

AESTIMATIVA VIS (faculty of sensory judgment) — an instinct in an animal that spontaneously and infallibly guides the animal in behavior and in preserving its life.

The struggle to maintain the life of the individual and the species is the basic activity of beings of an organic nature. In order to succeed in this struggle, an animal must perform very many purposeful and coordinated actions that we call instinctive actions. These may be divided into two groups: a) actions with the purpose of preserving the life of only one individual; b) actions with the purpose of preserving the species.

A DESCRIPTION OF INSTINCTIVE ACTIONS. Among the instinctive actions ordered to the preservation of the life of only one individual we may distinguish the following activities: nutrition, defense, migration and play. Nutrition is the basic factor that preserves life. Defense against enemies comes after nutrition. Here we see the use of many varied purposeful actions (depending on the nature of the animal) ordered to the defense of life. Animals may preserve their life by fleeing (deer, goats, birds, fish, reptiles etc.) or becoming immobile (since predators are attentive to motion, certain insects become rigid and fall on the forest floor where they are difficult to find; not only do we see mammals hide in burrows and holes in trees, but also insects and spiders). Animals' migrations have the same purpose of preserving life. The external reason for migration may be change in temperature or climatic conditions. In the Alps, alpine marmots and hares descend several hundred meters in the winter. In North America, the buffalo spent winter migrating over the prairies and in spring would return to their own territories. Birds are the best known among the animals for their migrations. Even when they are flying for the first time, birds know the migration route. Certain birds cover immense distances, such as the American golden plover which migrates about two thousand miles from its breeding grounds in the Arctic to South America (as far south as Patagonia) and returns in spring to its point of origin. Many fish and insects (such as the locust) are migratory. Animal migrations show that there are many purposeful activities that are not learned but which are immediately performed with efficiency.

The instinctive behaviors for protecting offspring and creating the right conditions for their development are amazing. The parents' care for their young is very particular. An example of this is the yucca moth (mentioned by Bergson in his *Creative Evolution*). The life of the moth is very closely tied with that of the plant. The young moth emerges from its cocoon at the exact time the yucca begins to bloom. The flowers bloom and fade in the course of one night. That same night, the female moth emerges from the chrysalis and gathers pollen from the yucca flowers. She makes a ball of pollen with her specially adapted mouthparts (called "palps") and carries the ball between her tentacles and chin. With this cargo she flies to another flower and inserts her ovipositor into the carpel (a chamber containing the flower's eggs) and lays her eggs within between the buds. After this, the opening at the top of the pistil brushes against the ball of pollen she is carrying. The female lays four or five eggs in the carpel and caterpillars hatch in a short time. Each caterpillar will eat about 20 seeds, while in the carpel there are about 200. The caterpillars have enough to eat and about 100 seeds remain untouched, enough seeds to ensure the continuity of the plant species, which because of its brief blossoming could not thrive without the moth.

We also see purposeful instinctive behaviors aimed at preserving offspring among certain species of wasp. A digger wasp of the species *cerceris tuberculata* will lay her eggs in the living body of a weevil larva of the species *cleonus ophthalmicus*. The wasp larvae have food in the form of fresh and unspoiled meat. The wasp must paralyze the weevil larva. She

holds the larva and opens its chitinous covering. She presses with its legs and inserts poison into its ganglion which paralyzes the living grub. Its body is immobilized for the hatching wasp larva. The wasp "knows" well that the ganglion is closest to the surface in exactly that spot, and without any hesitation she paralyzes its victim with one sting. No one taught her how to do this.

The group life that we encounter not only among insects such as termites, ants and bees, but also among higher animals such as elephants, antelopes, zebras, bison and beavers, makes possible the growth of the life of the species. The most highest degree of herd life is seen among ants, bees and termites, where there is a complete division of work for preserving and fostering life. These insects do not learn their various functions from anyone. As demonstrated by experiments where young insects are separated from older ones as soon as they hatch, each individual insect immediately knows the role it is supposed to play in the life of the group. The things animals build chiefly serve the life of the species and only secondarily serve to defend the life of the individual animal against attackers, and these constructions show many purposeful instinctive behaviors. The way the construction of burrows, dams or lodges, and nests follows the laws of physics is sometimes quite astonishing.

A PHILOSOPHICAL ANALYSIS OF INSTINCTS. There are many philosophical theories on instinct. Here are a few of the more important ones:

The theory of reflex reactions. Descartes' philosophy reduced all animal behaviors to purely mechanical functions. The animal was a mere machine, albeit a more complicated one. J. Loeb took a similar position and reduced instinctive behaviors to tropes: chemotropism, phototropism and so forth. Spencer, Minkiewicz, Bathe, Pavlov and the behaviorists took similar positions.

The theory of intelligence. The sensualistic school of Condillac, and also Darwin, Richet, Maréchal, Nussbaum and others held the opposite position and thought that instinct could be explained by a primitive intelligence somewhat similar to man's.

Evolutionary theory. Lamarck and to a certain degree Darwin and others thought that instinct was passed from ancestors to succeeding generations. Over the course of centuries the instinct stabilizes and petrifies, as it were.

Bergson also explained instinct by way of evolution. The "*élan vital*" splinters like an artillery shell from which new shells scatter when it bursts, and takes on successive stages of evolution. One of these stages is the instinct that directs life which enters into particular stages of evolution. It probably plays a role in the life of animals similar to that of intuition in man.

The theory of innatism has three versions: that certain images are innate and at particular moments in its life the animal "reads" them and by necessity acts as if it has knowledge (Conimbricenses, Maine de Biran, Haan, Frank); that cognitive images are not innate, but certain associations among these cognitive images are innate — depending on its nature, an animal will associate a given image that it acquires in a certain way (Mercier, Frobes, Lindworsky, Van de Woestyne and others); that cognitive images are not innate, while affections or the necessary association of particular affections are innate and these determine

the animal to act in a certain way (Donat, Scheider, Lossada et al.).

The theory of P. Siwek, S.J. looks to a text of Thomas Aquinas in his commentary on the *De Anima* (II, lect. XIII, n. 398) and explains instinctive functions by way of a "natural judgment" (*iudicium naturale particulare*) that an animal possesses in a particular case. The judgment results from the fact that a perceived object is in some way useful to the knowing subject. The determination of behaviors originates from very precise representations of the behaviors.

Many of the theories presented by various philosophical systems have weak aspects. Descartes' mechanistic interpretation and the tropism of Loeb and others are untenable because we see in instinctive activity not only a great element of determination, but also a great plasticity that cannot be explained by any purely mechanical laws. The plasticity of instinctive behavior, namely adaptation to various particular features of the concrete object and concrete conditions, eliminates the theories of mechanistic determinism and requires that knowledge plays some role. The premise that an animal is a machine and nothing more is purely dogmatic.

On the other hand, it is also a mistake to attribute to an animal the same kind of intelligence that man has. Man's intelligence conceives its object under the aspect of being, which does not occur in the instinctive behavior of animals.

The evolutionary theory that acquired skills are inherited is based on unverifiable premises and does not explain the fact that animals had to stay alive before they acquired their skills. If an animal had to acquire skills gradually, then before it could acquire them over the course of generations, it would have fallen prey to predators and would have become extinct. The possibility that characteristics could be inherited does not adequately explain the question of instinct.

Bergson's theory is only a certain part of the general Bergsonian theory of evolution. It is an interesting theory, but it is arbitrary.

The theories of the innatists (that impressions or associations of impressions and feelings are innate) are constructed on the basis of *a priori* premises. Furthermore, they contain many internal contradictions. Why is it that only animals supposedly possess innate ideas, affections or mental associations, while human beings do not? If innate elements existed, they would have to be almost infinite in number to explain the variety of instinctive behaviors that animals perform at different times. Furthermore, the theory of innate affections and their associations would at most explain only a few of the most simple manifestations of instinct, but could not explain complex behaviors that demand real concrete cognition.

Siwek's theory is closest to the truth, although it does not completely explain instincts. It arbitrarily resorts to mental images of behaviors. What would the source of such mental images be in the animal? Would they be reproduced images? This cannot be the case, because the ideas direct behavior that only then takes place. In this theory we would have to suppose that at some point there are innate images for behavior that has not yet occurred.

AN EXPLANATION OF INSTINCTIVE BEHAVIORS. Instinctive behaviors appear in life of animals when they act for an end. This teleology is clearly seen in the particular

determination of an animal's behavior toward an object. The fact of teleology, namely a present striving or appetite to a determined good, suggests to many modern contemporary psychologists the conception of instincts and drives, namely manifestations of the animals appetitive aspect. This position is in some measure correct, since all behavior occurs under the influence of emotional factors, for appetite directly governs the animal's external movements. Yet does appetite by itself explain everything? If we conceive appetite both in its emotional form and in its volitional form, it is a certain aspiration to something that is defined by cognition. Therefore, cognition underlies instinctive behaviors. In nature in action we see clearly that there must be some kind of cognition in instinctive behaviors. The activity of a nature is in accord with the nature itself and cannot be contrary to that nature. Since that nature of an animal is a cognitive nature, thus the activity of that cognitive nature must be in accord with the nature, namely it must be based on knowledge. When we consider instinctive behaviors, we observe that they meet all the conditions for behavior specific to animals, for these behaviors are only found in animals and thus these behaviors arise from some kind of animal cognition.

The question is then whether the various instinctive behaviors of this kind based on cognition can be reduced to mere behaviors or not. If they cannot be reduced to behaviors alone, they would then have to arise from various sources of knowledge. If in their knowledge they can be reduced to themselves, then they emerge from only one source of knowledge, from one cognitive sense or one sense of instinct.

When we examine instinctive behaviors in animals, we see immediately a certain stable aspect in how they are performed: they purposefully tend to what is most fitting and best for the nature of the animal (the nature of the individual or species). No instinctive behaviors result in harm to the animal (at the most, the good of the individual is in some instances subordinated to the good of the species). These behaviors conform to the nature of the animal that performs them. This conformity and this utility occur in concrete cases. Thus, we may state that instinctive behaviors function for the animal's concrete utility.

If we consider their utility as the reason and formal object of instinctive functions, then their utility, to which all instinctive behaviors may be traced, shows that there is only one cognitive source for all the manifestations of instinct, for only one object specifies acts and potencies. Instinctive behaviors result from the animal's cognition of a concrete utility and thus can be reduced to one and only one cognitive power whose object is the knowledge of this concrete utility.

Concrete knowledge is the source for concrete action. One feature of the concrete thing is that it is determined in detail, and so both knowledge and particular action are determined in particulars. Concrete cognition must be specially determined if it is to be followed by concrete action in particular instances. The particular or concrete determination of cognition will then not consist in a merely general affirmation that a given object is useful or useless for the nature that knows, but it will consist in an affirmation in detail of how and by what means under these particular circumstances this utility may arise. In the particular cognition of instinct there must be a certain particular disposition that grasps concretely the relation of the usefulness of the subject to the object and vice versa.

How does an animal know in concrete detail the utility of an object to its nature? A general answer is found in an analysis of sense cognition. By its faculty of instinct an animal reads something in the cognitive impression that the other senses cannot interpret. The instinct as a

cognitive faculty (or a sense) presupposes, as do all the internal senses, the existence of cognitive impressions that originate from an object. The animal's own organism might be the object as it secretes hormones that cause profound changes in the organism, and these changes are perceived by the animal's sense of its own body. The objects may otherwise be things outside the subject perceived by the external senses. In whatever way the object of sense cognition is connected with the knowing subject by impressions (shapes — impressed images) which by their nature represent the known object, the object alone does not produce the impressions, but they are produced by the knowing subject under the influence of the known object's action. The cognitive impression is a certain synthesis of the known object and the knowing subject. These impressions are produced by the subject, but an impression is not an arbitrary construction, since its entire content and the entire representation of the impression comes from the object. One cognitive impression arises as the result of the subject's operation (efficient causality). In the impression, the subject knows an object, which is an instance of exemplar and efficient-instrumental causality, the latter being the condition for the influence of the object with its qualities upon the knowing subject. In the one sensory impression or image there is a twofold concrete similarity: a) of the object; b) of the subject.

The similarity of the object in the impression is completely explicit. The purpose and meaning of the sense impression is to present the object as accurately as possible. The impression is the object itself as it intentionally exists in the knowing subject. Philosophy calls it the *forma vicaria* — a form that substitutes for the thing itself. This term is an attempt to express the identity of the impression and the thing that is outside of the subject with respect to content. In any cognitive impression that may be consciously perceived (by the common sense in the framework of the external senses), the concretely perceived content will be represented in a concrete way. This content is the same as the content of the thing itself in the features that are apprehended, since the act of perception does not apprehend all features, and in its content the thing possesses much more than does the impression.

In every cognitive impression there is also a certain similarity to the knowing subject, since impressions arise in the subject. Their efficient cause is the knowing subject, and in a strict sense they are effects of the subject. In every effect some features of the cause are expressed. In a certain respect (as an effect), every effect is similar to its cause. The cause leaves a trace in the effects. As a result we can know the cause from its particular effects. If the effect is the term of the action of the cause, and activity is the immediate emanation of a nature in operation, then each nature acts in accordance with what it is. It is easy to see the similarity (in any sense) of the operation to the nature. Since the term of the operation is the effect, thus all the features similar to the nature in the operation will remain and pass to the effect. The awareness of the similarity of the effect to cause found expression in the axiom: "*omne agens agit sibi simile*". The similarity of cause and effect is also the foundation for a person's property title to his work. The similarity of cause to effect rules many domains of scientific and practical studies, e.g., I may know an author who is otherwise unknown to me by his literary style (for example, I may discover interpolations and textual borrowings), and I may know an artist by his work.

In the cognitive impression that arises as the result of the operation of the knowing subject's nature, a concrete similarity to the nature that produced the impression is produced. The one concrete cognitive sensory impression expresses in itself a twofold similarity: to the object whose concrete nature it represents, and to the nature of the knowing subject, the concrete nature that is the efficient cause of the impression. In other words, the concrete nature of the

knowing subject and the concrete nature of the known object are concretely synthesized in one cognitive impression.

This cognitive impression is a means or mode of knowledge of the animal nature. In the impression, if it is a synthesized concrete similarity to the concrete object and concrete subject, the entire material is contained, or in precise terms, the entire cognitive aspect. There must be a sense to read and interpret this concrete synthesis in the framework of the synthesis of similarities that has been produced. This is done by the sense of instinct, which sees and reads in the cognitive impression not only the content of the object (other senses also do this, e.g., the imagination), but also knows the content insofar as it is in harmony or not in harmony with its nature. All this already expressed there in the form of the synthesis. This kind of knowledge is a product of nature judgment. In every judgment we have an object and a predicate joined together. In the question of the knowledge of instinct we also have an expressed subject and object joined by the relation of concrete harmony or concrete disharmony.

Desire necessarily follows such knowledge. This is an inclination and an unavoidable conviction. No judgment other than the one that has been given is possible. There is no other harmony possible between object and subject than the one that is here in reality. The fittingness of instinctive knowledge is not some general fittingness, but it is concrete and individual in relation only to the animal that knows. The concreteness of this fittingness also includes in a concrete and determinate way certain reactions to the known impression. Thus the animal immediately knows how it should react to particular stimuli. Hence an animal's behavior is remarkably certain and automatic. The animal does not hesitate, because the particular knowledge of instinct is certain, exact and united.

Instinctive knowledge is remarkably ordered to operation. Thomas Aquinas calls knowledge by instinct — *aestimativa vis* — a source of experiences and actions. In light of the above analysis of the nature of instinct and the mode of its knowledge, we may explain the various instinctive behaviors seen in animals, from nutrition to the rearing of young. For example, a dung beetle goes in search of food as soon as it hatches. It is compelled to search by factors of a physiological nature. In its pursuit of food, its senses encounter various objects that in themselves are not appropriate food for a dung beetle. When it finally finds fresh dung, it immediately knows it (by an analyzed psychic process) as concretely fitting (according to a fixed mode) to its nature. This process is almost instantaneous, and so the dung beetle knows in an instant what it must do and how. On occasion there may be certain modifications, for everything depends on the concrete instinctive knowledge.

Other manifestations of instinct occur in like manner. The secretions of endocrine glands play an enormous role as they strongly determine the animal to activities fitting to nature, especially to the nature of the species. The hormones secreted in the organism affect the animal's organic feeling of itself. This feeling of self is perceived by the organic sense and also provides contents of knowledge and contents of particular reactions to stimuli. Hence we also see how animals react to hormonal stimuli, which in a special way serve the nature of the species. This explains why a female animal may occasionally reject her young even before they are able to live on their own. As soon as the secretion of hormones ceases, the stimuli for impressions cease and the instinctive behaviors stop.

In the operation of instincts we do not yet know all the stimuli that determine nature to specific instinctive reaction. For example, there has only been a little research into the

factors that govern the regular times and courses of migration in animals and birds. It is possible that migration is affected by changes in temperature, food, insects, the angle of sunlight or other things. There may be still other unstudied factors of a physical nature that influence the fixed pattern of migrations. Wind currents and the food they find on a certain route may be significant. All these factors act on the animal as stimuli for knowledge to the sense of judgment that appears as instinct.

J.H. Fabre, *Souvenirs entomologique*, P 1879-1907, 1924-1925; M. Barbado, *Introduction à la psychologie expérimentale*, P 1931, Ma 1943²; P. Siwek, *Psychologia metaphysica*, R 1944; S. Thomatis Aquinatis, *Summa theologiae*, I, q. 78, a. 4; in: *Opera omnia Sancti Thomae Aquinatis*, Tn-R 1948-1967; Krapiec *Dzieła* [Works] XX.

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