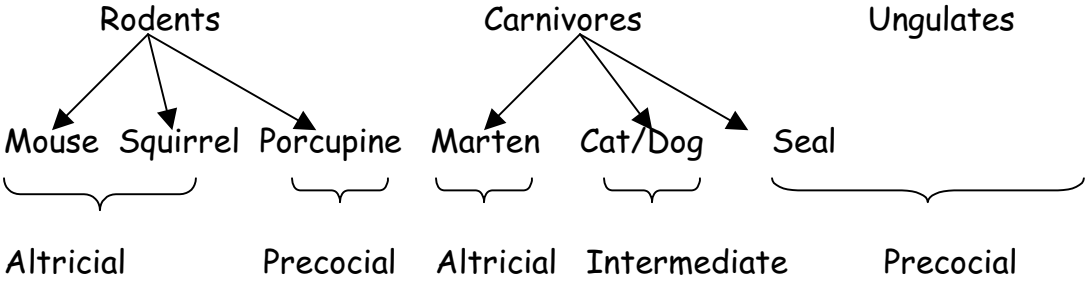
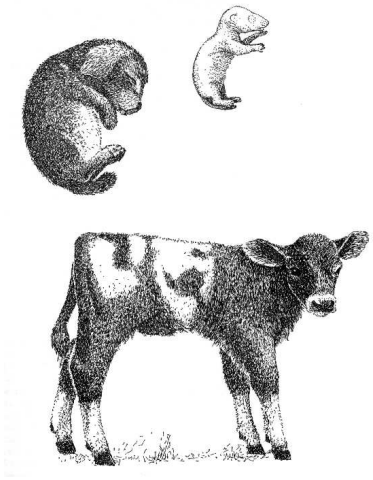
Chapter 3. Soul Life of Animals

Reproduction

Mammals withdraw the reproductive process from the external world into the security of the mother's body. The developmental process is part of the defining characteristics of animals. A plant, for example, develops in time; new leaves are added but the earlier ones remain. Metamorphosis builds new structure on top of the old one. But an animal develops in space; old organs are gradually transformed into new ones. Metamorphosis is continual. Mammals exhibit a range of development in the newborn. Those able to stand, see and hear soon after birth are called precocial. Those born blind, helpless and dependent on parental care are called altricial. This division corresponds to the threefold organization. Hoofed animals bear precocial young; rodents and carnivores are almost always altricial.





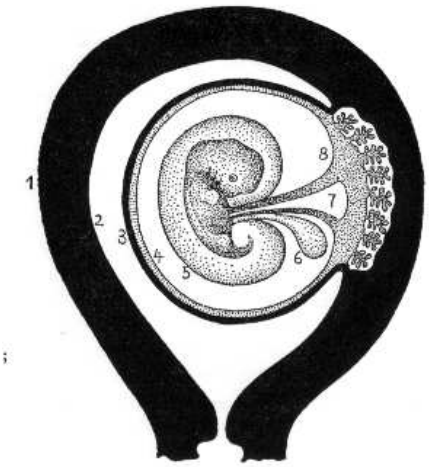
The mouse is an example of a creature that hurries to reproduce. Litters are large and frequent. In their hast to give birth, it is as if the young are not even finished, Eyes are closed, skin is hairless, limbs cannot support the body. Further development takes place outside in the open environment and with paternal care required. Altricial young show rapid but incomplete prenatal development that has to be finished outside.

Newborn rat, dog and calf are respectively altricial, intermediate and precocial. Source: Shad.

In contrast, the hoofed animals try to carry their young as long as possible. Birth is less frequent and pregnancy lasts longer. During pregnancy, the mother devotes her considerable metabolic energy to nourish the young. So at birth, the young animal is quite complete and the environment has little influence on development. The calf, having developed for a long time in the

metabolic region of its mother, becomes an animal dominated by metabolism. While the mouse is brought up affected by external events and nurtured by the nervous activity of the parent, it remains ruled by the sense organs.

In egg-laying animals, the developmental stages are completed under the influence of the outside world. In the birds, incubation warmth of the parents replaces a direct warmth influence of the outside. Only mammals transfer all the developmental influence to the inner body. Food, water, air and warmth are all supplied by the mother's inner environment. The embryo is surrounded by a number of membranes, both from the mother and from its own tissues.



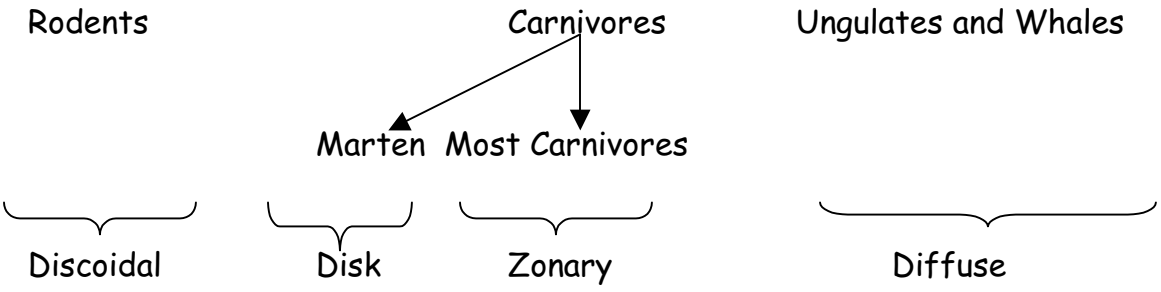
The chorion or outer membrane is covered with villii. These join with the maternal membrane to form the placenta. The embryo floats in amniotic fluid to protect against jarring – the amniotic sac develops out of the embryo's epidermis. The yolk sac is vestigial in mammals but is an extension of the developing gut. The allantois is an outgrowth of the hindgut. Blood vessels to the placenta develop along the allantois and quickly form the heart in early embryonic stages,

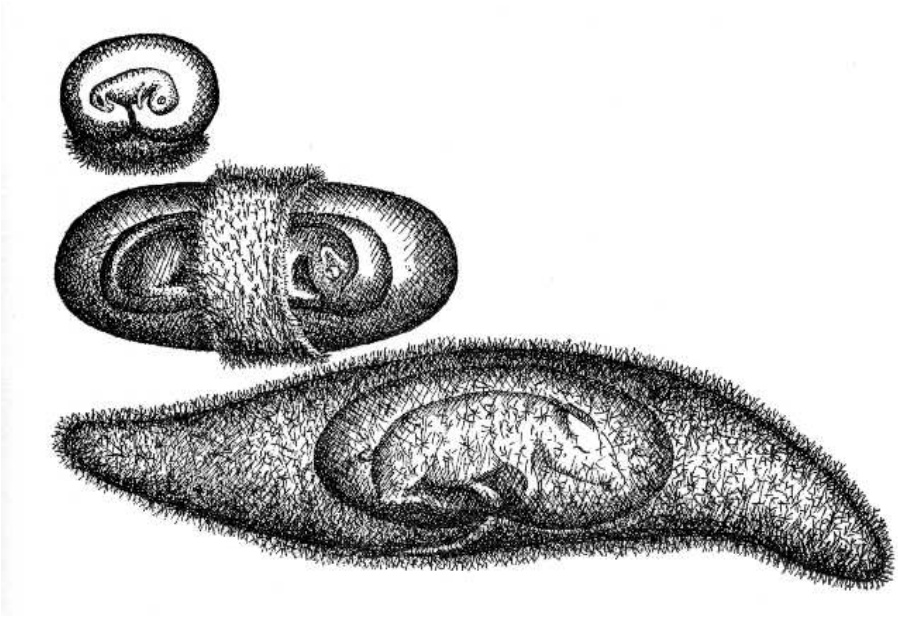
Sheaths surrounding the embryo; maternal tissue is black. 1) uterus 2) mucosa of uterus 3) deciduate mucosa 4) serosa 5) amnion 6) yolk sac 7) allantois 8) placenta. Source: Shad.

The placenta has to be cast off after birth. Those that penetrate deeply into the mother's tissue require that the maternal decidate membrane be discarded as well; these are called deciduous. Those with less connection allow the uterine membrane to remain intact and are called nondeciduous. One might think that the deciduous type shows a higher level of prenatal development, but that is not the case. It is rodents and carnivores that have the deciduous type. Ungulates and whales have nondeciduous placenta.

The shape of the placenta is also a distinguishing feature. The rodent placenta develops in only one place (discoidal) so it has a somewhat restricted connection to the mother. Carnivores develop a zonary placenta that surrounds the central part of the embryo. In martens, the zonal band is

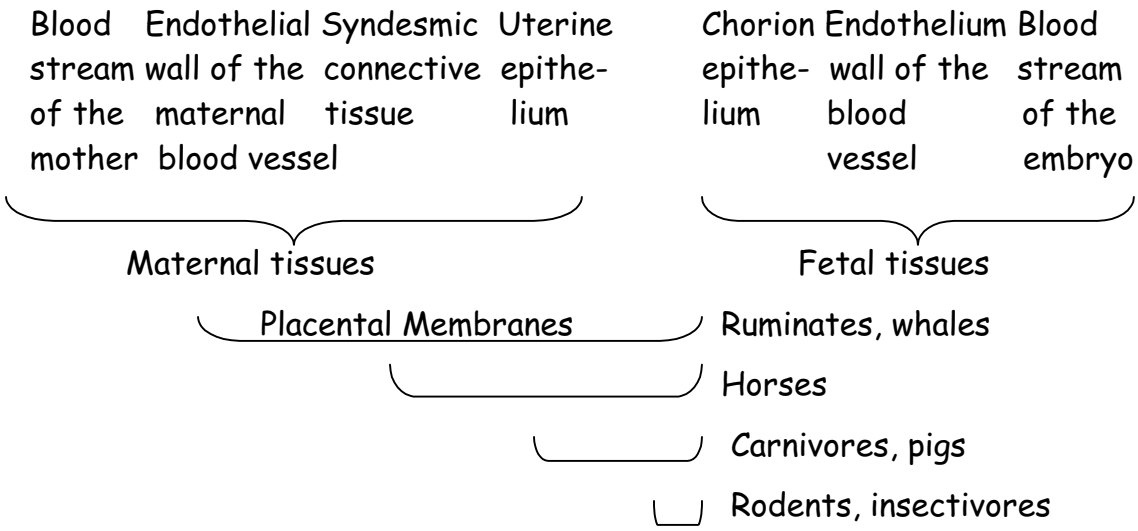
incomplete and forms two disks instead. Ungulates develop a diffuse placenta that completely envelops the whole embryo.





Fetus and placenta of the mouse (discoidal), the dog (zonary) and the pig (diffuse). Source: Shad.

The final consideration is the degree to which the fetal and maternal blood streams meet to exchange nutrients. The fetal chorion remains throughout and in nondeciduous placentas, the uterine epithelium remains. When this happens, nutrients must travel through a number of membranes to reach the fetus. So different families lose membranes in order to facilitate exchange. The extreme, found in rodents, is when the fetal chorion dissolves all the maternal membranes and reaches directly into the maternal blood stream.



Now the picture of prenatal influence becomes apparent. The rodent embryo has the most direct connection with the maternal blood supply. Oxygen and nourishment passes directly from the mother's blood with little hindrance. The connection to the outside environment is as open as it can be. In ungulates, the placental barrier is more substantial; the embryo has less oxygen exchange and is in a venous condition. The demand on life processes is more intensive. For additional nourishment, glands in the maternal mucosa secrete a uterine milk to enhance the transfer of nourishment. The cow makes about 100 of these glands, each about $\frac{3}{4}$ inch in diameter; the deer makes up to 10 but they may be up to 4 inches in diameter. In carnivores, the chorion dissolves the uterine wall creating small hemorrhages along the edge of the placenta. The chorion then dissolves the clotted blood as a source of added nourishment. Thus, prenatal feeding anticipates the adult diet. Rodents receive a rich food through a thin placental barrier; the calf feeds on a milk-like secretion and the carnivore is nourished by blood. The calf embryo gets stimulation to develop digestive processes while the rodent embryo requires no digestion. The mouse will have to actively search for rich nourishment while the cow will live from the earth's bounty.

Emotional Life of Animals

What takes place in the embryonic development continues in the adult animal. The rodent pushes out before being fully developed; even the adult body is comparatively underdeveloped. The ungulate has slow development so that the young are more completed at birth. The developmental energy of the rodent goes into accelerated membranes of the placenta, while the

ungulate is content with less developed membranes. For the rodent, its body remains small and insignificant. The rodent constantly tests the outside world. It lives in a state of fear and exhausting tension. Often it seems that rodents like the reassurance of touch; that's why they like small burrows.

Such a condition of constant fear would be pathological in a human. Steiner discussed what happens when a cat catches a mouse. For the mouse, death brings a welcome release from fear. During its lifetime, the animal's soul is so taken with perceptions of the outside that it merges easily upon death. The metabolic animal, however, is attached to its physical body and dies with reluctance and difficulty. The ungulate shuns death; the rodent seeks it. This emotional predisposition influences the animal's choice of behavior.

Rodent	Carnivore	Ungulate
Lives unwillingly; Dies gladly	Accepts equally life or death	Lives gladly; Dies unwillingly
Flight	Aggression	Avoidance

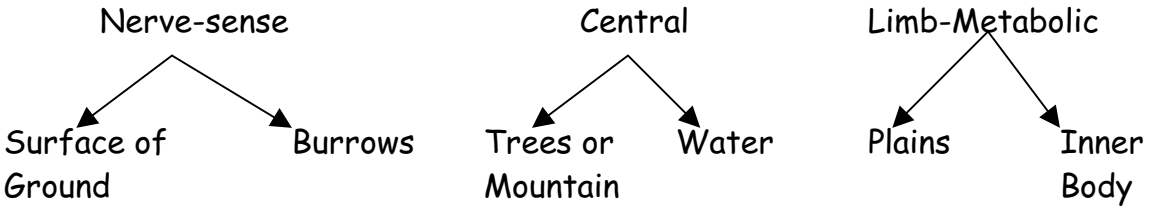
Influence from the Environment

Reproduction demonstrates how animals have differing degrees of attachment to the outer world. Separation from the environment has been part of the evolutionary process. The lowest chordates had a primitive spinal chord; fish developed the front end to form the brain. This central nervous system separates fish from invertebrates and begins the isolation of the nerve-sense pole. Amphibians continued by developing lungs but were still dependent on a watery environment. Reptiles were the next step; by enclosing themselves and completing the circulation system, they were able to leave the water. But current reptiles are still dependent on temperature; only birds show control of the body's interior warmth. Finally, mammals complete the process by protecting the developing young from all the influences of the outside world.

Fish	*Amphibian*	*Reptile*	*Bird*	*Mammal*
Central nervous System	Breathing System	Fluid System	Warmth System	Reproductive System
Brain	Lung	Heart	Viscera	Uterus, mammary

Since the nerve-sense pole developed first, the other developments proceeded from the head downward. Breathing centered in the lung, circulation in the heart. Each was emancipation from a certain constraint and

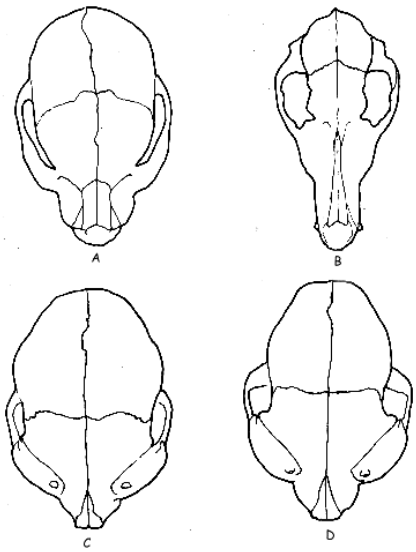
each was necessary in order to develop the animals and humans of today. This allows animals to adapt to specific environments. The sense oriented rodents and small carnivores like to live at the ground, exploring their habitat. Those more metabolic members live in deep burrows where they can avoid the sensory irritation and excitement. The rhythm animals are agile tree or mountain climbers. With a focus on their own internal circulation, it is not surprising that those with more metabolism seek the fluid or watery habitat. The limb dominated animals stretch out, running on open plains and savannas. Those with powerful metabolism focus inward; their own powerful body has become the immediate environment. The animal's form expresses its own basis; it needs its own complementary surroundings to be complete. The animal and its habitat form a cooperative super-organism.



Domestic Animals

Earlier we mentioned the fact that certain bovines become man's domestic partners and other species did not. Interestingly, it appears that the domestic animals avoid the extreme end of the spectrum. The earliest domestic animal was the dog – it chose man as substitute for its own wolf-pack social order. Later came the ruminants. These needed to be animals self-sufficient enough to be docile but oriented enough to their surroundings that they would accept man's dominion as a substituted social order. Thus, we partnered with the horse but not the zebra, the cow but not the bison. Would these other animals have been useful partners or were there fundamental differences in their emotional life that prevent taming?

Once joined with man, breeding replaced natural selection as an influence on the animal's form. It is noteworthy that some animals, dogs for example, have developed so much variation in their body forms. The wild forms of these animals do not show an unusual amount of variation. Why are there so many and varied domestic breeds? One explanation is that these animals have been encouraged to retain their infantile characteristics, a process called neoteny. The picture shows that dogs differ from cats in having a much more pronounced change from the newborn skull to the adult skull. Thus, it is possible for a race of dogs to have a completely different



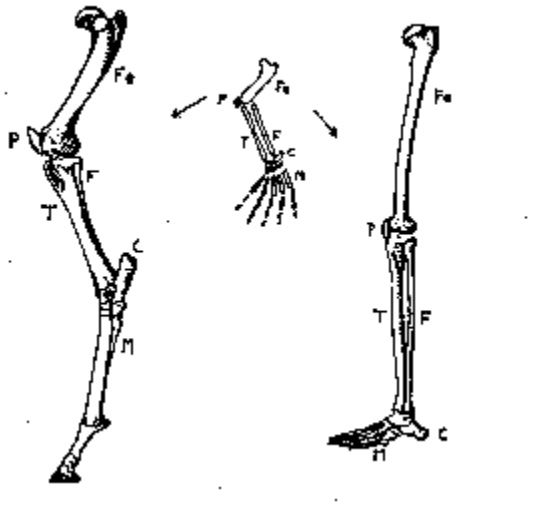
appearance if they merely retain puppy characteristics into adulthood. Neoteny is found among domestic breeds of cattle and pigs as well. It would appear that retaining youthful body form correlates with placid emotions and more obedient behavior as well. This is an example of the animal species adjusting body form in response to the changed environment.

Skull bones of A) newborn puppy B) adult dog C) newborn cat D) adult cat. Source: Gould, Eight Little Piggies.

Human Threefoldness

Humans are, in a sense, more freed from the environment since they have no specialized body parts. Actually, our primary characteristic, the five-fingered hand, could be considered specialized in its underdevelopment. The hand needs tools in order to complete what animals naturally possess. Yet because it is underdeveloped, the hand can fit any variety of tools.

Imperfection gives man a choice. And the rest of the body supports this flexibility; it is no accident that man's upper limbs have been freed of the task of locomotion. Thus, the lower limbs of man have become adapted. They are adjusted to deal with gravity.



In animals, limb adjustments take place at the periphery, where the limb is closest to the environment. The thighbones of horses are relatively short; the toes are extended to form the hoof.

Skeletal structure of the embryonic limb transformed into the horse (left) and man (right). FEmur, Tibia, Fibula, Calcaneus, Metatarsus. Source Shad.

In man, the weight-bearing limbs develop out of the trunk. Man's legs reach out to the environment, while his feet withdraw. Human limbs with a damming process at their periphery free us from too much dependence on the external world. Even our closest relatives, the apes, failed to gain emancipation of their limbs. It is in the immature ape that something like the human limb organization exists. For this reason, human structure is often described as showing neoteny, similar to our favored domestic animals. Steiner recognized the importance when he characterized the human body as a limb organization. It was the development of feet that permitted primates to become man.

Recent studies have demonstrated the extent to which the human anatomy is interconnected. Humans have a unique ability to accurately throw objects. Apes, such as chimps or baboons, also throw sticks and stones as an expression of aggression. But a chimp's level of accuracy is, quite literally, the broad side of a barn. Skilled humans, such as a baseball pitcher, can deliver an object to an inches-wide target at speeds of up to 100 miles per hour. It's not difficult to see how that development permitted man to become a hunter. The complexity of limb-eye-brain coordination is enormous but not readily apparent. To deliver that level of coordination, the brain has to instantly deal with multiple feedbacks and micro-level motor adjustments, a process called "sequencing". Interestingly, a similar sequencing process is required for speech and, we can assume, is related to conceptualization. In hominoid development, we observe that the upright stance and limb/hand development happened first; then humans evolved a progressively larger brain. So it appears that development of throwing ability brought, as an ancillary benefit, the ability to develop speech and society. (William Calvin, "Emergence of Intelligence", in Life in the Universe, Scientific American, 1995, ISBN 0-7167-2714-5.)

With this in mind, we can elaborate on the progressive emancipation of the organism.

Invertebrates	*Fish*	*Amphibian*	*Reptile*	*Bird*	*Mammal*	*Man*
Sense System	Nervous System	Respiratory System	Fluid System	Warmth System	Reproductive System	Limb System

What is special about man's threefoldness? In animals, specialized processes dominate the nerve-sense pole and the metabolic-limb pole. In man, while the systems have reached a high degree of development, no one pole dominates.

Man's body represents more of an interrelated whole. For example, our teeth are all harmonious, without any type dominating. While apes are central animals with large canines, we have held back any type dominance. Man has an unusual placenta development as well. The placenta starts out diffuse but develops into a discoidal type. That is, it starts resembling an ungulate and finishes resembling a rodent. Only man's placenta goes through the full range of types, taking part in all of them. Likewise, at birth, the human baby is both precocial, in well-developed sense organs, and altricial, in underdeveloped limbs.

In postnatal development, the child's body grows slower than that of our ape relatives. The human child is developing in other ways, in part, due to its longer childhood. Steiner pointed out that the nerve-sense develops first; the young child should not be pushed into premature intellectual instruction. The rhythmic system develops during the second seven years, as is recognized in Waldorf education. During the third seven-year cycle, the limb-metabolic structure gains maturity. By the time of adolescence, the human body is finally at home. Thus, in man, the threefold systems are differentiated, not in the physical body, but in time.

In summary, we have expanded on how the physical body and its development influence the emotional life. Our human characteristics are unique in many ways and allow us to achieve a step qualitatively beyond the animals.