The Concept of Instinct

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WHEN a hen has laid eggs for the first time in her life she immediately sits on them. She does not know why she does this for she does not consciously know what an egg is, nor what incubation is, nor can she take any interest in the hatching of the future brood. Hitherto science has called this a typical example of animal instinct. Without any consciousness of the biological purpose, it is said the animal finds the right thing to do because it was born with a mysterious instinct, which is inherited from the experience gained by its ancestors in primeval times.

THE CONCEPT OF INSTINCT

What is the real truth of the matter? Careful investigation has proved that the animal certainly has personal motives for sitting, but they are not biological ones. Shortly before the beginning of hatching-time the animal's breast shows the so-called hatching spot. Here the feathers fall out and there is a bald spot which feels hot, as if from inflammation (probably caused by hormones). This evidently causes the animal pain, for it seeks cooling substances, which must necessarily have a curved shape to be effective. After the eggs have been laid, these offer what is required. But we may just as well give the hen stones or billiard balls to sit upon; she will 'hatch' them in exactly the same way, because all she wants is to soothe the discomfort of her body. It is also possible to soothe the 'hatching irritation' in an entirely different way, that is, by holding the animal's breast in cold water. These are experiments which even the peasant knows and often makes for practical reasons. Only a bird which has these 'spots' sits on the eggs, and with many species frequently it is the cock. Similarly, the bird takes no more interest in its own eggs than in those of another bird, if these are put into its nest soon enough to become familiar. There is, therefore, no such thing as purposeful hatching. The hen only sits on her eggs while the irritation from the 'hatching-spot' lasts. When the eggs have been hatched, others may be substituted, and she will continue to sit on them. But when the irritation has ceased, the hen does not continue to sit but forsakes the eggs, which decay.

Usually, however, this subjective conduct on the part of the bird serves a purpose, for the

consequence generally is that the eggs are hatched. The hen turns the eggs so that she may sit on the cool parts, and without meaning to do so she thus causes all parts of the egg to be equally warmed.

This example shows animal behaviour in an entirely new light. The conclusions to be drawn from it are the following:

(1) Every animal acts only in accordance with *personal or subjective impulses*; it only satisfies its personal needs. The hen merely wishes to soothe the pain of the 'hatching spot'.

(2) The *means* to do this may vary a great deal; they are *fundamentally variable*. It is a matter of indifference to the hen whether she sits on eggs or on other subjects, or whether cold water is used for satisfying her needs.

(3) Biological purposes are not aimed at, either consciously or unconsciously, that is, instinctively. The 'personally' motivated behaviour is often biologically useless or harmful. The hen is indifferent to the fate of the eggs. Frequently, however, subjective (psychological) aims and objective (biological) purposes coincide.

The theory of the *psychological autonomy of action* in all living creatures, which I evolved on these lines a few years ago, cast doubt on all mechanistic conceptions of human and animal behaviour and therefore to the ancient conception of instinct, which had persisted for more than two thousand years. This conception had completely dominated the theory of organic behaviour. All actions were traced to fundamental instincts, even the actions of the apparently free will, for at long last the motives for these too were believed to consist in vital impulses.

In opposition to this conception, the new theory postulates the fundamental 'uniformity of all organic action' from the simplest reaction of the Protozoa to the voluntary action of man. The prototype of all reaction, indeed, is this *voluntary action*. Its principle is variability in the choice of the means to obtain its ends.

The aim of voluntary action is always a personal motive, a psychological experience, which represents the subjective reason for the reaction. The motives themselves may be of an inferior or of a superior nature, that is at present theoretically unimportant. Every organic action, therefore, is merely the satisfaction of an impulse, without

regard to the question as to how far self-preservation and race-preservation, the two impulses generally recognized in biology as the only influential ones, are guaranteed.

These two great unconscious motives in the theory of instinct and all biological psychology must be eliminated; they do not exist; they are neither conscious nor unconscious impulses of organic behaviour. If then there is no instinct as the imaginary basis of action, neither is there instinctive action or reaction, in short no unconsciously suitable action (that is, no action for the purpose of self-preservation or race-preservation); there is no pre-formed reaction which intervenes, as an inherited factor, between the sensation and its expression.

Only in a certain percentage of cases do self-preservation and race-preservation occur in Nature as the *consequence* of purely individual action.

VOLUNTARY AND REFLECTIVE ACTION

The first and fundamental question here is the transition of ideas in the line which leads from true voluntary action (or action of the free will) by way of rigid instinct, occasionally modifiable, it is true, yet essentially and fundamentally invariable, to true *reflex action*. If this continuous line cannot be sharply divided, the result will always be: instinct is in the end a reflex-chain and the action of the will is only a relaxed action of the instinct; this was how it was described even in the most recent publications. Instinct is actually only an 'extended organ'—this was the rigid and materialistic conception of what is in truth free responsive action.

So we must first find a short and correct definition of reflex action. It is characterized by movement independent of the personal will, such as is to be found in the action of the internal organs of the body. Reflex action needs a nerve centre the existence of which has in many cases been proved. As it does not emanate from the ego, it is not directed towards the ego's purposes; how far it is biologically useful is another question. But this is not our concern for the moment.

In contrast to these *involuntary* processes *all* others appear as *voluntary actions*, modelled on the true action of the will. To these belong the voluntary closing of the eyelids or voluntary breathing, whereas involuntary breathing is a reflex. To these belong also, however, as I have proved by a number of examples, most of the so-called instinctive actions—not, it is true, taken as a whole (as described in the famous old alternative: conscious action of the will or unconscious action of the instinct), but analysed and broken up into a series of "small voluntary actions".

Thus every true action (action of the free will) is a natural product of all the circumstances, a product consisting of three main factors. That is, *psychological* and *physical* tendencies and abilities can only be effective in the animal's natural *surroundings*. In short, every living creature acts in any given situation so far as possible under the impulse of pleasure or pain.

SENSATION AND REACTION

Most investigators pay too little attention to the decisive factor, *sensation*, which they generally treat as of minor importance. Instinct is mostly defined as unconsciously purposive activity. But why should there be any sensations, pleasure or pain, and whence do they arise, if they do not cause a reaction and, moreover, a fitting reaction? Does not every living creature, as the simplest observation shows, act in a manner which leads, for example, to the satisfaction of the painful sensation of hunger? On these occasions biologically inexpedient activity frequently occurs, such as the eating of injurious food, only because it has a pleasant taste. It is only personal impulse, that primarily controls and guides action.

A striking example of instinct seems to be that of the *swallow*, the instinct of which appears to impel her to a sticking activity, even when there is no reason for it, when, for example, she has a perfect nest. The sticking is an instinctive impulse, it is said. But birds which build with saliva—swallows as well as nuthatches and salanganes—have special salivary glands, which swell during brooding-time and obviously drive them to secrete the salivary fluid, as is the case with all animal secretion. Alfred Brehm has pointed out that the pain caused by the swollen glands impels the animals to get rid of the secretion of these glands by pressing and rubbing movements. So here, too, there is no question of the irresistible beginning of a purposive instinct but of a subjective activity on the part of the bird, of a significant reaction to a painful stimulus, a reaction which may, however, be purposeless.

One of the chief examples of instinct, the piercing reaction of the lanneret (*Lanius collurio* L.) has since been proved, in complete agreement with my theory, to be the result of suitable actions according to the principle of trial and error, knowledge of the thorn being only acquired after long investigation (Lorenz). Another pillar of the instinct theory has therefore fallen.

A splendid new example of instinct analysis according to my theory is solving the famous problem of the *cuckoo's egg*. This was formerly a problem which evidently defied solution. How is it that the cuckoo's eggs found in other birds'

nests always correspond in colour to those of the owner of the nest? How can the cuckoo sometimes put bluish-green eggs, then again white ones with brown spots, or speckled or unspeckled ones into the strange nest? If the eggs differed from those of the host, they would, of course, be thrown out of the nest. But it is just these fundamental problems that have been solved quite naturally. Each cuckoo has been bred in a certain kind of nest and has been fed with a certain kind of food. This influences the colour of the eggs, for example, the bluish-green colour of the garden redstart's eggs. We now know almost for certain that for the purpose of laying her eggs, the cuckoo generally only chooses a nest like the one in which she herself has been reared and with which she is therefore familiar. This is easily explained. So her eggs are laid beside eggs of a different nature but of the same colour, and are therefore not thrown out by the host but hatched by her. In this way, a particularly complicated problem has been solved in a perfectly natural way in conformity with my theory, according to which purely physiological factors (the same colour resulting from the same food) generally co-operate in these complicated cases with psychologically motivated reactions (choice of the familiar kind of nest). Here, therefore, we have series of truly voluntary actions, and analysis has led to the solution of the problem.

It is therefore evident that there is always a *personal reason* for the action, and that nothing takes place *without* such a motive.

The second decisive point is the *reaction* to emotion. Every action is *always* and *only* the response to an emotion. Where the psychological basis is very narrow and slight and the physical possibilities very unmistakably re-formed, the response may be of an exceedingly stereotyped nature. In such cases the impression gained from superficial observation will be that the actions are really mechanical.

It is well known that ichneumon flies sting strange caterpillars or grubs which they find beneath the bark of a tree. The explanation of this mystery was found by means of an experiment which once more proved the exclusive effect of personal impulse. In this case, the impulse was provided by the smell of the victims. It was proved that the ichneumon flies also stung small paper cornets filled with the blood of the caterpillars or grubs, this blood providing the characteristic smell. If there were an instinct or some complete reaction unconsciously serving a vital purpose, it would necessarily *include* the strange insect as the *object* of the action, for without this insect as its object the action itself would be useless. It is therefore clear that here too the stimulus merely

leads to its own satisfaction irrespective of any object or purpose, whereupon a true inner organic reflex action takes place, which causes the laying apparatus to function.

The well-known experiment made in Germany a few years ago with *young storks* in order to submit their instinct to an *experimentum crucis* ended in a real catastrophe for this conception. The birds, which had been brought from east Prussia to the Rhine and which had not hitherto migrated, should have moved in a south-easterly direction, according to the instinct theory. This is usual with storks the home of which is in eastern Germany, a fact hitherto explained by the 'instinct of direction', that is a south-easterly instinct. The result, however, was that the storks scattered in all directions. Some were sighted in the Alps, some in France, but not a single one in the east. The reason for this is that all the storks in eastern Germany, being 'water-birds', must naturally move along the river valleys, etc., where they find their food, and finally in the direction of the Black Sea, and the Bosphorus, whereas when taken to western Germany they pursue the opposite course, that is, like the west-German storks, they fly along the Rhine-Rhone valley to the western Mediterranean and North Africa. In this case, however, the most natural thing was for them to scatter, as storks, 'traditional flyers', mostly migrate under the leadership of old ones, and this leadership was lacking.

THE PROBLEM OF PURPOSE

In all these occurrences in Nature as well as in all experiments, we have repeated evidence of the uncertainty with which biological aims are achieved. A glance at 'fundamental instincts' will prove this; for example, the important and decisive *food instinct*, where the fundamental divergence between the significant reaction to stimuli (taste and smell) and the biological utility of this procedure is clearly evident. Every living creature, from the protozoon to man, directs its actions primarily and exclusively according to such subjective stimuli; only in the second place does the problem arise as to how far satisfaction of the stimulus is conducive to health. Even in the animal kingdom this problem may become a momentous one, as when certain tribes of ants cause the downfall of their community through excessive consumption of the intoxicating secretion of the plant-louse. It must be remembered that there is no question here of *abnormal behaviour*. On the contrary, it is in such extreme cases that the fundamental law is most clearly evident, the law of reaction to a sensation.

The frequently destructive behaviour in the animal's *care of its young* is perhaps the most

striking example of all. The fact that with many species the devouring of eggs and offspring is not an abnormality, but almost a normal procedure, as with ants, bees, bumble-bees, also with some kinds of fish, is clearly in favour of the exclusive principle of the subjective satisfaction of impulse, a principle which rules even in opposition to elementary biological purposes.

On the other hand, I have already given a detailed description of cases in which 'genuine' care of the brood, that is the care of the young animal itself, as well as genuine friendship and love in animals, are found.

With regard to the problem of the so-called instinctive goal, *migration of birds* of passage is of special interest. It used to be said that the true migratory instinct determined both, the *passage* and its *destination*. But there is scarcely another instance which proves so unmistakably that all is variable. At most it can be said that the impulse of flying is constant, the impulse which is the fundamental phenomenon of the migration, and which I have already described in detail elsewhere. This impulse signifies the beginning or breaking forth of a *completely undirected* storm of motion—probably due to the action of hormones. In this storm the moving stimulus is once more recognizable, the stimulus to which all migration is the natural reaction. But the two factors essential to the instinct, that is, the *way* and the *goal*, are by no means pre-formed. On one hand, suitable adaptation to circumstances is again possible, leading to the only action which is biologically (relatively) expedient. On the other hand, the loss is naturally very great, due to the difficulties of the flight and to the inadequate intelligence of the birds, which are not able to gauge the difficulties that face them. Frequently they make fatal mistakes, as when the great flocks of singing birds fly over the Black Sea by night and perish in thousands, because their wings are frozen. The bird knows nothing, it neither recognizes its danger consciously, for it evidently does not even know that it is flying over a great expanse of water, nor does instinct guard it unconsciously, but all the more surely, from destruction.

RESULTS

So the nature of organic action proves to be quite different from what has always been assumed. For the assumption of instincts makes the living creature an automaton, which, if properly constructed, cannot make mistakes. (The famous struggle for existence constitutes only an apparent exception. For it is those individuals who have been most favourably predisposed from the beginning which automatically survive through the

process of selection. There can scarcely be any question of a real struggle.) The theory which I have propounded, that of the *risk* of organic life, is something fundamentally different. For every organism, from the lowest to the highest, acts in conformity with it, according to the same principle of adaptation to circumstances under the ægis of subjective impulses and experiences. Thus we have genuine reflection and genuine risk. We also have error as a necessary ingredient of life, not as the abnormal breaking-down of an automatic machine. A real risk, and in consequence a real struggle worthy of the name, are only possible where there is that which in its highest sense is called free will. It always rests on the same principle—the possibility of *selection* among various reactions. What we term *psyche* or *consciousness* is needful, that is real psychological experience, the recollection and estimation of which leads to the corresponding action.

What becomes of organic purposiveness? The only thing we must state as an indisputable fact in Nature is the presence of a certain pre-formed harmony. Every living creature is born with an organism which enables it to exist within certain limits. Part of this constitution is a disposition to experience certain stimuli. The fact that sugar has a sweet taste and therefore a pleasant one rests on constitutional factors. But the behaviour which satisfies such pleasurable impulses and wards off painful ones is by no means, and cannot be, pre-formed, for the ever-changing circumstances of life necessitate a constantly renewed adaptation to them.

I must once more state emphatically that the instinct hypothesis is in direct contradiction to every result of the modern theory of heredity. It has been proved again and again that only a certain disposition to receive impressions on one hand, and to general emotional attitude and bent of mind on the other is inherited; for example, a profoundly emotional nature or a generally intelligent disposition. We have never known, especially in practical life, anything like an inborn impulse to action or hereditary knowledge. We may inherit a talent for languages, but not a knowledge of French. Neither can knowledge that an object is there for a special purpose be inherited; for example, the hen has not inherited the knowledge that sitting on an egg will hatch it. We see that man's knowledge and actions emanate from his mental and emotional disposition and as their result, but nothing more. There is no 'born murderer' as such, except in so far as a man is predisposed to murder by his general mental and emotional life. Instinct has been defined as 'inherited experience'. Science has proved that such a thing does not exist.