GENERAL INTRODUCTION

These studies attempt to elucidate the effects on behavior of: a) placing small mammals in confining artificial environments in which outlets and alternatives for activity are highly restricted; b) compelling or attempting to compel them to accept arbitrary stimulus and/or activity regimes; and c) allowing small mammals subjected to conditions a or b to control modifications of the environment (using the term in its broadest sense).

The present experiments illustrate the potential breadth of utility of wheel-running for behavior studies and cast new light on it and on certain other aspects of the behavior of confined animals. Once male deer mice, Peromyscus crinitus, have learned to turn on a motor which drives a running wheel (for a set time), they repeatedly perform the act and run the motor-driven wheel. Given control over both the onset and cessation of rotation, they turn the motor both on and off themselves, running the wheel (for varying periods) on a purely volitional schedule. But they will only run a motor-driven wheel when the rotation is self-initiated. As often as the motor is turned on by the experimenter, they doggedly press a lever (within seconds) that turns it off, even though this entails giving up wheel-running entirely (KAVANAU, 1962a).

The studies also show that if wheel-running is prevented, by locking the wheel, deer mice learn to press levers that temporarily unlock it, and they then run the wheel until it relocks. The sequence of acts is carried out time

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after time, in some cases throughout the active period. Wheel-running patterns built up in this way are very similar to those under free-wheeling conditions.

In the second paper of this series, it will be shown that similar behavior results when deer mice control ambient illumination. Animals repeatedly press certain levers (operating stepping switches) that turn light off in steps, after it is turned on by the experimenter; conversely they press other levers that turn light on in steps, after it is turned off by the experimenter; while if given complete control over illumination, they repeatedly run back and forth between levers, stepping light on and then off.

Compulsory Regime and Control of Environment.

An animal in the wild has a certain amount of control over its environment, for example, by selection with regard to nest site, territory, food, time and degree of activity, and social contacts. It is seldom forced to endure conditions it cannot escape or reduce in severity by appropriate behavior. But in many laboratory experiments, animals are placed in completely artificial and essentially barren surroundings. There is usually no alternative but to endure imposed conditions; control over aspects of the environment is absent or at a minimum. Experimental sessions commence almost immediately and are usually short-term, often a matter of a few hours at most.

The degree of restriction and compulsion is mitigated if laboratory-born domestic animals, allowed a period of emotional adaptation, are used. However, whether domesticated or wild, captive-born or captive, when animals are provided with an experimental situation in which their scope of activity is limited, but in which they can exert a selection, manipulate objects or control stimuli, one must be cautious in interpreting their responses. Yet in past experiments where such acts were possible, the influence of the possession of these powers was not considered. Results have usually been interpreted solely with reference to the presumed reward-value of the stimuli or activities.

Certain behavior, previously regarded as paradoxical, can be understood better when allowance is made for the factors of compulsory regime and control of environment. The findings presented below suggest that, taken alone, the nature of a mild stimulus or activity is an unreliable guide to the interpretation of early behavior of confined mammals given control over its application. When conditions are arbitrarily imposed upon animals or the ability to control the environment is made possible, determinants of behavior may come into play other than the presumed rewarding or punishing effects (as determined in other situations) of the specific stimuli or activities in-