

**THE PHYSIOLOGY OF  
DIGESTION CONSIDERED  
WITH RELATION TO THE  
PRINCIPLES OF DIETETICS**

Published @ 2017 Trieste Publishing Pty Ltd

ISBN 9780649671212

The Physiology of Digestion Considered with Relation to the Principles of Dietetics by Andrew Combe & James Cox

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Cover @ 2017

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**ANDREW COMBE & JAMES COXE**

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THE  
PHYSIOLOGY OF DIGESTION

CONSIDERED WITH RELATION TO THE  
PRINCIPLES OF DIETETICS.

BY  
ANDREW COMBE, M.D.,  
FELLOW OF THE ROYAL COLLEGE OF PHYSICIANS OF EDINBURGH; ONE  
OF THE PHYSICIANS IN ORDINARY, IN SCOTLAND, TO THE QUEEN;  
AND CORRESPONDING MEMBER OF THE IMPERIAL AND  
ROYAL SOCIETY OF PHYSICIANS OF VIENNA.

NINTH EDITION,  
EDITED, AND ADAPTED TO THE PRESENT STATE OF  
PHYSIOLOGICAL AND CHEMICAL SCIENCE,

BY  
JAMES COXE, M.D.,  
FELLOW OF THE ROYAL COLLEGE OF PHYSICIANS OF EDINBURGH.

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"Nor is it left arbitrary, at the will and pleasure of every man, to do as he list; after the dictates of a depraved humour and extravagant passion, to live at what rate he pleaseth; but every one is bound to observe the *Injunctions and Laws of Nature*, upon the penalty of forfeiting their *Acidit*, strength, and liberty,—the true and long enjoyment of themselves."

MAINWATRIDGE.

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EDINBURGH:  
MACLACHLAN AND STEWART.  
SIMPKIN, MARSHALL, AND COMPANY, LONDON; AND  
JAMES M'GLASHAN, DUBLIN.

MDCCKLIX.

## DEDICATION.

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TO

GEORGE COMBE,

AUTHOR OF "THE CONSTITUTION OF MAN CONSIDERED IN RELATION  
TO EXTERNAL OBJECTS," &c.

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MY DEAR GEORGE,

On the eve of departure to a foreign clime, in search of that health which I may never find, I gladly seize the opportunity of dedicating the present volume to you, in grateful remembrance of the happiness derived from our life-long and unclouded friendship. There are other reasons which concur to render such a dedication peculiarly appropriate. It is mainly to your advice and influence that I am indebted for perhaps the most valuable parts of my general and professional education, and consequently for all the advantages which I have derived from them. It is to the example of your untiring zeal in the discovery and diffusion of useful truths, and in the cause of human improvement, that I owe much of the deep interest which I have long felt in similar pursuits. And, lastly, if this or any other of my published works has proved useful in diminishing the sum of human suffering, or in adding to the means of human enjoyment, it is in a great measure to you that I owe the gratification of having been of some service to my fellow-men; for without your cheering encouragement to urge me on at the beginning, it is doubtful whether any one of my volumes would ever have been written. To you, therefore, I have great pleasure in addressing this dedication, as a sincere expression of the gratitude, esteem, and regard, with which I remain,

MY DEAR GEORGE,

Your very affectionate Brother,

ANDREW COMBE.

EDINBURGH, October 15. 1842.



## THE AUTHOR'S ADVERTISEMENT

TO THE

### FIFTH EDITION.

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SINCE the first publication of this work, four editions, amounting together to nearly 8000 copies, have been sold in this country. In the United States also it has enjoyed a very wide circulation. This success is very gratifying, as it affords an encouraging indication that the importance of physiological knowledge as a branch of general instruction is every day becoming better understood and more extensively recognised.

In the third edition various improvements were effected. Of these the most important was the introduction of a new chapter, explaining more fully the relation subsisting between the different kinds of food and the principal varieties of the human constitution. Several other improvements, of a still more extensive kind, and in which I intended to turn to account such of the recent discoveries in organic chemistry as have a more direct bearing on the practical principles it was my object to expound, had also occurred to me, as calculated to increase the utility of the work and place it on a level with the science of the day; but these I have not been able to effect to the extent I contemplated and wished. When engaged in preparing this edition for the press, a recurrence of severe and protracted indisposition obliged me to desist, and left me no hope of being able to accomplish my original design, without a much longer delay than it seemed prudent to incur, as the work had already been several months out of print, and numerous applications had been made to me, urging its immediate republication. Nevertheless, I have been able to introduce many improvements, especially in the first half of the work, which had undergone a careful revision before my labours were interrupted: among these may be specified the insertion of what I think will be found a useful chapter on the "Conditions required for securing Healthy Digestion." As the mode of treating the subject of the present volume is in many respects new, and more practical in its character than that followed in other works; and as it seems to me to suggest means of farther improvement, of which others may avail themselves; I trust that most readers will concur with me in thinking that I have decided correctly in not delaying the republication of the volume, and awaiting the uncertain event of restored health and ability to render it more complete.



The same motive which induced me to reprint "The Principles of Physiology applied to Health and Education" in a cheaper form—an earnest desire to render it accessible to all classes of the community—has induced me to follow a similar course with respect to the present edition of this work. The continued extensive circulation of the former treatise, in the shape of a "People's Edition," and the many applications I have received from persons wholly unknown to me for a cheap edition of that now in the hands of the reader, have satisfied me that I ought to adopt this plan. But here I have chosen the smaller size of page, as more pleasant and convenient for use and reference.

Lastly, I think it necessary to repeat on this occasion a caution given in the preface of the former work, as to the spirit in which the following pages ought to be read by those whose object in perusing them is not merely to occupy a passing hour. The subjects treated of embrace so many important facts and principles of action, which are comparatively new to the general reader, that it is only by their careful and frequent study that he can become sufficiently familiar with them to avail himself, to the full extent, of the applications of which they are capable to the purposes of self-education and improvement, and to the preservation or recovery of health. To read merely as one reads a novel or a newspaper, can be productive of but little solid or permanent advantage; and therefore, while I value highly the grateful tribute implied in *endeavouring to act* (it may be, in silence) upon the principles I have unfolded, I feel indifferent to even the most eloquent and laboured eulogium, when it is not accompanied by any practical results. I am the more anxious to enforce this view, because many will, I believe, read with increased interest and advantage, after their attention has been thus earnestly directed in the very outset to the practical character and aim of the work.

EDINBURGH, 15th April 1845.

## THE EDITOR'S ADVERTISEMENT

TO

### THIS EDITION.

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DURING the interval of two years which elapsed between the publication of the fifth edition of this work and the Author's death on 9th August 1847, his strength, unfortunately, was at no time adequate to the accomplishment of his wish to revise and improve it in such a manner as "to place it on a level with the science of the day." In consequence, the sixth, seventh, and eighth editions, which were called for in rapid succession, and have brought up the total British circulation of the work to above 16,000 copies, were merely new impressions of the edition to which the foregoing advertisement was prefixed. Shortly before his death, Dr Combe expressed a desire that I should undertake that revisal of his works which he saw it would never be in his own power to effect. In making this selection of an editor, he probably was influenced by the consideration that, from long and familiar intercourse with him, I was well acquainted with the views which guided him in the practice of his profession and in the composition of his popular writings, and heartily concurred with him in attaching deep importance to the diffusion, among the public at large, of a general knowledge of the structure and functions of the body, and the causes by which its health and efficiency are preserved or impaired. Knowing that, during many years, he had been to me a "guide, philosopher, and friend," he may have thought that, after his death, I would make every effort in my power to maintain the scientific accuracy, the clearness and earnestness of exposition, and the practical tendency, which he himself had uniformly aimed at, and which are generally allowed to characterise his works in a degree seldom equalled, and perhaps never surpassed, in any popular treatises on science. With the desire thus expressed by my lamented Uncle, I felt it impossible to refuse compliance, however distrustful of my ability to perform with success the duties imposed on me. The reader has now before him the first-fruits of my editorial labours; and, whatever defects may appear, I have at least done what I could to justify the Author's choice, and to sustain the high reputation of his work. The volume has undergone, throughout, a severe and searching revisal; and while, on the one hand, I have not found it necessary to delete passages beyond the amount of three pages in all, on the other hand the additions which have been made extend to about thirty-six

pages. My leading aim has been to introduce, in pursuance of the Author's unfulfilled intention, a statement of the doctrines of the modern school of organic chemistry, so far as they bear upon the composition of food and the nature of the digestive process. Considerable difference of opinion still exists on many points connected with this department of physiology; but, though occasionally stating the opposite views, I have in general thought it better simply to give those which appeared to me most probable, rather than incur the risk of confusing the general reader with controversial statements. The popular nature of the work frequently prevented me from entering into details which would have been called for in a more scientific treatise. The additions on the subject referred to are contained principally in Chapters III. and XII., the former of which is entirely new. Other additions are scattered elsewhere throughout the volume; but as my object in making them has been to amplify statements already made, to correct such as have been shewn by recent discoveries to be erroneous, and to illustrate and enforce, by new examples, the rules laid down by the Author for the preservation of health, they in no way alter the former character of the work; and the present volume is therefore to be regarded as in all essential respects the production of Dr Combe. The chief passages for which I am responsible, besides Chapter III., treat of the following subjects:—Effect of narcotics upon the appetite, pp. 7-8; Chemical action of saliva, p. 19; Absorption by the bloodvessels of the stomach and bowels, pp. 29, 37; Chemical character of the gastric juice, pp. 48-9; Intestinal digestion, pp. 55, 126; Artificial digestive liquor, pp. 58-9; Changes of the chyme in the intestines, pp. 61-63; Process of assimilation, p. 63; Influence of the nervous system on digestion, pp. 113-14; Properties of different kinds of food, pp. 127-33—of fibrinous food, p. 138—of vegetable food, pp. 143-4, 145-50; Effects of cod-liver oil, pp. 158-60; Causes of bad health in the prison of Nimes, pp. 164-6; Impurities in water, pp. 171-4; Spirits not the most effectual means of protection from cold, pp. 178-9; Bowel-complaints, pp. 183-5. I have considered it more advisable to point out the chief additions here, than to indicate every new passage at the place where it is introduced; for, as my sentences are frequently interwoven with the Author's, any attempt of this kind must have been but partial, and the reader's attention would have been often and needlessly distracted. In order to preserve, however, as far as possible, a marked distinction between the Author's dicta and my own, I have carefully abstained from writing in the first person singular.

J. C.

*EDINBURGH, 15th March 1849.*