

# Animal

## INTRODUCTION

ALPHABETICAL ordering places ANIMAL after ANGEL in this list of ideas. There is a third term which belongs with these two and, but for the alphabet, might have come between them. That term is MAN.

These three terms—and a fourth, God, which rounds out the comparison—are conjoined in Shakespeare's statement of what is perhaps the most universal reflection of man upon himself. "What a piece of work is man!" says Hamlet, "How noble in reason! how infinite in faculty! in form and moving, how express and admirable! in action, how like an angel! in apprehension, how like a god! the beauty of the world! the paragon of animals!" Animal, angel, god—in each of these man has seen his image. And at different moments in the history of thought, he has tended to identify himself with one to the exclusion of the others.

Yet predominantly man has regarded himself as an animal, even when he has understood himself to be created in God's image, and to share with the angels, through the possession of intellect, the dignity of being a person. As his understanding of himself has varied, so has he altered his conception of what it is to be an animal.

In terms of a conception of personality which involves the attributes of reason and free will, man has legally, as well as morally and metaphysically, drawn a sharp line between persons and things, and placed brute animals in the class of things. According to the principle of this distinction, being alive or even being sensitive does not give animals, any more than plants and stones, the dignity or status of persons.

When man's animality—either in terms of his biological affinities or his evolutionary ori-

gins—has seemed an adequate definition of his nature, man has attributed to animals many of his own traits, his intelligence and freedom, even his moral qualities and political propensities. Nevertheless, he has seldom ceased to regard himself as the paragon of animals, possessing in a higher degree than other animals the characteristic properties of all.

There are exceptions to this, however. One such exception is the worship of animals in primitive cultures. In *The Golden Bough*, Frazer gives numerous examples of the belief that the "external soul"—which holds that "the soul may temporarily absent itself from the body without causing death"—sometimes extends itself into a belief that the soul is deposited in an animal. The result is a kind of animal-man blood-brotherhood: "such a sympathetic relation is supposed to exist that the moment the animal dies the man dies also, and similarly the instant the man perishes so does the beast." Thus, primitive tribes, which are usually identified as hunters, often hold animals in higher regard than most modern societies, which experiment on animals in the name of science.

Animals have also been glorified by man for skeptical or satiric purposes. Montaigne, for example, doubts that man can lay claim to any special attributes or excellences, and further suggests that, in some particulars at least, men are less able and less noble than the beasts. Relying on legends found in Pliny and Plutarch which describe the marvelous exploits of animals, he argues that "it is not by a true judgment, but by foolish pride and stubbornness, that we set ourselves before the other animals and sequester ourselves from their condition and society."

"Why," Montaigne asks, "do we attribute to some sort of natural and servile inclination . . . works which surpass all that we can do by nature and by art?" We have no grounds for believing that "beasts do by natural and obligatory instinct the same things that we do by our choice and cleverness." Rather "we must," he continues, "infer from like results like faculties, and consequently confess that this same reason, this same method that we have for working, is also that of the animals."

Nor can we excuse our presumption of superiority by the fact that we are compelled to look at animals from our human point of view. "When I play with my cat," Montaigne writes, "who knows if I am not a pastime to her more than she is to me?" Suppose animals were to tell us what they thought of us. "This defect that hinders communication between them and us, why is it not just as much ours as theirs? It is a matter of guesswork," Montaigne thinks, "whose fault it is that we do not understand one another; for we do not understand them any more than they do us. By this same reasoning they may consider us beasts, as we consider them."

If Montaigne's view were to prevail, no special significance could be given to "brute" as opposed to "rational" animal. For that matter, the same holds true whenever man is conceived as *just an animal*, paragon or not. Animals are brute only when man is not—only when to be human is to be somehow more than an animal, different in kind, not merely in degree.

Satirists like Swift idealize an animal nature to berate the folly and depravity of man. In his last voyage, Gulliver finds in the land of the Houyhnhnms a race of human-looking creatures, the Yahoos, who by contrast with their noble masters, the horses, are a miserable and sorry lot. Here it is the Yahoos who are brutes, bereft as they are of the intelligence and virtue which grace the splendid Houyhnhnms.

THE COMPARISON of men and animals takes still another direction in the allegories of fable and poetry. From Aesop to the medieval *Bestiaries*, there is the tradition of stories in which animals are personified in order to teach a

moral lesson. In *The Divine Comedy* Dante uses specific animals to symbolize the epitome of certain passions, vices, and virtues. The intent of his allegory is, however, never derogatory to man as man. But when Machiavelli allegorizes the qualities required for political power, he advises the prince "knowingly to adopt the beast" and "to choose the fox and the lion." This tends to reduce human society to the jungle where strength and guile compete for supremacy. Other discussions in literature of the differences between animals and human beings can be found in the chapter on MAN.

The comparison of men and animals fails to touch the distinction, or lack of distinction, between animals and plants. This is basic to the definition or conception of animal nature. As in the case of men and animals, this problem can be approached in two ways: *either* from the side of plant life, and with respect to those functions which seem to be common to all living things; *or* from the side of animal life, and with respect to those functions which seem to belong only to animals, never to plants. On either approach the issue remains whether plants and animals are different in kind, not merely in degree.

On the one hand, it may be argued that sensitivity, desire, and locomotion (even perhaps sleeping and waking) are, in some form or degree, to be found in all living things. On the other hand, it may be argued that such functions as nutrition, growth, and reproduction, though obviously common to plants and animals, are performed by animals in a distinctive manner. If plants manifest all the vital powers or activities present in animals; or if in functions common to both, animals differ only in degree, then the scale of life would seem to be a continuous gradation rather than a hierarchy.

The opposite position, which affirms a difference in kind and consequently a hierarchy, is taken by Aristotle. In his biological writings, as well as in his treatise *On the Soul*, he draws a sharp line between plant and animal life by reference to faculties or functions absent in the one and found in the other. Aristotle first points out that "living may mean thinking or perception or local movement and rest, or

movement in the sense of nutrition, decay, and growth. Hence," he goes on, "we think of plants also as living, for they are observed to possess in themselves an originative power through which they increase or decrease in all spatial directions; they grow up and down, and everything that grows increases its bulk alike in both directions or indeed in all, and continues to live so long as it can absorb nutriment."

This leads him to assign to plants what he calls a nutritive or vegetative soul, whereby they have the three basic faculties common to all living things—nutrition, growth, and reproduction. But Aristotle does not find in plants any evidence of the functions performed by animals, such as sensation, appetite, and local motion. These are the characteristic powers of the animal soul, called by him the "sensitive soul" because sensation is the source both of animal desire and animal movement.

Galen follows Aristotle in this distinction. In his *On the Natural Faculties* he limits his investigations to the functions common to all living things. He uses the word "natural" for those effects, such as "growth and nutrition . . . common to plants as well as animals," which, in his view, are opposed to such activities as "feeling and voluntary motion . . . peculiar to animals," that he calls "effects of the soul," or "psychic." It may seem surprising at first that Galen's study of nutrition, growth, and reproduction—not only of the functions themselves but of the bodily organs and processes involved in these functions—should be restricted to their manifestation in animals, and not in plants as well. The reason may be that for the naturalists of antiquity, the biological functions of vegetable matter did not yield their secrets readily enough to observation. A treatise on plants, not written by Aristotle but attributed to his school, begins with the remark that "life is found in animals and plants; but whereas in animals it is clearly manifest, in plants it is hidden and less evident."

This view of the world of living things as divided into the two great kingdoms of plant and animal life prevailed through centuries of speculation and research. But from the time that Aristotle began the work of classification, it has been realized that there exist numer-

ous examples of what Francis Bacon called "bordering instances . . . such as exhibit those species of bodies which appear to be composed of two species, or to be the rudiments between the one and the other."

Within the last hundred years the difficulty of classifying such specimens, particularly those which seem to fall between plant and animal, has raised the question whether the traditional distinction can be maintained. "If we look even to the two main divisions, namely, to the animal and vegetable kingdoms," writes Darwin, "certain low forms are so far intermediate in character that naturalists have disputed to which kingdom they should belong." Yet Darwin does not find the evidence available to him sufficient to determine whether all living things have descended "from one primordial form" or whether the evolution of life is to be represented in two distinct lines of development.

Since Darwin's day the researches of scientists like Jacques Loeb and Herbert Spencer Jennings on the behavior of microorganisms, and the phenomena of tropisms (e.g., the sunflower's turning toward the sun), and the study of what appears to be local motion in plants, have contributed additional evidence relevant to the issue. Some research, however, is still considered open and arguable. Viruses, for example, cannot be classified as plants or animals, although some would argue that they are not organisms at all, for they cannot exist and reproduce without a host organism. As Waddington points out, the discovery of viruses has led to tremendous advances in the study of DNA recombination.

The fact that organisms exist which do not readily fall into either classification may signify continuity rather than separation between plants and animals; but it may also be taken to mean that more acute observations are required to classify these so-called "intermediate forms." Plant tropisms may or may not require us to deny that sensitivity belongs to animals alone. The apparent local motion of plants may be a mode of growth or a random movement rather than a directed change from place to place; and the attachment to place of apparently stationary animals, such as barnacles and

mussels, may be different from the immobility of rooted plants.

AGAINST THE BACKGROUND of these major issues concerning plants, animals, and men as continuous or radically distinct forms of life, the study of animal organisms—their anatomy and physiology—acquires much of its critical significance.

Anatomy is an ancient science. Several surgical treatises of Hippocrates display an extensive knowledge of the human skeletal structure and the disposition of some of the organs of the human body. The dissection of animals, as well as gross observation, provides Aristotle with a basis for the comparative anatomy of different species of animal. For Galen as well as Aristotle, much of this anatomical study was motivated by an interest in the structure and relation of the organs involved in the local motion of the body as a whole, and in local motions within the body, such as the motions of the alimentary or reproductive systems.

It remains for a later investigator, schooled in the tradition of ancient biology, to make the startling discovery of the circulation of the blood through the motions of the heart. Harvey not only does this, but he also suggests the functional interdependence of respiration and circulation, based on his observation of the intimate structural connections between heart, arteries, veins, and lungs. His contribution is at once a departure from and a product of the scientific tradition in which he worked, for though his conclusions are radically new, he reaches them by a method of research and reasoning which follows the general principles of Aristotle and Galen. His insistence, moreover, on the necessity of finding a functional purpose for an organic structure stands as the classic rejoinder to Bacon's recommendation that formal and final causes be separated from material and efficient causes in the study of nature. Bacon assigns the first two types of cause to metaphysics, and limits physics to the last two.

Harvey's work on the generation of animals is another example of the continuity between ancient and modern biology. In some respects, Aristotle's researches on the reproductive or-

gans and their functions are more general than Harvey's. They represent for him only part of the large field of comparative anatomy and have significance for the study of mating habits in different classes of animals. Yet on the problem of the act of generation itself, its causes and consequences, especially the phenomena of embryonic development, Harvey's treatise reads partly as a conversation with Aristotle and partly as the record of original observations undertaken experimentally.

"Respect for our predecessors and for antiquity at large," he writes, "inclines us to defend their conclusions to the extent that love of truth will allow. Nor do I think it becoming in us to neglect and make little of their labors and conclusions, who bore the torch that has lighted us to the shrine of philosophy." The ancients, in his opinion, "by their unwearied labor and variety of experiments, searching into the nature of things, have left us no doubtful light to guide us in our studies." Yet, Harvey adds, "no one of a surety will allow that all truth was engrossed by the ancients, unless he be utterly ignorant . . . of the many remarkable discoveries that have lately been made in anatomy." Referring to his own method of investigation, he proposes as a "safer way to the attainment of knowledge" that "in studying nature," we "question things themselves rather than by turning over books."

It is particularly with respect to animal generation that the great books exhibit continuity in the statement of basic problems in biology, as well as indicate the logical conditions of their solution. The issue of spontaneous generation as opposed to procreation runs through Aristotle, Lucretius, Aquinas, Harvey, and Darwin. The problem of sexual and asexual reproduction, with all the relevant considerations of sexual differentiation and sexual characteristics, is to be found in Aristotle, Darwin, and Freud. Questions of heredity, though they are raised with new significance by Darwin and William James, have a lineage as ancient as Plato.

Scientific learning has, of course, advanced in recent times with regard to the nature and behavior of animals. On such topics as hered-

ity, the work of Mendel, Bateson, Morgan, Waddington, Schrödinger, and Dobzhansky is crucial; or, to take another example, our knowledge of the functioning of the respiratory and the nervous system has been greatly enlarged by the researches of Haldane, Sherrington, and Pavlov. Yet even in these areas, the background of recent scientific contributions is to be found in the great books—in the writings, for example, of Harvey, Darwin, and William James.

ANOTHER INTEREST which runs through the whole tradition of man's study of animals lies in the problem of their classification—both with respect to the principles of taxonomy itself, and also in the systematic effort to construct schemes whereby the extraordinary variety of animal types can be reduced to order. In this field Aristotle and Darwin are the two great masters. If the names of Buffon and Linnaeus also deserve to be mentioned, it must be with the double qualification that they are followers of Aristotle on the one hand, and precursors of Darwin on the other. According to Dobzhansky, "the classification of organisms that existed before the advent of evolutionary theories has undergone surprisingly little change in the times following it, and whatever changes have been made depended only to a trifling extent on the elucidation of the actual phylogenetic relationships through paleontological evidence . . . The subdivisions of the animal and plant kingdoms established by Linnaeus are, with few exceptions, retained in the modern classification, and this despite the enormous number of new forms discovered since then."

The Aristotelian classification is most fully set forth in the *History of Animals*. There one kind of animal is distinguished from another by many "properties": by locale or habitat; by shape and color and size; by manner of locomotion, nutrition, association, sensation; by organic parts and members; by temperament, instinct, or characteristic habits of action. With respect to some of these properties, Aristotle treats one kind of animal as differing from another by a degree—by more or less—of the same trait. With respect to other

properties, he finds the difference to consist in the possession by one species of a trait totally lacking in another. He speaks of the lion as being more "ferocious" than the wolf, the crow as more "cunning" than the raven; but he also observes that the cow has an "organ of digestion" which the spider lacks, the lizard an "organ of locomotion" which the oyster lacks. The sponge lives in one manner so far as "locale" is concerned, and the viper in another; reptiles have one manner of locomotion, birds another. So ample were Aristotle's data and so expert were his classifications, that the major divisions and subdivisions of his scheme remain intact in the taxonomy constructed by Linnaeus.

The radical character of Darwin's departure from the Linnaean classification stems from a difference in principle rather than a correction of observational errors or inadequacies. Where Aristotle and all taxonomists before Darwin classify animals by reference to their similarities and differences, Darwin makes inferred genealogy or descent the primary criterion in terms of which he groups animals into varieties, species, genera, and larger phyla.

Naturalists, according to Darwin, "try to arrange the species, genera, and families in each class, on what is called the Natural System. But what is meant by this system? Some authors look at it merely as a scheme for arranging together those living objects which are most alike, and for separating those which are most unlike . . . The ingenuity and utility of this system are indisputable," but Darwin thinks that its rules cannot be explained or its difficulties overcome except "on the view that the Natural System is founded on descent with modification—that the characters which naturalists consider as showing true affinity between any two or more species, are those which have been inherited from a common parent, all true classification being genealogical—that community of descent is the hidden bond which naturalists have been unconsciously seeking, and not some unknown plan of creation, or the enunciation of general propositions, and the mere putting together and separating objects more or less alike."

In Darwin's opinion, classification "must be

strictly genealogical in order to be natural." Only by the principle of descent—"the one certainly known cause of similarity in organic beings"—can we arrange "all organic beings throughout all time in groups under groups"; see "the nature of the relationships by which all living and extinct organisms are united by complex, radiating, and circuitous lines of affinities into a few grand classes"; and understand "the wide opposition in value between analogical or adaptive characters, and characters of true affinity." Furthermore, "the importance of embryological characters and of rudimentary organs in classification" becomes "intelligible on the view that a natural arrangement must be genealogical." By reference to "this element of descent," not only shall we be able to "understand what is meant by the Natural System," but also, Darwin adds, "our classifications will come to be, as far as they can be so made, genealogies; and will then truly give what may be called the plan of creation."

Whereas the Aristotelian classification is static in principle, having no reference to temporal connections or the succession of generations, the Darwinian is dynamic—almost a moving picture of the ever-shifting arrangement of animals according to their affinities through common ancestry or their diversities through genetic variation. Connected with this opposition between static and dynamic principles of classification is a deeper conflict between two ways of understanding the nature of scientific classification itself.

The point at issue is whether the classes which the taxonomist constructs represent distinct natural forms. Do they exist independently as objects demanding scientific definition or are the scientist's groupings somewhat arbitrary and artificial? Do they divide and separate what in nature is more like a continuous distribution with accidental gaps and unevennesses? This issue, in turn, tends to raise the metaphysical question concerning the reality and fixity of species, which relates to the problem of the difference between real and nominal definitions, and the difference between natural and arbitrary systems of classification.

On these matters Aquinas and Locke have

much to say, as well as Aristotle and Darwin. Fuller discussion of such questions is to be found in the chapters on DEFINITION and EVOLUTION. Insofar as problems of classification and the nature of species have a bearing on evolution, they are treated in that chapter, as are the related issues of *continuity* or *hierarchy* in the world of living things, and of *difference* in *degree* or *kind* as between plants and animals, animals and men. The last two problems also occur in the chapters on LIFE AND DEATH and MAN.

The most interesting comment on continuity and discontinuity in the classification of animals is to be found in Dobzhansky. He writes as follows: "Let us examine first an imaginary situation, a living world in which all possible gene combinations are represented by equal numbers of individuals. Under such conditions no discrete groups of forms and no hierarchy of groups could occur, since the single gene differences producing striking phenotypical effects, like some of the mutations in *Drosophila*, would be the sole remaining source of discontinuity. Disregarding these, the variability would become a perfect continuum. The most 'natural,' although not the only possible, classification would be a sort of multi-dimensional periodic system, with a number of dimensions equal to that of the variable genes." Dobzhansky goes on to say, "Clearly the existing organic world is unlike the above imaginary one . . . only an infinitesimal fraction of the possible gene combinations is realized among the living individuals, or has ever been realized. According to a conservative estimate given by Wright . . . the number of possible combinations of genes is of the order of  $10^{1000}$ , while the estimate of the number of electrons in the visible universe is of the order of  $10^{100}$ ."

ON THE THEME of comparisons between animals and men, two further points should be noted.

The first concerns the soul of animals. When soul is conceived as the principle or source of life in whatever is alive, plants and animals can be said to have souls. Like Aristotle, Augustine distinguishes "three grades of

soul in universal nature": one which has "only the power of life . . . the second grade in which there is sensation . . . the third grade . . . where intelligence has its throne."

Though he also follows Aristotle in defining three kinds of soul, Aquinas distinguishes four grades of life, and in so doing differentiates between *perfect* and *imperfect* animals. "There are some living things," he writes, "in which there exists only vegetative power, as the plants. There are others in which with the vegetative there exists also the sensitive, but not the locomotive power; such are immovable animals, as shellfish. There are others which besides this have locomotive power, as perfect animals, which require many things for their life, and consequently movement to seek the necessities of life from a distance. And there are some living things which with these have intellectual power—namely, men."

On this theory, man, viewed in terms of his animal nature, is a perfect animal. Viewed in terms of his reason or intellect, he stands above the highest animals. Yet having a soul is not peculiar to man, just as being alive, or sensitive, or mobile, is not. But when, as with Descartes, soul is identified with intellect—as "a thing which thinks, that is to say a mind . . . or an understanding, or a reason"—and, in addition, soul is conceived as a spiritual and immortal substance, then the conclusion seems to follow that animals do not have souls.

For Descartes, the theory of the animal as a machine or automaton follows as a further corollary. "If there had been such machines, possessing the organs and outward form of a monkey or some other animal without reason," Descartes claims that "we should not have had any means of ascertaining that they were not of the same nature as those animals." Hobbes likewise would account for all the actions of animal life on mechanical principles. "For what is the heart, but a spring," he asks, "and the nerves, but so many strings; and the joints, but so many wheels, giving motion to the whole body?" The animal is thus pictured as an elaborate system of moving parts, inflexibly determined to behave in certain ways under the impact of stimulation by external forces.

The doctrine of the animal automaton is sometimes generalized, as by La Mettrie, a follower of Descartes, to include the conception of man as a machine. The same conclusions which are reached from the denial of soul in animals seem to follow also from the theory that the soul, even in the case of man, is material or a function of matter. According to those who, like Lucretius, hold this view, the phenomena of life, sensation, and thought can be explained by the movement of atomic particles and their interaction.

The second point concerns the relation between instinct and intelligence in animals. The nature of animal instincts (or innate habits) is considered in the chapters on EMOTION and HABIT, as is the nature of animal intelligence in the chapters on MAN and REASONING. But here we face the issue whether instinct functions in animals, as reason does in man, to meet the exigencies of life; or whether in both, though varying in degree, intelligence cooperates with instinct to solve the problems of adjustment to environment.

Those who, like Aquinas, regard instinct and reason as the alternative and exclusive means which God provides for the ends of animal and human life, necessarily tend to interpret animal behavior in all its detail as predetermined by elaborate instinctive endowments. Accordingly, animal behavior, even when voluntary rather than purely the action of physiological reflexes, is said not to be free, or an expression of free choice on the part of the animal; for, as is pointed out in the chapter on WILL, Aquinas calls behavior "voluntary" if it involves some knowledge or consciousness of the objects to which it is directed.

Instinctive behavior, such as an animal's flight from danger or its pursuit of food or a mate, involves sense perception of the objects of these actions, as well as feelings or emotions about them. But though it is "voluntary" in the sense in which Aquinas uses that word, instinctive behavior is, according to him, the exact opposite of action based upon free will. It is completely determined by the inborn pattern of the instinct. It may vary in operation with the circumstances of the occasion, but it does not leave the animal the freedom to act

or not to act, or to act this way rather than that. Such freedom of choice, Aquinas holds, depends on reason's ability to contemplate alternatives, to none of which is the human will bound by natural necessity.

Aquinas does not limit human reason and will to a role analogous to the one he ascribes to instinct and emotion in animal life. Their power enables man to engage in speculative thought and to seek remote ends. Nevertheless, on the level of his biological needs, man must resort to the use of his reason and will where other animals are guided by instinct. "Man has by nature," Aquinas writes, "his reason and his hands, which are *the organs of organs*, since by their means man can make for himself instruments of an infinite variety, and for any number of purposes." Just as the products of reason take the place of hair, hoofs, claws, teeth, and horns—"fixed means of defense or of clothing, as is the case with other animals"—so reason serves man's needs, in the view of Aquinas, as instinct serves other animals.

Others, like Darwin, James, and Freud, seem to take a different view. They attribute instinct to men as well as to animals. In their opinion instinctively determined behavior is influenced by intelligence and affected by memory and imagination, in animals as well as in men. They recognize, however, that instinct predominates in some of the lower forms of animal life and acknowledge that the contribution of intelligence is great only among the more highly developed organisms.

"Man has a far greater variety of *impulses* than any lower animal," writes James; "and any one of these impulses taken in itself, is as 'blind' as the lowest instinct can be; but, owing to man's memory, power of reflection, and power of inference, they come each one to be felt by him, after he has once yielded to them and experienced their results in connection with a *foresight* of those results." On the same grounds, James argues that "*every instinctive act, in an animal with memory, must cease to be 'blind' after being once repeated, and must be accompanied with foresight of its 'end' just so far as that end may have fallen under the animal's cognizance.*"

If instinct, in animals or men, were sufficient for solving the problems of survival, there would be no need for what James calls "sagacity" on the part of animals, or of learning from experience. Like Montaigne, James assembles anecdotes to show that animals exercise their wits and learn from experience. "No matter how well endowed an animal may originally be in the way of instincts," James declares, "his resultant actions will be much modified if the instincts combine with experience, if in addition to impulses he have memories, associations, inferences, and expectations, on any considerable scale."

In his consideration of "the intellectual contrast between brute and man," James places "the most elementary single difference between the human mind and that of brutes" in the "deficiency on the brute's part to associate ideas by similarity," so that "characters, the abstraction of which depends on this sort of association, must in the brute always remain drowned." Darwin similarly makes the difference in degree between human and animal intelligence a matter of greater or less power to associate ideas. In consequence, human instincts are much more modified by learning and experience than the instincts of other animals, as in turn the higher animals show much greater variability in their instinctive behavior than do lower organisms.

It is not necessary to deny that men alone have reason in order to affirm that, in addition to instinct, animals have intelligence in some proportion to the development of their sensitive powers, especially their memory and imagination. The position of Aristotle and Aquinas seems to involve both points. But if we attribute the extraordinary performances of animals to their intelligence *alone*, rather than primarily to instinct, then we are led to conclude with Montaigne that they possess not merely a sensitive intelligence, but a reasoning intellect.

Montaigne asks, "Why does the spider thicken her web in one place and slacken it in another, use now this sort of knot, now that one, unless she has the power of reflection, and thought, and inference?" And in another place he asks, "What sort of faculty of ours do we



not recognize in the actions of the animals? Is there a society regulated with more order, diversified into more charges and functions, and more consistently maintained, than that of the honeybees? Can we imagine so orderly an arrangement of actions and occupations as this to be conducted without reason and foresight?"

GREGARIOUSNESS in animals and the nature of animal communities are considered in the chapter on STATE, in connection with the formation of human society. But so far as human society itself is concerned, the domestication of animals signifies an advance from primitive to civilized life and an increase in the wealth and power of the tribe or city.

Aeschylus includes the taming of animals among the gifts of Prometheus, who yoked beasts of burden "that they might be man's substitute in the hardest tasks," and who "harnessed to the carriage, so that they loved the rein, horses, the crowning pride of the rich man's luxury." *The Iliad* pays eloquent testimony to the change in the quality of human life which accompanied the training of animals to respond to human command. Homer's reference to Castor as "breaker of horses" indicates the sense of conquest or mastery which men felt when they subdued wild beasts; and the oft-repeated Homeric epithet "horsetaming," which is intended as a term of praise for both the Argives and the Trojans, implies the rise of a people from barbarous or primitive conditions—their emancipation from the discomforts and limitations of animal life.

Aristotle points out that one mark of wealthy men is "the number of horses which they keep, for they cannot afford to keep them unless they are rich." For the same reason, he explains, "in old times the cities whose strength lay in their cavalry were oligarchies."

Legend and history are full of stories of the loyalty and devotion of animals to their human masters, and of the reciprocal care and affection which men have given them. But, motivated as it is by their utility for economic or military purposes, the breaking of animals to human will also frequently involves a violent or wanton misuse.

The use, or even the exploitation, of ani-

mals by man seems to be justified by the inferiority of the brute to the rational nature. As plants exist for the sake of animals, so animals, according to Aristotle, "exist for the sake of man, the tame for use and food, the wild, if not all, at least the greater part of them, for food, and for the provision of clothing and various instruments." Aristotle's conception of the natural slave, discussed in the chapter on SLAVERY, uses the domesticated animal as a kind of model for the treatment of human beings as tools or instruments.

Though he does not share Aristotle's view that some men are by nature slaves, Spinoza takes a comparable position with regard to man's domination and use of animals. "The law against killing animals," he writes, "is based upon an empty superstition and womanish tenderness, rather than upon sound reason. A proper regard, indeed, to one's own profit teaches us to unite in friendship with men, and not with brutes, nor with things whose nature is different from human nature . . . I by no means deny," he continues, "that brutes feel, but I do deny that on this account it is unlawful for us to consult our own profit by using them for our pleasure and treating them as is most convenient to us, inasmuch as they do not agree in nature with us."

But other moralists declare that men can befriend animals and insist that charity, if not justice, should control man's treatment of beasts. Nor is such contrary teaching confined to Christianity, or to the maxims of St. Francis, who would persuade men to love not only their neighbors as themselves, but all of God's creatures. Plutarch, for instance, argues that although "law and justice we cannot, in the nature of things, employ on others than men," nevertheless, "we may extend our goodness and charity even to irrational creatures." In kindness to dumb animals he finds the mark of the "gentle nature"—the sign of a man's humaneness. "Towards human beings as they have reason, behave in a social spirit," says Marcus Aurelius; but he also writes: "As to animals which have no reason, and generally all things and objects, do thou, since thou hast reason and they have none, make use of them with a generous and liberal spirit."