

Methods of Animal Experimentation

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VOLUME VI

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Preface

As we approach publication of Volume VI of this treatise, the National Academy of Sciences reports that the numbers of research animals used, particularly the larger ones, are declining. The percentage of nationally supported research projects using laboratory animals has continued unchanged and animal inventories have not declined. Part of this decline in use may be due to federal legislation and other governmental requirements which have increased the costs of producing and maintaining them. It is assumed by most that these regulations and the resultant increased investment results in an improvement in the quality of research animals and in defining their physiological characteristics.

While this volume was in press, meetings were being arranged to discuss cellular systems and mathematical models as replacements for laboratory animals. It is obvious from meetings that have been held in Europe and at the National Academy of Sciences that we have not yet reached the stage where laboratory animals can be replaced by test tubes and computers, the way the horse was replaced by the automobile.

The recent meeting directed attention to political and ethical issues, but provided little new information that would change the state of the art for research involving animals. Reflecting on medical research advances, we must remember the spectrum of laboratory animals it took to detect the dangers of thalidomide and saccharin; the variety of animals required to work out the complexities of immunology associated with transplantation; and the role of animals in vascular surgery and in the development of vascular and skeleton prostheses. The need for a complete animal system to evaluate the more complex technologies and therapies which are on the horizon seems self-evident. It is hoped that this volume will further contribute to defining which animals will be the most useful in solving biological problems as well as the best methods of obtaining the desired results.

This volume contains a chapter on ophthalmology—long sought by the editor. The eye is our most complex sensory receptor, and there are a number of unusual features about it which the authors have discussed in a concise manner. In addition, they have provided an extensive bibliography for the more serious student or investigator. We are very pleased that the subjects of pain and anesthesiology can be covered concurrently.

Pain is a subject which raises many questions about the use of animals and provides a basis for much of the opposition to animal experimentation. The author has dealt modestly with these issues in his chapter, concentrating on the scientific aspects of pain and the methods of producing and measuring it. He has also noted that, whereas the cellular systems may be able to detect toxic or even

hereditary influences, only the animal system can indicate pain, thereby assisting us in predicting the occurrence and intensity of pain and its possible effect on man.

Volume 1 contains a chapter on the clinical use of anesthesiology as applied to the major species of laboratory animals. One chapter in this volume treats the research applications of anesthesiology and also updates the information essential to understanding the safe use of anesthesia.

I will be forever grateful to Dr. Earl Green for completing the chapter on genetics. It is, in the words of Dr. Green, written to provide the information he often wished he had when he started some of his early experiments. Although he concentrates on one animal species as a model, he has referred to other species where appropriate and provided a background which is applicable to all species.

I am also indebted to several of my colleagues for their continuing encouragement and advice; to my wife, Millicent, for her continuing interest in reviewing drafts and providing the required encouragement for completion of this volume; and to the editorial staff of Academic Press, as a source of editorial advice and encouragement.

WILLIAM I. GAY

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