

INSTINCT AND PURPOSE

BY EDWARD CHACE TOLMAN

University of California

This paper will be roughly divided into two parts. The first part will present a definition of instinct. The second part will use this definition in a psychological analysis of purpose. The discussion will be throughout from an objective, external standpoint, that is, the interest will be in how purpose works rather than in how it feels.

By way of introduction let us liken the human being to a slot-machine. The pennies will represent the stimuli, *i.e.*, the sights, sounds, printed symbols and the like which we may apply to the machine, and the resulting pieces of candy the words, action, and movements which issue forth. If the penny be a word of praise, the answering candy may be a blush or sparkle of the eye. If the coin we apply be an insult or a blow, the resulting packet will probably contain vituperation. If the penny be the word 'white' spoken suddenly and in no particular connection, the answering phonograph sound will in all probability be the word 'black.' In every case, if we but knew the mechanism well enough, we could predict a particular action as the result of a particular stimulus.

But let us see in what ways this picture of the simple slot-machine is inadequate. We may note that sometimes when a stimulus is presented to the human machine, nothing externally observable issues forth; or, again, that something quite different from a previous response to the very same stimulus comes out. These facts of the uncertainty and changeableness of response in the human machine, though one and the same stimulus be presented, require the assumption of two principles not contained in the simple machine so far described. The first of these principles is that the nature of the response on any given occasion, or whether in fact there is any overt response at all, is dependent upon the general

internal adjustment of the organism at the moment. To make a slot-machine adequate to such a situation we would have to imagine a complex machine capable of various different adjustments such that, when one adjustment was in force, the succeeding pennies produced musical sounds, when another was present, the same pennies introduced into the same slots produced different kinds of candy, and so on for each different adjustment. Finally, we would have to assume in addition that some of these internal adjustments might act like partial locking devices such that, when they were in force, no response at all would be produced from some single penny or for some particular group of pennies.

These internal adjustments would sometimes arise primarily as the result of just preceding external stimuli and sometimes as due almost wholly to automatic changes within the organism itself. If a man refuses food (*i.e.*, if the eating response is locked), it may be because of a preceding stimulus such for example as a slap in his face which has aroused the internal adjustment which we call anger (which locks the eating responses); or it may be because of some automatic physiological condition (*e.g.*, lack of hunger) which, though not positively locking, at least does nothing to unlock the eating responses. If a man responds to one and the same book on one day with tears and on another with laughter, the change in internal adjustment bringing about the change in response may be due either to a specific preceding stimulus or to some mere physiological rhythm.

The second principle which the simple slot-machine lacks and which it should possess, if it is to adequately represent the human organism, concerns the changeableness of response in the human organism which is due to learning. Everywhere we find that, simply as a result of previous experience, the organism exhibits new responses to stimuli. When a child learns to play the piano it acquires a series of finger movements in response to black marks on paper to which, before, it did not react at all. When one learns to read and write, to play tennis, to open and close doors, to lace and unlace shoes; when, in short, one learns any of the million and one things

which one does learn, one is merely attaching responses to stimuli which did not originally call them out.¹

No easy way of representing such alteration in the case of the slot-machines, however, suggests itself. We will, therefore, have to think of the latter as illustrating but single stages in the human organism and imagine a new and improved machine as a result of each acquisition of new traits and habits.

To sum up: the human being is a mechanism which makes responses to external stimuli. The nature of these responses and whether there is any overt response at all, however, is a variable matter. This changeability depends, first, upon the possibility of different internal adjustments (either called out by specific external stimuli or as the result of internal physiological rhythms), and second, upon the changes in the internal structure of the organism due to learning.²

Our task must now be a more specific classification and description of such responses and internal adjustments. Different classification would no doubt be possible, but for our interest, which is concerned primarily with a definition of instinct, the necessary classification is simple. It contains but three groups: (1) independent reflexes, (2) subordinate acts, and (3) determining adjustments.

By an independent reflex we shall mean any response to a stimulus which takes place always in the same manner and relatively independently of what the rest of the organism is doing. The kick of the foot in response to a tap on the knee, winking in response to a movement before the eyes, sneezing in response to tickling the nose, yawning in response to certain internal sensations, are examples. These always occur in much the same way and each is relatively complete in itself and independent of what the rest of the organism may be doing.

Activities on the other hand, such as biting, chewing,

¹ And this holds, be it noted, not only for actual overt responses, but also for the internal adjustments we have just discussed. Thus, for example, the internal adjustments originally appropriate to and only aroused by such things as loud sudden noises and really startling objects may as a result of training get attached to a whole series of secondary associated objects such as the dark, strange faces, etc.

² Also upon changes resulting in the course of natural growth, *e.g.*, the appearance of new sets of instincts as the child matures.

swallowing, which form part of larger wholes—in this example, eating—would be classed in the second group: *i.e.*, termed subordinate acts. The members of this group are almost infinitely numerous. The leg movements of walking, the handlings of curiosity, the cries and shouts and strugglings of anger, the sighing and tears of sorrow, the facial expressions, words and gesticulations of love, would all be examples. In fact all the things we do, not as separate and independent reflexes, but as parts of bigger groups of activity, belong to this second class.

Finally we have as our third group what we called determining adjustments. These are, in fact, to be considered as identical with the internal adjustments just described in our picture of the slot-machine. They determine and set in readiness the subordinate acts. Whether one responds to one and the same stimulus with the subordinate acts of handling and manipulation, those of destruction, or those of rejection, depends upon which particular determining adjustment has first been aroused—whether one of curiosity, one of anger, or one of fear.

It is to be noted that determining adjustments often occur in hierarchies. What may be called the lowest one of the hierarchy is then the immediate determining adjustment for the actual subordinate acts. The next higher one of the hierarchy releases this lowest one. A still higher one releases that, and so on. For example, we may suppose that on a given occasion an individual's leg and foot movements are directly subordinate to what may be called the walking adjustment. This walking adjustment, however, we may assume is subordinate to an anger adjustment. (The man may be on his way to confront a business opponent.) This anger adjustment will then be subordinate to a business adjustment and, finally, this business adjustment itself may be assumed to be subordinate to what may be called the man's general socio-domestic adjustment. In the case of such a hierarchy of adjustments it is obvious that the function of all, save the lowest one in the sequence, consists in a release of a lower determining adjustment rather than in a release of actual subordinate acts.

One further point. In the case of activities such as eating, running, walking, is it legitimate to talk of a determining adjustment as something existing in addition to the individual walking or eating movements themselves? The reason I assume that there is a distinct walking adjustment rather than that the individual walking movements are released directly by the next higher adjustment (for example, the anger of the above illustration) may be indicated first by the case of the child. In the case of a baby, the individual walking movements are obviously very irregular and variable. Yet (when the child is in the 'walking vein') they are all *walking* movements: they all fall within that one general class. Now, wherever these two phenomena occur, of variability within a class of movements and persistence of the class as a whole, my thesis will be that we must assume a specific determining adjustment.

In an adult the situation (in the case of walking) would seem to be somewhat different because of the added influence of habit. With the advent of habit there come fixed and invariable sequences (in the case of walking, fixed and invariable sequences of foot and leg movements). This being the case, the assumption of an immediate walking adjustment to release and maintain walking movements, as such, would not seem so necessary. The total complex of movements is nearly equivalent to a single act and as such would seem a candidate for the *immediate* control of a higher adjustment, such, for example, as the anger of the preceding illustration. It may be noted, however, that in unusual situations such as unevenness or obstacles in the path, this unitary and automatized character of walking may break down, in which case the original walking adjustment would seem again to have to come to the fore to release further walking movements not part of the automatized act.¹

This discussion has brought out three important points

¹ This last point, however, I do not necessarily desire to stress. I would be willing to admit the possibility that with the growth of habits the original determining adjustment upon which these habits are built up recedes and may even entirely disappear (waning of instinct). And, if such is the case, the total habit becomes an alternative act *directly* at the service of higher adjustments.

concerning determining adjustments which it will be well to summarize. (1) The determining adjustment sets in readiness a particular group of subordinate acts. One and the same external or internal stimulus may call out quite different groups of subordinate acts according to the particular determining adjustment which happens at the time to be aroused. (2) Determining adjustments often occur in hierarchies, the higher ones calling out the lower ones and the lowest one of all calling out the actual acts. (3) The essence of the determining adjustment and the reason for it consists in the variability of the subordinate acts. If such variability has disappeared, as is the case where habits have developed, the determining adjustment tends to atrophy and may, perhaps, even disappear altogether.

Let us here stop and assert that determining adjustment as thus characterized is a definition of *instinct*.

It would appear that such a definition tends to differ primarily from most others by virtue of its two-level conception (determining adjustment underneath, subordinate acts on top). Most other definitions seem to reduce in the last analysis to the assumption that an instinct (on the objective side and before learning has affected it) is a definite and stereotyped action (*i.e.*, that it is an inherited reflex pattern).¹

Two authors, however, I have found who suggest views similar to mine. They are Woodworth² and Kempf.³ The former's conception of 'drive and mechanism,' and the latter's 'autonomic and projicient systems,' both suggest a two-level account.⁴ My idea of determining adjustment and subordinate

¹To take an introspectionist on the one hand and a behaviorist on the other: such a view seems to be that of both McDougall and Watson. See W. McDougall, 'Social Psychology,' p. 29 and following, and J. B. Watson, 'Behavior,' Chs. IV. and VI.

²R. S. Woodworth, 'Dynamic Psychology,' Chap. II.

³E. J. Kempf, 'The Autonomic Functions and the Personality,' Nervous and Mental Disease Monograph Series, No. 28. See also an article by G. A. de Laguna, *PSYCHOL. REV.*, 1919, 26, especially page 419, for a discussion of emotion significant for the present theory.

⁴Woodworth might object to his theory being called two-level, since he seems to hold that one and the same apparatus may function either as a drive or mechanism according to circumstance (*i.e.*, that the difference between drive and mechanism is functional rather than structural). But from the point of view of function, if not structure, his is a two-level theory.

act would differ from either of theirs only, first, in leaving speculation as to the actual mechanism of the thing open; and, second, and most importantly, in emphasizing the *variability* among the subordinate acts.

It is this variability which I now particularly wish to emphasize. It will be found especially significant when we turn to the analysis of purpose.

By way of introduction to that analysis, let me now quote two concrete descriptions of animal behavior. First an account of nest building by Prof. Swindle.¹ The bird observed was a male, one of a pair of Brazilian birds, in a large outdoor cage in a zoo.

“Early in April, I noticed that as this bird walked about in its cage, it occasionally bit in the air as if it were grasping an object. At times, however, it bit the bars of its cage, a branch of a tree, and even the naked earth. Sometimes, it sprang and ran rapidly, and it very often flew to a one-and-a-half meter post on the top of which a wide shallow basket was fastened. On April 18, 1915, the following movements were observed: The bird stood at first motionless in the basket, shortly it began biting in the air as if attempting to seize something, and occasionally it seized, lifted, and then dropped certain branches which lay in the basket. It threw a stick out of the basket onto the ground, gazed for a few seconds at the sky, grabbed still another twig which it had previously thrown out of the nest, flew back into the basket with these, beat them quickly here and there without releasing them, let them fall in the basket, bit and arranged them there, and then remained for many minutes by the side of the female which was then also in the basket. Presently the male, half-springing and half-flying, reached the ground, ran quickly to and fro in the cage, gazed for a while at the female as he walked round and round the post, and finally sprang and seized a twig which projected from the basket. This twig was unfortunately so badly tangled with the others of the nest that a great many were drawn out with it. But in spite of the fact that the nest was occasionally mutilated by the builder, a neat nest was eventually constructed.”

¹ E. P. Swindle, *Amer. J. of Psychol.*, 1919, 30, 180.

The startling thing about this account is that it indicates that, even in the case of those supposedly perfectly adaptive instinctive activities such as nest-building, careful observation may show a considerable amount, and in this case indeed a positively shocking amount, of variability, the very point we wish to emphasize. If the reader is inclined to doubt the validity or general applicability of this one case, I may quote a word or two more.

The author says, further: "The fact deserves emphasis that birds often work very crudely while building the nest. It is really astonishing how often a bird allows objects of building material to fall, apparently without responding further to them. A bird frequently stands or walks among objects which it could well use in constructing its nest but suddenly runs or flies away without grasping any of them. I have observed the Blue Jay to tear the leaves, branches, and feathers from another bird's nest before it seized an object of the foreign nest and flew to the one which it had started; and it often seemed to arrange the objects on the foreign nest as if it were preparing to deposit its own eggs there, which it did not do."¹

And, again: "Many birds can build their nests at only certain portions of the trees which are adapted to hold the collected objects, and generally, these places are located by the birds only after a number of trials. That this fact is not well known seems to be due to the circumstance that it is very difficult to observe a bird with sufficient scientific accuracy in freedom. It should also be mentioned in this connection that birds occasionally start two or three nests simultaneously and later destroy some of them to obtain the material for a single nest."²

Let us turn, now, to our second case; to wit, Prof. Thorndike's classical experiment of a hungry kitten shut up in a cage with food outside. We quote his words: "When put into the box the cat would show evident signs of discomfort and of an impulse to escape from confinement. It tries to squeeze through any opening; it claws and bites at the bars

¹ Op. cit., p. 178.

² Op. cit., p. 183.

or wire; it thrusts its paws out through any opening and claws at everything loose or shaky; it may claw at things within the box. It does not pay very much attention to the food outside, but seems simply to strive instinctively to escape from confinement. The vigor with which it struggles is extraordinary. For eight or ten minutes it will claw and bite and squeeze incessantly."¹ It may be added that in the experiment as arranged by Thorndike the kitten usually got out eventually because one of its strugglings quite *accidentally* hit upon a release mechanism arranged to open the door. These mechanisms were always very simple: a hanging loop of wire which required but the slightest clawing, or a wooden latch easily lifted by the nose. It is to be observed that with the opening of the door, a new final act occurred, the cat went out and ate.

I draw attention to the significant feature of both illustrations, the variable or random character of the subordinate acts. In the one case, squeezings, bitings, clawings; and in the other, picking, dropping, carrying. First one act and then another occurs in a perfectly haphazard order. The whole thing seems to be mere chance.

Let us stop, however, and analyze the thing further. Is there any principle underlying the actual order of these, to all outward appearances, purely random acts? It must be supposed that there is. To return to our slot-machine, we must suppose that each one of them is set off by some particular penny, if we could but detect the penny. Now, undoubtedly the pennies are in part internal conditions such as the sensations arising from muscle strain. In addition, however, it is equally certain that they are in part external objects. The stimuli to which the cat's clawings, biting, etc., are the responses are in part particular features of the cage itself. In so far as they are such features, a definite principle underlying the succession of the responses can be actually observed. The cat, at any given instant, responds to a feature of the cage with which its just previous reaction has brought it in contact. In other words, it carried out a definite train of movements. One

¹ E. L. Thorndike, 'Animal Intelligence,' 1911, p. 35.

feature of the cage calls out one response. As a result of the movement made by this response the cat is brought in contact with another feature of the cage. This new feature calls out still another response and so on. If, in between these responses to the successive parts of the cage as such, we imagine a few responses to purely internal conditions, we shall have a fairly exact picture of the cat's total behavior. An identical account could be given of the bird's nest-building activities. Although to all outward intents the acts are purely haphazard and random, still they follow definitely traceable sequences. Finally, at the risk of hammering the point to excess, we may again emphasize that in each case the particular subordinate acts are what they are, rather than other equally possible responses to the same stimuli, by virtue of the particular sensitizing effect of the determining adjustments.

The second feature about the process, to be emphasized, is that the individual random responses continue *until* some one of them presents a new stimulus, the final response to *which*, removes the condition or stimulus which was the original cause of the determining adjustment itself. In the case of the bird, the activity continues until a nest eventually gets built. When this happens we have a new stimulus, the completed nest. And the responses to the completed nest, those of laying and setting, are such as to remove the internal physiological condition which was the original cause of the nest-building adjustment. In the case of the cat, its random acts eventually open the door, whereupon food is presented and the response to food is such as to remove the internal sensation of hunger which was the stimulus to the original food-getting adjustment. In each case the determining adjustment continues, *until* some of its subordinate acts removes the stimulus and with it the adjustment itself.

We have here a fundamental phenomenon. In as much as only one act will remove the adjustment and the adjustment continues *until* that act occurs and in as much as further the adjustment sensitizes and hence, so to speak, supplies the group of acts among which this final successful one appears, it seems to me that we have a situation which may truly be

characterized as one of purpose. A determining adjustment provides the purpose. The subordinate acts (which the adjustment sensitizes) are the means which the organism adopts to fulfill that purpose and the removal of the determining adjustment itself (as a result of one of these subordinate acts) constitutes the fulfillment of that purpose.

If this analysis be accepted, then the goal of this paper, an objective psychological analysis of purpose, is in sight. All that remains to be done is to transfer the account to man. Before attempting this latter, however, let me draw attention to the relation between this definition of purpose, and that of Professor Perry.¹

In Professor Perry's analysis the emphasis is put upon *learning*, upon the fact that with repetition the cat gradually *learns* the successful act. It is in the fact that the successful act is selected (learned) and the other acts rejected, that Professor Perry sees the primary justification for calling the situation teleological. I, on the other hand, believe that even without learning, the situation is teleological. Even though the cat showed absolutely no evidence of learning to get out in a shorter time on succeeding trials, the mere fact that on each single trial it hits about *until* it gets out, seems to me to be sufficient to characterize its activity as purposive. The cat hits about *in order to* get out, *for the sake of* getting out—expressions which Professor Perry himself designates as the 'most unmistakably and unqualifiedly teleological expressions in common use.'

It will be noted that such situations do not imply anything essentially non-mechanical. Given the environment and the total condition of the organism, the complete response (*i.e.*, the particular succession of subordinate acts and the time of the appearance of the final successful one) can all be predicted in a wholly deterministic way. This, however, is no criticism of the definition. When we are talking mechanism we would be very much upset to find something which was not mechanical.²

¹ R. B. Perry, 'Docility and Purpose,' *PSYCHOL. REV.*, 1918, 25, 1-20.

² It should be emphasized that my definition differs from Prof. Perry's principally in not going quite so far. The essential idea for my conception was for the most

To return, now, to our further problem: we wish to show how this mechanism of determining adjustments (or instinct) and subordinate act works in man. One preliminary remark, however, may not be amiss. In the preceding descriptions we spoke as if the random strugglings of the cat or the bird always ended in success. As if, that is, when the activity ended, it was always because a response was finally made which removed the initiating stimulus for the determining adjustment. But such an ending, though from the point of view of purpose the successful one, is by no means the only mechanically possible one. Instead of the cat's getting out and eating the food, some other powerful adjustment may intervene and replace the food-getting. Thus it may become frightened by the bruises and bumps that it receives as a result of its strugglings so that a *fear* adjustment gradually sets in and replaces the original food-getting one. Hence when the door finally does open, the cat either continues to struggle or runs off and hides instead of eating. In such a case the original food-getting adjustment has not been satisfied but merely replaced by another. A second way in which the original determining adjustment may not be 'satisfied' may be as a result of exhaustion. The cat may become so utterly exhausted that all responses cease to be made. 'It gives up trying.' *Only if some subordinate act takes place which was released by the determining adjustment and which removes the stimulus to that adjustment can the purpose as such be said to be fulfilled.*

Let us now turn to man. In the case of a single purpose I believe that the situation is essentially identical to that represented by the cat struggling to get out of the box or of the bird struggling with sticks and straws. An instinct or determining adjustment is aroused. This facilitates and sensitizes one particular class of subordinate acts. Some one or group of these, if they occur, remove the stimulus to the original instinct and, if they do thus occur, we say, speaking in purposive part drawn from Perry's discussion. It may be noted, however, that determining adjustment and subordinate acts, though analogous to, are not exactly identical with Professor Perry's 'higher propensity' and 'lower propensities.' I believe, indeed, that my two concepts are, for the purposes of behavioristic treatment, more precise and definite than his.

language, that our problem has been solved, that the right means have been chosen.

We may make the issue more concrete by an example. Imagine a man trapped in a burning hotel. He *may* rush madly about in the same blind fashion as does the cat in the cage. If so, his behavior and that of the cat would seem to be entirely identical. It may happen, however, that instead of thus rushing blindly he stops to *think*. If such be the case, he does not attack all the exits of his trap indiscriminately, but only some one which is apparently suggested to him by his 'thoughts.' We have in these thoughts a new principle which does not hold or, if so, to an infinitesimal extent in the case of the cat.

What, now, we may ask, is this thought and when and why does it occur? It will be remembered that in the initial statement of our program we declared that it was an objective, behavioristic account rather than an internal subjective one that we should aim to achieve; that we were interested not in how purposes felt, but in how they worked. Can we, now, shift our point of view and begin to talk about apparently internal subjective things such as thoughts? My answer is that thoughts, or at least the kind of thought with which we are here concerned, can be conceived from an objective point of view as consisting in internal presentations to the organism (on a basis of memory and association) of stimuli not actually present but which would be present, if some hypothesized action were carried out. Such a definition says nothing about the subjective 'immediate-feel' side of thoughts as such. It is concerned with thought simply in so far as the latter has significance in an objective, behavioristic, stimulus and response account. A complete treatment of thought on its subjective (immediate-feel) side and of its epistemological significance we can leave to the combined researches of introspective psychologist and philosopher.¹ The one point we here mean

¹ In what follows I present one sample of the way in which 'thoughts' may, it seems to me, be properly introduced into what claims to be a purely behavioristic (stimulus and response) account. It is my belief that such examples might be indefinitely multiplied and that a whole system, properly to be called behavioristic psychology, might be built up in which thoughts (on their behavioristic side) would still find as much place as do sense-stimuli.

to make is that over and above whatever these functionaries may have to say, a significant behavioristic aspect of thought still remains.

To return to our definition itself. What we mean by thought in this particular case as 'an internal presentation to the organism (on the basis of memory and association) of stimuli not actually present but which would be present, if some hypothesized action were carried out,' can be made clear perhaps, only by a concrete example. We come back to our man in the hotel. Instead of trying all possible parts of his burning trap, we find him stopping to *think* and then on the basis of that thought reacting to certain parts only. What is this stopping to think in behavioristic terms? It consists, I would assert, in what may well be called, not random subordinate acts, but random subordinate *thoughts-of-acts*.

You will remember that the cat reacted to a part of the cage with which the just preceding response had brought him in contact. As a result of each successive response the cat was automatically provided with a stimulus for another response. How now in the case of the man? He sees a door but instead of actually responding, he merely thinks of responding. He hypothesizes a response and on the basis of this hypothesized response he achieves mentally, a new stimulus, *i.e.*, the mental image of what is beyond the door. (This mental image is provided by memory or association. He may actually remember that this door leads to a corridor or merely by association based upon the general position be merely led to imagine that it leads to a corridor.) In either case this idea or mental image of what is beyond acts as a stimulus to a new thought-of-act. He thinks of going down the corridor and this will lead, mentally, to still a new stimulus of what is at the end of the corridor, perhaps stairs or an elevator. These will lead in a flash to a mental image of an open road to the outside. When the image of the latter occurs he will in all probability actually react. If no such vision of an open road beyond stairs or elevator occurs, he will mentally rush back, or perhaps more truly speaking jump back, to his starting point and mentally attack some other feature of his environment.

One point in need of immediate further elucidation emerges. Why is it that the man thinks in the first place? We have already said that sometimes he does not think but merely rushes blindly about as does the cat. Stopping to examine the matter more carefully, it would seem that those times when he does not think, but does thus rush blindly about, are times when he is excessively frightened. Occasions, in short, when the original determining adjustment is especially potent. If, therefore, a particularly potent adjustment produces action, I should suggest that when action does not occur, it is when some inhibiting or checking process which works against or controls the determining adjustment is also acting. Just what, physiologically, this inhibiting or checking process may be, I shall not venture to say, though I shall assume that like all other physiological processes it follows perfectly definite mechanical laws. The significant thing, for us, is simply that it works against the determining adjustment in such a way as to *shunt* the latter's activities, so that instead of producing subordinate acts, it, the determining adjustment, produces merely thoughts-of-acts. For this reason, let us call it the thinking or rationalizing adjustment. We may note in passing several interesting things about this tendency. First it seems to be much stronger in some individuals than in others and secondly, to be very much subject to training and practice. In fact it can sometimes be so over-trained as to result in an almost complete inability to act at all, a condition which is sometimes supposed to be characteristic of the typical college professor.

We may now ask, how is it that this thinking, rationalizing tendency, having once got going, ever ceases, in order to allow action to take place. In answer, we would posit the general principle that action eventually occurs because of what we shall call a prepotent stimulus. A stimulus may be prepotent for either of two reasons: (a) because it is the stimulus to an act to which the original determining is particularly favorable or (b) because it releases some other favorable adjustment. To return to the example of the man in the hotel. The first case would be represented when as a result of his trains of thoughts-

of-acts he arrives at the mental image of open road beyond stairs or elevator. Such a sight of the outside, if present in perception, would be the *one* stimulus to which the man would have been *most* sensitive. If the door in the cat's cage had been left open, the response of going out would have been *first* to occur. It would have taken precedence over all other responses such as those of squeezing, clawing, biting. So, here, the thought of the open road beyond stairs or elevator is the stimulus to which the given determining adjustment makes the man most susceptible, so susceptible in fact that the impulse is enough to break down the inhibiting effect of the thinking propensity and action results.

Turn, now, to the second way in which the stimulus may be prepotent: the case in which it is prepotent because it releases a second adjustment favorable to the given action in addition to the original adjustment. Suppose that as a result of social intercourse our man had acquired a general maxim to the effect that stairs and elevators become perfect smokestacks and that much the best thing to do in case of fire is to run to the window and call for help. Simply on the basis of his original determining adjustment alone the thought of the window would tend to call out the subordinate act of going and calling. If, now, in addition such an act is supported by what we may call a general 'social-subservience' adjustment, a tendency to do those acts recommended by society, this act becomes doubly ready to go off, so much so that it does actually occur.

To sum up: thought ceases and action supervenes whenever thought arrives at the image of a prepotent stimulus. And a stimulus is prepotent either (*a*) because it tends to call out a subordinate act which is especially favored by the original determining adjustment or (*b*) because it tends to call out in addition to the original determining adjustment some other adjustment which is also favorable to the act.

This is all there is to a case of single purpose.¹ An original determining adjustment provides the purpose. Subordinate

¹The problem of what happens in the case of a conflict of purposes is more complex, but the general principles of explanation would be the same.

acts are either actually called out or merely thought of. Eventually one occurs which removes the stimulus to the determining adjustment and the purpose is satisfied. Or, if no such subordinate act occurs, it remains unsatisfied until, perhaps, mere exhaustion causes the determining adjustment to disappear.

In conclusion, we may briefly enumerate the more important points we have advanced and which we most wish to emphasize: (1) a two-level (*i.e.*, determining adjustment—subordinate act) theory of instinct; (2) Purpose as interaction of determining adjustment and subordinate acts; (3) images of memory and imagination (thoughts) as properly included in a behavioristic non-introspective account; (4) the satisfaction of purpose as consisting in the removal of the stimulus to the determining adjustment as a result of one of the subordinate acts which the determining adjustment itself releases.