A Survey in Biological Science

The Human Organism and the World of Life

by CLARENCE W. YOUNG and Others

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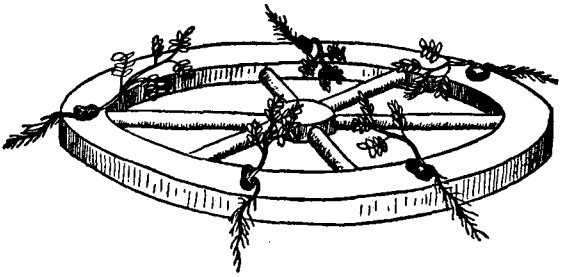

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Preface

Almost a decade ago, as a part of a general plan of curricular reorganization, there was instituted at Colgate University a survey course in biological sciences which was made a part of the work of every Colgate freshman. Its aim was to give every student a broad view of scientific knowledge concerning the processes of life; and in furtherance of that aim it was planned that it should include a survey of the mental activities occurring in organisms as well as the processes that have more traditionally been included within the realm of biological science. This book is the outcome of our experience in teaching this course. In its present form it is the result of much experimentation, throughout which one question has remained uppermost in our minds: How can this course and this book be made to yield the utmost possible value to the freshman student?

Our most important discovery has been that the student is primarily interested in the life process as it displays itself in his own species, and we have come to the conclusion that this is not only a natural but a thoroughly wholesome prejudice on his part. For human life, one's own life and that of one's companions, is surely the aspect of the biological process that is of most profound importance to every man and woman; and if one is to spend only a brief period in the study of biological science, one will certainly put in his time to best advantage in securing as good an understanding as possible of the ways of life among his own kind.

This centering of attention upon the human organism does not necessarily make for a narrowness of outlook. In the first place, the picture of human life cannot be complete unless it includes within it a portrayal of the relationship between the species *Homo sapiens* and the whole organic world. Secondly, the activity of protoplasmic systems is much the same throughout the two biological kingdoms, and a comprehension of the workings of one organism provides the key to the understanding of all. Hence, our account shifts back and forth from detailed description of human processes to less detailed comparison with the structure and function of plants and animals. Our experience indicates that

this approach does make the study of biological science meaningful and interesting to the freshman student and that he finds that it satisfies his own felt needs and desires for knowledge in this field.

Early in our work with the course, we discovered that one of the major difficulties our students experienced was the mastery of biological terminology. To prevent this purely mechanical difficulty from standing between the student and the acquisition of an understanding of the facts and principles which we are primarily interested in conveying to him, we have eliminated as much strange vocabulary as possible and have introduced a rather complete glossary of new terms at the end of each chapter. It is not intended that these glossaries be used for reference purposes. Rather, they are to be employed in the study of each chapter, so that the student can make certain that he has mastered the new terminology before he passes along to sections where the words may be used without explanation of their meaning. In short, these glossaries are intended to serve much the same function as the vocabulary lists attached to each lesson in an elementary course in foreign languages.

While the authors did not confine their work entirely to specific chapters, the chief responsibility for the preparation of Chapters II, V, VI, VII, and XI was in the hands of Dr. Hylander, and for Chapters XII, XIV, XV, XVI, and XVII in the hands of Dr. Stebbins. Dr. Young is chiefly responsible for the preparation of all other chapters as well as for the general editing of the entire book.

In closing, we wish to express our appreciation to all those who have helped us in the preparation of this book with friendly counsel and criticism. Especially, we wish to thank Dr. W. M. Chester, Dr. F. S. Keller, Dr. James Stauffer, Dr. Raymond J. Myers, Dr. Oran Stanley, and Dr. G. H. Estabrooks, our colleagues at Colgate; Dr. Jackson W. Thro, of Hamilton, N. Y.; Dr. H. D. Stebbins, of Brookline, Mass.; Dr. Edgar Anderson, Dr. R. H. Wetmore, Dr. J. H. Welsh, all of Harvard University; and Dr. Ernest B. Babcock, Dr. Richard Goldschmidt, and Dr. Alden Muller, all of the University of California.

Colgate University
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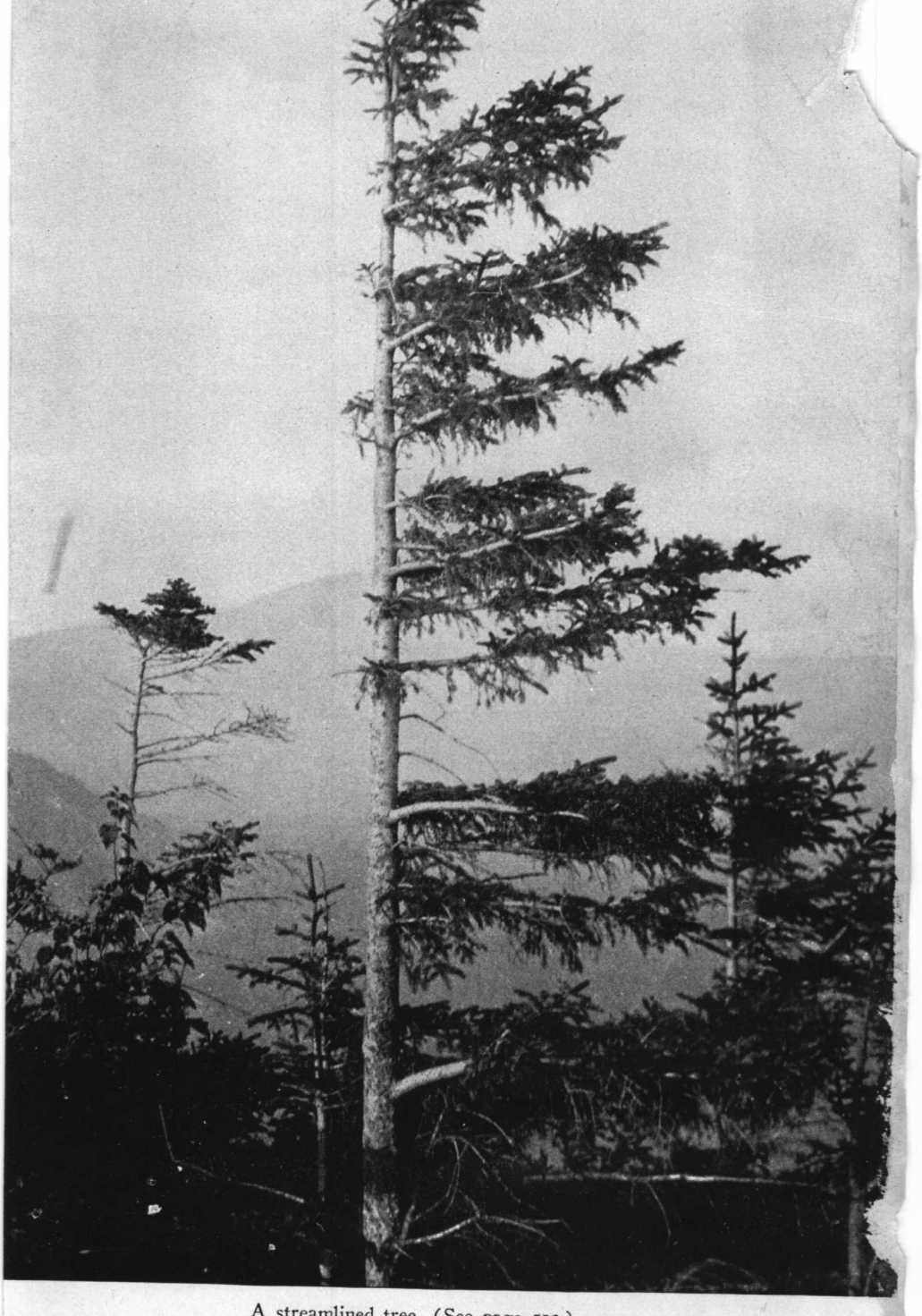
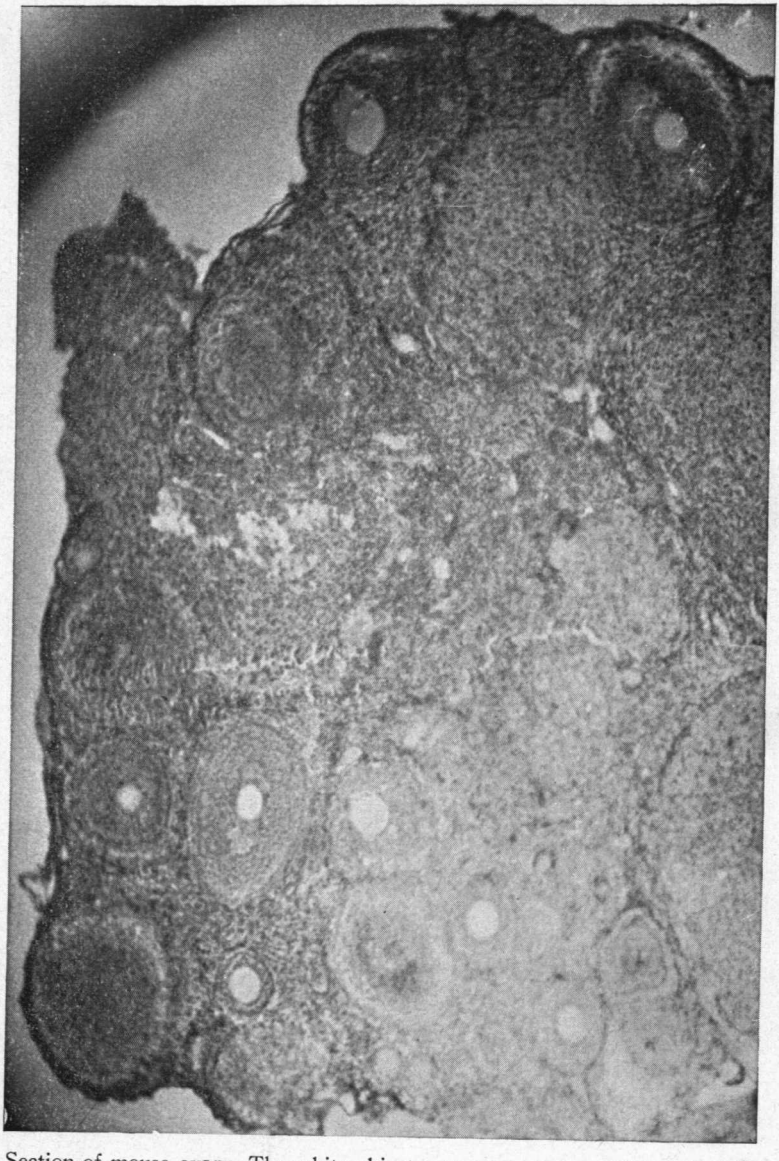
CLARENCE W. YOUNG



A streamlined tree. (See page 512.)

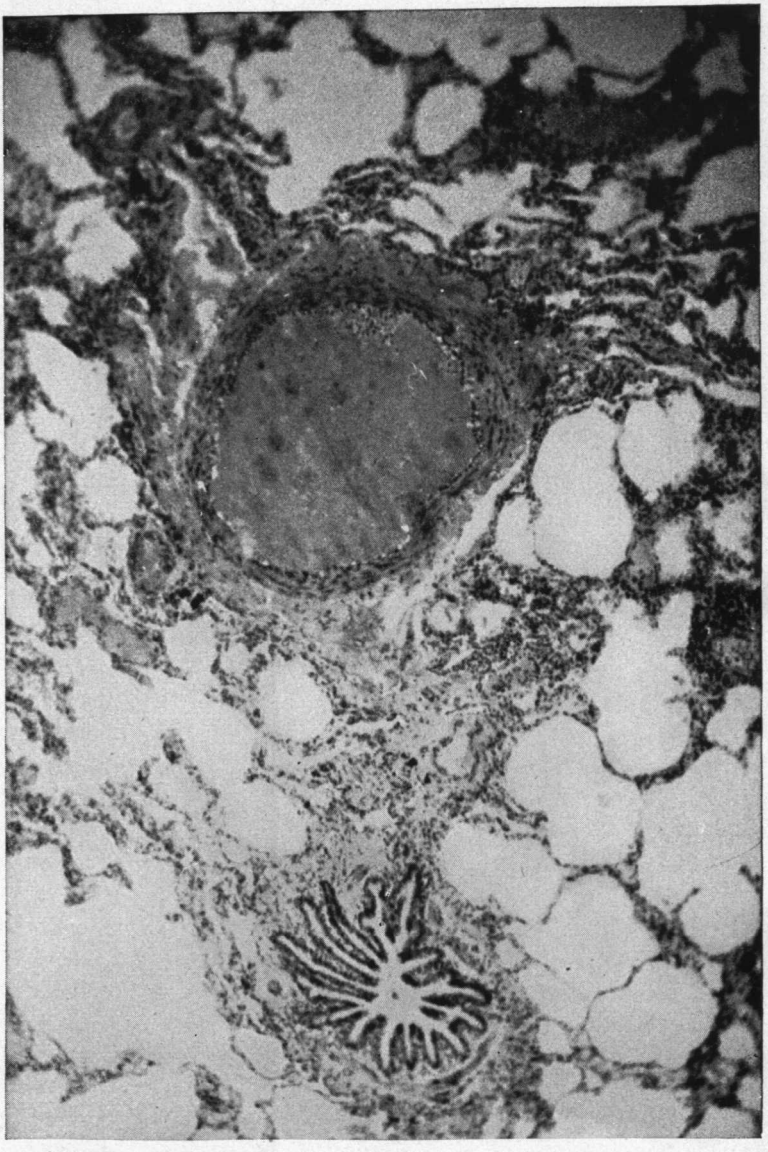
Lichen plants. Examples of symbiosis.



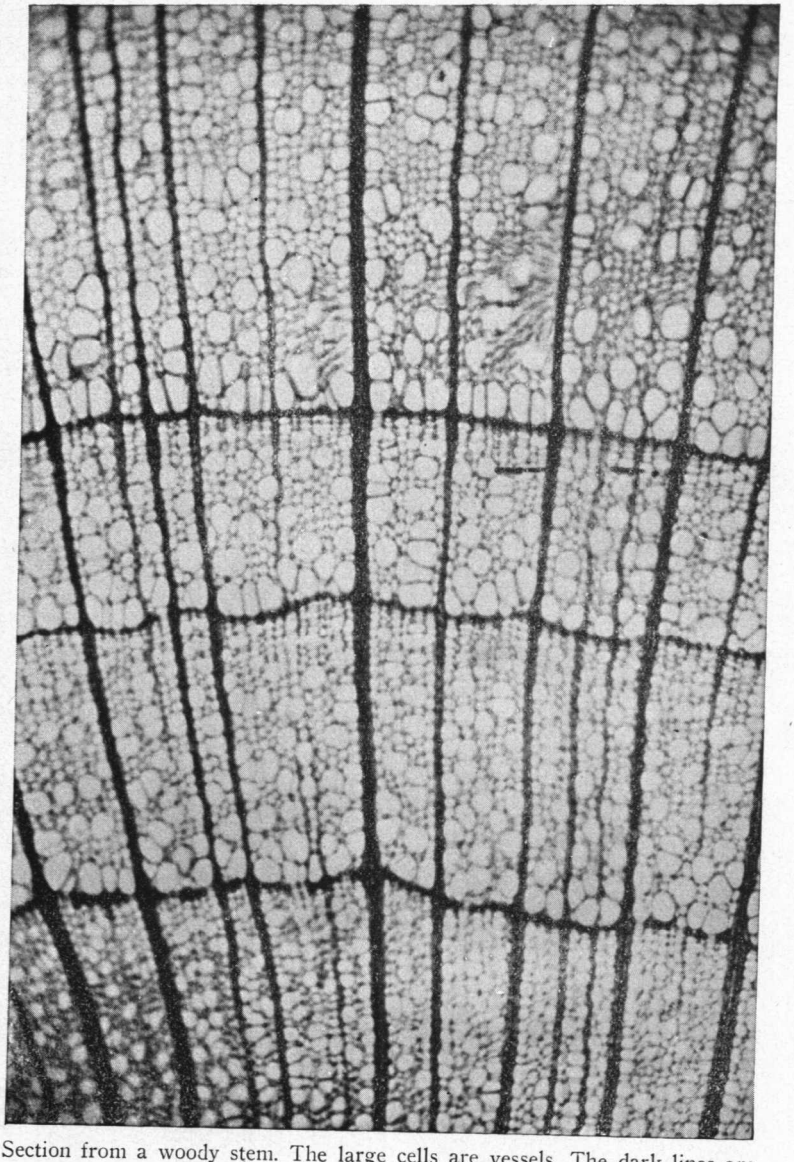
Section of mouse ovary. The white objects are eggs, surrounded by the cells of undeveloped Graafian follicles.

Indian pipes. A plant parasite.

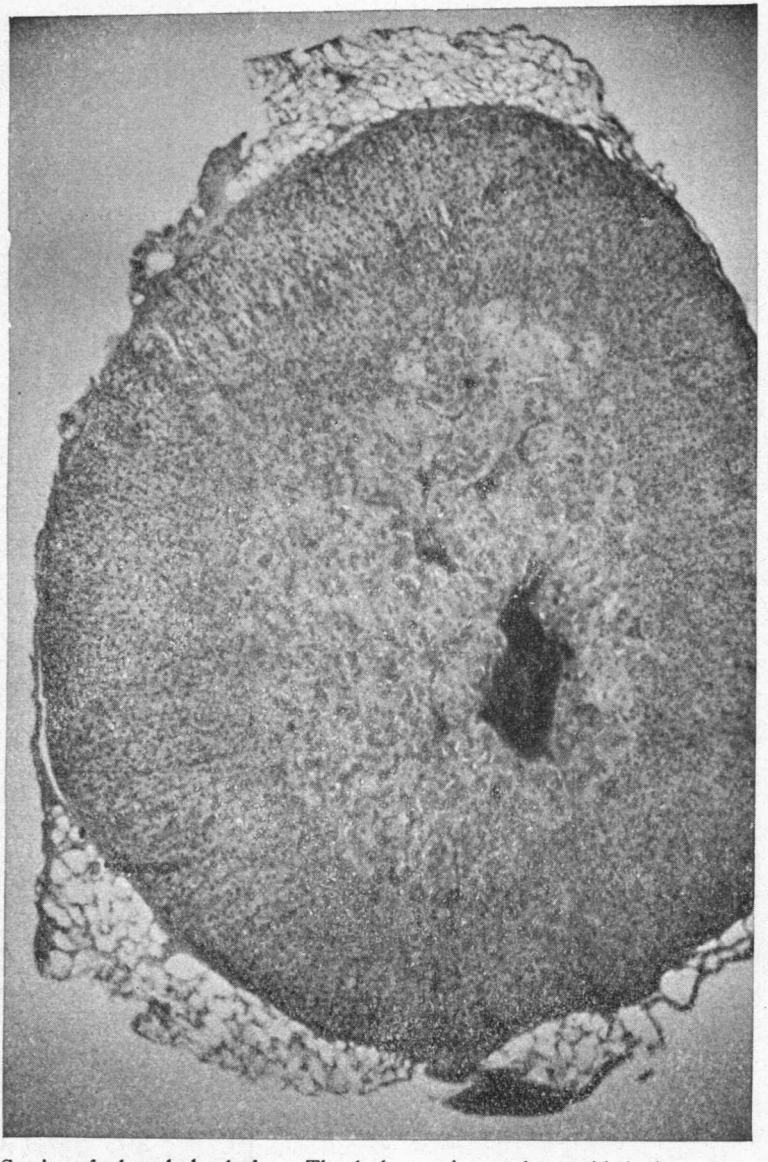
Motor neurons from spinal cord of ox. The large, dark structures are the cell bodies. The dendrite and axon processes branching from them show rather dimly.



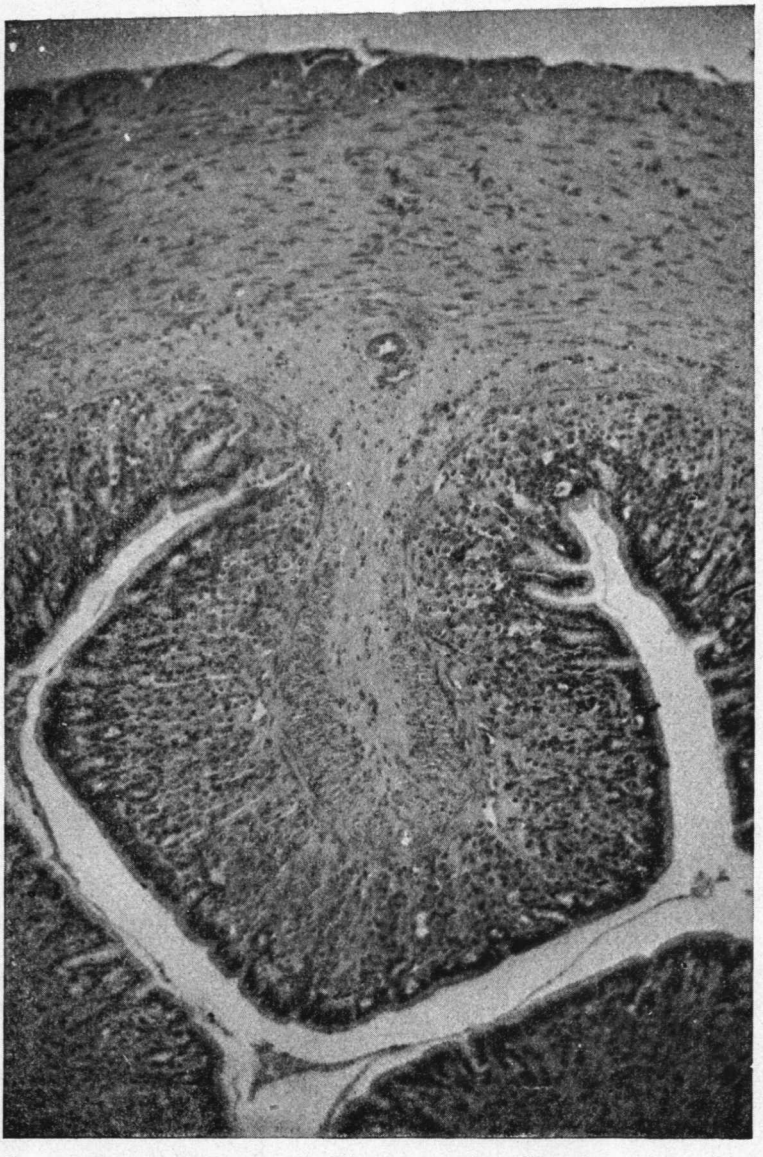
Human lung. Microphotograph showing alveoli (the open spaces), bronchiole (the roughly star-shaped object toward the bottom), and a blood vessel (the large, round object in the upper center).



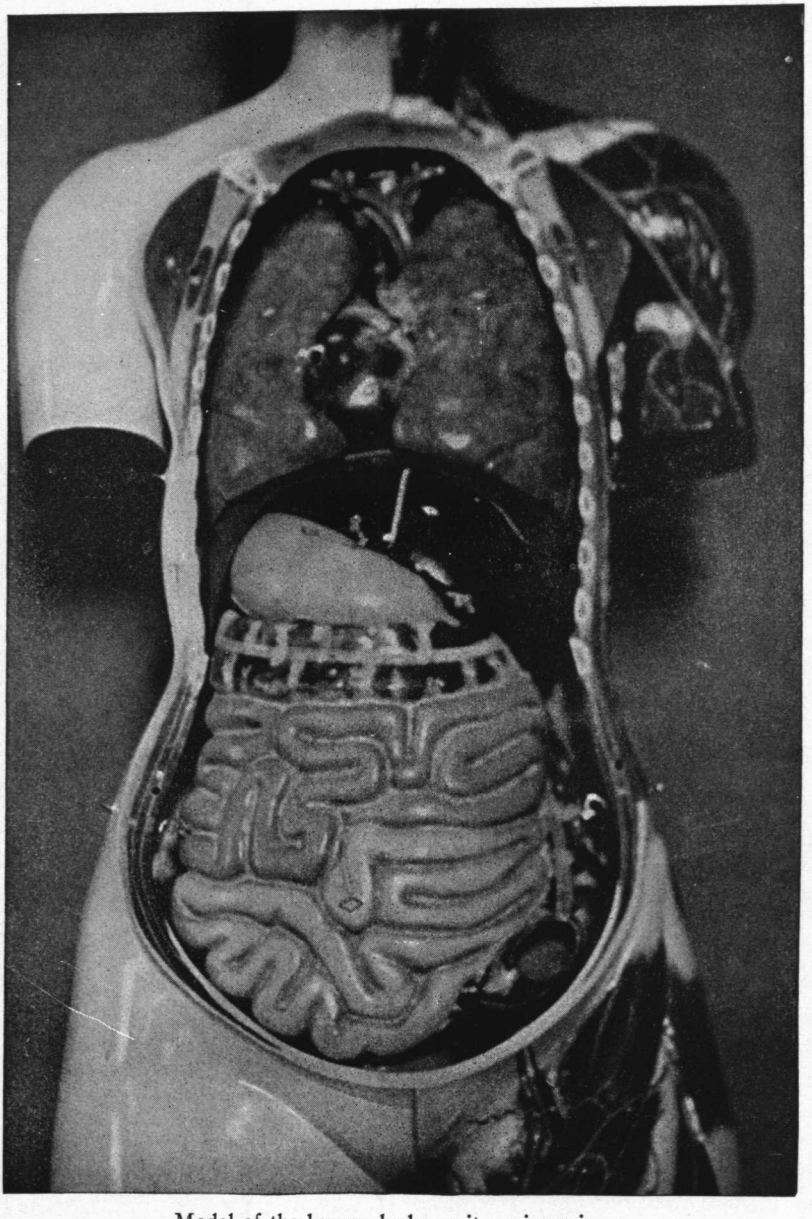
Section from a woody stem. The large cells are vessels. The dark lines are formed by ray cells.



Section of adrenal gland of rat. The darker region on the outside is the cortex; the lighter region, the medulla.



Cross section of frog stomach. The stomach is collapsed, so that only a narrow, irregular cavity remains.



Model of the human body cavity, mirror image.

Pollen grains in stamen. The small, dark objects within each grain are the nuclei.

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