

## Diamond Chapter 9

[comments in square brackets are Dr. Roe's]

"Domesticable animals are all alike; every undomesticable animal is undomesticable in its own way" (Diamond 1999:157)

Most "...successful domesticates were almost exclusively Eurasian"

Many others, like the peccary & the zebra, are unsuitable in several ways & were never domesticated. The 4 species of zebra get vicious as they age, while "Efforts at domestication went as far as hitching them to carts: they were tried out as draft animals in 19th-century South Africa, and the eccentric Lord Walter Rothschild drove through the streets of London in a carriage pulled by zebras" (p.171), they have resisted domestication. "Zebras have the unpleasant habit of biting a person and not letting go. They thereby injure even more American zoo-keepers each year than do tigers! Zebras are also virtually impossible to lasso with a rope" (p.172).

The emphasis here is on Africa with its plethora of seemingly domesticable large mammals--most of which were never domesticated locally--why?

**Many Benefits of Big Domesticates:** "...the many ways in which big domestic animals were crucial to those societies possessing them...they provided meat, milk products [or blood--all proteins & fat], fertilizer [& dung as fire material for cooking], land transport, leather, military assault vehicles [or venues], plow [& water wheel] traction, and wool [always secondary in domestication to meat], as well as germs that killed previously unexposed peoples" [i.e., "unintended weaponry," part of Mumford's "Technic," what one might call "metatechnology"] (Diamond 1999:158).

### **Small Mammals, Birds & Insects are Secondarily Important:**

- 1.) Birds for meat, eggs & feathers: a.) chicken in China, (b.) geese & ducks in Eurasia, (c.) turkeys in Mesoamerica, (d.) guinea fowl in Africa & (e.) the Muscovy duck in S. America.
- 2.) Wolves domesticated into Dogs in Eurasia & North America for hunting, to pull burdens [(travois=drag car), carry saddlebags], act as sentinels & war biomachines, [for wool (in Northwest Coast)], for hunting, for companionship & for meat [(the Mexican hairless)]-eating of dogs in China, Korea, Vietnam, Indonesia. (p.158) Polynesians also developed a variety

of dog for eating (p.161) [& Indians of Northwest Coast of North America developed a special long white-haired dog for its wool for weaving Chilcat blankets!]

[dogs are a "special case" because of their role in watchdog, hunting & companionship, they are the earliest at 10,000 B.C. (p.167).

- 3.) "Ferrets [Mustelids] were domesticated in Europe to hunt rabbits."  
[1 exception to the rule that solitary & territorial animals don't domesticate, here because people keep just 1 as a pet or hunter-p.173].
- 4.) "...cats were domesticated in North Africa [Egypt] and Southwest Asia to hunt rodent pests." [but, as anyone who has kept cats as pets knows, they are never really domesticated & can become fully feral easily--they are nature's "perfect carnivores," and, unlike dogs, can never be maintained on a vegetarian diet; they are also an exception to the "solitary, territorial animal" rule].
- 5.) "Rodents...domesticated for food included the rabbit in Europe, the guinea pig in the Andes, a giant rat in West Africa, and possibly a rodent called the hutia on Caribbean islands."
- 6.) "Even some insects have been domesticated, notably Eurasia's honeybee and China's silkworm moth, kept for honey and silk, respectively." (p.158).

**Only 14 species of "big" animals (over 100 lbs.) Have Been Domesticated:**

1.) Of those, 9 are of spatially limited importance, such as "the Arabian camel [the single-humped Dromedary], Bactrian [the two-humped Asiatic] camel, [the South American small "humpless camelids"], llama/alpaca (distinct breeds of the same ancestral species), donkey, reindeer [Eurasian steppes], water buffalo [East & Southeast Asia], yak [Himalayas], banteng, and gaur [Southeast Asia]" (Diamond 1999:159).

2.) "Only 5 species became widespread and important around the world: ...the cow [Eurasian & India], sheep, goat, pig [Eurasian & Southeast Asia], and horse [Eurasian steppes]."

**Domestication Differs from Taming:** The African war elephants of Hannibal's army & Asian work elephants are just tamed & don't breed in captivity.

**Domestication:** "...a domesticated animal is defined as an animal selectively bred in captivity and thereby modified from its wild ancestors, for use by

humans who control the animal's breeding and food supply" (p.159) [to some "end" such as meat, eggs, milk or fur, the production of which is heightened by artificial selection].

**[=Domesticate, a "Bio-machine]**=[because it is self-guided & powered but modified from nature by humans via artificial selection. Like cultigens, domesticates are biological "monsters" which usually cannot survive by themselves in the wild].

**Domesticates Raised for Docility=Stupidity:** "Several species of domestic animals have smaller brains [a stupid animal is a docile animal] and less developed sense organs than their wild ancestors, because...[they no longer need]...to escape from wild predators." [exception is the pig, which are brighter than dogs--reason, they are omnivores with same dietary needs as humans]

**Recent Small Mammals Domesticated:** "Small mammals domesticated as recently as the 19th and 20th centuries include foxes, mink, and chinchillas grown for fur and hamsters kept as pets."

### **Changes As A Result of Domestication:**

1.) "Many species changed in size: cows, pigs and sheep became smaller under domestication, while guinea pigs became larger." [note, bigger ones are reduced in size to control hostility & threat, small ones are upgraded to yield more flesh--as in the Aztec white turkey bred for Thanksgiving, now reduced to impossibly large-breasted birds which can hardly move to slake American's taste for white meat].

2.) [Goals-this one is **wrong**]-"Sheep and alpacas were selected for retention of wool and reduction or loss of hair" [actually, that is a secondary goal, the 1st goal was meat production].

3.) "...cows have been selected for high milk yields" (Diamond 1999:159).

4.) dogs are highly variable [descended from Southeast Asian, North American & Western Asian wolves--multiple domestication]

### **The Major 5 Domesticates:**

- 1.) Sheep-wild ancestor the Asiatic mouflon sheep of West & Central Asia [8,000 B.C.]
- 2.) Goat-wild ancestor the bezoar goat of West Asia [8,000 B.C.]
- 3.) Cow-wild ancestor the extinct aurochs of Eurasia & N. Africa [much bigger] [6,000 B.C.]
- 4.) Pig-wild ancestor the wild boar-unique as an omnivore, from Eurasia & N. Africa [8,000 B.C.]
- 5.) Horse-wild ancestor now extinct wild horses of southern Russia= Ukraine, like the living [pony-sized] Przewalski's horse of Mongolia. [4,000 B.C.]

**The Minor 9 Domesticates:**

- 1.) Arabian (one-humped [dromedary]), Arabia & N. Africa [2,500 B.C.]
- 2.) Bactrian (two-humped) Asiatic camel, Central Asia [2,500 B.C.]
- 3.) Llama & Alpaca [wild ancestor, Pleistocene Paleo-Llama **not** the guanaco as he states-moreover, the guanaco is not Andean as he also states] These appear to be well-differentiated breeds of the same species, rather than different species" [3,500 B.C.]
- 4.) Donkey-wild ancestor the North African & Southwest Asia wild ass [not the Asiatic ass, the Onager, which was experimented with by the ancient Sumerians, but proved too nasty in disposition to fully domesticate (p.171)] [4,000 B.C.]
- 5.) Reindeer-northern Eurasia
- 6.) Water Buffalo-Southeast Asia [4,000 B.C.]
- 7.) Yak-Himalayas & Tibetan plateau
- 8.) Bali cattle-wild ancestor the banteng of Southeast Asia

9.) Mithan-wild ancestor, the gaur of India & Burma (Diamond 1999:160-161, Table 9.1).

**Uneven spread of Wild Ancestors to Big Domesticates:** "South America had only 1...North America, Australia, and sub-Saharan Africa had none at all" which is astonishing since tourists go to modern Africa to marvel at its wealth of large animals!

**North Africa is part of Eurasia:** "...my use of the term 'Eurasia' includes in several cases North Africa, which biogeographically and in many aspects of human culture is more closely related to Eurasia than to sub-Saharan Africa" (p.161).

**Eurasia leads in Large Animal Bio-diversity:** "Eurasia has the largest number of big terrestrial [herbivorous or omnivorous] species... weighing...over 100 pounds (45 kilograms)"=72 species! Why? Eurasia is world's largest landmass with greater ecological diversity-from jungle to tundra, deserts to temperate areas. (**percentage domesticated=18%**)

**Africa has only 51 (percentage domesticated=0%!)** "Africa has smaller areas of tropical rain forest than does Southeast Asia [& lots smaller than South America], and no temperate habitats at all beyond latitude 37 degrees."

**Yet Africans Readily Adopted Eurasian Domesticates="**...African herders thereby achieved a huge advantage over...hunter-gatherers and quickly displaced them. In particular, Bantu farmers who acquired cows and sheep spread out of their homeland in West Africa and within a short time overran the former hunter-gatherers in most of the rest of sub-Saharan Africa [all the way to the Cape of South Africa] (p.163).

**Horses Revolutionized West Africa [like North American Plains & the Pampas of South America in warfare & political complexity]**

"The arrival of the domestic horse in West Africa transformed warfare there and turned the area into a set of kingdoms dependent on cavalry. The only factor that prevented horses from spreading beyond West Africa was trypanosome diseases borne by tsetse flies" (p.164).

**Horses Revolutionized Plains Indian Warfare:** but they only got them in the 17th cen., [yet that created an "equestrian culture" where many groups abandoned

farming along the Mississippi & entered the Plains to become big-game hunting nomads! They developed a unique style of raiding warfare (in part, stealing horses) & "counting coup". They also developed very complex tribal societies with Peace & War Chiefs & even developed their own form of horse, the Apaloosa! In a unique case of "parallel cultural evolution" the Twelche of the Pampas of South America did the same, but now preying on guanaco & rhea, not the North American bison!

**Sheep were adopted by Navaho in the North American Southwest & by the Guajiro in Venezuela, both groups becoming pastoralists!**

### **Tasmanians adopted & bred dogs**

"Within a decade of ....settlement by Europeans with dogs, Aboriginal Tasmanians, who had never before seen dogs, began to breed them in large numbers for use in hunting" (p.164).

**Therefore, it was something to do with the unsuitability of the animals, not the limitations of the people (p.164).**

**Pets Aren't Domesticates:** Lots of animals have been trained as pets, but never domesticated-- including gazelles, giraffes, cheetas and hyenas (ancient Egyptians-p.165).

**All the Big Domesticates are Early:** All the big animals were domesticated early (8,000-2,500 B.C.) by the post-Pleistocene early farmers (p.165), the last were the camels (p.166)-no recent large animals. "...big mammal domestication virtually ended 4,500 years ago. By then, all of the world's 148 candidate big species must have been tested innumerable times, with the result that only a few [14] passed the test and no other suitable ones remained" (p.166) altho there are current plans for the Eland, the biggest African antelope, and modern programs have been carried out for the American bison, the elk, moose, musk ox and zebra (p.166)--all without much success, tho in Russia domesticated moose have been milked, ridden & used to pull sleds-p.168].

**Some were domesticated multiple times!** mitochondrial DNA "...recently confirmed [notice, in non-humans it is non controversial!], as had long been suspected, that humped cattle [zebu] of India and humpless European cattle were derived from two separate populations of wild ancestral cattle that had diverged hundreds of thousands of years ago" similarly, wolves were independently domesticated to become dogs in the Americas and probably in several parts of

Eurasia, including China and Southwest Asia. Modern pigs are derived from independent ... [species]... in China, western Eurasia... These examples reemphasize that the same few suitable wild species attracted the attention of many different human societies" (p.166).

**Some Small Mammals were Domesticated later:**"...rabbits were not domesticated for food until the Middle Ages, mice and rats for laboratory research not until the 20th century, and hamsters for pets not until the 1930s. The continuing development of domesticated small mammals isn't surprising, because there are literally thousands of wild species as candidates, and because they were of too little value to traditional societies to warrant the effort" (p.166)-[tho the case of the guinea pig in the Andes shows that the existence of larger domesticates may have inhibited that elsewhere].

**South America is nearly as diverse as Eurasia & once had great large mammal diversity [but as a "semi-island continent" most became extinct by 11,000 B.C.] only 24, just 1 domesticated=4%** "...Australia and the Americas, but not Eurasia or Africa, lost most of their candidates in a massive wave of late-Pleistocene extinctions-possibly because the mammals of the former continents had the misfortune to be first exposed to humans suddenly and late in our evolutionary history, when our hunting skills were already highly developed" (p.175) [&, as protected & therefore non-competitive "island fauna" already faced extinction by competition from other animals, new "world continent" rivals, smarter & more adaptable, who entered their spheres with changing geography]. **Australia**=real island continent, all megafauna extinct on human arrival or shortly thereafter, only 1 remaining=the red kangaroo, & it was never domesticated=0% (p.163). [ref. the red kangaroo, no marsupials have ever been domesticated, they are simply too primitive compared with placental mammals, in this respect they are like reptiles, which also have never been domesticated, tho they may be tamed--the tropical American Iguana is the only candidate--& that case has not yet been proved].

**What About "Near Relatives"?** "Why were Eurasia's horses domesticated, but not Africa's zebras? Why Eurasia's pigs, but not American peccaries of Africa's three species of true wild pigs? Why Eurasia's five species of wild cattle...,but not the African [Cape] buffalo or American bison? Why the Asian mouflon sheep...but not North American bighorn sheep?" (p.163).

**Trophic levels [& cultural attitudes] mitigate against carnivores as domesticates for a food source**-conversion of biomass is only about 10% efficient as one goes up trophic levels "...it takes around 10,000 pounds of corn to grow a 1,000 pound cow. If instead you want to grow 1,000 pounds of carnivore, you have to feed it 10,000 pounds of herbivore grown on 100,000 pounds of corn" (p.169). dogs aren't an exception since they are omnivores, like bears.

**Excluding factors: rare diets**-"...many species, like koalas [who only eat eucalyptus leaves], are too finicky in their plant preferences to recommend themselves as farm animals" (p.169).

**Slow Growth rate**-"To be worth keeping, domesticates must also grow quickly. That eliminates gorillas and elephants, even though they are vegetarians with admirably nonfinicky food preferences and represent a lot of meat [unfortunately wild gorillas are regularly killed for food as "bush meat" in Africa, the single factor most leading them to extinction behind loss of habitat to farmers]. What would-be gorilla or elephant rancher would wait 15 years for his herd to reach adult size? Modern Asians who work elephants find it much cheaper to capture them in the wild and tame them" (p.169).

**Problems of captive Breeding**-"...some potentially valuable animal species don't [breed well in captivity]...That's what derailed attempts to domesticate cheetahs...for thousands of years"--similar problems with the vicuña (p.170).

**Nasty Disposition**-bears are relative soft dogs & omnivores; they grow rapidly & are very big, but they are not ideal candidates due to their strength & unpredictable character, tho the Ainu regularly captured grizzly cubs & reared them to the 1st yr. of age & then sacrificed & ate them (pp. 170-171). "Another otherwise suitable candidate that disqualifies itself for equally obvious reasons is the African [Cape] buffalo. It grows quickly up to a weight of a ton and lives in herds that have a well-developed dominance hierarchy...[a good trait for domestication]...But the African buffalo is considered the most dangerous and unpredictable large animal of Africa...Similarly, hippos, as four-ton vegetarians, would be great barnyard animals if they weren't so dangerous. They kill more people each year than do any other African mammals, including even lions" (p.171).

**Tendency to Panic**="Big mammalian herbivore species react to danger from predators or humans in different ways. Some species are nervous, fast, and

programmed for instant flight when they perceive a threat. Other species are slower, less nervous, seek protection in herds, stand their ground when threatened, and don't run until necessary. Most species of deer and antelope ([like the wilderbreast or gnu & the gazelle] with the conspicuous exception of the reindeer) are of the former type [& do not domesticate], while sheep and goats are of the latter [& do]" (p.172)

**Lack Dominance Hierarchies & Overlapping Ranges**="Almost all species of domesticated large mammals prove to be ones whose wild ancestors share three social characteristics: they live in herds [& can thus be packed in corrals since they are used to close proximity to co-specifics]; they maintain a well-developed dominance hierarchy [& therefore humans can place themselves in the position of the alpha individual & the submissive imprint on them as on their own co-specifics] among herd members; and the herds occupy overlapping home ranges [so different herds can be mixed together in corrals & on the move] rather than mutually exclusive territories [& so would battle if placed with another herd]" (pp.172-173)=this disqualifies Bighorn sheep versus Mouflon sheep of the Old World altho they are of the same genus (p.174).

**Exclusive territories in Breeding Season**=also will not work "...many species that live in herds for part of the year are territorial in the breeding season, when they fight and do not tolerate each other's presence. That's true of most deer and antelope species (again with the exception of reindeer) (p.173).