# ON THE ORIENTATION OF AN ANIMAL IN A PROBLEM-BOX

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It is stated by Thorndike in his "Animal Intelligence"[1] that in learning to open the door of a problem-box a cat gradually associates the successful movement with the sense-impression of the interior of the box, so that the cat comes to perform the act as soon as it is confronted with the sense-impression. The particular impression with which the movement is associated is that of the button or other devise fastening the door on the inside. "It makes little or no difference whether the box from which a cat has learned to escape by turning a button is faced north, south, east or west. * * * * * * * The cat will operate the mechanism substantially as well as it did before."[2]

That these statements of Thorndike's,—to the effect that the animal's orientation is to the sense-impression of the interior of the box, and that the changing of the position of the box does not make any substantial difference in the successful adjustment of an animal which has already learned to turn the button,—are not always true, and perhaps never true, is indicated by the following experiment.

A cat was allowed to learn to open a problem-box which throughout the learning remained in the same position, facing the east. The box was then turned through 180 degrees, and the animal reintroduced into it. The cat went through the pawing motion of turning the button, but on the east side of the box, although the door and the button were now to the west.

The original learning, when the door was to the east, required twenty-eight trials. Two days afterwards the cat showed perfect retention of the habit. It was then that the box was turned through 180 degrees, and the cat put in again, the result being as noted above. All the conditions, including dishes of food equidistant from the four sides of the box, were retained as in the first

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[1] Psych. Rev. Mon. Supp., No. 8, 1898, p. 15.
[2] Thorndike: Educ. Psych., Briefer Course, p. 134.

learning, except for the one change mentioned. The animal, in this second part of the experiment, went directly and immediately to the east side, where the door had been; and, after making eight or nine button-turning movements where the button had been, engaged in random movements until after three minutes and forty seconds it turned the button. Upon the next trial it at once directed its movements toward the button in its new position, and with hardly any superfluous motion. After this the box was placed in other positions—namely, 90 and 270 degrees from the original one, and the cat went directly to the door and button, performing the correct act.

The experiment was repeated with another cat, and the findings set forth above were corroborated in all essential respects.

The experiment shows that an association can be formed between the button as a stimulus and the appropriate movement, but that this association does not come about until the box has occupied several different positions. The original orientation, when the box was facing east, was with other, no doubt external, features of the environment rather than with the sense-impression of the interior of the box.

The results of this experiment accord with Carr's findings relative to the orientation of rats in a maze.[3] The maze was covered with a canvas top about two feet above the glass, flaps extending all the way down on the four sides. There was a peep-hole, and the interior was illuminated with an electric light. A group of ten rats learned the maze thus covered; then the cover above was turned through ninety degrees, and the rats reintroduced. No disturbance in the habit resulted. After this another group, of seven rats, learned the maze with the same canvas cover, except that one side of the cover remained open. Then the cover was closed on this side, and opened on another. Five of the seven rats were disturbed by this new condition. In six trials the total number of errors per rat ranged from nine to fifteen.

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[3] Jour. of Am. Beh., 7, 1917, pp. 265f.

This indicates that the adaptation, of five animals at least, was not to the interior of the maze only, but to the larger environment as well.

It is the purpose of this paper but to point out that the cats concerned in the experiment did not respond merely to the button, but were affected by other conditions besides the interior of the box. The question as to what feature or features of the larger environment affected them is left open. It may be conjectured, nevertheless, that in the case of the cat, as pretty certainly in the case of Carr's rats, the direction of the light was the main if not the sole factor. The door of the box, in our experiment, in its original position faced a window twelve feet away, there being no window on any of the other sides of the room. Another possible factor was the position of the experimenter, which remained the same, irrespective of the changes in the position of the box.

The bearing of this experiment on the question of animal intelligence (meaning by "intelligence" conscious analytical capacity with the purposeful adaptation of means to ends, or the purposeful adoption of such means accidentally discovered) is plain. Heymans[4] has recently rejected the problem-box experiment as furnishing any material bearing upon this question. He asserts that it is unreasonable to expect the cat to analyze a situation so terrifyingly new, into which it has been thrust forcibly; and that man in a similar situation would have some past experience with locks and bolts to fall back upon, which the animal lacks. But after twenty or twenty-five trials there was no sign of fear on the part of these cats; and their actions in going to the side where the door had been, and making the turning-motion there, seemed, to say the least, unintelligent.

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[4] Zeit. f. Ang. Psych., 21, 1922, pp. 84ff.