

**THE EDUCATION OF THE CENTRAL
NERVOUS SYSTEM: A STUDY
OF FOUNDATIONS, ESPECIALLY
OF SENSORY AND MOTOR
TRAINING**

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The Education of the Central Nervous System: A Study of Foundations, Especially of Sensory and Motor Training by Reuben Post Halleck

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REUBEN POST HALLECK

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THE
EDUCATION OF THE CENTRAL
NERVOUS SYSTEM

*A STUDY OF FOUNDATIONS, ESPECIALLY OF
SENSORY AND MOTOR TRAINING*

BY

REUBEN POST HALLECK, M.A. (YALE)
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"In all the higher processes of the brain we must recognize that, in nervous material at all events, action determines structure, meaning by structure molecular arrangement and disposition."

DR. M. FOSTER, F.R.S.

"Every cerebral element is subject to the educating influence of those sensory nerve fibres with which it is anatomically connected."

HERING.

"Just as muscular exercise causes an increased growth of muscular fibre, so regulated mental exercise must develop and strengthen the tissue of the brain."

DRS. M'KENDRICK AND SNODGRASS.

"The goal attained by the process of practice is simply the mechanization of movements which were originally dependent upon psychical antecedents. That must mean that mechanical, *i.e.* physiological, alterations are at the bottom of the whole matter."

WUNDT.

"Race, age, and previous training seem to have a marked effect in determining the extent and character of the reflex actions, which the spinal cord is capable of carrying out."

DR. M. FOSTER, F.R.S.

"Everywhere where there is development later events are conditioned by earlier."

HÖFFDING.

PREFACE

THE old theory that education consists solely in modifications in an immaterial entity has worked untold damage. It was argued that the immaterial never grew old, and that it could be trained as well at one time as at another. From this mistaken notion arose such adages as, "It is never too late to be what you might have been." It would be nearer the truth to say of any creature whose higher knowledge rests upon sensory foundations, or, in other words, upon modifications in nerve cells: "It is always too late to be what you might have been." Education may be something more, as the writer believes, than modifications in the central nervous system, but it is also true that without these modifications no mortal can be educated.

If brain cells are allowed to pass the plastic stage without being subjected to the proper stimuli or training, they will never fully develop. The majority of adults have many undeveloped spots in their brains.

This book calls attention to the importance of early purposive training of the central nervous system while its brief morning of plasticity lasts. Then, and only then, can the nerve cells be made lifelong friends, who will take upon themselves the duty of pronouncing correctly, of speaking grammatically, of making habitually correct responses to the

thousand and one demands of life, while the intellectual powers are left free to devote their entire energies to weightier matters. Such nerve cells will also be ready to reproduce their former sensory experiences as a firm foundation for thinking about concrete things. Rightly trained nerve cells occupy a position analogous to that of a trusty servant, who, without being looked after, attends to all the wearying details of housekeeping, leaving the mistress free to entertain her friends and to develop her higher powers. No human being knows a more relentless enemy than motor nerve cells which have been wrongly trained early in life. Such a man may be worth a million, but the bad grammar will continue to flow automatically from the motor mechanism of speech, and to mortify him in good society.

It has been known for some time that the higher processes of thought are dependent on modifications in brain cells, and that the highest intellectual superstructure can be no firmer than the sensory foundation, but this knowledge has not been properly applied in training these cells. Practical application of truths lags far behind a theoretical knowledge of them.

The principal object of this book is to prescribe for our complex central nervous systems at the proper time the special kinds of exercise, sensory, motor, and ideational, demanded for full development. A person who has only one or even two senses properly trained is at best a pitiful fraction of a human being. The writer has endeavoured to present herewith some facts which every parent and teacher must know and apply in order to secure the fuller development of children at a critical time.

A special feature of this work consists in showing that recalled images of sense objects are powerful and necessary

aids in further modifying and developing the sensory cells; not images of sight alone, but of *every* sense.

Many examples of sensory objects have been taken from literature to indicate the proper direction for training. Theory often fails because objects demanding constant practice are not at hand or suggested. Almost all study English literature, which constantly presents objects requiring sensory interpretation for their proper understanding. For this reason, numerous examples, especially from Shakspeare and Milton, have been quoted to show how the study of literature may be made to react on sensory training. From long personal experience, the author can testify that the majority of pupils can soon be induced to seize the first opportunity to obtain definite sensory knowledge of any object mentioned in poetry, whether of a daffodil, of a murmuring pine, or of "incense-breathing morn." It is hoped that the chapter on "How Shakspeare's Senses Were Trained" may be found practically serviceable in educating the central nervous system of youth.

It has been the aim of the author to restrict this work to its own proper field of training and developing the central nervous system, and not to offer these chapters as a substitute for the thorough study of psychology.

Acknowledgment is made to Professor Donaldson's excellent work, *The Growth of the Brain*,—although the following chapters do not view the subject in as fatalistic an aspect as that work,—and to Dr. August Schachner for much scholarly help in dissections of the central nervous system.

R. P. H.

CONTENTS

	PAGE
CHAPTER I	
THE CENTRAL NERVOUS SYSTEM	1
CHAPTER II	
FATALISTIC ASPECTS	28
CHAPTER III	
THE POSSIBLE MODIFICATIONS OF THE BRAIN	46
CHAPTER IV	
ATTENTION, NUTRITION, AND FATIGUE IN THEIR RELATIONS TO THE CENTRAL NERVOUS SYSTEM	61
CHAPTER V	
ENVIRONMENT AND TRAINING	76
CHAPTER VI	
AGE AND TRAINING	94
CHAPTER VII	
GENERAL SENSORY TRAINING, WITH AN EXAMINATION OF THE CHARACTER OF THE SENSORY IMAGES EMPLOYED BY SHAKSPERE AND MILTON	109

CHAPTER VIII

	PAGE
SPECIAL SENSORY TRAINING	130

CHAPTER IX

CEREBRAL DEVELOPMENT BY THE FORMATION OF IMAGES .	149
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CHAPTER X

HOW SHAKSPERE'S SENSES WERE TRAINED	171
---	-----

CHAPTER XI

MOTOR TRAINING	209
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CHAPTER XII

THE CENTRAL NERVOUS SYSTEM AND ENJOYMENT . .	238
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INDEX	253
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