

APPLIED  
PHYSIOLOGY  
—  
ADVANCED

BY  
FRANK OVERTON M.D.



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—  
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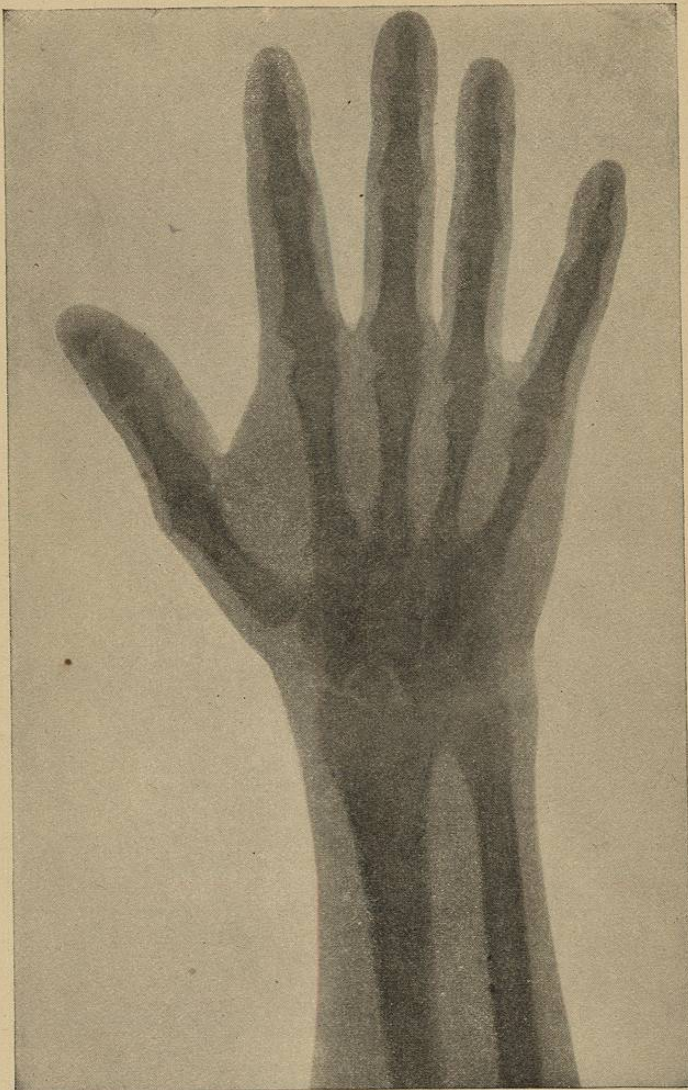
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Bones in the hand and wrist.  
(From an X ray photograph.)

# APPLIED PHYSIOLOGY

INCLUDING

THE EFFECTS OF ALCOHOL  
AND NARCOTICS

BY

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APPLIED PHYSIOLOGY

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## PREFACE

THIS text-book of *Applied Physiology* was suggested by a series of popular lectures in which the author presented the essential principles of physiology about which a physician is consulted daily. His explanations of many common facts were entirely novel to the auditors, and on investigation it was found that the school text-books were silent upon many of these points, especially in regard to the *cells*, where the essential vital functions of the body are carried on. Throughout this book the fact that the cells are the units in which life exists and acts is emphasized.

The author has endeavored to include all the useful points of the older text-books, and to add such new matter as the recent progress of physiological and hygienic science demands. He has avoided technical terms, and has sought to express the truths in simple language such as he would use in instructing a mother as to the nature of the sickness of her child.

The subject of alcohol is discussed in all its aspects. Its evil effects are not exaggerated; but the alleged good from the use of strong drink is contrasted with its dangers in a judicial manner, which appeals to men far more effectively than dogmatic abuse. The relation of alcoholic indulgence to other forms of intemperance, as excessive sugar eating, is also explained.

The essential act of respiration is oxidation within the cells. The relation of oxidation to the disappearance of

food, to the production of waste matters, and to the development of heat and force, is dwelt upon throughout the book.

Many of the demonstrations at the ends of chapters are new. All can be performed without the purchase of a single article of apparatus, except a microscope. The prepared microscopic specimens can be borrowed from a physician.

Most of the cuts are entirely new, and have been sketched by the author from actual specimens. The microscopic appearances of the tissues are especially illustrated. In each cut the illustration of a point, rather than artistic effect, has been the end in view.

The chapter on Repair of Injuries is an entirely new feature in a school text-book. How the body restores its natural functions after injury is as practical and simple a subject as how it sustains itself in health.

The author wishes to express his gratitude to his friend and instructor, Professor William H. Porter, of the New York Post Graduate Medical School, who has given his valuable counsel and encouragement throughout the entire preparation of the work; to Dr. W. E. Gordon, Principal of the Patchogue High School, for his suggestions in adapting the work to the practical needs of the pupils; and to Dr. Thomas E. Satterthwaite, ex-vice president of the New York Post Graduate Medical School, and Dr. William Pepper, M.D., LL.D., ex-provost of the University of Pennsylvania, for their kind criticisms of the proof sheets. Thanks are also due Professor J. O. Lansing for valuable pedagogical suggestions, and to Mr. Robert Cruger for suggestions and aid in the illustrations.

PATCHOGUE, N.Y.

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## APPLIED PHYSIOLOGY

### CHAPTER I

#### LIVING BODIES AND CELLS

1. **What physiology is.**—The world is composed of living bodies and lifeless matter. In *living* bodies there is a constant change, in which particles become lifeless and are thrown off, while, at the same time, a process of *creation* is going on by which lifeless matter is given life. This constant destruction and renewal of the particles of the body constitutes *life*.

The science which tells of the *structure* of living bodies is *Anatomy*; that which tells of their *working* is *Physiology*; and that which tells how to keep living bodies in good working order is *Hygiene*. The term *physiology* often includes *anatomy* and *hygiene*.

Some processes in man's physiology were discovered only by studying the lower animals; and others, by observing plants. In fact, it is by studying the workings of lower forms of life that most of our knowledge of the working of man's life has been gained. The physiology of vegetables and animals teaches the physiology of man, because man embodies the characteristics of lower forms of life. During the course of ages life de-