken spears, axes, knives, etc.), and the fact that the head and neck area were found amid an ash layer up to a foot thick all indicated that it had been killed by hunters.

Ashley Montagu, M. F. "An Indian tradition relating to the mastodon." *American Anthropologist* 46 (1944): 568-71.

Page 568: Evidence indicates that the mammoth was the last of the large Pleistocene mammals to become extinct. Prof. William Berryman Scott, "the doyen of American paleontologists," has told the author in conversations that his opinion is that mammoths might still have been alive in the interior when the first Spanish explorers arrived in America. "Another distinguished American paleontologist (whose special interest is the horse) is, I understand, of the opinion that the horse never became extinct in America." Page 569. "The argument is that the horse is a slow breeder, and that its enormous increase in so short a time in the post-Columbian period suggests that while the horse became an Indian domestic animal only after the Indian had learned its use from the Europeans, the stock drawn upon was primarily the native American horse." It is now generally accepted that W. D. Strong was correct in concluding that Indian traditions of apparent mammoths represent "historical traditions" based on fact. [Compare Eiseley 1945b, 1946.]

Ashley Montagu, M. F., and C. Bernard Petersen. "The earliest account of the association of human artifacts with fossil mammals in North America." *Proceedings, American Philosophical Society* 87/5 (1944b): 407-19.

Resurveys the evidence for the probity of Albert Koch's 1839 account of the discovery of a mammoth in Missouri. They conclude that it is highly probable that he discovered what he claimed. It is also probable that he discovered artifacts in association with remains of the fossil ground sloth, *Mylodon harlani*. Page 415: Two arrow-heads were found with the bones of the ground sloth. Page 418: Literature is cited on other

reported finds of human remains with extinct animals, including the Uhle mastodon in Ecuador.

Averitt, Beej, and Paul Averitt. "Mastodon of Moab." *The Desert Magazine* (August 1947): 24-27.

A clear picture of this trunked quadruped is pecked on a cliff a few miles from Moab, Utah. Indian sites nearby had not been vandalized [hence, they imply, anglos are not responsible for the petroglyph]. The peck marks were "not badly weathered." The creature has toes on the feet. They suppose it was made by an Indian from a legend, surely not from having seen a mastodon.

Badwin, James A. "Pre-Cookian pigs in Australia?" *Journal of Cultural Geography* 4/1 (Fall-Winter 1983): 17-27.

Most authorities have assumed that Australian Aborigines did not know the pig until at least the time of Cook's voyages in the late 18th century. But there is evidence to suggest that a variety of pig was introduced to Australia from neighboring New Guinea, perhaps at a time prior to Cook's visit, and that a feral pig population existed on Queensland's Cape York Peninsula. The evidence includes the carrying of pigs in the traditional Torres Strait trading system, depiction of pigs in Aboriginal rock art of the Cape York Peninsula, the presence of a typically New Guinea parasite in the Cape York feral pig population, the fact that these Cape York pigs are today quite similar in physical size and appearance to the pigs of New Guinea, the presence of prominent longitudinal stripes on newly-born piglets in both northeastern Australia and New Guinea, and finally the existence of a New Guinea-Torres Strait word for pig in the language of Aborigines living at Princess Charlotte Bay on the Cape York Peninsula. [Case study of the inadequacy of methodology and data on the "full" identification of "native fauna."]

Bahn, P. G. "The 'unacceptable face' of the West European Upper Palaeolithic." *Antiquity* 52 (1978): 183-92.

Reviews claims that several lines of evidence show Late Pleistocene humans in Europe controlled horses. The clearest evidence is thought to be types of incisor wear involving polished notching and anterior beveling. Hue (1915) examined 20,000 modern American horses and concluded that horses which run free never develop anterior beveling. The author believes further evidence is required about the significance of this criterion. [See Rogers and Rogers.]

Bancroft, Hubert Howe. *The Native Races of the Pacific States.* 5 vols. London: Longmans, Green, 1875.

Page 1:659: The Mijes [of south Mexico, nowadays] possess large numbers of mules, although they get no benefits from them. They make no use of them as beasts of burden but carry loads on their own backs. [Regarding the "utility" of animals "possessed."] Page 2:484: Rabbit hair fabrics were equal in finish and texture to silk.

Beck, Horace P. "The animal that cannot lie down." *Journal of the Washington Academy of Sciences* 39 (1939): 294-301.

The-animal-that-cannot-lie-down theme was probably common in India, Europe, and the Near East, and possibly China and Siberia. Critically considering accounts and discussions by Speck, Strong, Charlevoix, Eiseley, etc., of great creatures, he

concludes (p. 300) that "we (indeed) have a creature strongly resembling only one thing—the mammoth." Beck gives four cogent reasons for disbelieving that these stories could have originated with European settlers. "Thus, we are brought to the conclusion that the Indian must have remembered such a beast at one time in the ancient past." But since no evidence has been brought forth to show the mammoth existed after the Pleistocene, then we must consider that this memory dated back to that time.

Beck, Jane. "The giant beaver: a prehistoric memory?" *Ethnohistory* 19 (1972): 109-22.

This largest-ever American rodent (Casteroides ohioensis, up to 9 feet long, weighing to 500 lbs.) became extinct after the Pleistocene (no later than 4000 B.C.?) but Beck tentatively concludes that widespread tales in northern North America preserve a "fossil memory" of the creature.

Beddall, Barbara G. Letter. *Science* 180 (1 June 1973): 905.

The letter regards rapid extinction. The horse came to Argentina in 1536 and the cow in 1556. By about 1700, according to Félix de Azara, a Spanish naturalist and geographer who lived in South America from 1781 to 1801, 48 million head of feral cattle inhabited 1.7 million square kms. Before the middle of that century, however, wild cattle had been all but exterminated, although the human population probably did not exceed 300,000. Spaniards, Portuguese, and Indians slaughtered them for skins and fat; each Indian killed two pregnant cows a day in order to eat the flesh of the unborn calves, considered a delicacy. Throughout the year, the Spanish gauchos killed a cow for every meal.

Bender, M. Lionel. "Livestock and linguistics in North and East African ethnohistory." *Current Anthropology* 23 (June 1982): 316-17.

There is no evidence of small livestock in Ethiopia prior to 2,500 B.P. (but later, yes). We thus find cases in which it seems that languages have applied the *cow* term to the late-arriving small livestock.

Bennett, Wendell C., and R. M. Zingg. *The Tarahumara. An Indian Tribe of Northern Mexico*. Reprint edition, with additions. Glorieta, N. M.: Rio Grande, 1976.

In regards to the domestication process: young turkeys are usually caught and fed by hunters, whereupon they become tame house fowls which do not even need wings clipped to keep.

Brand, Donald D. *The coati or pisote (*Nasua narica*) in the archaeology and ethnology of Meso-America*. Actas y Memorias, 35a. Congreso Internacional de Americanistas, México, 1962, vol. 3. México, 1964, pp. 193-202.

A tour de force discussion of overlapping names for similar animals, with special reference to what happens when people encounter entirely new animals. Coatis are easily tamed as pets, though in the wild they are game animals. Ritual associations too. Also on co-presence of man and now-extinct animals: buffalo in northern Mexico into the 18th century and in Michoacán to a few centuries before the Conquest.

Brasseur de Bourbourg, Charles Etienne. *Popol Vuh. Le livre sacre et les mythes de l'antiquité américaine*. Paris: Aug. Durand, 1861.

Page xl, in footnote 1: Fu -Sang is the subject of a curious notice in the Wa-kan-san-taï-dzon-yé or Great Encyclopedia of the Japanese. That enigmatic region was situated to the east of Ta-nan-kouëh (i.e. of China) at a distance of around 20,000 li. Its inhabitants raised deer as (their) beef and they made a beverage of the milk. Milk was not (otherwise) unknown in Mexico (which he supposes to have been Fu Sang), for they milked bison cows and tame deer and made cheese from the milk.

Bryan, Alan L. "New light on ancient Nicaraguan footprints." *Archaeology* 26 (1973): 146-47.

The author obtained a soil sample from the layer below the mudflow in which the human footprints were made. Radiocarbon gives a date of 5945 B.P. He allows a thousand years for the soil to develop under the footprints, hence they date to around 3000 B.C.

Carr, Christopher. "Why didn't the American Indians domesticate sheep?" In *Origins of Agriculture*, edited by Charles A. Reed, 637-91. The Hague: Mouton, 1977.

Pages 637-38: Domestication is "that man-animal relationship in which animals are removed from their natural living area and breeding community, and are controlled in their breeding habits for profit." There may be numerous paths to domestication. Page 639: Example of an experiment with European elk where they were "attached" to a particular location by teaching them to associate the area with food. The tamed animals were then exploited for their milk, but allowed to interbreed with their wild counterparts. "It would take a shrewd archaeologist to unravel such a circumstance from the archaeological evidence."

Old World sheep domestication happened in the same area as the rise of agriculture. New World sheep (mapped on p. 640) occurred in mountainous western North America but only a few peoples in that area were agricultural and they did not suffer "pressure" in the use of economic resources of the kinds likely to have turned their attention to sheep. Also American sheep prefer cliffs while those of the Old World are more flat-land dwellers, so "social relationships between man and sheep" were harder to develop.

Carter, George F. "Uhle's mastodon." *Anthropological Journal of Canada* 6/2 (1968): 21-24.

An English-language summary of Uhle 1930. Franz Spillman of the University of Quito found a complete mastodon skeleton with artifacts associated in the vicinity of Alangasí, 12 km. east of Quito. Uhle was present for five days aiding the excavation. Spillman had long collected in the area, finding remains of the mastodon, horse, mylodon, and glyptodon. At one such site he found pottery. The animal had been killed in this marshy spot, a stream-cut bank north of Alangansí, southwest of the foot of Ilalo mountain, at about one meter deep and two meters above the river bed. The right side of the back of the head showed a pair of lesions that could only have been inflicted by man; both had superficially healed, though infected. It lay in a 50 cm. thick layer containing numerous lumps of charcoal and pieces of hard clay burned red. Fire had been built up all around the body. Large stones had shattered bones. Burn traces were found on the skull, parts of the pelvis, and one foot. Fire had also been started in the belly cavity. Pieces of chipped obsidian and a bone tool were found in or by the

body. About 150 potsherds were found scattered through the firelayer and especially covering the skeleton on various sides. Some were burned into the clay. Uhle speaks of some as "fine Maya pots of the oldest Cuenca culture." Uhle concluded that the mastodon had survived into the pottery-making period and specifically into the time of Mexican influences on Ecuador. [Compare Hoffstetter and J. Salvador L.]

Carter, George F. "Pre-Columbian chickens in America." In *Man across the Sea: Problems of Pre-Columbian Contacts*, edited by C. L. Riley, J. C. Kelley, C. W. Pennington, and R. L. Rands, 178-218. Austin: University of Texas Press, 1971.

A comprehensive treatment of the data and interpretive opinions generated from the data, with the result that anthropological, biological, historical, and linguistic evidence leads the author to conclude that (page 215) "the case for (a) Spanish and Portuguese introduction is weaker than the case for a pre-Columbian Asiatic source." [Carter as editor has in preparation a volume of papers greatly expanding on this question.]

Carter, George F. "A hypothesis suggesting a single origin of agriculture." In *Origins of Agriculture*, edited by Charles A. Reed, 89-133. The Hague: Mouton, 1977.

Pages 126-27: Suggests that the domestication of animals in America resulted from stimulus diffusion (transmission of the idea) from the Old World which led local peoples to utilize local animals. For example, the turkey ranged from Panama to New England but only in Mesoamerica was it domesticated (plus the Pueblos under heavy Mexican influence). And "There were plenty of sheep, Rocky Mountain 'goats,' cows . . . , horses, camels, elephants, ducks, and geese in the American landscape but the Amerinds did not perceive them as potential domesticates, except in the very areas of demonstrable strong overseas influences."

Caton, John D. *The Antelope and Deer in America.* 2nd edition. New York: Forest and Stream, 1877.

Reports on attempts at domestication and varying success therewith. Page 151: The Prong Buck (*Antilocapra americana, Ord.*, of the temperate western U.S.) is very easily tamed and enjoys human company. When taken young and brought up by hand, they become attached to the one feeding them, although with great individual variation in this tendency. Pages 54-56: Breeding in a domesticated state is rarely successful; however he believes "that with time and care all the difficulties . . . to the complete domestication may be overcome." Page 276ff: The moose is not infrequently reared and tamed, although they tend to attack humans during rutting season. The elk in northern Europe is said to be tamed without difficulty and goes in harness as well as a reindeer, being so used in Sweden for two or three centuries. Page 297ff: But his efforts to domesticate the Mule deer have been practical failures. Page 305: By selecting, he has succeeded in building a stock of the common or Virginia deer, although it is unclear whether they will breed successfully over many generations. Pages 113-16, 121, and 309-10: The "Acapulco deer" is a small variety of the Virginia deer, found in Mexico and south to Panama. Those he has had or observed range only from 30-50 lbs. "They seem to be hardy in domestication," though he is uncertain whether this would be so over generations.

Chapman, Carl. "Horse bones in an Indian mound." *Missouri Archaeologist* 7/1 (April 1941): 3-8.

Horse bones and a human skeleton exist in a private collection. A University of Missouri party dug in the mound from which potting had produced the bones. No

substantive information supports, nor rules out, their speculative scenario: that a horse died in the vicinity 40-50 years ago and was buried in an existing pothole, then was covered up to three feet deep incidentally by dirt from subsequent digging. Mound construction is similar to that of other (presumably pre-Columbian) mounds in the area.

Charlevoix, Pierre Francois Xavier de. *Historia del Paraguay*. Vol 1. Translated to Spanish by Pablo Hernández. Madrid: Librería General de Victoriano Suárez, 1910 [1756].

Page 51: He calls the *anta* (tapir) "a species of buffalo of the size and somewhat looking like an ass." Page 52: Its meat is very healthful and little different from that of the ox.

Clavigero, Francisco Savier. *Historia Antigua de Megico*, Tomo 2. London: R. Blackmann, 1826.

Page 278: In Zacatecas there was a man (before Clavigero's day) who used elk to pull his coach in place of horses, as attested by Betancourt (no reference). Page 344: They raised in their houses innumerable species of animals unknown in Europe. They had *techichis* (fattened dogs), *pabos* (turkeys), *codornices* (quail), *ánades* (dictionary: "duck" and by extension goose), *patos* (ducks), and other species of birds. The rich and noble, in addition to the birds, had fish, deer, and rabbits, and in the royal houses were found nearly all the quadrupeds, "animales volatiles" (wild animals), and many aquatic ones and reptiles.

Connell, Evan S. *Son of the Morning Star*. San Francisco: North Point, 1984.

Page 135: Several half-grown pronghorn antelope followed Custer's column and became very fond of him personally. He loved animals and exuded this feeling powerfully. Audobon and Catlin agreed that the American antelope could not be tamed, yet whenever Custer's unit camped, these antelope would locate Custer "and quite ignoring the presence of strangers . . . would paw his hand precisely as a pet dog might have done in mute request to be fondled"—a performance which caused grave surprise among visiting Indians. [Some individuals have a special gift to tame animals?]

Cortes, Fernando. *His Five Letters of Relation to the Emperor Charles V*. Vol. 1. Translated and edited by Francis Augustus MacNutt. Glorieta, New Mexico: Rio Grande, 1977.

Page 254: Second Letter. In regards to certain early enigmatic Spanish hints about "silk": "Montezuma gave me a large quantity of stuffs, which considering it was cotton, and not silk, was such that there could not be woven anything similar in the whole world, for texture, colours, and handiwork. . . . bed clothing, with which that made of silk could not be compared."

[Cuadernos Americanos] "¿Conocieron la rueda los indígenas mesoamericanos?" *Cuadernos Americanos* 25/1 (Enero-Febrero 1946): 193-207.

Page 206: Photo opposite this page shows a nondescript animal with fragmentary remains of a rider on its back said to come from the Valley of Oaxaca. On the page the argument is made that while this figurine looks pre-Columbian, it must have come from immediate Conquest times because it shows a rider, an idea that must have come to a native potter by seeing a Spanish rider.

Delibrias, Georgette, and Marie-Therese Guillier. "Gif natural radiocarbon measurements XI." *Radiocarbon* 30 (1988): 61-124.

Page 89: A radiocarbon sample (Gif-4055) from "bones of large mammals (*Camelidae*) in paleolacustrine deposit" from Playa San Bartolo, Sonora, Mexico, yields a date of 7630 +- 460 years before A.D. 1950 or ca. 5680 B.C. "*Comment:* date proves late existence of camel in Mexico."

Denison, Thomas Stuart. *The Primitive Aryans of America.* Chicago: The author, 1908.

Page 22: Nahuatl for cow is *quaquaue* (pronounced ka-ká-way) to which he compares Sanskrit *go, gau* (cow). Page 23: Under the article "Mexico" in the *Encyclopedia Britannica,* E. B. Tylor on the Aztecs quotes one of their prayers. The worshipper tells Tezcatlipoca he has sacrificed a sheep to him. Tylor supposes Spanish influence, but Denison compares Nahuatl *ichcatl,* sheep, to *chága,* "goat," in Sanskrit.

Dillon, Brian D. "Meatless Maya? Ethnoarchaeological implications for ancient subsistence." *Journal of New World Archaeology* 7 (1988): 59-70.

Only recently have analyses of faunal remains begun to overturn the old "meatless Maya" model of subsistence. Page 60: Some Mayanists are convinced that small herds of tamed or semidomesticated deer ranged though Maya sites, with a result not dissimilar in some respects to the "deer parks" of European royalty. Some researchers have been quietly suggesting for years that the Maya tamed or even quasi-domesticated many more animals than those commonly recognized by archaeologists (citations). The collared peccary may have been utilized through their attraction to human tree crop locations. Peccary behavior is described. Ancient Maya animal taming is reprised, including citations regarding walled enclosures of stones which possibly were used as animal pens (even for peccaries). Examples of modern animal taming ("a great diversity of species") are reprised, including the peccary. "That the modern Maya pattern of peccary taming owes much to Precolumbian tradition is probable."

Edmonson, Munro S. *Quiche-English Dictionary.* Tulane University Middle American Research Institute Publication 30, 1965.

Page ix, Introduction: He gives *keh,* "deer," as one of 41 "key words." Page 57: The entry in the alphabetical listing has "*keheh:* (v.) *kieheh:* mount, ride" (citing Xec and Maynard vocabulary, 1973). Also "*qiheh:* mount" (from Edmonsen's Cakchiquel informants). "*keh:* (n.) deer (Cariacus virginianus), seventh day name, horse (-8)." (The numeral indicates that the term *keh* dates by glottochronology to approximately 800 B.C.) Page 58: Further sub-entries: "*kehebal:* (n.) *kiehebal:* steed" (Xec and Maynard). "*kehem:* (n.) *kiehem:* mounted" (Xec and Maynard). "*kehen:* (n.) *kiehen:* ride" (Xec and Maynard). "*kehenik:* (v.). *kiehenik:* ride" (Xec and Maynard). "*kehexik:* (v.) *kiehexik:* be mounted" (Xec and Maynard). [Nothing in these entries indicates positively that the meaning "mount, ride," and so on were other than recent extensions of meaning of the original "deer," although it is possible.]

Edmonson, Munro S. *The Book of Counsel: The Popol Vuh of the Quiche Maya of Guatemala.* Tulane University, Middle American Research Institute Publ. 35. New Orleans, 1971.

Page 219: Quote from Las Casas regarding the use of birds for sacrifices at temples along with confession. Page 4: Raynaud translates an expression in Popol Vuh as "(great dawn pig), great dawn tapir." Page 28: Gallinaceous birds of Central America

include pheasant and quail (named). A partridge-like wood rail (*Aramides spp.* or *Tinamous spp.*) was raised in captivity in Yucatan. Page 32: Four principal parrots of Guatemala are named and specified. Page 96: Two species of rabbits specified. Page 136: Sacrifice of dogs was common in Yucatan. Page 141: Deer and birds were used as burnt offerings.

Edmonston, Mary Chandler. "The Mammoth and the Mastodon in the Folklore of the Indians of North America." M.A. thesis, Columbia University, 1949.

A comprehensive, partially critical treatment which concludes that such a tradition has indeed been continuous among North American Indians since extinction of these creatures ca. 10,000 B.C.

Eiseley, Loren C. "Indian mythology and extinct fossil vertebrates." *American Anthropologist* 47/2 (1945a): 318-20.

To early (18th-19th century) men, including Indians, with little knowledge of palaeontology, it is understandable how they could have speculated on mastodons and other extinct mammals based on some bones, without benefit of any "tradition." Page 319: In conversation with the late naturalist Dr. Edgar Howard, Howard was somewhat inclined toward the view that the horse survived. Eiseley argued that if the horse survived, its bones would have been found in archaeological sites, but Howard countered, "perhaps it wasn't eaten." Eiseley thinks this won't do because Paleolithic hunters in Europe as well as Folsom hunters ate horses.

Eiseley, Loren C. "Myth and mammoth in archaeology." *American Antiquity* 11/2 (1945b): 84-87.

Sheds doubt on the traditions reported by Strong and others and on finds such as Koch's as constituting acceptable evidence. "Too often there is a tendency to speak as though these early reports settled the matter, even though the records show that similar beliefs were once entertained about the Old World mammoth, only to be abandoned later."

Eiseley, Loren C. "Men, mastodons, and myth." *Scientific Monthly* 62 (1946): 517-24.

Constant repetition of the "fact" that mastodon hide and hair have been found in well-preserved condition turns out to have no basis. When the 18th- and 19th-century accounts are examined, their force evaporates because "no person of real scientific repute ever saw these remains." [Koch's value as witness is here impugned, apparently calling forth Ashley Montagu's defense of him in 1947.]

[Encyclopaedia Judaica.] "Animals of the Bible and Talmud." *Encyclopaedia Judaica,* 3:8-19. Jerusalem, 1972.

Page 8: Horses were not much used in Israel, the donkey and mule being preferred. In talmudic literature wild animals are not permitted for sacrifice, though they are for food. Pages 11-12: Table gives separate terms for goat and wild goat. Pages 15-16: Same for sheep and wild sheep. Page 17: Doves, turtledoves, and sparrows were used for sacrifices. Page 19: "The identification of the animals in the Bible has given rise to divergent views, some contending that it is possible to identify them in a few cases only. Others, however, hold that this can be done in most instances. While the problem of their identification has been raised in the separate articles on them, the above list gives only the most probable identification." [Related comment by Benjamin Urrutia in a personal communication to J. L. Sorenson: *Tahash* (in Hebrew), for example, is possibly identifiable as either the dugong or the giraffe, yet the King James Version translates it "badger."]

the zoological identity of the animals referred to—probably camelids for "sheep" and "goats," this Spaniard's naming them is of interest. Conventional goats and cats are supposed absent from America.]

Gatschet, Albert S. "Elephants in America." *American Antiquarian and Oriental Journal* 9 (1887): 202-3.

Quotes the account of Davyd Ingram who traveled from Mexico to Acadia in 1568-1569 and described an animal somewhere in eastern North America seen by him and his companions which he calls an "Eliphant." Gatschet also reports that a French expedition on the Red River in Louisiana in 1719 claimed to find a party of Indians "roasting unicorns," while another French explorer "heard from the savages, that upon the upper Washita river unicorns were found." [At the least, shows some of the difficulty eye-witnesses and non-eye-witnesses have with perception and labelling.]

George, Wilma. "Sources and background to discoveries of new animals in the sixteenth and seventeenth centuries." *History of Science* 18 (1980): 79-104.

Page 80: How information from South America came to public knowledge in Europe: first in letters or journals of explorers, then more complete descriptions from residents, governors, or missionaries. Specialized animal encyclopedias were slow to include new information. Page 83: Enciso, who had visited Venezuela in 1510 and 1513, said of tapirs: "as big as an ox or a cow." Page 85: Cabeza de Vaca on the capybara: "a sort of waterboar, half hog, half hare." Around 1526 Pietro Martieri on the agouti, from Guyana: "conies like unto hares." Page 86: Vicuñas were rounded up, sheared, then released. North America: In 1532 Cabeza de Vaca considered bison: "like the cows of Morocco. . . . They come as far as the sea coast of Florida from a northerly direction." Page 90. Cortez saw turkeys in Mexico (probably the ocellated turkeys of Yucatan) in 1519 and called them "peacocks." Casteñeda on the Coronado expedition, 1540-1542, called turkeys "native fowl." Page 91: Cabrillo, at San Diego Bay, 1542, of pronghorn antelope: "animals like flocks of sheep, which resembled in appearance and movement Peruvian sheep [i.e., llamas]."

Gibson, Frances. *The Seafarers: Pre-Columbian Voyages to America.* Philadelphia: Dorrance, 1974.

In discussing the "silk" mentioned in the Chinese Fu-sang tradition, which he believes does describe America, he asks, was this silk actually vicuña-hair textile? Prescott said that a silklike cloth was made from the worm of a caterpillar other than the silkworm. Cortes referred to "silk" in Mexico. Humboldt said the Aztecs manufactured silk. Von Hagen said that the Incas made a silk-like cloth from the fur of bat's wings.

Gilmore, Raymond M. "Fauna and ethnozoology of South America." In *Handbook of South American Indians,* edited by Julian H. Steward, 6:345-464. Smithsonian Institution, Bureau of American Ethnology Bulletin 143. Washington.

Page 423: The European horse was unknown in pre-Columbian times, but was redomesticated from feral Spanish herds in the early 17th century by certain southern Indians. Extinct horses of other species were known to the early (prehistoric) aborigines, and were hunted and eaten by them, but were not domesticated to our knowledge. Page 424: Eaton's identification of the bison in a Cuzco grave (1912) was later withdrawn (1913) in favor of a post-Columbian cattle specimen. Page 426: There are several early Spanish references to humped dogs in the Antilles, Central America, New Grenada (Colombia) and Peru.

"Domestication is a phenomenon which is difficult to explain or define accurately, and it is equally difficult to make a list of domesticated animals. . . . It seems best to consider several conditions and several classes or degrees of domestication."

"A distinction must be made between 'domesticated' and 'tamed wild' animals. The latter generally are isolated individuals which are caught wild (usually when young) and tamed as pets. However, such a condition grades into that in which animals are caught purposely in numbers in the wild state and kept for certain economic purposes." Page 427: "[The term] domestication should apply to an animal species which meets the following conditions: That it (1) is integrated into human culture; (2) is kept forcibly under human control for a purpose; (3) is dependent upon man, either voluntarily or involuntarily, for survival under this prior condition; (4) generally breeds under the artificial conditions of human control; and (5) generally is modified into breeds (or strains) through selective breeding by man."

"This definition gives several degrees of domestication: (1) Ordinary, or highly domesticated animals—those which answer all conditions (generally widespread geographically also); (2) semidomesticated animals—those which answer at least the first three conditions. Some semidomesticated animals, e.g., pearl oysters, silkworms, honey bees, etc., have been called 'cultivated.' "

Hamblin, Nancy L. *Animal Use by the Cozumel Maya.* Tucson: University of Arizona Press, 1984.

Pages 93-94: The ocellated turkey, unlike the common turkey (*Meleagris gallpavo*), has never been domesticated, because its offspring fare poorly in captivity and possibly because of its superior flight capabilities, although they might have been captured and tamed. The presence of pen-like stone circles in some sites may support the idea of captive birds. They range in diameter from 5 to 15 m. and have walls of dry-laid masonry up to 1.5 meters (preserved). Chemical testing shows possible animal waste concentrations within them. Pages 146-47: Cozumel sites uniquely show high numbers of coati remains, apparently having served as food.

Harner, Michael. "The ecological basis for Aztec sacrifice." *American Ethnologist* 4 (1977): 117-35.

Population pressure combined with lack of domesticated animals to provide protein resulted in Aztec resort to cannibalism on a large scale.

Hatt, Gudmund. "The reindeer." *American Anthropologist* 23 (1921): 97-101.

Pages 100-101: A passage from the Kalevala mentions the reindeer as the Lappish equivalent of the horse.

Hatt, R. T. "Faunal and archaeological researches in Yucatan caves." *Cranbrook Institute of Science Bulletin* 33.

Pages 71-72: Examining remains taken by Mercer from Actun Lara cave, he finds numerous tooth and bone fragments of the horse, *Equus conversidans*. As regards chronology, the teeth and bones were in many cases heavily encrusted with lime; pottery occurred throughout the deposits. But two foot bones present in the upper of two layers in which the horse remains occurred were identified as those of domestic cattle, raising a question about the antiquity of the horse piece. [In light of the definite

Hunn, Eugene "Did the Aztecs lack potential animal domesticates?" *American Ethnologist* 9 (1982): 578-79.

Contra Harner's 1977 explanation of Aztec cannibalism as due to nutritional need for protein, Hunn argues that "the mammalian fauna of Mesoamerica was no less well endowed with potential domesticates than other world regions that supported the evolution of early civilizations." Gives five criteria for potential: (1) species present (to the Aztecs), (2) primarily herbivorous, (3) large mammals (2 kg. plus), (4) highly social species (to more readily tolerate conditions of domestication), (5) species with close phylogenetic or ecological counterparts under domestication elsewhere. The following are then discussed in those terms: Peccary (two species; classed with Old World pigs, distinguished primarily by foot structure); collared peccaries are known to be easily tamed and make excellent pets (citing Leopold); Pronghorn antelope (*Antilocapra americana*), "the ecological counterpart of the Old World sheep . . . and goats" [not much south of the Valley of Mexico, however]; Tapir, a relative of the horse and rhino. Grzimek's Atlas [see Frädrich] judges them to have "characteristics suitable for domestication." A closely related species of tapir has been used in recent times as a draft animal in Amazonia, according to the Atlas. Agouti and paca belong to the same suborder as Andean guinea pigs. Their flesh is considered "outstandingly delicious." Walker 1968 says agoutis "tame easily and make excellent pets." Finally, he says the Muscovy duck was never domesticated in Mesoamerica. So lack of domesticates does not explain Aztec failure to use such animals for protein but probably shows their choice of more efficient means of nutrient provision through intensive agriculture.

Hunter, Milton R. *Archaeology and the Book of Mormon*, vol. 1. Salt Lake City: Deseret Book, 1956.

Fig. 3 pictures part of the Temple of the Plaques at Chichén Itzá, with an arrow on the photo pointing to the wall where the author sees "the location of carving of horse." Page 6 shows him pointing at this panel, said to show "the Chichen Itza horse and bearded man." The animal figure is waist-high to the human, the animal standing behind the man. [Perhaps this is a deer, in the light of Pendergast, Kidder, etc.]

Johnson, Irmgard Weitlaner. "Basketry and textiles." In *Archaeology of Northern Mesoamerica*, part 1, edited by Gordon F. Ekholm and Ignacio Bernal. *Handbook of Middle American Indians*, 10:297-321. Austin: University of Texas Press, 1971.

"Silk." Cotton cloth from Tlamimilolpa, Teotihuacan (ca. A.D. 300) is characterized by Strömberg 1942 as "of gossamer thinness." Page 312: Also "dyed rabbit hair (*tochomitl)* was interwoven or embroidered on fine cottons. . . . Wild silk was probably spun and woven in remote areas."

Kamar Al-Shimas. *The Mexican Southland.* Fowler, Indiana: Benton Review Shop, 1922.

Pages 111-12: The "tejan" [tejón or coatimundi], a cousin of the raccoon, is easily tamed and makes a great pet. Page 112: In the Isthmus, the tapir is considered "half hog and half elephant." It is easily domesticated if caught young. The tapir is called "Anteburro, that is, 'once an ass'." Pages 114-15: Curassows are easily domesticated.

Kaufman, Terrence. *El Proto-Tzeltal-Tzotzil. Fonología comparada y diccionario reconstruido.* Universidad Nacional Autónoma de México, Centro de Estudios Mayas Cuaderno 5, 1972 (México).

Page 13: His glottochronology puts this proto language at 1400 years ago. Page 15: In the absence of historical data we could reconstruct a Proto-Tzeltal-Tzotzil form **wakas(h)*, "cattle," which would explain forms occurring in all dialects of both languages, but of course it comes from Spanish *vacas*. Page 98. **c'ex,* "chinchilla." Page 110: **me?-mut, gallina* ("chicken"). [Note: full orthography not reproducible here.]

Kaufman, Terrence. "Archaeological and linguistic correlations in Mayaland and the associated areas of Meso-America." *World Archaeology* 8/1 (1976): 101-18.

Page 105: Proto-Mayan, which began to break up by around 2200 B.C., included terms for the following: dog, turkey, and pet, all of which he counts as domestic animals. Other animals represented by terms in Proto-Mayan: deer, agouti, bee, and others.

Kaufman, Terrence. "Areal linguistics and Middle America." In *Native Languages of the Americas,* edited by Thomas A. Sebeok, 2:63-87. New York: Plenum, 1977.

Page 81: Aztec *mizton, miztli,* "cat, wild-cat," is believed by some to be from Spanish, but Hopi *mosa* allows a Uto-Aztecan reconstruction **musa,* which may have referred to a small wild cat, as per Whorf's loanwords paper. Page 83: List of loans has Zapotecan giving *picjinja,* "deer/large animal," to Huastecan and *mani,* "horse" (< deer) to Yucatecan. No discussion.

Kidder, A. V. *Miscellaneous archaeological specimens from Mesoamerica.* Carnegie Institution of Washington Department of Archaeology, Notes on Middle American Archaeology and Ethnology No. 117 (Mar. 1954).

Page 11: Fig. 4, c, gives three views of the cover of an incense burner in which a man sits on a deer's back. From Poptun, the Peten, it probably was from a tomb. Period is uncertain [though pre-Columbian and probably Classic].

Kiddle, Lawrence B. "Spanish and Portuguese cattle terms in Amerindian languages." In *Italic and Romance Linguistic Studies in Honor of Ernst Pulgram,* edited by Herbert J. Izzo, 273-91. Amsterdam: John Benjamins B. V., 1980.

Page 273: Adoption of a new domestic animal into a culture causes a linguistic problem which has four solutions: (1) loan creation, i.e., giving the animal a descriptive name; (2) loanshift or loan extension, i.e., giving it the name of a familiar animal it is believed to resemble; (3) loanblend, i.e., to combine the foreign name with a native term that indicates its origin or some other characteristic; or (4) loanword, i.e., to adopt, frequently in a distorted form, the foreign name. Page 274: The first cattle arrived at Hispaniola in 1494 from Columbus's second voyage. In 1521 cattle were taken from Hispaniola to Mexico. Page 275: Coronado headed for Cibola (the Southwest of the present USA) in 1540 driving cattle, some of which were lost. Feral herds from those were found 25 years later in western Mexico, and by 1555 a single owner might have up to 20,000 head. Pages 279-85: Tables list the names, tribes (country by country), and references for hundreds of "native" language terms derived from *vaca,* "cow"; *buey,* "ox" (Portuguese *boi,* "ox"); *toro,* "bull"; and *beséro,* "calf". Page 285: In his research he has discovered approximately 35 languages, mostly from Brazil, where he has been unable to analyze the terms (not listed). They may be descriptive names or

loan creations. The Mataco and Vejo in South America did loanshifts from deer, thus *wasetaj*, "cow," from *wase*, "deer," plus *-taj* = "-like." The classic case of loanshift: the Tupinamba were the first Indians in Brazil to have cattle and likened the new animal to the tapir, *tapyra*. As cattle passed to other tribes, many simply accepted Tupían *tapyra* as the name for the new creature and kept their own names for tapir. Others extended their own words for the tapir to mean cow.

Kleivan, Inge. " 'Lamb of God' = 'Seal of God'? Some semantic problems in translating the animal names of the New Testament into Greenlandic," *Papers from the Fourth Scandinavian Conference of Linguistics, Hindsgavl, Jan. 6-8, 1978*, edited by Kirsten Gregersen, 339-46. Odense, Denmark: Odense University Press, 1978.

Discusses some solutions developed by missionaries when translating New Testament terms for animals not present in Greenland. The 1744 reference to sheep in Matthew 9:36 used a foreign word with a footnote: "small animals which are nearly like caribous." Unsatisfactory though this is, no other animal would have made a better comparison. Myth among translators holds that "The Lamb of God" was once translated "The Seal of God" in Greenlandic Eskimo because the importance of the seal compared with that of the sheep in Palestine. Actually this expression was never used. Mainly, animals unknown to natives were labelled with words borrowed from Norwegian, to which footnotes were appended.

Krickeberg, Walter, Hermann Trimborn, Werner Müller, and Otto Zerries. *Pre-Columbian American Religions*. History of Religion Series. New York: Holt, Rinehart and Winston, 1969.

Pages 258-59: Among the Tupinamba of eastern Brazil and modern Tupi-speaking tribes of the Amazon Basin, Korupira, the guardian spirit of the forest and game animals, is described as riding on a game animal; sometimes his mount is a deer or rabbit, but usually he rides a peccary (wild pig) and acts as swineherd.

Jorge Larde, "Los Mazahuas de El Salvador." *Anales, Museo Nacional "David J. Guzman"* 5/17-18 (1954): 86-87. Reprinted from *El Salvadoreño*, 24 May 1926.

"Among the most ancient Indian tribes which the most ancient traditions mention is found the 'Mazahuas,' a herding people ("pueblo pastor"), who took their name from the fact of possessing and caring for (herds of) deer, especially 'white deer,' which disappeared from our territory during the time of Spanish domination. The name of 'mazahua' is formed from the Pipil word 'mazat,' deer, and 'hua,' who has or possesses something; thus 'mazahua' signifies 'the possessors of deer.' " They were distributed in present Salvadorean territory in four groups: one in the district of Metapán (Departamento de Santa Ana), another in Mazahua (Depto. de La Paz), another in Santa Catarina (Depto. de Sonsonate), and the last in Comazahua (Depto. de La Libertad). "These last two groups covered a relatively small extent. In the name of the second is seen the particle 'co,' which expresses place ('place of deer')." These peoples were conquered in 1530.

Latcham, Ricardo E. "Los animales domésticos de la América precolombiana." *Museo de Etnología y Antropología de Chile Publicación* 3/1(1922): 1-199.

Page 6: Wild cameloids are taken young when mothers are slain in the hunt, then, once cared for and domesticated, they rarely return to the wild. He has seen herds of tame huanacos which feed on the hills in the day and return to pastures at night on their own, reinforced by putting salt out. Page 7: Even adult animals are easily tamed after short

captivity once they have come to eat in cultivated fields and are surrounded. Page 7-8: Various individuals claim to have found remains of the auchenia (auchenia is the genera name for all the American cameloids), related to the llama, among ancient ruins in New Mexico and Arizona but this has not been proved. (P. 75. Cushing supposed that the ancient inhabitants of Arizona must have domesticated a cameloid, from having found figurines representing an animal of this family in archaeological ruins. But no actual bones have been found.) Also in New Mexico are found pictographs of an animal (p. 76) that looks like a llama.

Page 8: The cui (*cavia cobaya,* "guinea pig") is found from Mexico to Bolivia. It was found domesticated even among some hunting tribes. Ducks were found (domesticated) among the more civilized groups from the southern U.S. to Peru. Other gallinaceous fowl were domesticated among peoples of the Gulf of Mexico and Central America. Page 36: Wolf-like dogs were used in North America to carry and pull burdens; they could carry more or less 70 lbs., according to Elliot Coues (*History of the Expedition under the Command of Lewis and Clark,* 1893, Vol. 1, p. 140). Page 37: Sioux terminology for these dogs was so archaic and they were so much involved in tradition and ritual that it has been supposed they were so used for a long time. Used elsewhere (Iroquois and Pueblos) in sacrifice. Small hairless, often voiceless dogs were used for food in the Antilles, Mexico, Central America and Peru at least. Page 76: Gómara reported that when Fr. Marcos de Niza returned from Cibola in 1538 he reported that there they had *ganado de lana,* "woolly animals." Latcham suggests that it is barely possible this referred to *auchénidos* (cameloids), but overall (page 77) there is not convincing evidence for the presence of cameloids in the Southwest.

The bison was called *vaca,* "cow," by Cabeza de Vaca and his fellows. In Patagonia *huanacos* were tamed sometimes, and Alonso Veedor, scribe in the expedition of Simón de Alcazaba, reported they were there used as beasts of burden. Page 90: Both the *huanaco* and vicuña are easily domesticated. Page 94: In the early 16th century in Europe the Peruvian name *huanaco* was not known. The first observers named them variously; most believed that they were a tapir, at the same time believing that the tapir was related to European deer. Others described it as a wild ass, while Gómara confused it with the mountain goat. The cameloids generally were termed by many Spaniards during the first century after the Conquest *carnero u oveja de la tierra,* "sheep of the land" or "native sheep." Pages 98-99: Vicuñas were scarce in Peru because they were reserved for royal possession. Vicuñas were rarely used to carry burdens; they were, rather, specially kept for their fiber and for food. Llamas and alpacas, highly changed through domestication, could not breed without human intervention to assist the act.

Pages 150-51: Gómara (mistakenly, in Latcham's judgment) thought that Plains Indians had tamed bison. He also said, concerning "Apalachicola, an area now in the state of Georgia, that the inhabitants had many deer which they raised in the house, kept in corrals at night and herded in pastures in daytime." From their milk they made cheese (citing *Historia de las Indias,* p. 180). Regarding peccaries or *puerco del monte,* "mountain pigs," some chroniclers indicate they were domesticated (*que se crian,* "that are raised") in Peru, and Lozano said the Guaraní had them domesticated (Latcham thinks this must mean only tamed and captive rather than truly domesticated). Page 154: There is no positive information that these animals were domesticated at the time of the Conquest, but they might have been after Indians observed the keeping of European pigs. Page 156: *Cuy* or *cavia* (guinea pig) existed in great numbers in northern South America and the Antilles and apparently also in Honduras and Mexico. Page 157: When Columbus took them to Europe, they were called *cochinillo de las*

Indias, "little pigs of the Indies," and later *conejillo de las Indias,* "little rabbit of the Indies."

Page 167: Various New World peoples domesticated different species of birds or fowl, notably ducks, turkeys, geese, *faisáns* ("pheasants"), and quail —*perdices*. Others—among which were eagles, hawks, parrots, and *avestruces* ("ostriches" [rheas?])—were kept in pens or corrals and used for various purposes, usually for their plumage. Page 175: Cites Joyce (1914, p. 154) regarding geese, in both west Mexico and the Maya area. Page 176: Latcham: "It is supposed that in America there were no true chickens, but this is true only in part. It may be that in North American they did not have them, but at least in South America there were several species, but distinct from those of the Old World. Not all the species have been classified, but in Chile, Bolivia and Peru at least three indigenous varieties or species are known, domesticated by the natives, and the terms cock or chicken were not adopted for them . . . because they have their own names." (Further details given.) Page 184: Another fowl that was domesticated or at least kept captive very generally in the central portion of pre-Columbian America was the partridge. In some places they could be considered domesticated because raised in captivity; in others they were caught as adults. Page 185: *Faisáns* were captives or semi-domesticated only. Probably they could have been domesticated and may have been in some cases.

Laufer, Berthold. "The reindeer and its domestication." *American Anthropological Association Memoirs* 4/2 (1917): 89-147.

Page 93: The earliest Chinese reference to the tame stag used for drawing sledges and for milking—as in the fifth century A.D. Page 94: Domestication remains deficient; herds graze where they wish and milking is difficult as the cows behave stubbornly. Page 96: The Soyot and Tungus (Siberia) ride on the backs of reindeer; other, earlier reports of the practice are to be doubted. Pages 99-100: A description at the end of the 15th century from northern Scandinavia tells of a kind of carriage pulled by reindeer at a pace such that 20 miles could be traveled in one day. The deer then let loose returned to their owner. Page 102: Skeptical Laufer simply doubts reports that the elk (*Alces alces* or *Cervus alces*) were domesticated and used in the harness for two or three centuries in Sweden, granting only that "sporadic cases of training elks to harness may formerly have occurred in Sweden." Page 102-03: Huei Shen's A.D. 499 account of journeying to mythical Fu-san country says that the people there had vehicles drawn by horses, oxen and stags. They were said to raise deer in the manner of oxen in China. Page 103: The Tungus use deer as beasts of burden. Page 107: Marco Polo spoke of a tribe perhaps from the Baikal area: they "live by their cattle, the most of which are stags and these stags . . . they used to ride upon." (Citing Yule and Cordier, *The Book of Ser Marco Polo*, vol. 1, p. 269.)

Page 108: The Persian historian Rashid-eddin, in his history of the Mongols written in 1302, speaks of a tribe styled Woodland Uryangkit living in forests northeast of Lake Baikal. "In place of sheep and cattle they kept mountain-oxen (*gawi kohi*), mountain-sheep (*mis*), and jur (Saiga antelope)." They tamed these animals, milked them, and consumed this milk. During their perigrinations they loaded the mountain-oxen. (The Scandinavians and Lapps apply terms like *ox, cow,* and *calf* to the reindeer.) The tame yak occurs in the Baikal region and may have been one of the (109) Uryangkit animals. (In the Koibal language, the reindeer is called *white goat.*) Page 110: The Yakut received reindeer keeping from the Tungus and call the deer *foreign cattle.* Page 111: A Chinese traveler in 1259 said the Kirgiz used dogs instead of horses for drawing sledges. (P. 137: Driving with dogs is practised throughout Siberia and anciently west of the Urals.) Page 130: Descriptions of the process of taming deer, by lassoing an

animal and confining it for a time day after day until quiet and useful. Only the reindeer has been fully domesticated but others in the deer family are easily tamed. (P. 141: The reindeer is never domesticated in the full sense of the horse or cow which can live in a stall and must be fed by man.) Pages 131-32: In ancient Italy does were reared on sheep's milk; Romans kept them in their parks together with chamois and gazelles. Page 139: Reindeer will haul 200 lbs. or more day after day.

Law, Howard W. "A reconstructed proto-culture derived from some Yuman vocabularies." *Anthropological Linguistics* 3 (April 1961): 45-57.

Page 54: He reconstructs a term for horse with first-order validity, but he questions it because horses are not supposed to have been present before the Spaniards brought them. He suggests the terms may have come out of some process common to the groups involved of playing with words for deer or dog. Similarly, he reconstructs a term for chicken, but neither is that acceptable.

Legge, A. J. "Prehistoric exploitation of the gazelle in Palestine." In *Papers in Economic Prehistory*, edited by E. S. Higgs, 119-24. Cambridge: Cambridge University Press, 1972.

Hypothesizes semidomestication of the gazelle by hunters.

Leopold, A. Starker. *Wildlife of Mexico: The Game Birds and Mammals.* Berkeley and Los Angeles: University of California Press, 1959.

Page 158: Fulvous Tree Duck. *Dendrocygna bicolor.* Also named: *Pijía, gallarita, serrano, chiquiote, pato silvón.* Mapped all along both coasts of Mexico (Fig. 61, opposite page 158).

[Most of the following are not said to be tamed or domesticated, but Leopold is valuable as providing additional information about potentially tamed or domesticated species.]

Page 113: Great Tinamou. *Tinamus major.* Named: *gallina de monte, gran tinamú, perdiz real, robust tinamou.* Page 115: Called "the most perfect of birds for culinary purposes." Page 117: Rufescent Tinamou. *Crypturellus cinnamomeus.* Named: *perdiz canela, tinamú canelo, perdiz.* Page 123: Little Tinamou. *Crypturellus soui.* Named: *perdíz chica, perdíz de gorro ceniciento, ponchita, pileated tinamou.* In Yucatan called *Kel Nom—Nom* being applied to any small tinamou.

Page 149: Snow Goose. *Chen hyperborea.* Named: *ansar blanca, ansar real.* Small numbers in central and southern Mexico in winter. Page 151: Blue Goose. *Chen caerulescens.* Named: *ansar azul.* As far south as the Isthmus of Tehuantepec. Page 152: White-fronted Goose. *Anser albifrons.* Named: *oca salvaje; ganso frente blanca.* As far south as Tabasco and Chiapas (coast). (More wary than other geese.)

Page 160: Black-bellied Tree Duck. *Dendrocygna anutumnalis.* Named: *pichichi, phichichil, pichihuile, pijiji* (Chiapas), *pato maizal.* Page 163: Muscovy Duck. *Cairina moschata.* Named: *pato real, pato pinto, pato perulero, solareno.* Page 164: The wild Muscovy was the progenitor of all domestic varieties. J. C. Phillips (*A Natural History of the Ducks.* 4 vols. Boston and N. Y.: Houghton Mifflin, 1922-1926. p. 66) states that the Spaniards first met the domesticated bird, "At Cartagena, the capital of the State of Bolivar, Colombia, in 1514, where according to Oviedo the Indians kept it in domestication and called it 'Quayaiz.' . . . It was extremely abundant in Peru, whence

the Spaniards exported it under the name of 'Pato perulero' to Central America, Mexico, and Europe." Presumably, therefore, the domestic bird originated in South America and was not kept by the Mexican Indians until the Spaniards imported it. [I find no evidence to contradict this thesis.] (Other ducks described too.)

Page 202: Curassow. *Crax rubra.* Named: *Hocofaisán, faisán real, faisán.* Pages 205-06: Crested Guan. *Penelope purpurascens.* Named: *cojolite, pava cojolita, ajol, faisán gritón, faisán, guajalote silvestre* (Guerrero). Page 210: Chachalacas. *Ortalis vetula,* and related species. Page 213: A frequently repeated rumor is that tame chachalacas cross readily with domestic poultry. He discounts this.

Page 219: Tree Quails. *Dendrortyx macroura,* and related species. Named: *gallina de monte, gallinita, charando, cordorniz coluda,* long-tailed partridge, wood-partridge. Page 245: Bobwhite. *Colinus virginianus.* Named: *cordorniz común, cuiche.* Page 253: Spotted Wood Quail. *Odontophorus guttatus.* Deep rain forests. Page 255: "The natives seemed more anxious to obtain the birds for pets than for food." Singing Quail. *Dactylortyx thoracicus.* Named: *chivizcoyo, chibilúb, codorniz dedilarga,* long-toed quail. Page 258: Ocellated Quail. *Cyrtonyx ocellatus.* Named: *codorniz pinto, cincoreál* (?).

Page 268: Wild Turkey. *Meleagris gallopavo.* Named: *Guajalote silvestre, cócono.* Mapped "former range" shown as only north of Valley of Mexico. Published statements about turkey distribution frequently mention Oaxaca as the most southerly point of original occurrence. Page 270: Examining the literature he now doubts presence in the southern uplands, supposing that the reports refer either to curassows or to escaped domestic turkeys. E.g. Oviedo used the name *pavo* indiscriminately for curassows and turkeys. Domestic turkeys are mentioned frequently in the relaciones of southern Mexico and by Humboldt. Pages 275-76: Ocellated Turkey. *Agriocharis ocellata.* Named: *pavo de monte, guajalote de Yucatán, guajalote brilliante, cut, Meleagris ocellata.* Yucatan as far west as southern Tabasco, including even Chiapas near Yaxchilan ruins.

Page 290: Inca Dove. *Scardafella inca.* Almost ubiquitous in cities and ranch yards. Ground dove. *Columbigallina passerina.* Nearly as widespread. Plain-breasted Ground Dove. *Columbigallina minuts.* Southern coastal zones. Others. Redbilled Pigeon. *Columba flavirostris.* Named *paloma morada, pepencha, patagona, patagonia, tecaco, torcaza, paloma mora.* Page 293: Band-tailed Pigeon. *Columba fasciata.* Named: *paloma de collar, pichón grande, yaz, cuauhpaloma.* Page 301: Mourning Dove. *Zenaidura macroura.* Named: *huilota, tórtola, tiuta, kuikipu.* Pages 304-305: White-winged Dove. *Zenaida asiatica.* Named: *paloma con alas blancas, torcáz, torcaza, tortola, huilota costeña, Melopelia asiatica.* Flocks much. Others.

Page 352: Cottontail Rabbits. *Sylvilagus brasiliensis.* Named (the several species of cottontails): *conejo.* This is the tropical forest rabbit. *Sylvilagus floridanus,* eastern cottontail, also occurs as far south as Chiapas (?) and beyond.

Page 388: Paca. *Cuniculus paca.* Named: *tepescuintle, tuza real,* spotted cavie, *Agouti paca, Coelogenys paca.* Size of a raccoon. Prefers dense rain forest (mapped: Veracruz to Yucatan to Tapachula). Page 390: Much sought game animal. Live singly. Page 391; Fine leather. Agouti. *Dasyprocta punctata,* and related species. Named: *aguti, cuautuza, guaqueque.* Size of a jackrabbit. Tropical forests of southeastern Mexico. Shy. Desirable flesh.

Pages 432-433: Coati. *Nasua narica.*

Page 488: Tapir. *Tapirella bairdii*. Named: *tapír, danta, anteburro, tzimin, tapirella dowii*. Tropical foests of southeastern Mexico. About 2 meters long and 1 meter high. 600 lbs. Page 491: Shy, highly intolerant of disturbance by man or dogs.

Page 493: Collared Peccary. *Pecari tajacu*. Named: *jabalí, pecari de collar, javelina, Pecari angulatus, Dicotyles torquatus, Tayassu angulatus*. 30-55 lbs. Page 497: White-lipped Peccary. *Tayassu pecari*. Named: *senso, marina, Dicotyles labiatus*. Larger in size than the collared. Fig. 185 maps range, in Mesoamerica mainly in eastern rain forests from Los Tuxtlas mountains up the Usumacinta and throughout Yucatan.

Page 507: White-tailed Deer. *Odocoileus virginianus*. Named: *venado, venado saltón, venado cola blanca*. Pages 513-14: Brocket Deer. *Mazama americana*, and related species. Named: *temazate, temazame, corzo, venadito rojo*. Veracruz, Tabasco, Chiapas (incl. Pacific coast). *Mazama gouiazoubira* is the "brown brocket" of the Yucatán Peninsula.

Linne, Sigvald. *Mexican highland cultures*. Ethnographical Museum of Sweden Publication No. 7, new series. Stockholm, 1942.

Page 156: "A remarkable find was made during excavations in the great pyramid of Cholula. Here an earthenware vessel in a grave contained some charred cloth. In a report issued by Instituto de Biología in Mexico City the material is declared to be wool. The grave is not with certainty stated to be pre-Spanish, and that the Indians shortly after the Conquest could have come into possession of woollen cloth does not appear very probable. It is true that it did not take long ere sheepbreeding was under way . . . , but that a 'pagan' burial should have taken place in Cholula is not very likely." [Hence the possibility remains that this was pre-Spanish wool textile, impliedly from some sort of sheep.]

Loayza, Francisco A. *Chinos Llegaron antes que Colón*. Lima: D. Miranda, 1948.

Pages 42-43: A padre in 1638 reported finding a ruin at Trujillo, Peru, with a painted wall showing armed horsemen with swords and lances, which Loayza takes to be Chinese. Squier in 1877 reported another Peruvian ruin with stone statues representing similar armed men [and mounts?].

Luna Cárdenas, Juan. "El orígen americano del caballo." *Boletín de la Sociedad Mexicana de Geografía y Estadística* 98 (Sept. 1964): 213-25.

An undocumented set of precious assertions about supposed pre-Columbian presence of horses in "Anáhuak" among the "Aztekah" of "Metziko." Page 223: For example, the "Aztekatl" name of a certain variety of horse is *Mazton* which has come into English as "Mustang."

Mahr, August C. "Semantic evaluation." *Anthropological Linguistics* 3/5 (May 1961): 1-46.

Page 3: Argues that (in regard to semantics) American Indians in actions and speech were primarily concerned with functionality and only secondarily with description, the reverse of what he finds for Old World languages. His examples are drawn, for simplicity, he says, from the Mediterranean (particularly Greek and Roman) on the one hand and Algonkian on the other. Pages 5-6. For example, European languages refer

to "trees amassed in a spot" (e.g., forest), while in North America a functional definition is rather "an uninhabited place" [cf. "wilderness"?]. Page 7: Example: Among Delaware, white and red beech trees were given two names and considered distinct. One was "basket-making tree" and the other "weak tree" depending on how they served in the hands of women basketmakers. Also gives evidence that what the Anglo-called "yellow poplar" was to Delaware "(dugout) canoe-making tree," but later on, when they made dugout canoes from the sycamore, it was the sycamore they called "canoe-making tree."

Page 9: Animals: Shawnee for elk can be translated "there is something big and white." Page 10: Shawnee name for beaver means "creature which shifts trees." Pages 11-12: Shawnee buffalo may mean "an animal that butts against and breaks in pieces." Miami Indians had been confronted with European cattle before seeing their first buffalo [as a result of moving their location westward], for the name they used specifically denotes "a cow [European]." To make it mean "buffalo" it had to be preceded by Miami term meaning "wild." Page 23: Horse: Miami = "one-hoof" Page 24: Plural of the term for deer was used for domesticated cattle but more basically "big four-footed animal." Page 26: Sheep, "looks like a cow" in Miami. [Terms in languages with this semantic orientation would not display the linguistic origins of the denominating words very well.]

Martin, Paul S. "The discovery of America." *Science* 179/9 (Mar. 1973): 969-74.

Note 3, page 974: "Admittedly, there is no theoretical reason why a herd of mastodons, horses, or ground sloths could not have survived in some small refuge until 8000 or even 4000 years ago. But in the past two decades, concordant stratigraphic, palynological, archeological, and radiocarbon evidence demonstrate beyond doubt that the post-glacial survival of an extinct large mammal has been confined to extinct species of Bison" (citations). "No evidence of similar quality has been mustered to show that mammoths, mastodons, or any of the other 29 genera of extinct large mammals of North America were alive 10,000 years ago." Same page, note 7: The North American megafauna that he believes disappeared at the time of the hunters includes the following genera: *Nothrotherium, Megalonyx, Eremotherium,* and *Paramylodon* (ground sloths); *Brachyostracon* and *Boreostracon* (glyptodonts); *Castoroides* (giant beaver); *Hydrochoerus* and *Neochoerus* (extinct capybaras); *Arctodus* and *Tremarctos* (bears); *Smilodon* and *Dinobastis* (saber-tooth cats); *Mammut* (mastodon); *Mammuthus* (mammoth); *Equus* (horse); *Tapirus* (tapir); *Platygonus* and *Mylohyus* (peccaries); *Camelops* and *Tanupolama* (camelids); *Cervalces* and *Sangamona* (cervids); *Capromeryx* and *Tetramerys* (extinct pronghorns); *Bos* and *Saiga* (Asian antelope); and *Bootherium, Symbos, Euceratherium,* and *Preptoceras* (bovids).

Martín del Campo, Rafael. "Contribución a la etnozoologia Maya de Chiapas." In *Los Mayas del Sur y sus Relaciones con los Nahuas Meridionales*,8:29-39. Mesa Redonda, San Cristobal Las Casas, Chis., 1961. (Constituting volume 17, part 1, of *Revista Mexicana de Estudios Antropológicos*.)

Page 33: The Maya at the time of the Conquest first named all the large quadrupeds, including, e.g., horse, ass and mule, *tzimin,* "tapir." Later they adopted a modified Spanish name for each (e.g., cattle, *uacax,* from *vacas*). Sheep were called *taman, algodón que carnero* ("cotton you can eat"). Cattle in the Nahuatl region were termed *ichcatl,* "cotton." The Maya called the goat *temazate,* from Nahuatl *tamazatl,* "brocket" (small short-horned deer). Pigs were denominated *keken.*

McBryde, Felix Webster. *Cultural and historical geography of southwest Guatemala.* Smithsonian Institution Institute of Social Anthropology Publication No. 4. Washington, 1945.

Page 37: Before the Conquest, the Indians of Central America had no regular meat supply from domesticated animals. Turkeys were raised mainly for feathers. A mute dog was used, called *xulo* in Nicaragua, raised on a very large scale for food. Page 38: Introduced sheep and goats are kept rarely below 2,000 m. (6562 ft.), evidently owing to the greater abundance of insect pests and diseases in the warmer, lower zones (warmth alone is not a deterrant). Sheep were only slowly acclimatized in Guatemala after the Conquest. Page 39: He counts "native Muscovy ducks (*Cairina moschata*)" among domesticated animals. Flesh of the (undomesticated) "tepeizcuinte" (paca, "probably *Cuniculus paca*") and of "wild boar" [presumably peccary] were being sold in the (piedmont) Santa Lucía Cotzumalguapa market in 1941.

Means, Philip Ainsworth. *History of the Spanish Conquest of Yucatan and of the Itzas.* Harvard University Peabody Museum of American Archaeology and Ethnology Papers, vol. 7. Cambridge, 1917.

Page 30: On Cortez's first journey to Honduras, his men found in the Peten large settlements called *Mazotecas* or "villages of deer." Large numbers were about so free from fright that the Spaniards could come right up to them. The Indians said they held deer to be gods, hence they would neither kill nor frighten the animals.

Mercer, Henry C. *The Hill Caves of Yucatan. A Search for Evidence of Man's Antiquity in the Caverns of Central America.* Lippincott: Philadelphia, 1896.

Page 89: A strange type of dog is sometimes supposed to have been indigenous to ancient Yucatan, represented on Spanish carvings in the 16th century in Merida. Fig. 33 shows one of these which seem to have had humps on their backs. Page 172: Found horse remains in three caves. [Ray 1957 notes that Mercer's horse material was associated with potsherds and other artifacts and showed no signs of fossilization. Cf. also R. Hatt.] Cope, in a footnote on page 172, reports examining the material, which he considered referable to *Equus occidentalis* on morphological characteristics, but noted the absence of fossilization. Mercer simply says that "European horses must have been cooked and eaten in the caves of Sayab, Lara, and Chekt-a-leh since the fifteenth century, to account for the fragments of bone and teeth discovered there; for we find no reason for supposing that the people of Yucatan knew the American fossil horse, or scattered its remains in late portions of their culture-layers. Horses could have walked into Lara and Sayab, where their teeth were found close to the surface. But in Chekt-a-leh the animal, which, like his relative at the other caves, had been cooked and eaten, must have been killed and brought in piecemeal." [Compare Ray.]

Michelson, Truman. "Mammoth or stiff-legged bear." *American Anthropologist* 38 (1936): 141-43.

He finds Speck's and Strong's "mammoth" tales from the Northeast too much like the folkloric theme of a man-like or bear-like monster to really refer to the mammoth and thus not "anything more than mythical."

Morton, John. "The domestication of the savage pig: the role of peccaries in tropical South and Central America and their relevance for the understanding of pig domestication in Melanesia." *Canberra Anthropology* 7/1-2 (1984): 20-70.

Page 23: "I show how, in a region noted for its relative paucity of game and protein supplies, some communities rely heavily on the hunting of wild pigs, and how this reliance has repercussions for the maintenance of social organization." Shamans contact their spirit familiars who are said to control the peccary herds. He suggests that parallels and differences between New Guinea and South and Central America may be instructive for understanding cultural development in both areas. He concludes, finally, that "a cultural inertia in the Americas . . . prevent(ed) fuller exploitation of the material base (the peccaries)." Page 54: "Peccaries tend to make good, if boisterous, pets; indeed they are kept as such throughout South and Central America" (citing ethnographic accounts). Page 56: "Tropical forest Indians see pets as family members and eat them only rarely. These groups are . . . famed for their abilities to tame wild animals." (again citing ethnographies).

Navarrete, Carlos. "El hombre danta en una pintura de la costa de Chiapas: una aportación a la iconografía del Preclásico Superior." In *Homenaje a Román Piña Chan*, 229-64. México: Universidad Nacional Autónoma de México, Instituto de Investigaciones Antropológicas, 1987.

Surveys various exotic and composite creatures identified or proposed in Mesoamerican art and shows that some qualify as the danta or tapir (including some which have been identified elsewhere as "elephants"). Page 238: One representation is of *Tapirus bairdii* (Grill). An adult specimen of this animal can weigh three or four hundred kilos, yet it is agile on land and in the water, its favorite scene. It inhabits southern Veracruz and Oaxaca, Tabasco, Quintana Róo and Chiapas, as well as the lowland jungles of Guatemala all the way to the border with Honduras and El Salvador. It likes the rain forest and even along streams in the semideciduous forests and up into the cloud forests high in the mountains. Zoologists consider it a kind of ancient horse, that is an unevolved form. This primitive character has captured popular sensibility in the name *anteburro* ["formerly an ass"]. Page 240: Quotes Pedro Martir concerning it: "the size of an ox; armed with the elephant trunk, but it is not an elephant; it has bovine color but is not an ox; the cranium of a horse but it is not a horse, and with elephantine ears also." In 1722 Fr. Ximénez said of the tapir's presence in native fiestas: "the danta, which without doubt is the elephant because it resembles it, although it has a split hoof, is the size of a large burro, and has a trunk like an elephant." Further, he says that while they raise them for use in feasts, yet this is a very fierce animal and it cannot be domesticated like the elephant has been. Page 241: Contemporary literature is equally puzzled how to characterize it. Rodríguez Macal says; "It is an animal the size of a mule with an aspect between that of a wild pig and a rhinoceros." Page 242: Its involvement in modern native dances and myths and in the Popol Vuh, where it is called "the great coati." Altar 12 at Kaminaljuyu is in its form. Page 260: Fr. Agustín de Ceballos in 1610 from Costa Rica says that the Indians used tame dantas, reared in their houses from when they were little; prominent Indians kill (sacrificed?) them in their fiestas.

Nelson, N. C. Review of *The Antiquity of the Deposits in Jacob's Cavern,* by Vernon C. Allison. *American Anthropologist* 30 (1928): 329-35.

Resumes Allison's work and concludes that the reputed elephant bone from this midwestern cavern is a fraud. He makes a telling critique of Allison's methods, the latter having tried to defend and revive consideration of the carved bone as genuine.

Nibley, Hugh. *Lehi in the Desert. The World of the Jaredites. There Were Jaredites*, edited by John W. Welch. Vol. 5, *The Collected Works of Hugh Nibley*. Salt Lake City: Deseret Book and F.A.R.M.S., 1988.

Pages 220-21: Travelers in central Asia used to comment on peculiar animals found there—camels with two humps (which are really no more like the Arabian camels than a llama is like a sheep), big-tailed sheep, and strange varieties of oxen and horses, for none of which it is possible for the travelers to find words in their own languages. So they called dromedaries and Bactrian camels both *camels* and *kulans*, "horses."

Nicholson, H. B. "Montezuma's zoo," *Pacific Discovery* 8/4 (July-Aug. 1955): 3-11.

This feature of the capitol, Tenochtitlan, included creatures gathered from all parts of the Aztec dominion. Three hundred men did nothing else than care for the birds, including providing 250 lbs. of fish for those birds normally eating such. Captive birds of prey were all fed "chickens." Caged lions, tigers, wolves, foxes and different kinds of cats were also fed "chickens." "It should be mentioned that at this early period, before the newcomers became better acquainted with the resources of the 'Indies,' many European terms were applied to things which had no exact counterpart in the Old World." A late writer, de Solís, 1684, said that the zoo contained the "toro Mexicano" [Mexican bull], American bison, but this seems unlikely due to silence of the earlier sources about the bison existing within Aztec lands.

Noyes, Ernest trans. and annot. *Fray Alonso Ponce in Yucatan, 1588*. Tulane University, Middle American Resarch Series 4 (1932): 297-372.

Page 307: In addition to great numbers of deer in Yucatan, there are "small goats." Footnote 17 identifies these as *Maya yuc* (*Odocoileus truei*), called by the Spaniards *cabrito*, meaning "small goat." [Tozzer, Landa, identifies *yuc* as *Mazama pandora*, the brocket.] Page 308: "There are . . . tapirs which they call tzimin and in the same manner they call horses because they say they resemble them greatly." In footnote 19: "After the introduction and spread of horses in Yucatán, to distinguish between them and the tapir, or true tzimin, the tapir was and is still called tzimin-kaax, literally 'forest horse.' " "There are birds as large and almost as delicious as fowl of Castile, called gaches." Footnote 25 says this is probably a printer's error for *baches*. *Baach* is the Maya name for grouse (*Ortalis vetula pallidiventris*), called *chachalaca* by the Spaniards. Motul Dictionary has: baach, una especie de faisanes (a kind of pheasant). Page 325: Of these "gaches" Ponce says "the Indians raise them tame in their houses . . . and although they go into the wood when they desire, they return home afterward."

Orellana, Sandra L. *The Tzutujil Mayas: Continuity and Change, 1250-1630*. Norman: University of Oklahoma Press, 1984.

Page 9: "The highlanders hunted and domesticated animals such as deer, rabbits, wild pigs, armadillos, pacas, quail, jaguars, foxes, coyotes, coatis, turtle doves, wild pigeons, turkeys, two or three species of parrots, eagles, and macaws." [Obviously not all those were domesticated; she does not distinguish.]

Ortíz de Montellano, Barnard R. "Aztec cannibalism: an ecological necessity?" *Science* 200 (12 May 1978): 611-17.

Rebuts Harner's proposal. The greatest amount of Aztec cannibalism coincided with times of harvest, not with periods of scarcity, and is better explained as a thanksgiving rite. They also consumed various animals and insects for protein and had no lack of vegetable food which studies show capable of providing for protein needs. Moreover, the amount of protein available from human sacrifice would not have made a significant difference anyhow, particularly as only a privileged 25% of the population ever consumed human flesh.

Pendergast, David M. *The prehistory of Actun Balam, British Honduras*. Royal Ontario Musum, Art and Archaeology, Occasional Paper 16, 1969. Toronto.

Fig. 12 shows artist's rendering of the deer hunt scene on the Actun Balam Vase. Page 45: His discussion centers on the uniqueness of the representation of the Maya female, figure shown, but nothing is said of the fact of her being astride a deer, which has been wounded by identifiable god figures.

Pendergast, David M. "Altun Ha, Honduras Británica (Belice): temporadas 1966-1968." *Estudios de Cultura Maya* 8 (1972): 35-56.

Page 45: In a tomb which dates to perhaps the fifth century A.D. were four figurines carved in mammoth bone.

Perry, Richard. *Life in Forest and Jungle*. New York: Taplinger, 1976.

Page 90: Capybaras (a species of aquatic guinea pig) he considers "resembling barrel-like sheep with dark brown coats."

Pires-Ferreira, Jane Wheeler, Edgardo Pires-Ferreira, and Peter Kaulicke. "Preceramic animal utilization in the central Peruvian Andes." *Science* 194/4264 (29 Oct. 1976): 483-90.

Evidence for domestication of camelidae in Puna area of Junin. All four American species present: guanaco (*Lama guanicöe*), vicuña (*L. vicugna*), llama (*L. glama*), and alpaca (*L. pacos*). Equids are limited to 10,000-7,000 B.C.

Page 488: Camelid exploitation in the archaeological record at Uchcumachay and other caves "must be considered in much wider terms than domestication. For this reason we present four models." (1) specialized hunting of wild Camelidae; (2) control of semidomesticated Camelidae (cf. Chuckchi reindeer-herding: "Chuckchi reindeer are only half tamed. Though they differ slightly in appearance and morphology from the wild reindeer, they appear to have no specific traits dependent on their association with man. They interbreed freely with the wild deer. . . ."); (3) herding of domestic Camelidae; and (4) hunting of wild Camelidae and herding of semidomesticated or fully domesticated Camelidae or both. In period 7 (2500-1750 B.C.) they have clear evidence of domestic Camelidae.

Pohl, Mary. "Maya ritual faunas: vertebrate remains from burials, caches, caves, and cenotes in the Maya lowlands." In *Civilization in the Ancient Americas: Essays in Honor of Gordon R. Willey*, edited by Richard M. Leventhal and Alan L. Kolats, 55-103. Cambridge, Mass.: University of New Mexico Press and Peabody Museum of Harvard University, 1983.

Price, Barbara J. "Demystification, enriddlement, and Aztec cannibalism: a materialist rejoinder to Harner." *American Ethnologist* 5 (1978): 98-115.

She finds Harner's proposal that cannibalism was a response to protein deficiency in an expanding Aztec population poses serious substantive, interpretative, and epistemological problems. Offers an alternative model that is more parsimonious and omits any nutritional consideration.

Puleston, Dennis E. "The role of semi-domesticated animal resources in Middle American subsistence." Paper presented at the 37th Annual Meeting, Society for American Archaeology, May 5, 1972, Bal Harbour, Florida.

New World peoples failed to domesticate and use many animals, compared with peoples in the Old World. Assuring protein in the diet is the key aim in early domestication. While this problem was never fully met, three measures were employed (use of vegetable protein, hunting/fishing, and keeping animals). Examination of human skeletal remains suggests that there were indeed dietary deficiencies. Regarding Maya, he believes they did not fully domesticate any animals other than the dog and possibly the turkey. Excavated bones probably are biased toward recognition of larger animals, yet few dog and turkey bones appear. Deer bones found are almost all long bones; butchering must have taken place away from house sites.
Evidence for semi-domestication comes principally from historical sources. In the West Indies parrots were kept as pets and "could be easily converted into table fare."(?) Maya area accounts give evidence for keeping birds "in great quantities" according to Landa: turkeys, great curassow, several species of tinamou ducks, and a variety of pigeons and doves. Raised from eggs taken in the wild and incubated by fowl already tame. Doves at least multiplied rapidly in captivity. Cortes spoke of caged "fowls, partridges, pigeons and pheasants." There is no evidence that coatimundis were used for food. He concludes "that animal keeping was a fairly standard practice in Post Classic times." Likely also in the Classic. But with population crowding, deer tend to disappear due to forage limits. Peccary, tapir, paca, etc., inhabit upland and intermediate environments; a recent survey showed that paca, deer, peccary, and various bird species are kept and bred in various parts of Guatemala even today; two cases of keeping sizable deer herds are sketched. This appears to be easy. Deer are frequently raised now as companions for children in the lowlands; they sleep in the village in the day and browse nearby at night. Could skeletal remains of animals distinguish these from "domesticated" ones? There is some reason to believe (in the case of tamed musk oxen) that, yes, even in the first generation, the comparative inactivity of tamed life has bone effects. Was foliage of the ramón tree a food used for such animals?

Ray, Clayton E. "Pre-columbian horses from Yucatan." *Journal of Mammalogy* 38 (1957): 278.

Horse remains from Yucatan caves were previously reported by Mercer and by Hatt. Now he reports material from Cenote Ch'en Mul near Mayapan, consisting of four teeth. They were in the bottom stratum of a sequence of layers of unconsolidated earth almost two meters in thickness. Pottery occurs throughout the stratigraphic section. They are considered to be pre-Columbian on the basis of depth of burial and degree of mineralization. Species cannot be determined from the teeth. [He concludes with the strange statement] "It is by no means implied that pre-Columbian horses were known to the Mayans, but it seems likely that horses were present on the Yucatan Peninsula in pre-Mayan times. The tooth fragments reported here could have been transported in fossil condition [from where?] as curios by the Mayans, but the more numerous horse

remains reported by Hatt and Mercer (if truly pre-Columbian) could scarcely be explained in this manner."

Robertson, Jesse S., Jr. "Fossil bison of Florida." In *Pleistocene Mammals of Florida*, edited by S. David Webb, 214-59. Gainesville: University presses of Florida, 1974.

Page 234: Contrary to the belief of many zoologists, Bison was present in prehistoric times in Florida. A bison femur was found in an Indian mound dating to the late Weeden Island Period, A.D. 800-1200.

Rogers, Richard A., and Laurine A. Rogers. "Notching and anterior beveling on fossil horse incisors: indicators of domestication?" *Quaternary Research* 29 (1988): 72-74.

Following Bahn's call for consideration of tooth morphology as evidence of horse domestication in Late Paleolithic Europe, these researchers find similar forms of wear on the teeth of horses from early and middle Pleistocene deposits in North America. As there is no significant reason to hold that humans were even present there and then, such teeth formations must not be reliable in distinguishing wild from human-controlled horse populations.

Romero, Javier "Estudio de los entierros de la pirámide de Cholula." *Anales, Museo Nacional de Arqueología, Historia y Etnografía*, (5a. época) Tomo 2. Pages 5-36 (plus two tables extended over 13 pages). México, 1935.

Thirty-one burials were exposed by trenching on the northeast platform of the pyramid at Cholula. Pages 31-32: These fell into three classes according to depth and assumed age. The first was in superficial dirt over the last constructed stuccoed surface (the pyramid's surface was dirt-covered at the time of the Conquest; it was considered merely a hill). The second class was within the foundations of walls, and the third consisted of burials beneath the stucco level and (implied) thus still older. Pages 19-20: Burial No. 15 was immediately beneath No. 14, both being below the level of the stuccoed surface which had been broken through in the digging. It thus belongs clearly to class 3. The burial contained a shallow vessel (bowl, shown with contents, Fig. 13) in which were fragments of charcoal and ashes. The substance was identified as originally wood.

Rosenthal, Jane M. "Dogs, pets, horses, and demons: some American Indian words and concepts." *International Journal of American Linguistics* 51 (1985): 563-65.

Over the territory from Idaho through Mexico and into the Caribbean and into the northern half of South America, a pattern of three recurring phonological shapes for "dog" and related concepts is found. Languages belonging to the same family or phylum have chosen differently from these three forms, while unrelated languages of some geographic proximity often have the same form. Some sort of contact phenomena clearly seem to be operating here. In the Numic branch of Uto-Aztecan, the words variously for "dog," "pet," "domesticated animal," and "horse" have shapes like *puhku, pukku, pungu,* for example. The concept of marking animal ownership with a word or particle denoting "pet," often related to the local word for "dog," permeates the whole Greater Southwest and is probably not a Uto-Aztecan invention. Navajo, an Athapaskan language, extends the meaning of its root for "dog" to "horse" and other owned "livestock," applying it especially to sheep. The same *pVkV* phonetic configuration for "dog" resurfaces in Huastec and Yucatec Mayan, while in Tzeltal, Tzotzil and Tojolabal a seemingly related word also means "devil" or "spook." (This

meaning might have related to the use by the Spaniards of fierce dogs to attack the natives.)

Samayoa Chinchilla, Carlos. "Armas de fuego, cotas de algodón, espadas y caballos." *Antropología e Historia de Guatemala* 18/2 (Jun. 1966): 61-70.

Page 65: The first horses arrived via Columbus's second voyage. They quickly multiplied to great numbers. The Aztecs called them *Castillan mazatl* ("Spanish deer"). In archaeological material in the Museo de Arqueología y Etnología de Guatemala there exists a ceramic representation of an Indian riding on a deer [perhaps the same piece reported by Kidder?] Describes how fearful natives were upon first seeing horses.

Sanderson, Ivan T. *Living Treasure.* New York: Viking, 1941.

Pages 39-40: He had speculated about possible pre-Columbian survivors in Haiti of a unique form of the (Pleistocene) horse, based on the fact that feral Spanish horses found on the island do not appear to interbreed with this "peculiar pinkish-grey" type. Furthermore, "There is a body of evidence both from the mainland of Central America and even from rock drawings on Haiti itself tending to show that the horse may have been known to man in the Americas before the coming of the Spaniards." However, upon examining a specimen of this unusual Haitian animal, nothing about it suggested notable differences from the modern horse.

Sauer, Carl O. *Agricultural Origins and Dispersals.* Bowman Memorial Lectures, Series Two. New York: American Geographical Society, 1952.

Page 52: Early Spanish reports seem to refer to the guinea pig in the Antilles and Yucatan.

Schorger, A. W. *The Wild Turkey.* Norman: University of Oklahoma Press, 1966.

Pages 8, 13: Cites historical literature showing that curassows and chachalacas were captured and raised.

Schuchert, Charles. "Mammut Americanum in Connecticut." *American Journal of Science* 37, Fourth Series (April 1914): 321-30.

Page 328: In 1887 John M. Clarke (41st Annual Report, New York State Museum of Natural History, 1888, 388-90) dug up bones of a mammoth (*Mammut americanum*) at Attica, N.Y., associated with pottery and charcoal. The bones lay 2.5 ft. beneath the "natural surface." Associated with the ribs were four small fragments of charcoal, while in another part of the diggings beneath all (4 ft.) of the vegetable muck and lying upon "compact laminated clay" was found a fragment of pottery, and from beneath and around it were taken about thirty fragments of charcoal. "These traces of ancient man were found fully 12 inches further down from the natural surface of the ground than the deepest of the bones taken from the other . . . sink hole." "The associated human evidence found with or beneath the Attica mastodon bones is a positive hint that should open our minds to the possibility that man was associated in America with Mammut americanum."

Schwarz, Herbert F. "Stingless bees (Meliponidae) of the Western Hemisphere." *American Museum of Natural History, Bulletin* 90 (1948).

Pages 143-60: "Domestication of Stingless Bees and Rites Connected with Bee Culture," is a major work rounding up about all known on the topic to the time. At least half a dozen species were domesticated and honey and the bee were vital elements in Mesoamerican cultures. Page 160-66: "Distant Voyages and Attempts to Acclimatize Stingless Bees" recounts much data demonstrating that these bees cannot be established where frost prevails. The extensive bibliography is marked to indicate the literature on stingless bees in the Old World, occurrences of which stretch from Micronesia and Australia through tropical south Asia to include most of subsaharan Africa. He implies that *Apis,* the Old World stinging bee, was imported by the Spaniards, but there is no discussion of that point.

[Scientific Monthly]. "The Moab mastodon pictograph." *Scientific Monthly* 41/4 (1935): 378-79.

Presence of this feature was reported to the author by a local inhabitant in 1924. That this carving is designed to be an elephant or mastodon is evident. Genuineness of the pictograph is "entirely plausible" to him. The technique of pecking is the same as in all the larger figures thereabouts. Vandals' initials and marks are much fresher. Its inconspicuous location supports the idea that no modern person produced it. Further, a great deal of time and energy went into it.

Scott, William Berryman. *A History of Land Mammals in the Western Hemisphere.* Rev. ed. New York: Macmillan, 1937.

Page 177: The American mastodon (*Mastodon americanus*) survived into the historic period and most of the skeletons displayed in so many museums are long post-Glacial in date. Page 260: "Many Pleistocene mammals were in existence only a few centuries ago."

Shattuck, George C. *The Peninsula of Yucatan. Medical, biological, meteorological and sociological Studies.* Carnegie Institution of Washington, Publication 431. 1933.

Page 17: Muscovy duck, *Cairina moschata,* is native to South America and is not found wild in the eastern hemisphere. Here they were "doubtless" domesticated anciently. Four varieties of stingless bee, *Melipona beecheii,* identified by the natives. Page 15: Finding feed for mules and horses today is a problem.

Siebert, Frank T., Jr. "Mammoth or 'stiff-legged bear' " *American Anthropologist* 39 (1937): 721-25.

Algonkian cannibal giants and other mythical animals, some extended to the bear species, are referred to in myths, but not mammoths.

Sjodahl, J. M. *An Introduction to the Study of the Book of Mormon.* Salt Lake City: Deseret News Press, 1927.

Page 96: When European settlers arrived in America, none of them had known the llama, alpaca, huanucu, vicuña, or tapir and had not names for them. They did what anyone would do, attach names familiar to them that classified them according to some characteristic or other. Page 98: Garcilaso de la Vega in Peru noted: "There are other animals in the Antis (Andes), which are like cows. They are the size of a very small

cow, and have no horns." He refers to the tapir. Page 99: The Hebrews picked a salient characteristic of an animal from which to name it. Thus the horse was *sus,* from a root meaning "to leap." But the swallow (bird) was also considered to "leap," so they called it *sus* or *sis,* putting it in the same category as the horse. Similarly a moth was called *sas.* They had at least six words for ox. One, *aluph,* was from a root meaning "tame" or "gentle," which was used for both ox and cow. But the same word could apply to a friend and sometimes meant "the head of a family or tribe." Another word for ox was *teo,* translated "wild ox" on account of its swiftness, although the word also stands for a species of gazelle.

Smith, Gordon. "*E. equus:* immigrant or emigrant?" *Science* 84 (1984): 79-80.

A fossilized skull found in southern California is that of a modern horse, *Equus equus,* although this animal supposedly was absent from the fossil record of the New World. Most experts believe that what became the domestic horse arose in Asia and first came to America with the Spanish. G. Miller, a paleontologist, who was present at the find, believes that it dates to a million years ago. Mammoth bones were found above and below the horse skull. Others are skeptical of the age, believing it is historic.

Smith, Robert F. "*Sawi-Zaa word comparisons." Ms. Sept. 1977. [Copy in possession of J. L. Sorenson].

Page 8: Mixtecan *yi-su,* "deer." Compare Hebrew *sus,* Ugaritic *ssw,* Akkad. *sisu,* Egypt. *ssm(t), ss, zz,* "horse." Compare Egypt. *shsh, shs, shs3w, bubalis,* "antelope."

Snarskis, Michael J. "Stratigraphic excavations in the eastern lowlands of Costa Rica." *American Antiquity* 41/3 (1976): 342-53.

Page 348: A ceramic effigy vessel from the Linea Vieja area, on which precise provenience data are lacking, "appears to portray a member of the camelids." (Pictured in Fig. 6, page 350). It is definitely in El Bosque style, placing it around the beginning of the Christian era (p. 350). Zooarchaeologists at Columbia University consider it much more like a llama or guanaco than a deer. Actually the family *Camelidae* ranged as far as the northern Andes in Ecuador and Colombia and the 16th century Panamanian chief, Tumaco, amazed Spaniard Vasco Núñez and his men by modeling in clay a long-necked beast which they immediately recognized as a *camello.* Pointing toward the south, Tumaco went on to tell that people there used such long-necked creatures as beasts of burden (citation, Bartolomé de las Casas). "The author has seen other Costa Rican vessels depicting similar animals with bound eyes and tied-down cargo." It is conceivable that these represent captive deer such as are sometimes portrayed on Maya polychrome ceramics (Gordon Ekholm, personal communication), but the possibility remains that some aboriginal Costa Rican potters had occasion to see either an actual llama or a representation detailed enough to allow them to reproduce faithfully the spraddling padded toes and deeply cleft, pendulous upper lip characteristic of the American camelids.

Southall, James C. *The Epoch of the Mammoth and the Apparition of Man upon the Earth.* Philadelphia: Lippincott, 1878.

Page 162: "The bones of the mastodon were found in miry clay, above a stratum of rock-salt, on the island of Petit Ance, Louisiana, in association with pottery, stone hatchets, cane baskets, &c. These remains were found at a depth of twelve feet. Whether they are all contemporary we are not prepared to say." "A similar association

of the bones of the mastodon with fragments of pottery was found by Professor Holmes on the banks of the Ashley River, near Charleston, S.C." (citation, *Proceedings, Academy of Natural Science of Philadelphia* [July 1859]: 178-86, and [1847]: 125).

Sowls, Lyle K. *The Peccaries*. Tucson: University of Arizona Press, 1984.

Pages 1-3: In peccary territory one hears constantly the expressions "wild pigs" or "wild hogs" or equivalents in Spanish. Pages 2 and 3 have a table of local names for the two species of peccaries, collared (*Tayassu Tajacu*) and white-lipped (*Tayassu pecari*). (There is also an isolated Chacoan peccary of a different species.) Some 18 names are collected for Mexico and Guatemala. Page 5: A map of distributrion shows the collared type throughout Mexico and into Texas and Arizona. The white-lipped type is shown in lowland eastern Mesoamerica from about Veracruz City southeastward. Page 8: Old World pigs and New World peccaries superficially look alike although they followed different evolutionary lines. Pages 2-3: They are in parallel families under the Order Artiodactyla, in which the hippopotamuses constitute another parallel family. Page 105: Taming of the young is quite easy. "The peccary, if properly treated, could perhaps become a domesticated animal." "However, there is no evidence that man has ever truly domesticated the peccary."

Stempell, W. "Die Tierbilder der Mayahandscriften." *Zeitschrift für Ethnologie* 40 (1908): 704-18.

A zoologist claims on the basis of technical details that the trunked animal in the Maya codices is undoubtedly an elephant, and that those on Copan Stela B could not be tapirs but are mammoths, *Elephas Columbi.*

Stocker, Terry, D. Newman, and S. Anderson. "Mammals depicted on Plate A of the Florentine Codex." Unpublished ms. dated May 1990.

Sahagun's 16th century compilation on native Mexican life includes 14 figures of mammals in naturalistic depictions in color by an Aztec informant. In no case was an animal depicted correctly (to a biological scientist's standard) in every detail. Stylistic tendencies or ignorance might account for it. Each illustration can be associated with some actual animal but with different degrees of confidence. For example, the "tlacazolutl" is identified by zoologists as a tapir, yet its feet were incorrectly described as "like a bull's," cloven-footed, contrary to fact. The authors raise the question about how much direct information informants had about animals, particularly where they may not personally have observed them. Also, were "mythological" hybrid creatures believed by the natives (and, earlier, by the Olmecs) actually to exist in nature? Perhaps we should not expect pre-scientific characterizations, in art or terminology, to be near present standards of depiction by scientists, hence identification may be in question.

Stolyhwo, Kazimierz. "The antiquity of man in the Argentine and the survival of South American fossil mammals until contemporary times." In *Indian Tribes of Aboriginal America*, edited by Sol Tax, 353-60. Chicago: University of Chicago Press, 1952.

Believes that certain large Pleistocene fauna survived until modern times, but offers limited evidence.

Stone, Doris. *Pre-Columbian Man Finds Central America. The Archaeological Bridge.* Cambridge: Peabody Museum Press, 1972.

Page 21: On the banks of the Rio de la Pasión in the Petén, a petrified sloth bone was found associated with other extinct fauna and stone flakes; the sloth bone had three v-shaped incisions on it (it is implied that the marks would have been made in the same era as when the animal lived).

At Achualinca, near the cemetery in Managua, Nicaragua, in lahar and ash are fossilized footprints of more than 40 humans along with bison, white-tailed deer, nutria, alligator, and single-crested guan, without accompanying artifacts, dated approximately 5000 years ago. Page 22: At La Rama, Depto. de Usulutan, El Salvador, are similar footprints of at least five humans and various felines, in sandstone, "thought to date at approximately 1500 B.C." [Compare Bryan.]

Strong, William Duncan. "North American Indian traditions suggesting a knowledge of the mammoth." *American Anthropologist* 36 (1934): 81-88.

He reports a Naskapi myth from Labrador of a monster which could strike a man with its long nose. Other, less persuasive stories are also considered. L. H. Morgan wrote of a "Great Moose" known to Algonkians that had a fifth leg between his shoulders and believed this referred to the mammoth. Page 87: Strong considers "this general mythological background [as] suggesting a dim but actual tradition of the time when the mammoth lived in North America."

Stuart, L. C. "Fauna of Middle America." In *Natural Environment and Early Cultures,* edited by Robert C. West, 316-62. Vol. 1 of *Handbook of Middle American Indians.* Austin: University of Texas Press, 1964.

Page 318: Jackrabbits (hares, *Lepus spp.*), extend south only to the Isthmus of Tehuantepec, but cottontails (*Sylvilagus spp.*) are throughout Mesoamerica. Page 319: Agoutis and paca over the lowlands from southeastern Mexico southward. Those and squirrels were used extensively as food. Pages 319-20: *Felis spp.*: mountain lion, (all the following lowlanders) ocelot, jaguar, jaguarundi, and margay. Tapir (*Tapirus spp.*) spottily in lowlands from southern Mexico southward. *Odocoileus spp.* (deer): white-tailed general throughout the region. Brockets (*Mazama spp.*) northward only to the tropical lowlands of eastern Mexico. Collared peccary throughout but the white-lipped peccary is only in extreme southeastern Mexico and southward. Page 321: Quail-like tinamous were capable of flight but seldom off the ground, in the lowlands. Page 322: Muscovy duck, domesticated, was originally endemic to lowlands of Middle and South America. Upland game birds include curassows, guans, and chachalacas which are quite general. Scaled quail (*Callipepla squamata*) widespread in arid Mexican Plateau and the genus *Cyrtonyx* continues into Central America. Wood quails (*Odonophorus*) are southern. Wild turkey (*Meleagris gallopavo*). *Agriocharis ocellata* in Yucatan and adjacent southeast Mexico, Belize, and Guatemala. Page 323: Ground doves (*Columbigallina* and *Claravis*) and quail-doves (*Geotrygon*) are southern (meaning apparently south of Tehuantepec).

Thomas, Cyrus. "Report on the mound explorations of the Bureau of Ethnology." *Twelfth Annual Report of the Bureau of Ethnology to the Secretary of the Smithsonian Inst., 1890-91.* Washington, 1894.

Pages 91-93. "Elephant Mound." A civil engineer surveyed this midwestern feature in 1884 for the Bureau. The attached sketch is somewhat more elephant-like than earlier rough sketches.

Turner, B. L., II, and Peter D. Harrison. "Implications from agriculture for Maya prehistory." In *Pre-Hispanic Maya Agriculture,* edited by Peter D. Harrion and B. L. Turner II, 337-92. Albuquerque: University of New Mexico Press, 1978.

Pate 352: A reevaluation of the literature indicates that the Maya may have tamed, semidomesticated, and possibly domesticated several animals other than the dog. Cites Landa on raising of coatimundis, doves, and Muscovy ducks. The possibility that deer were at least semidomesticated by the Maya is very real; several early Spanish exploration accounts report the docility of deer, suggesting previous adaptation toward humans.

United Bible Societies. *Fauna and Flora of the Bible.* Vol. 11, *Helps for Translators.* N. p.: United Bible Societies, 1972.

Pages 2-3: Hebrew *dishon,* here rendered antelope (*Antilope addax),* is ibex in the Revised Standard Version (RSV) and white-rumped deer in the New English Bible (NEB). Page 11-12: Hebrew behemoth is perhaps *Hippopotamus amphibius* though this has problems at Job 40:15, where wild beast must be used. The NEB has crocodile.

Page 20: Hebrew *?ayyalah* is the deer, *Cervus elaphus,* but the term is translated in Song of Solomon 8:14 in the NEB as "young wild goat," and at Lamantations 1:6 the Jerusalem Bible (JB) has the same word as "ram." Page 36: One of nine Hebrew terms for goat is *zemer,* "wild goat." Page 38: Under Sheep: The translation of *zemer* is uncertain: RSV and JB have "mountain sheep," NEB "rock-goat." Kautzsch believes it to be a kind of antelope. Page 46: Ibex: two species: *Capra ibex nubiana,* and *Capra beden.* Considered a type of wild goat and still found in Sinai, Egypt, and Arabia. It is often difficult to distinguish it on ancient rock carvings from *Capra hircus,* the true wild goat. All translations render "wild goat." In Deuteronomy 14:5, JB translates *?aqqo* as ibex, but RSV and NEB have "wild goat." Page 36-37: *Capra hircus mambrica* is goat. Used for sacrifice (Lev. 22:27).

Pages 44-45: Hebrew *?abbir* may be read as "buffalo" [of India], "ox," or "horse," according to Sasson, in Jeremiah 8:16; 47:3; 50:11; Judges 5:22.

Pages 62-63: Ox, cow. Hebrew *baqar* is "ox," "cattle," or "herd." Cattle were used for sacrifice and food as well as for draft animals. Page 75: Sheep are often mentioned as "small cattle," which includes goats as well. The sheep mentioned in the Bible is usually the broad-tailed sheep, *Ovis laticaudata,* whose fat tail was used as a sacrifice, as at Leviticus 3:9; 7:3. Page 80: Since the swine was an unclean animal and Jews were forbidden to eat its flesh, the swine mentioned in the Bible must in most cases have been the wild pig, common in Palestine. Page 82: The vulture and eagle were anciently classified together.

Velez Lopez, Lizardo R. "Las mutilaciones en los vasos antropomorfos del antiguo Perú." *Proceedings of the 18th International Congress of Americanists (London, 1912)*, Part 2, 267-75. London: Harrison and Sons, 1913.

A ceramic figure is incidentally illustrated, showing a disfigured man mounted on the back of a nondescript animal. [Though heavily stylized the neck on the animal might suggest that it is a camelid; the author does not discuss the animal figure.] It comes from a collection in Trujillo and is in Chimu (Mochica) style, according to the author.

Vining, Edward P. *An Inglorious Columbus*. New York: D. Appleton, 1885.

Page 115: Discussion of problems in naming animals, in connection with the Fu-sang tradition, which he believes reports a Chinese visit to America with description and labelling of animals they saw. Citing Gómara (*Historia General de las Indias* [Medina 1558], chap. ccxiv), there existed in northwestern Mexico a population whose principal wealth consisted of domestic bison. Refers to the "natural tendency of a man who arrives in a new country to assimilate the animals he finds there to those which he has seen in his native land." So European invaders named American species in familiar terms, although the resemblances were sometimes strained. Thus they called llamas "big sheep" because covered with wool. Peccaries = "hogs," while remarking that they were smaller than European ones. Turkeys were "hens" that were larger than those of Spain. Castañeda in 1540 described bison as *vacas*, cattle (in Cibola and Quivera). He also referred to the mountain goat, *Musimon montanus*, by the name "sheep." Page 116: Spaniards called elk "horse-deer" because they were remarkable for great height and large antlers. The tapir was compared variously by Spaniards to a horse, a mule, or an ass.

Vogt, Evon Z. *Zinacantan: A Maya Community in the Highlands of Chiapas*. Cambridge: Belknap Press of Harvard University Press, 1969.

"The Chiapas highlands have been populated so densely for such a long period that almost all forms of edible mammals have long since been hunted off." Pages 68-69: Little meat is eaten. Pigs are rarely butchered or eaten. Beef is provided only for major fiestas and then is bought from ladinos. Sheep are owned and tended entirely by women. They are never butchered for mutton but kept only for wool. Horses and mules are owned by the men but are almost never ridden except for ritual "races." They are used to transport heavy burdens. Page 302: The Earth Lord lives underground and moves about riding on a deer.

Von Hagen, Victor. *The Ancient Sun Kingdoms of the Americas*. Cleveland and New York: World Publishing, 1961.

Page 473: "Batwings' fur (from which a silklike cloth was made for the Inca)."

Waterhouse, Viola "Two Oaxaca Chontal words." *International Journal of American Linguistics* 23/3 (1957): 244-45.

Origin of the Chontal word for horse, *aywála*, is puzzling. It appears to be a native word for a borrowed item yet has no recognizable derivation from any other animal name in the Chontal vocabulary. Most names of culture items are borrowed by the Chontales along with the item itself. She finds that in the mountain Chontal dialect the word for horse is wala and that for deer is *walak'ek'*, that is, "woods horse." Apparently the Chontales gave to the horse the name of the deer, then added a qualifying term for deer proper. The coastal Chontales, however, obscured the picture

by borrowing the Spanish word *venado* to apply to native deer while they retained the native word for deer, *ke'k'*, to name the horse, which became an integral part of their culture.

Wennergren Foundation. *Report for 1974*. New York.

Page 22: A grant to Dr. Warren L. Wittry to investigate mastodon and Paleo-Indian associations showed that mastodons did not become extinct in the Great Lakes area until about 6000 years ago (4000 B.C.). Humans and mastodons overlapped for about 6000 years.

Whitley, Glenn R. "The fulvous tree duck as a cultural tracer." *Anthropological Journal of Canada* 12/1 (1974a): 12-17.

Maps show the disjunct distribution of this duck in India, East Africa and Madagascar, southeastern Brazil, northern South America, and Mexico. In the East Indies, Australia, New Guinea, and Melanesia there are local subspecies, but to the west of India the same subspecies occur together. The duck is not a long-distance traveler nor salt-tolerant, hence it is puzzling how it reached those places westward. The author gives names for the fulvous tree duck showing an obvious similarity from India to Africa to South America. In the last, separate name histories are implied to have spread from separate Tupí and Arawak nucleii on the lower or middle Amazon northward and southward with the migration of speakers of those languages. On the north and central coast of Brazil the tame tree ducks are found associated with a sailing raft, the jangada, bearing a Hindu name.

Whitley, Glenn R. "Tame curassow birds as indicators of cultural diffusion." *Anthropological Journal of Canada* 12/2 (1974b): 10-15.

A highly characteristic trait of South American Indians is keeping as pets almost any animal tame enough to roam freely around a village. The curassow family, including curassow, guan, and chachalaca, is the most popular type of useful bird. They play the role of "watchdogs" to warn of strangers as well as scavenging bugs, snakes, etc., and furnishing feathers. A traveler's account is quoted demonstrating "the excessive and almost absurd tameness" of curassow. The author uses names to trace separate dispersions of the birds with Tupí and Arawak speakers from middle/lower Amazon hearths. Figure 1 also shows the distribution, based on written records, of tame curassow, extending through Central America to Tampico and Yucatan. Similar data shows parallel diffusion of names for the chachalaca and guan into Mesoamerica from the south.

Williams, Howel. *Geologic Observations on the Ancient Human Footprints near Managua, Nicaragua*. Carnegie Institution of Washington, Contributions to American Anthropology and History, No. 52. Washington, 1952.

Page 27: 19th century investigator Flint reported discovery of "mastodon" bones in a footprint bed near Managua, but this has never been verified and it is not clear whether the bones accompanied human tracks. (There have been many such flows.) Page 28: As for the bison tracks found at El Recreo, which were made either at the same time as the human footprints in El Cauce or very shortly thereafter, it is impossible at present to say exactly what their minimum age may be, for nobody knows just when bison became extinct in Central America. But, as Dr. Pollock has pointed out, it is hard to imagine that the animal existed there as recently as the time of Christ without leaving any trace among archaeological remains. Page 30: Archaeological evidence on the date

is uncertain, but one Usulutan sherd that may relate to the prints suggests a pre-Classic date estimated here at 3400 to 1400 years old. [Compare Bryan, Stone.]

Williams, J. J. *The Isthmus of Tehuantepec, Being the Results of a Survey for a Railroad to Connect the Atlantic and Pacific Oceans*. New York, 1952.

Page 204: Alpaca are reported in the mountains near San Juan Guichicovi. "Their existence on the Isthmus gives the appearance of truth to a tradition still preserved among the Mijes concerning the migration of their ancestors from Peru." A few (Spanish-introduced) sheep exist in the Isthmus but they do not thrive due to high temperatures. Further, people have no need of wool and seldom eat the flesh, so they "are a worthless possession." Page 207: Multitudes of deer. Flesh of the coatimundi is "much prized." Numerous peccary, which have good flesh, also "serve a useful purpose" by destroying snakes in the forest.

Williams, Stephen. "The Island 35 mastodon: its bearing on the age of Archaic cultures in the East." *American Antiquity* 22 (1957): 359-72.

Discusses fully carbon dates on mastodons in Michigan and the Mississippi valley. One is at 3344 B.C. plus or minus 400. Concludes that extinction took place ca. 5000 B.C. [This supposes that the latest dated sample by chance covers the full time range, something unlikely.]

Wing, Elizabeth S. "Animal domestication in the Andes." In *Origins of Agriculture*, edited by Charles A. Reed, 837-59. The Hague: Mouton, 1977.

Pages 842-43: Cabrera 1960 recognized three major widespread species of the genus *Cavia* (guinea pig) in South America (as against Hüchinghaus 1961a who placed all these three together into a single species). Three other minor species are known. The domestic species is *Cavia porcellus*. Page 846-47: After very heavy occurrence in early levels, fully domestic guinea pigs in reduced numbers moved beyond central Peru by 3000 B.C. They have been identified from sites as far north as the Dominican Republic. Page 848: The earliest indications of domestic lamoids (cameloids) in valley sites is from the Chihua Period (6550-5100 B.P.) at Pikimachay Cave in the Ayacucho Valley.

Wissler, Clark. "The influence of the horse in the development of Plains culture." *American Anthropologist* 16/1 (1914): 1-25.

Page 7: In Virginia wild horses (from colonists' stock) had become a pest by 1669. Page 10: The Pawnee have a story that the first horse among them came to their village of its own accord, which logically could have happened with a domesticated horse recently turned loose.

Woodward, A Smith. "The supposed existing ground-sloth of Patagonia." *Natural Science* 15 (1899): 351-54.

Discoveries in Patagonia of remains of the now-extinct giant ground sloth show that men and this sloth were contemporaenous several thousand years ago. One cave contains a large section apparently reserved for human habitation and a small walled-off "stable" with abundant ground sloth droppings. Nearby was a supply of cut hay and other plant food.

Appendix
Animal References in the Book of Mormon

Note: The animal names referenced are the names used by Book of Mormon writers; precise equivalents for them in modern zoological terms may be problematic. All animal references in quotations from Isaiah and other Old Testament books are omitted. Approximate dates and locations are given since external faunal comparisons ultimately will demand space and time loci. Comments are offered that may assist in linguistic analysis. For the more general categories, not every reference is cited but only the more instructive.

ass

Ether 9:19
: Jaredites: ca. 2500-2300 B.C., land northward

1 Nephi 18:25
: Lehi party: ca. 575 B.C., land of first inheritance; found in the forests, presumably wild, when Lehi arrives in the promised land.

Mosiah 5:14
: Nephites: ca. 125 B.C., land of Zarahemla; Benjamin uses as a teaching image: "doth a man take an ass which belongeth to his neighbor, and keep him? I say unto you, Nay; he will not even suffer that he shall feed among his flocks, but will drive him away."

Mosiah 12:5
: Zeniffites: ca. 150 B.C., land of Nephi; immediately applicable prophetic image, "driven before like a dumb ass." Same sense in Mosiah 21:3.

Mosiah 13:24
: In a quotation from "the ten commandments," presumably quoted from the brass plates of Old World origin.

beast

Ether 9:34
: Jaredites: ca. 2300 B.C., land northward; their flocks (v. 31) began to flee before drought-encouraged serpents; people followed the course of "the beasts."

Ether 10:26
: Jaredites: ca. 1500 B.C., land northward; made tools "with which they did work their beasts."

1 Nephi 18:25
: Lehi party: ca. 575 B.C.; "beast" encompasses: "cow," "ox," "ass," "horse," "goat," "wild goat," and "all manner of wild beasts," "which were for the use of men."

2 Nephi 5:24
: Lamanites: ca. 575 B.C., land of first inheritance; seek in the wilderness for beasts of prey. [Compare Enos 1:3, 20.]

Jarom 1:6
: Lamanites: ca. 400 B.C.; "would drink the blood of beasts."

Mosiah 8:21
: Zeniffites: ca. 150 B.C., land of Nephi; prophetic image, "as a wild flock which fleeth from the shepherd . . . and are devoured by the beasts of the forest." The "beasts" are implied to be carnivorous.

Alma 34:10
: Nephites: ca. 75 B.C., land of Zarahemla; "beast" sacrificeable.

Ether 6:4
: Jaredites: ca. 3200-3000 B.C., Old World; distinguishes "beast" from "animal" and "fowl" [is this Moroni's distinction?]

cattle

Ether 9:17-19

Jaredites: ca. 2500 B.C., land northward; "having . . . all manner of cattle, of oxen, and cows, and of sheep, and of swine, and of goats, and also many other kinds of animals which were useful for the food of man." Verse 19 apparently points to two other animals, not classified as "cattle," which they "had": horses and asses. It is not clear just what the verb "having," or "had," means; it might mean only "tamed," for example, rather than fully domesticated, or it might mean domesticated, or part that were domesticated and part that were only tamed. There is, however, definite contrast with the verb referring to "elephants," "cureloms" and "cumoms," which see. Of course the conceptual difference might be from Moroni, who provided the abstract of Ether's original record. The text seems not clear on whether the listed animals ("oxen," "cows," "sheep," "swine," and "goats") are intended as each constituting part of the category "cattle." The unlikelihood of "swine," for example, being so included suggests that only "oxen" and "cows" belong in that grouping, the further animals being linguistically separated by "and of" preceding the list of their names.

Enos 1:21

Nephites: ca. 450 B.C.; they "did raise . . . flocks of herds, and flocks of all manner of cattle of every kind, and goats, and wild goats, and also many horses." See also this passage under "flock."

3 Nephi 3:22

Nephites: ca. A.D. 15, extended land of Zarahemla; assemble for protection along with their "cattle." [See also 3 Nephi 6:1.]

cow

Ether 9:18

Jaredites: ca. 2500 B.C., land northward; "all manner of cattle, of oxen, and cows." A linguistic distinction appears to be made here by which "of oxen, and cows" communicates subcategories under the broader rubric "cattle," while subsequently listed animals are not "cattle," as indicated by the "and of" preceding "sheep," etc. [Compare the discussion at Ether 9:17-19 under "cattle."]

1 Nephi 18:25

Lehi party: ca. 575 B.C., land of first inheritance; found in the forests, wild, when they arrive.

cumom

Ether 9:19

Jaredites: ca. 2500 B.C.; "there were elephants and cureloms and cumoms; all of which were useful unto man, and more especially the elephants and cureloms and cumoms." The expression "there were" introducing this set stands in contrast to "had" in relation to "horses and asses" and "having" in relation to "all manner of cattle" and other animals all of which "were useful for the food of man." The expressions imply that the last three animals were not controlled to the same degree as the "cattle" or even as much as "horses and asses." A further implication in 9:19 is that horses and asses, though "had," were less "useful" than "elephants," "cureloms" and "cumoms." [Note the animals found in the wilderness by Lehi's party when they arrived, including explicitly "all manner of wild animals," which "were for the use of men." See 1 Nephi 18:25] A further implication, from verse 17, is that "elephants," "cureloms," and "cumoms" were not used for food. [They might have been used for hides or ivory, for example.] A final implication may be that increasing size is intended by the description's progressing from "sheep" and "swine," for example, through "horses and asses" to "elephants and cureloms and cumoms," which would mean that the last two were relatively bulky.

curelom
See "cumom."

dog
Alma 16:10
Nephites: ca. 80 B.C., extended land of Zarahemla; "dogs [of the land?] and wild beasts of the wilderness" mangle the bodies of Ammonihahite victims of Lamanite attack.
Helaman 7:19
Nephites: ca. 25 B.C., land of Zarahemla; prophecy that wicked Nephites will "become meat for dogs."
3 Nephi 7:8
Nephites: ca. A.D. 25, land of Zarahemla; figurative—people turned to wickedness "like a dog to his vomit."

dragon
Mosiah 20:11
Nephites: ca. 125 B.C.; figurative of a fierce fighter; uncertain whether a real or only a mythical animal is the referrant.

elephant
See "cumom."

fatling
Indefinite referrant; could apply to a specially fed/fattened young animal of a number of species.

flock
Ether 2:1
Jaredites: ca. 3200-3000 B.C., land of the "great tower," i.e., Mesopotamia; gather flocks in their original land, implied Mesopotamia, to begin journey.
Ether 6:4
Jaredites: ca. 3200-3000 B.C., Old World departure point; distinguish "fowl" from "beast" and "animal" [or is this Moroni's distinction?]; "flocks" put and kept aboard barges.
Ether 10:12
Jaredites: ca. 1900 B.C., land northward; exceedingly rich in flocks, etc.
2 Nephi 5:11
Nephites: ca. 570 B.C., land of Nephi; began to raise flocks, and herds and animals of every kind.
Enos 1:21
Nephites: ca. 450 B.C., land of Nephi; they "did raise . . . flocks of herds, and flocks of all manner of cattle of every kind, and goats, and wild goats, and also many horses." Hebrew *baqar* can be translated "ox," "cattle," or "herd" (see United Bible Societies in abstracts), hence it is plausible that Enos's "flocks of herds" constitutes a Hebraism which could have been translated more clearly as "flocks of oxen" or "flocks of cattle." The phrasing, "flocks of all manner of cattle of every kind, and goats, and wild goats, and also many horses" seems to exclude the latter three animals from the conceptual category "cattle."
Mosiah 10:2
Zeniffites: ca. 180 B.C., land of Nephi; guarded their flocks to keep them from Lamanite thievery.
Mosiah 10:21
Zeniffites: ca. 160 B.C., land of Nephi; people "tend their flocks."
Mosiah 17:17
Nephites: ca. 150 B.C., land of Nephi; priests of Noah to be "driven and scattered to and fro, even as a wild flock is driven by wild and ferocious beasts."

Mosiah 7:22
Zeniffites: ca. 125 B.C., land of Nephi; increase in flocks and herds.
Mosiah 8:21
Zeniffites: ca. 125 B.C., land of Nephi; prophetic image, "as a wild flock which fleeth from the shepherd . . . and are devoured by the beasts of the forest.""fowl." Does "wild flock" merely mean domesticated animals out of control, or are we to infer that shepherds somehow normally dealt with flocks of nominally "wild" creatures, that is "tamed" animals?
Mosiah 21:16
Zeniffites: ca. 125 B.C., land of Nephi; flocks and herds increased, against hunger. [Compare 22:2, 6, 8, 11; Alma 1:29.]
Alma 3:2
Nephites: ca. 90 B.C., land of Zarahemla; fighting immediately upstream from the city of Zarahemla killed many flocks and herds, led to famine next year. [Compare 4:2, 6.]
Alma 5:59
Nephites: ca. 85 B.C., land of Zarahemla; figurative—what shepherd having sheep would allow wolves to enter and devour his flock?
Alma 7:27
Alma's group: ca. 80 B.C., land of Helam; Alma blesses flocks and herds.
Alma 9:12
Zeniffites: ca. 185 B.C., land of Nephi; Lamanites take flocks of Zeniffite fields for feasting.
Alma 17:25-39
Lamanites: ca. 90 B.C., land of Nephi; it may be inferred that only one species constituted the flocks of the king referred to (compare 18:6-7, not only the king had flocks) although no mention is made of what type of animal was involved. Keepers "drive" them to a specific watering spot ("*the* place of water") to which access was limited (were it a sizable body of water, the rustlers would not have known where to gather). Verses 31-32: the scattering animals were slow enough that Ammon could "flatter" his companions yet still pursue and "head" the animals. Verse 33. A relatively few men were able to "encircle the flocks round about that they flee not." Verse 39. At the end of the watering activity, the flocks were returned "to the [safely enclosed?] pasture of the king," which seems to have been their normal place.
Alma 27:14
Anti-Nephi-Lehies: ca. 80 B.C., land of Nephi; flee with flocks and herds to the land of Zarahemla.
Alma 34:20
Nephites: ca. 75 B.C., extended land of Zarahemla; pray when "in your fields, yea, over all your flocks."
Alma 62:29
People of Ammon: ca. 65 B.C., land of Melek; raised flocks and herds to aid Nephite war effort.
Helaman 6:12
Nephites: ca. 30 B.C., both lands northward and southward; raised many flocks.
3 Nephi 3:22
Nephites: ca. A.D. 15, extended land of Zarahemla; assemble for protection along with their "flocks of every kind." [See also 3 Nephi 4:4 and 6:1.]

fowl
Ether 2:2
Jaredites: ca. 3200-3000 B.C., Old World; caught fowls with snares.
Alma 34:10
Nephites: ca. 75 B.C.; fowls sacrificeable.

game

Ether 10:21

Jaredites: ca. 1500 B.C., land southward in or adjacent to the narrow neck; land southward kept as a wilderness, "to get game."

3 Nephi 4:2

Robber bands among Nephites: ca. A.D. 20, extended land of Zarahemla and perhaps beyond; the land overhunted: "there were no wild beasts nor game" left for the robbers' subsistence. [Compare v. 20: wild game became scarce.]

goat

Ether 9:17-19

Jaredites: ca. 2500 B.C., land of northward; "having . . . all manner of cattle, of oxen, and cows, and of sheep, and of swine, and of goats, and also many other kinds of animals which were useful for the food of man." See also this passage under "cattle."

1 Nephi 18:25

Lehi party: ca. 575 B.C., land of first inheritance; found in the forests when Lehi arrives in the promised land. Note that both this animal and "the wild goat" were found apparently wild. Probably the two names signify different animals (surely based in Semitic language usage—see United Bible Societies in abstracts), not just some (here meaningless) distinction between domesticated vs. non-domesticated versions of the same animal.

Enos 1:21

See this passage under "flocks."

Alma 14:29

Nephites: ca. 80 B.C.; figurative, but probably familiar referrant, "as a goat fleeth with her young from two lions." Could be a wild goat as well as a tame one.

hen

3 Nephi 10:4-6

Nephites: ca. A.D. 30, land of Bountiful; figurative use only; applies as easily to various fowls, such as the quail, as to the chicken (*Gallus domesticus*).

herd

Ether 6:4

Jaredites: ca. 3200-3000 B.C., Old World; "herds" taken aboard barges.

Ether 10:12

Jaredites: ca. 1900 B.C., land northward; exceedingly rich in herds, etc.

2 Nephi 5:11

Nephites: ca. 570 B.C., land of Nephi; began to raise flocks, and herds and animals of every kind.

Enos 1:21

See this passage under "flock."

Mosiah 7:22

Zeniffites: ca. 125 B.C., land of Nephi; increase in flocks and herds.

Mosiah 21:16

Zeniffites: ca. 125 B.C., land of Nephi; flocks and herds increased, against hunger. [Compare 22:2, 6, 8, 11; Alma 1:29.]

Alma 3:2

Nephites: ca. 90 B.C., land of Zarahemla; fighting immediately upstream from the city of Zarahemla killed many flocks and herds, led to famine next year. [Compare 4:2, 6.]

Alma 7:27

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Alma 27:14
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Alma 62:29
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Helaman 6:12
Nephites: ca. 30 B.C., both lands northward and southward; raised many herds.
3 Nephi 3:22
Nephites: ca. A.D. 15, extended land of Zarahemla; assemble for protection along with their "herds." [See also 3 Ne. 6:1.]

horse
Ether 9:19
Jaredites: ca. 2500 B.C., land northward; had horses. [Compare discussion of this verse under "cumom."]
1 Nephi 18:25
Lehi party: ca. 575 B.C., land of first inheritance; found in the forests, wild, when Lehi arrives in the promised land.
Enos 1:21
See this passage under "flocks."
Alma 18:9-12
Lamanites: ca. 90 B.C., land of Ishmael; "horses and chariots" "prepared" to "conduct" the king forth to the land of Nephi.
Alma 20:6
Lamanites: ca. 90 B.C., land of Ishmael; horses and chariots made ready to go to the land of Middoni.
3 Nephi 3:22
Nephites: ca. A.D. 15, extended land of Zarahemla; assemble for protection along with their "horses." [See also 6:1.]
3 Nephi 4:4
Nephites: ca. A.D. 15, land between Zarahemla and Bountiful; assembled in refuge area for protection against besieging robber armies, "having reserved for themselves provisions, and horses and cattle, and flocks of every kind, that they might subsist for the space of seven years." The implication is clear that at this time "horses" were considered part of the food supply along with "cattle" and "flocks," rather than, say, a means of transportation.

lamb
[Prophetic and symbolic references are omitted.]
3 Nephi 4:7
robbers: ca. A.D. 15, land between Zarahemla and Bountiful; their soldiers wear "a lamb-skin about their loins."
3 Nephi 28:22
Nephites: ca. A.D. 325—see this passage under "wild beast",unknown; prisoners play with wild beasts "as a child with a suckling lamb." [Compare 4 Ne. 1:33.]

lion
Mosiah 20:10
Zeniffites: ca. 125 B.C., land of Nephi; figurative—combatants "fought like lions for their prey."
Alma 14:29
Nephites: ca. 85 B.C., extended land of Zarahemla; figurative—people fled "as a goat fleeth with her young from two lions."
[All other references are figurative and prophetic.]

ox

1 Nephi 18:25

Lehi party: ca. 575 B.C., land of first inheritance; found in the forests, wild, when Lehi arrives in the promised land.

Ether 9:17-19

Jaredites: ca. 2500 B.C., land northward; "having . . . oxen and also many other kinds of animals which were useful for the food of man." See also this passage under "cattle."

serpent

Ether 9:31, 33

Jaredites: ca. 2300 B.C., land northward to narrow neck; poisonous serpents brought forth by drought. [Compare 10:19 serpents at the narrow neck destroyed in the days of Lib, ca. 1500 B.C.]

sheep

Ether 9:17-19

Jaredites: ca. 2500 B.C., land northward; "having . . . all manner of cattle, of oxen, and cows, and of sheep, and of swine, and of goats, and also many other kinds of animals which were useful for the food of man." See also this passage under "cattle."

Alma 5:37-39

Nephites: ca. 85 B.C., land of Zarahemla; figurative—people have gone astray as a sheep having no shepherd.

Alma 5:59-60

Nephites: ca. 85 B.C., land of Zarahemla; figurative—what shepherd having many sheep would allow wolves to enter and devour his flock?

Alma 25:12

Zeniffites: ca. 80 B.C., land of Nephi; figurative—as a sheep having no shepherd is driven and slain by wild beasts.

[All other references are figurative.]

sow

3 Nephi 7:8

Nephites: ca. A.D. 25, land of Zarahemla; figurative—the wicked are like a sow wallowing in mire.

swine

Ether 9:17-19

Jaredites: ca. 2500 B.C., land northward; "having . . . all manner of cattle, of oxen, and cows, and of sheep, and of swine, and of goats, and also many other kinds of animals which were useful for the food of man." See also this passage under "cattle."

vulture

Mosiah 12:2

Zeniffites: ca. 150 B.C., land of Nephi; prophecy that those among them who were wicked would be consumed by vultures.

Alma 2:38

Nephites: ca. 90 B.C., land of Zarahemla; corpses of Lamanite invaders in the wilderness consumed by vultures.

wild animals (see also "beasts")

1 Nephi 18:25

Lehi's party: ca. 575 B.C., land of first inheritance; found in the wilderness upon arrival.

Alma 22:31
Nephites: ca. 90 B.C.; Bountiful, then wilderness, was filled "with all manner of wild animals."

wild beasts
Mosiah 17:17
Nephites: ca. 150 B.C., land of Nephi; Priests of Noah to be "driven and scattered to and fro, even as a wild flock is driven by wild and ferocious beasts.
Mosiah 18:4
Zeniffites: ca. 150 B.C., land of Nephi; Mormon was "infested . . . at seasons, by wild beasts."
Alma 2:37-38
Nephites: ca. 90 B.C., land of Zarahemla; Lamanite invaders and Amlicite rebels are pursued out of the vicinity of the city of Zarahemla to the wilderness of Hermounts which was "infested by wild and ravenous beasts"; wounded were "devoured by those beasts."
Alma 16:10
Nephites: ca. 80 B.C., extended land of Zarahemla; "wild beasts of the wilderness" mangle the bodies of Ammonihahite victims of Lamanite attack.
Alma 25:12
Amulonites and Lamanites: ca. 80 B.C., east wilderness; prophecy fulfilled that the priests of Noah and their seed would be "driven and slain by wild beasts." The writer (Alma? [cf. v. 9] Mormon?) sees fulfillment in the Lamanites driving and slaying these Amulonites, apparently construing "wild beasts" as a metaphor for the Lamanites.
Helaman 7:19
Nephites: ca. 25 B.C., land of Zarahemla; prophecy that wicked Nephites will "become meat for . . . wild beasts."
3 Nephi 4:2
Robbers: ca. A.D. 20, extended land of Zarahemla and perhaps beyond; the land overhunted, "there were no wild beasts nor game" left.
3 Nephi 28:22; 4 Ne. 1:33
Nephites; ca. A.D. 225, unknown; three Nephite disciples cast into dens of wild beasts but were miraculously unhurt. The story is given twice by Mormon; the telling in 3 Nephi could be read as occurring around A.D. 30, but comparison with 4 Nephi indicates that only a single period is meant and that is clearly post-A.D. 200. [Compare also Mormon 8:24.]

wild goat
1 Nephi 18:25
Lehi party: ca. 575 B.C., land of first inheritance; found in the forests when Lehi arrives in the promised land.
Enos 1:21
See this passage under "flocks." Also see "goat."

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* Literature on the chicken is included only incidentally; much more will be summarized and expanded in a volume now in preparation under the editorship of George F. Carter.

llama. *See* camelids.
mammoth. *See* mastodon.
mastodon: Allison, Academy, Ashley Montagu 1942, 1944, Averitt and Averitt, H. Beck, Carter 1968, Edmonston, Eiseley 1945a, 1945b, 1946, Gatschet, Henshaw, Hester, Hoffstetter, Kamar, Martín, Michelson, Navarrete, Nelson, Pendergast 1972, Schuchert, Scientific Monthly, Scott, Southall, Stempell, Strong, Thomas, Wennergren Foundation, H. Williams, S. Williams.
mule: Navarrete.
Muscovy duck. *See* duck.
ox: Charlevoix, George, Kiddle, Navarrete, Sjodahl.
paca. *See* agouti.
parrot: Leopold, Puleston.
partridge: Latcham, Leopold, Puleston.
peacock: George.
peccary: Dillon, Hunn, Latcham, Leopold, Martín, Morton, Pohl, Pohl and Feldman, Puleston, Sowls, J. Williams.
pig: Badwin, Edmonson 1971, Kamar, Martín, Sowls, United Bible Societies, Vining.
pigeon: Puleston.
quail: Clavigero, Leopold, Stuart.
rabbit: Johnson, Stuart.
sheep: Gartlemann, George, Mahr, Martín, McBryde, Nibley, United Bible Societies, Vining, J. Williams.
sloth. *See* ground sloth.
tapir: Charlevoix, Edmonson 1971, Frädrich, George, Hunn, Kamar, Kiddle, Latcham, Leopold, Martín, Navarrete, Noyes, Puleston, Sjodahl, Stempell, Stocker et al, Stuart.
tejón. *See* coati.
tepescuintle. *See* agouti.
tinamou: Leopold, Puleston, Stuart.
turkey: Bennett and Zingg, Clavigero, George, Humboldt, Kaufman, Leopold, Pollock and Ray, Puleston, Stuart.
turkey, sacrificed: Hamblin.
unicorn: Gatschet.
vicuña. *See* camelids.
wood rail: Edmonson 1971, Leopold.

Definitions of *domesticated* and related concepts: Carr, Gilmore, Hunn, Laufer, Pires-Ferreira et al, Puleston.

Domestication process: Bennett and Zingg, Carr, Carter 1977, Connell, George, Latcham, Laufer, Pires-Ferreira et al, Puleston, Wissler.

Draft animals: Clavigero, Frädrich, Latcham, Laufer, Pohl.

Extinction processes; also "anomalous" fauna: Badwin, Beddall, Brand, Eiseley 1945, Flannery, Free, Gilmore, Martín, Robertson, Vogt, Wennergren Foundation, H. Williams, J. Williams, Woodward.

Functions of animals that are counter-intuitive: Bancroft, McBryde, Vogt, J. Williams.

Mesoamerica
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deer: Arriola, Larde, Means.
dog (fattened): Clavigero, Latcham, McBryde.
general: Harner, Hunn, Puleston.

guinea pig (cony): Latcham, Sauer.
peccary: Hunn, Morton.
tapir: Frädrich, Navarrete.
uncertain: Garduño.

domesticated or tamed fowls
ara: Humboldt.
chachalaca: Leopold, Noyes, Pollock and Ray, Whitley 1974b.
chicken: Carter 1971.
curassow: Humboldt, Kamar, Leopold, Pollock and Ray, Whitley 1974a and 1974b.
dove: Pollock and Ray, Stuart.
duck: Clavigero, Humboldt, Latcham, Leopold, McBryde, Stuart.
guan (yacu): Humboldt.
goose: Clavigero, Latcham, Leopold.
partridge: Latcham, Leopold.
quail: Clavigero, Humboldt, Leopold, Stuart.
turkey: Bennett and Zingg, Clavigero, Humboldt, Kaufman, Leopold, Pollock and Ray, Shattuck, Stuart.
wood rail: Edmonson 1971, Leopold.

potential domesticates
antelope: Flannery, Caton.
bison: Brand, Carter 1977, Caton, Vining.
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various: Hunn.

Methodology in domestication studies: Bahn, Caton, Hunn, Pires-Ferreira et al, Puleston, Rogers and Rogers.

Naming ambiguities
agouti: George.
antelope: George, R. Smith.
ass: Charlevoix, Kamar, Latcham, Martín, Navarrete.
bison: Charlevoix, George, Gilmore, Latcham, Mahr, Nicholson.
camel: Nibley.
cat: Gartlemann, Kaufman 1977.
cattle: Bender, Martín, United Bible Societies.
chicken: Carter 1971, Kaufman 1972.
cow: Bender, Denison, George, Kiddle, Kiddle, Latcham, Law, Mahr, Nicholson, Sjodahl, Vining.
deer: Edmonson 1965, G. Hatt, Laufer, Mahr, Martín, R. Smith.
dog: Rosenthal, United Bible Societies, Waterhouse.
donkey: Frädrich
elk: Mahr, Vining.
general: Kiddle, Kleivan, Mahr, Nicholson, Sjodahl, Stocker et al, United Bible Societies, Vining.
goat: Encyclopedia Judaica, Gartlemann, Latcham, Martín, Noyes, United Bible Societies.
guinea pig: George.
horse: Anderson and Dibble, Edmonson 1965, Frädrich, Gilmore, G. Hatt, Mahr, Noyes, Sjodahl, R. Smith, United Bible Societies, Vining, Waterhouse.
huanaco: Latcham.
llama: George.
mastodon (elephant, mammoth): Gatschet.
ox: Charlevois, George, Kiddle, Sjodahl, United Bible Societies.

peacock: George.
pig: Edmonson 1971, Martín, United Bible Societies, Vining.
sheep: Mahr, Martín, United Bible Societies, Vining.
tapir: Charlevoix, Edmonson 1971, Frädrich, George, Kiddle,. Latcham, Martín, Noyes, Sjodahl, Stocker et al.
turkey: George.
unicorn: Gatschet.
vulture: United Bible Societies.

Nutrition: Harner, Ortiz de M, Price, Puleston.

Pastoral societies, American: Arriola, Larde, Latcham, Pieres-Ferreira et al, Vining.

Pens to confine kept animals: Hamblin, Pohl and Feldman, Pollock et al.

Pets: Brand, Connell, Frädrich, Gilmore, Hunn, Kamar, Kaufman, Leopold, Martín, Puleston, Rosenthal, Whitley 1974b.

Quasi-domestication: Dillon, Hamblin, Turner and Harrison.

Riding animals: Kidder, Krickeberg et al, Laufer, Pendergast 1969, Pohl, Samayoa C, Velez Lopez, Vogt.

Taming: Dillon, Schorger, Turner and Harrison.

Tradition or myth regarding animals perhaps not extant: Ashley Montagu 1944, H. Beck, J. Beck, French, Michelson, Siebert, Stocker et al, Strong.

"Silk": Bancroft, Cortes, Gibson, Johnson, Prescott, Von Hagen.

"Wool": Gartelmann, Latcham, Linne, Romero.