

The Principles of Humane Experimental Technique

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CHAPTER 3

THE ECOLOGY OF EXPERIMENTAL ANIMALS

We may infer that our domestic animals were originally chosen... because they were useful...

The rat and mouse... have been transported by man to many parts of the world...

Man and the Animal World

Huxley (1941), in a vivid image, saw the course of evolution as a maze with many blind turnings, into which the specialized have stumbled, and only one way out--to indefinite further progress (cf. also Russell, in press, b). He observed that in finding the way ourselves, we have barred it to all other species, and that we are a unique solution of the evolutionary problem, so far as this sector of time and space is concerned. We have so changed the world that, despite horror stories, no earthly species will ever challenge our supremacy. But this is only one aspect of our relations with the animal kingdom.

So far as wild animals are concerned, we ourselves are now almost the major feature in the environment of most on land, and many in the sea, where we are beginning to move deeper. We directly prey on many species, we destroy others in competition for food supplies, we attempt deliberate interference with the balance of number in interspecific equilibria--sometimes with unexpected results, as when we try to conserve game by destroying predators, only to see it succumb as a result to starvation or epizootic (e.g. Anon., Nature, 1957a). There remain our interventions in plant life, our exploitations of mineral resources, and the countless side effects of human technology and urban development. The problems created by our expansion are often the subject of warnings (e.g. Vogt, 1949; Roberts, 1951; Lillie, 1954), and great efforts are beginning to be made at international levels to explore and control "Man's Role in Changing the Face of the Earth" (cf. Thomas, ed., 1956). Hediger (1955) has noticed one special consequence--the great impact we must have had on the adaptive evolution of wild animal behavior. For instance, wild species can now usefully be classified as technophile or technophobe, according to their mode of adjustment to the

products of human technology--a classification that would have been meaningless a short geological time ago. Hediger goes so far as to suggest that we can never now see lower animal behavior as it might have been before our coming.

There are, of course, positive aspects in the interaction. Long ago, the Roman poet Lucretius was listing the attributes which have ensured survival under natural selection (what we should now call adaptive characters). Besides (e.g.) strength and swiftness, he included a usefulness to man. This aspect of selection must be assuming daily greater importance. Our domesticated species are swept up in our own triumphal career. Among these are laboratory animals, and Lane-Petter has pointed out to us that, if experimentation can become completely humane, we may be doing these species a considerable service in keeping them alive. The hamster is perhaps a case in point (Hindle, 1947).

In dealing with non-feral animals, a sharp distinction must be made between captive and domesticated ones (Lorenz, 1940, 1952; Hediger, 1955).

"Captive animals usually 'know what is good for them', and our chief concern must usually be to provide them with the essential components of the environment from which we have removed them. ...Domesticated animals, however, have lost many of their original responses, and suffered disruption of a formerly well-organized and dove-tailed behavior system, in connection with their long history in a new kind of environment, one in which many of their needs may be supplied by man... We have often to supplement their behavior, for we are now an essential part of their world" (Russell, 1956).

The differences between a domesticated species and its wild near relatives may be far-reaching, as we know in the case of rats, where they include radical changes in the physiology of adrenal cortex (Richter, 1951) and rhinencephalon (Woods, 1956). These changes must have important psychosomatic aspects.

Experimental animals are occasionally captive, mostly domesticated in the laboratory, some removed thither from other spheres of domestication in the home or on the farm. They present a complex of varied problems. But in one respect they are all alike. Theirs is a man-made ecology. Their numbers, distribution, and environmental adventures are not an intrinsic problem, as those of wild animals remain to some extent, but a problem in human sociology; for they are determined by human needs and decisions. It is to this imposed ecology that we must now turn. Now that our general principles are established, the next step in the study must be to obtain some impression of the pattern of animal experimentation--what animals are used, where, and for what purposes--and above all, how many. As a starting point, in this book, we shall consider an exceptionally well-documented country--the United Kingdom.