

Preface

Although designed to be used with the authors' *General Biology*, this manual is suitable for many beginning college courses in biology.

The exercises are so arranged that a selection of the wide range of work permits emphasis on such parts as the instructor may desire. Alternate exercises and a choice of work permit flexibility for courses of a year, a semester, or a quarter. Some of the exercises present certain topics that may serve as the basis for oral reports or group discussions.

Many exercises have been rearranged to follow the text sequence and a number of new illustrations have been added. An attempt has been made to develop a proportionate balance between physiologic, experimental, and morphologic exercises. Emphasis remains on cellular biology; experiments on such living organisms as paramecia, hydras, earthworms, and crayfishes; biochemical and biophysical phenomena, including photosynthesis, chromatography, plant hormones, respiration, and viability of seeds; and the fetal pig, which may be studied in place of, or in addition to, the frog.

It is believed that principles can be learned more easily and be more meaningful if students actually develop them for themselves. A study of facts and phenomena without considering the principles involved is stopping short of the goal. Since drawings should encourage accurate observation and recording of data, the number and specific type of drawings in some instances may be left to the instructor, who may base the selections on student qualifications and purposes of the course. *In all instances drawings should be made to help the student rather than merely to fulfill a laboratory requirement.*

Simple keys for the identification and classification of both plants and animals are given in the Appendices, together with a list of materials and solutions needed for each exercise.

The pages of the manual are perforated for removal and punched for replacement after being corrected.

As in past editions, I am indebted to many individuals whose suggestions have contributed to improvements made in this edition. Suggestions for further improvements will be welcomed from the instructors and students who use this manual.

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