The Project Gutenberg eBook, The Mind and Its Education, by George Herbert

Betts

This eBook is for the use of anyone anywhere at no cost and with

almost no restrictions whatsoever. You may copy it, give it away or

re-use it under the terms of the Project Gutenberg License included

with this eBook or online at www.gutenberg.org

Title: The Mind and Its Education

Author: George Herbert Betts

Release Date: December 29, 2006 [eBook #20220]

Language: English

\*\*\*START OF THE PROJECT GUTENBERG EBOOK THE MIND AND ITS EDUCATION\*\*\*

E-text prepared by Roger Frank and the Project Gutenberg Online

Distributed Proofreading Team (http://www.pgdp.net/c/)

Note: Project Gutenberg also has an HTML version of this

file which includes the original illustrations.

See 20220-h.htm or 20220-h.zip:

(http://www.gutenberg.net/dirs/2/0/2/2/20220/20220-h/20220-h.htm)

or

(http://www.gutenberg.net/dirs/2/0/2/2/20220/20220-h.zip)

THE MIND AND ITS EDUCATION

by

GEORGE HERBERT BETTS, Ph.D.

Professor of Psychology in Cornell College

Revised and Enlarged Edition

New York

D. Appleton And Company

Copyright, 1906, 1916, by

D. Appleton and Company

Printed in the United States of America

PREFACE TO THE REVISED EDITION

Authors, no doubt, are always gratified when their works find favorable

acceptance. The writer of this text has been doubly gratified, however,

at the cordial reception and widespread use accorded to the present

volume. This feeling does not arise from any narrow personal pride or

selfish interest, but rather from the fact that the warm approval of the

educational public has proved an important point; namely, that the

fundamental truths of psychology, when put simply and concretely, can be

made of interest and value to students of all ages from high school

juniors up, and to the general public as well. More encouraging still,

it has been demonstrated that the teachings of psychology can become

immediately helpful, not only in study or teaching, but also in business

or profession, in the control and guidance of the personal life, and in

the problems met in the routine of the day's work or its play.

In effecting the present revision, the salient features of the original

edition have been kept. The truths presented are the most fundamental

and important in the field of psychology. Disputed theories and

unsettled opinions are excluded. The subject matter is made concrete and

practical by the use of many illustrations and through application to

real problems. The style has been kept easy and familiar to facilitate

the reading. In short, there has been, while seeking to improve the

volume, a conscious purpose to omit none of the characteristics which

secured acceptance for the former edition.

On the other hand, certain changes and additions have been made which,

it is believed, will add to the strength of the work. First of all, the

later psychological studies and investigations have been drawn upon to

insure that the matter shall at all points be abreast of the times in

scientific accuracy. Because of the wide use of the text in the training

of teachers, a more specific educational application to schoolroom

problems has been made in various chapters. Exercises for the guidance

of observation work and personal introspection are freely used. The

chapter on Sensation and Perception has been separated into two

chapters, and each subject given more extensive treatment. A new chapter

has been added on Association. The various chapters have been subdivided

into numbered sections, and cut-in paragraph topics have been used to

facilitate the study and teaching of the text. Minor changes and

additions occur throughout the volume, thus adding some forty pages to

the number in the original edition.

Many of the modifications made in the revision are due to valuable

suggestions and kindly criticisms received from many teachers of the

text in various types of schools. To all who have thus helped so

generously by freely giving the author the fruits of their judgment and

experience he gladly renders grateful thanks.

CORNELL COLLEGE,

IOWA.

CONTENTS

CHAPTER I

THE MIND, OR CONSCIOUSNESS PAGE

1. How the mind is to be known: Personal character of

consciousness--Introspection the only means of discovering nature of

consciousness--How we introspect--Studying mental states of others

through expression--Learning to interpret expression. 2. The nature of

consciousness: Inner nature of the mind not revealed by introspection

--Consciousness as a process or stream--Consciousness likened to a

field--The "piling up" of consciousness is attention. 3. Content of

the mental stream: Why we need minds--Content of consciousness

determined by function--Three fundamental phases of consciousness.

4. Where consciousness resides: Consciousness works through the nervous

system. 5. Problems in observation and introspection . . . . . . . . . . 1

CHAPTER II

ATTENTION

1. Nature of attention: The nature of attention--Normal consciousness

always in a state of attention. 2. The effects of attention: Attention

makes its object clear and definite--Attention measures mental

efficiency. 3. How we attend: Attention a relating activity--The rhythms

of attention. 4. Points of failure in attention: Lack of

concentration--Mental wandering. 5. Types of attention: The three types

of attention--Interest and nonvoluntary attention--The will and

voluntary attention--Not really different kinds of attention--Making

different kinds of attention reënforce each other--The habit of

attention . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 15

CHAPTER III

THE BRAIN AND NERVOUS SYSTEM

1. The relations of mind and brain: Interaction of mind and brain--The

brain as the mind's machine. 2. The mind's dependence on the external

world: The mind at birth--The work of the senses. 3. Structural elements

of the nervous system: The neurone--Neurone

fibers--Neuroglia--Complexity of the brain--"Gray" and "white" matter.

4. Gross structure of the nervous system: Divisions of the nervous

system--The central system--The cerebellum--The cerebrum--The

cortex--The spinal cord. 5. Localization of function in the nervous

system: Division of labor--Division of labor in the cortex. 6. Forms of

sensory stimuli: The end-organs and their response to

stimuli--Dependence of the mind on the senses . . . . . . . . . . . . . 30

CHAPTER IV

MENTAL DEVELOPMENT AND MOTOR TRAINING

1. Factors determining the efficiency of the nervous system: Development

and nutrition--Undeveloped cells--Development of nerve fibers. 2.

Development of nervous system through use: Importance of stimulus and

response--Effect of sensory stimuli--Necessity for motor

activity--Development of the association centers--The factors involved

in a simple action. 3. Education and the training of the nervous

system: Education to supply opportunities for stimulus and

response--Order of development in the nervous system. 4. Importance of

health and vigor of the nervous system: The influence of fatigue--The

effects of worry--The factors in good nutrition. 5. Problems for

introspection and observation . . . . . . . . . . . . . . . . . . . . . 50

CHAPTER V

HABIT

1. The nature of habit: The physical basis of habit--All living tissue

plastic--Habit a modification of brain tissue--We must form habits. 2.

The place of habit in the economy of our lives: Habit increases skill

and efficiency--Habit saves effort and fatigue--Habit economizes moral

effort--The habit of attention--Habit enables us to meet the

disagreeable--Habit the foundation of personality--Habit saves worry and

rebellion. 3. The tyranny of habit: Even good habits need to be

modified--The tendency of "ruts." 4. Habit-forming a part of education:

Youth the time for habit-forming--The habit of achievement. 5. Rules for

habit-forming: James's three maxims for habit-forming--The preponderance

of good habits over bad . . . . . . . . . . . . . . . . . . . . . . . . 66

CHAPTER VI

SENSATION

1. How we come to know the external world: Knowledge through the

senses--The unity of sensory experience--The sensory processes to be

explained--The qualities of objects exist in the mind--The three sets of

factors. 2. The nature of sensation: Sensation gives us our world of

qualities--The attributes of sensation. 3. Sensory qualities and their

end-organs: Sight--Hearing--Taste--Smell--Various sensations from the

skin--The kinæsthetic senses--The organic senses. 4. Problems in

observation and retrospection . . . . . . . . . . . . . . . . . . . . . 84

CHAPTER VII

PERCEPTION

1. The function of perception: Need of knowing the material world--The

problem which confronts the child. 2. The nature of perception: How a

percept is formed--The percept involves all relations of the object--The

content of the percept--The accuracy of percepts depends on

experience--Not definitions, but first-hand contact. 3. The perception

of space: The perceiving of distance--The perceiving of direction. 4.

The perception of time: Nature of the time sense--No perception of empty

time. 5. The training of perception: Perception needs to be

trained--School training in perception. 6. Problems in observation and

introspection . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 98

CHAPTER VIII

MENTAL IMAGES AND IDEAS

1. The part played by past experience: Present thinking depends on past

experience--The present interpreted by the past--The future also depends

on the past--Rank determined by ability to utilize past experience. 2.

How past experience is conserved: Past experience conserved in both

mental and physical terms--The image and the idea--All our past

experience potentially at our command. 3. Individual differences in

imagery: Images to be viewed by introspection--The varied imagery

suggested by one's dining table--Power of imagery varies in different

people--Imagery types. 4. The function of images: Images supply material

for imagination and memory--Imagery in the thought processes--The use of

imagery in literature--Points where images are of greatest service. 5.

The cultivation of imagery: Images depend on sensory stimuli--The

influence of frequent recall--The reconstruction of our images. 6.

Problems in introspection and observation . . . . . . . . . . . . . . 111

CHAPTER IX

IMAGINATION

1. The place of imagination in mental economy: Practical nature of

imagination--Imagination in the interpretation of history, literature,

and art--Imagination and science--Everyday uses of imagination--The

building of ideals and plans--Imagination and conduct--Imagination and

thinking. 2. The material used by imagination: Images the stuff of

imagination--The two factors in imagination--Imagination limited by

stock of images--Limited also by our constructive ability--The need of a

purpose. 3. Types of imagination: Reproductive imagination--Creative

imagination. 4. Training the imagination: Gathering of material for

imagination--We must not fail to build--We should carry our ideals into

action. 5. Problems for observation and introspection . . . . . . . . 127

CHAPTER X

ASSOCIATION

1. The nature of association: The neural basis of

association--Association the basis of memory--Factors determining

direction of recall--Association in thinking--Association and action.

2. The types of association: Fundamental law of association--Association

by contiguity--At the mercy of our associations--Association by

similarity and contrast--Partial, or selective, association--The remedy.

3. Training in association: The pleasure-pain motive in

association--Interest as a basis for association--Association and

methods of learning. 4. Problems in observation and introspection . . 144

CHAPTER XI

MEMORY

1. The nature of memory: What is retained--The physical basis of

memory--How we remember--Dependence of memory on brain quality. 2. The

four factors involved in memory:

Registration--Retention--Recall--Recognition. 3. The stuff of memory:

Images as the material of memory--Images vary as to type--Other memory

material. 4. Laws underlying memory: The law of association--The law of

repetition--The law of recency--The law of vividness. 5. Rules for using

the memory: Wholes versus parts--Rate of forgetting--Divided

practice--Forcing the memory to act--Not a memory, but memories. 6. What

constitutes a good memory: A good memory selects its material--A good

memory requires good thinking--Memory must be specialized. 7. Memory

devices: The effects of cramming--Remembering isolated facts--Mnemonic

devices. 8. Problems in observation and introspection . . . . . . . . 160

CHAPTER XII

THINKING

1. Different types of thinking: Chance, or idle thinking--Uncritical

belief--Assimilative thinking--Deliberative thinking. 2. The function

of thinking: Meaning depends on relations--The function of thinking is

to discover relations--Near and remote relations--Child and adult

thinking. 3. The mechanism of thinking: Sensations and percepts as

elements in thinking. 4. The concept: The concepts serve to group and

classify--Growth of a concept--Definition of concept--Language and the

concept--The necessity for growing concepts. 5. Judgment: Nature of

judgment--Judgment used in percepts and concepts--Judgment leads to

general truths--The validity of judgments. 6. Reasoning: Nature of

reasoning--How judgments function in reasoning--Deduction and the

syllogism--Induction--The necessity for broad induction--The

interrelation of induction and deduction. 7. Problems in observation and

introspection . . . . . . . . . . . . . . . . . . . . . . . . . . . . 179

CHAPTER XIII

INSTINCT

1. The nature of instinct: The babe's dependence on instinct--Definition

of instinct--Unmodified instinct is blind. 2. Law of the appearance and

disappearance of instincts: Instincts appear in succession as

required--Many instincts are transitory--Seemingly useless

instincts--Instincts to be utilized when they appear--Instincts as

starting points--The more important human instincts. 3. The instinct of

imitation: Nature of imitation--Individuality in imitation--Conscious

and unconscious imitation--Influence of environment--The influence of

personality. 4. The instinct of play: The necessity for play--Play in

development and education--Work and play are complements. 5. Other

useful instincts: Curiosity--Manipulation--The collecting instinct--The

dramatic instinct--The impulse to form gangs and clubs. 6. Fear: Fear

heredity--Fear of the dark--Fear of being left alone. 7. Other

undesirable instincts: Selfishness--Pugnacity, or the fighting impulse.

8. Problems in observation and introspection . . . . . . . . . . . . . 201

CHAPTER XIV

FEELING AND ITS FUNCTIONS

1. The nature of feeling: The different feeling qualities--Feeling

always present in mental content--The seeming neutral feeling zone. 2.

Mood and disposition: How mood is produced--Mood colors all our

thinking--Mood influences our judgments and decisions--Mood influences

effort--Disposition a resultant of moods--Temperament. 3. Permanent

feeling attitudes, or sentiments: How sentiments develop--The effect of

experience--The influence of sentiment--Sentiments as motives. 4.

Problems in observation and introspection . . . . . . . . . . . . . . 226

CHAPTER XV

THE EMOTIONS

1. The producing and expressing of emotion: Physiological explanation of

emotion--Origin of characteristic emotional reactions--The duration of

an emotion--Emotions accompanying crises in experience. 2. The control

of emotions: Dependence on expression--Relief through expression--Relief

does not follow if image is held before the mind--Growing tendency

toward emotional control--The emotions and enjoyment--How emotions

develop--The emotional factor in our environment--Literature and the

cultivation of the emotions--Harm in emotional overexcitement. 4.

Emotions as motives: How our emotions compel us--Emotional habits. 5.

Problems in observation and introspection . . . . . . . . . . . . . . 239

CHAPTER XVI

INTEREST

1. The nature of interest: Interest a selective agent--Interest supplies

a subjective scale of values--Interest dynamic--Habit antagonistic to

interest. 2. Direct and indirect interest: Interest in the end versus

interest in the activity--Indirect interest as a motive--Indirect

interest alone insufficient. 3. Transitoriness of certain interests:

Interests must be utilized when they appear--The value of a strong

interest. 4. Selection among our interests: The mistake of following too

many interests--Interests may be too narrow--Specialization should not

come too early--A proper balance to be sought. 5. Interest fundamental

in education: Interest not antagonistic to effort--Interest and

character. 6. Order of development of our interests: The interests of

early childhood--The interests of later childhood--The interests of

adolescence. 7. Problems in observation and introspection . . . . . . 254

CHAPTER XVII

THE WILL

1. The nature of the will: The content of the will--The function of the

will--How the will exerts its compulsion. 2. The extent of voluntary

control over our acts: Simple reflex acts--Instinctive acts--Automatic,

or spontaneous acts--The cycle from volitional to automatic--Volitional

action--Volition acts in the making of decisions--Types of decision--The

reasonable type--Accidental type: External motives--Accidental type:

Subjective motives--Decision under effort. 3. Strong and weak wills: Not

a will, but wills--Objective tests a false measure of will power. 4.

Volitional types: The impulsive type--The obstructed will--The normal

will. 5. Training the will: Will to be trained in common round of

duties--School work and will-training. 6. Freedom of the will, or the

extent of its control: Limitations of the will--These limitations and

conditions of freedom. 7. Problems in observation and introspection. . 271

CHAPTER XVIII

SELF-EXPRESSION AND DEVELOPMENT

1. Interrelation of impression and expression: The many sources of

impressions--All impressions lead toward expression--Limitations of

expression. 2. The place of expression in development: Intellectual value

of expression--Moral value of expression--Religious value of

expression--Social value of expression. 3. Educational use of

expression: Easier to provide for the impression side of education--The

school to take up the handicrafts--Expression and character--Two lines

of development. 4. Problems in introspection and observation . . . . . 294

INDEX . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 307

THE MIND AND ITS EDUCATION

CHAPTER I

THE MIND, OR CONSCIOUSNESS

We are to study the mind and its education; but how? It is easy to

understand how we may investigate the great world of material things

about us; for we can see it, touch it, weigh it, or measure it. But how

are we to discover the nature of the mind, or come to know the processes

by which consciousness works? For mind is intangible; we cannot see it,

feel it, taste it, or handle it. Mind belongs not to the realm of matter

which is known to the senses, but to the realm of \_spirit\_, which the

senses can never grasp. And yet the mind can be known and studied as

truly and as scientifically as can the world of matter. Let us first of

all see how this can be done.

1. HOW MIND IS TO BE KNOWN

THE PERSONAL CHARACTER OF CONSCIOUSNESS.--Mind can be observed and

known. But each one can know directly only his own mind, and not

another's. You and I may look into each other's face and there guess the

meaning that lies back of the smile or frown or flash of the eye, and

so read something of the mind's activity. But neither directly meets the

other's mind. I may learn to recognize your features, know your voice,

respond to the clasp of your hand; but the mind, the consciousness,

which does your thinking and feels your joys and sorrows, I can never

know completely. Indeed I can never know your mind at all except through

your bodily acts and expressions. Nor is there any way in which you can

reveal your mind, your spiritual self, to me except through these means.

It follows therefore that only \_you\_ can ever know \_you\_ and only \_I\_

can ever know \_I\_ in any first-hand and immediate way. Between your

consciousness and mine there exists a wide gap that cannot be bridged.

Each of us lives apart. We are like ships that pass and hail each other

in passing but do not touch. We may work together, live together, come

to love or hate each other, and yet our inmost selves forever stand

alone. They must live their own lives, think their own thoughts, and

arrive at their own destiny.

INTROSPECTION THE ONLY MEANS OF DISCOVERING NATURE OF

CONSCIOUSNESS.--What, then, is mind? What is the thing that we call

consciousness? No mere definition can ever make it clearer than it is at

this moment to each of us. The only way to know what mind is, is to look

in upon our own consciousness and observe what is transpiring there. In

the language of the psychologist, we must \_introspect\_. For one can

never come to understand the nature of mind and its laws of working by

listening to lectures or reading text books alone. There is no

\_psychology\_ in the text, but only in your living, flowing stream of

thought and mine. True, the lecture and the book may tell us what to

look for when we introspect, and how to understand what we find. But the

statements and descriptions about our minds must be verified by our own

observation and experience before they become vital truth to us.

HOW WE INTROSPECT.--Introspection is something of an art; it has to be

learned. Some master it easily, some with more difficulty, and some, it

is to be feared, never become skilled in its use. In order to introspect

one must catch himself unawares, so to speak, in the very act of

thinking, remembering, deciding, loving, hating, and all the rest. These

fleeting phases of consciousness are ever on the wing; they never pause

in their restless flight and we must catch them as they go. This is not

so easy as it appears; for the moment we turn to look in upon the mind,

that moment consciousness changes. The thing we meant to examine is

gone, and something else has taken its place. All that is left us then

is to view the mental object while it is still fresh in the memory, or

to catch it again when it returns.

STUDYING MENTAL STATES OF OTHERS THROUGH EXPRESSION.--Although I can

meet only my own mind face to face, I am, nevertheless, under the

necessity of judging your mental states and knowing what is taking place

in your consciousness. For in order to work successfully with you, in

order to teach you, understand you, control you or obey you, be your

friend or enemy, or associate with you in any other way, I must \_know\_

you. But the real you that I must know is hidden behind the physical

mask that we call the body. I must, therefore, be able to understand

your states of consciousness as they are reflected in your bodily

expressions. Your face, form, gesture, speech, the tone of voice,

laughter and tears, the poise of attention, the droop of grief, the

tenseness of anger and start of fear,--all these tell the story of the

mental state that lies behind the senses. These various expressions are

the pictures on the screen by which your mind reveals itself to others;

they are the language by which the inner self speaks to the world

without.

LEARNING TO INTERPRET EXPRESSION.--If I would understand the workings of

your mind I must therefore learn to read the language of physical

expression. I must study human nature and learn to observe others. I

must apply the information found in the texts to an interpretation of

those about me. This study of others may be \_uncritical\_, as in the mere

intelligent observation of those I meet; or it may be \_scientific\_, as

when I conduct carefully planned psychological experiments. But in

either case it consists in judging the inner states of consciousness by

their physical manifestations.

The three methods by which mind may be studied are, then: (1) text-book

\_description and explanation\_; (2) \_introspection\_ of my own conscious

processes; and (3) \_observation\_ of others, either uncritical or

scientific.

2. THE NATURE OF CONSCIOUSNESS

INNER NATURE OF THE MIND NOT REVEALED BY INTROSPECTION.--We are not to

be too greatly discouraged if, even by introspection, we cannot discover

exactly \_what\_ the mind is. No one knows what electricity is, though

nearly everyone uses it in one form or another. We study the dynamo, the

motor, and the conductors through which electricity manifests itself. We

observe its effects in light, heat, and mechanical power, and so learn

the laws which govern its operations. But we are almost as far from

understanding its true nature as were the ancients who knew nothing of

its uses. The dynamo does not create the electricity, but only furnishes

the conditions which make it possible for electricity to manifest

itself in doing the world's work. Likewise the brain or nervous system

does not create the mind, but it furnishes the machine through which the

mind works. We may study the nervous system and learn something of the

conditions and limitations under which the mind operates, but this is

not studying the mind itself. As in the case of electricity, what we

know about the mind we must learn through the activities in which it

manifests itself--these we can know, for they are in the experience of

all. It is, then, only by studying these processes of consciousness that

we come to know the laws which govern the mind and its development.

\_What\_ it is that thinks and feels and wills in us is too hard a problem

for us here--indeed, has been too hard a problem for the philosophers

through the ages. But the thinking and feeling and willing we can watch

as they occur, and hence come to know.

CONSCIOUSNESS AS A PROCESS OR STREAM.--In looking in upon the mind we

must expect to discover, then, not a \_thing\_, but a \_process\_. The

\_thing\_ forever eludes us, but the process is always present.

Consciousness is like a stream, which, so far as we are concerned with

it in a psychological discussion, has its rise at the cradle and its end

at the grave. It begins with the babe's first faint gropings after light

in his new world as he enters it, and ends with the man's last blind

gropings after light in his old world as he leaves it. The stream is

very narrow at first, only as wide as the few sensations which come to

the babe when it sees the light or hears the sound; it grows wider as

the mind develops, and is at last measured by the grand sum total of

life's experience.

This mental stream is irresistible. No power outside of us can stop it

while life lasts. We cannot stop it ourselves. When we try to stop

thinking, the stream but changes its direction and flows on. While we

wake and while we sleep, while we are unconscious under an anæsthetic,

even, some sort of mental process continues. Sometimes the stream flows

slowly, and our thoughts lag--we "feel slow"; again the stream flows

faster, and we are lively and our thoughts come with a rush; or a fever

seizes us and delirium comes on; then the stream runs wildly onward,

defying our control, and a mad jargon of thoughts takes the place of our

usual orderly array. In different persons, also, the mental stream moves

at different rates, some minds being naturally slow-moving and some

naturally quick in their operations.

Consciousness resembles a stream also in other particulars. A stream is

an unbroken whole from its source to its mouth, and an observer

stationed at one point cannot see all of it at once. He sees but the one

little section which happens to be passing his station point at the

time. The current may look much the same from moment to moment, but the

component particles which constitute the stream are constantly changing.

So it is with our thought. Its stream is continuous from birth till

death, but we cannot see any considerable portion of it at one time.

When we turn about quickly and look in upon our minds, we see but the

little present moment. That of a few seconds ago is gone and will never

return. The thought which occupied us a moment since can no more be

recalled, just as it was, than can the particles composing a stream be

re-collected and made to pass a given point in its course in precisely

the same order and relation to one another as before. This means, then,

that we can never have precisely the same mental state twice; that the

thought of the moment cannot have the same associates that it had the

first time; that the thought of this moment will never be ours again;

that all we can know of our minds at any one time is the part of the

process present in consciousness at that moment.

[Illustration: FIG. 1]

[Illustration: FIG. 2]

THE WAVE IN THE STREAM OF CONSCIOUSNESS.--The surface of our mental

stream is not level, but is broken by a wave which stands above the

rest; which is but another way of saying that some one thing is always

more prominent in our thought than the rest. Only when we are in a

sleepy reverie, or not thinking about much of anything, does the stream

approximate a level. At all other times some one object occupies the

highest point in our thought, to the more or less complete exclusion of

other things which we might think about. A thousand and one objects are

possible to our thought at any moment, but all except one thing occupy a

secondary place, or are not present to our consciousness at all. They

exist on the margin, or else are clear off the edge of consciousness,

while the one thing occupies the center. We may be reading a fascinating

book late at night in a cold room. The charm of the writer, the beauty

of the heroine, or the bravery of the hero so occupies the mind that the

weary eyes and chattering teeth are unnoticed. Consciousness has piled

up in a high wave on the points of interest in the book, and the bodily

sensations are for the moment on a much lower level. But let the book

grow dull for a moment, and the make-up of the stream changes in a

flash. Hero, heroine, or literary style no longer occupies the wave.

They forfeit their place, the wave is taken by the bodily sensations,

and we are conscious of the smarting eyes and shivering body, while

these in turn give way to the next object which occupies the wave. Figs.

1-3 illustrate these changes.

[Illustration: FIG. 3]

CONSCIOUSNESS LIKENED TO A FIELD.--The consciousness of any moment has

been less happily likened to a field, in the center of which there is an

elevation higher than the surrounding level. This center is where

consciousness is piled up on the object which is for the moment foremost

in our thought. The other objects of our consciousness are on the margin

of the field for the time being, but any of them may the next moment

claim the center and drive the former object to the margin, or it may

drop entirely out of consciousness. This moment a noble resolve may

occupy the center of the field, while a troublesome tooth begets

sensations of discomfort which linger dimly on the outskirts of our

consciousness; but a shooting pain from the tooth or a random thought

crossing the mind, and lo! the tooth holds sway, and the resolve dimly

fades to the margin of our consciousness and is gone.

THE "PILING UP" OF CONSCIOUSNESS IS ATTENTION.--This figure is not so

true as the one which likens our mind to a stream with its ever onward

current answering to the flow of our thought; but whichever figure we

employ, the truth remains the same. Our mental energy is always piled up

higher at one point than at others. Either because our interest leads

us, or because the will dictates, the mind is withdrawn from the

thousand and one things we might think about, and directed to this one

thing, which for the time occupies chief place. In other words, we

\_attend\_; for this piling up of consciousness is nothing, after all, but

attention.

3. CONTENT OF THE MENTAL STREAM

We have seen that our mental life may be likened to a stream flowing now

faster, now slower, ever shifting, never ceasing. We have yet to inquire

what constitutes the material of the stream, or what is the stuff that

makes up the current of our thought--what is the \_content\_ of

consciousness? The question cannot be fully answered at this point, but

a general notion can be gained which will be of service.

WHY WE NEED MINDS.--Let us first of all ask what mind is for, why do

animals, including men, have minds? The biologist would say, in order

that they may \_adapt\_ themselves to their environment. Each individual

from mollusc to man needs the amount and type of mind that serves to

fit its possessor into its particular world of activity. Too little mind

leaves the animal helpless in the struggle for existence. On the other

hand a mind far above its possessor's station would prove useless if not

a handicap; a mollusc could not use the mind of a man.

CONTENT OF CONSCIOUSNESS DETERMINED BY FUNCTION.--How much mind does man

need? What range and type of consciousness will best serve to adjust us

to our world of opportunity and responsibility? First of all we must

\_know\_ our world, hence, our mind must be capable of gathering

knowledge. Second, we must be able to \_feel\_ its values and respond to

the great motives for action arising from the emotions. Third, we must

have the power to exert self-compulsion, which is to say that we possess

a \_will\_ to control our acts. These three sets of processes, \_knowing\_,

\_feeling\_, and \_willing\_, we shall, therefore, expect to find making up

the content of our mental stream.

Let us proceed at once to test our conclusion by introspection. If we

are sitting at our study table puzzling over a difficult problem in

geometry, \_reasoning\_ forms the wave in the stream of consciousness--the

center of the field. It is the chief thing in our thinking. The fringe

of our consciousness is made up of various sensations of the light from

the lamp, the contact of our clothing, the sounds going on in the next

room, some bit of memory seeking recognition, a "tramp" thought which

comes along, and a dozen other experiences not strong enough to occupy

the center of the field.

But instead of the study table and the problem, give us a bright

fireside, an easy-chair, and nothing to do. If we are aged,

\_memories\_--images from out the past--will probably come thronging in

and occupy the field to such extent that the fire burns low and the room

grows cold, but still the forms from the past hold sway. If we are

young, visions of the future may crowd everything else to the margin of

the field, while the "castles in Spain" occupy the center.

Our memories may also be accompanied by emotions--sorrow, love, anger,

hate, envy, joy. And, indeed, these emotions may so completely occupy

the field that the images themselves are for the time driven to the

margin, and the mind is occupied with its sorrow, its love, or its joy.

Once more, instead of the problem or the memories or the "castles in

Spain," give us the necessity of making some decision, great or small,

where contending motives are pulling us now in this direction, now in

that, so that the question finally has to be settled by a supreme effort

summed up in the words, \_I will\_. This is the struggle of the will which

each one knows for himself; for who has not had a raging battle of

motives occupy the center of the field while all else, even the sense of

time, place and existence, gave way in the face of this conflict! This

struggle continues until the decision is made, when suddenly all the

stress and strain drop out and other objects may again have place in

consciousness.

THE THREE FUNDAMENTAL PHASES OF CONSCIOUSNESS.--Thus we see that if we

could cut the stream of consciousness across as we might cut a stream of

water from bank to bank with a huge knife, and then look at the cut-off

section, we should find very different constituents in the stream at

different times. We should at one time find the mind manifesting itself

in \_perceiving\_, \_remembering\_, \_imagining\_, \_discriminating\_,

\_comparing\_, \_judging\_, \_reasoning\_, or the acts by which we gain our

knowledge; at another in \_fearing\_, \_loving\_, \_hating\_, \_sorrowing\_,

\_enjoying\_, or the acts of feeling; at still another in \_choosing\_, or

the act of the will. These processes would make up the stream, or, in

other words, these are the acts which the mind performs in doing its

work. We should never find a time when the stream consists of but one of

the processes, or when all these modes of mental activity are not

represented. They will be found in varying proportions, now more of

knowing, now of feeling, and now of willing, but some of each is always

present in our consciousness. The nature of these different elements in

our mental stream, their relation to each other, and the manner in which

they all work together in amazing perplexity yet in perfect harmony to

produce the wonderful \_mind\_, will constitute the subject-matter we

shall consider together in the pages which follow.

4. WHERE CONSCIOUSNESS RESIDES

I--the conscious self--dwell somewhere in this body, but where? When my

finger tips touch the object I wish to examine, I seem to be in them.

When the brain grows weary from overstudy, I seem to be in it. When the

heart throbs, the breath comes quick, and the muscles grow tense from

noble resolve or strong emotion, I seem to be in them all. When, filled

with the buoyant life of vigorous youth, every fiber and nerve is

a-tingle with health and enthusiasm, I live in every part of my

marvelous body. Small wonder that the ancients located the soul at one

time in the heart, at another in the pineal gland of the brain, and at

another made it coextensive with the body!

CONSCIOUSNESS WORKS THROUGH THE NERVOUS SYSTEM.--Later science has

taught that the \_mind resides in and works through the nervous system,

which has its central office in the brain\_. And the reason why \_I\_ seem

to be in every part of my body is because the nervous system extends to

every part, carrying messages of sight or sound or touch to the brain,

and bearing in return orders for movements, which set the feet a-dancing

or the fingers a-tingling. But more of this later.

This partnership between mind and body is very close. Just how it

happens that spirit may inhabit matter we may not know. But certain it

is that they interact on each other. What will hinder the growth of one

will handicap the other, and what favors the development of either will

help both. The methods of their coöperation and the laws that govern

their relationship will develop as our study goes on.

5. PROBLEMS IN OBSERVATION AND INTROSPECTION

One should always keep in mind that psychology is essentially a

laboratory science, and not a text-book subject. The laboratory material

is to be found in ourselves and in those about us. While the text should

be thoroughly mastered, its statements should always be verified by

reference to one's own experience, and observation of others. Especially

should prospective teachers constantly correlate the lessons of the book

with the observation of children at work in the school. The problems

suggested for observation and introspection will, if mastered, do much

to render practical and helpful the truths of psychology.

1. Think of your home as you last left it. Can you see vividly just how

it looked, the color of the paint on the outside, with the familiar form

of the roof and all; can you recall the perfume in some old drawer, the

taste of a favorite dish, the sound of a familiar voice in farewell?

2. What illustrations have you observed where the mental content of the

moment seemed chiefly \_thinking\_ (knowledge process); chiefly \_emotion\_

(feeling process); chiefly \_choosing\_, or self-compulsion (willing

process)?

3. When you say that you remember a circumstance that occurred

yesterday, how do you remember it? That is, do you see in your mind

things just as they were, and hear again sounds which occurred, or feel

again movements which you performed? Do you experience once more the

emotions you then felt?

4. What forms of expression most commonly reveal \_thought\_; what reveal

emotions? (i.e., can you tell what a child is \_thinking about\_ by the

expression on his face? Can you tell whether he is \_angry\_,

\_frightened\_, \_sorry\_, by his face? Is speech as necessary in expressing

feeling as in expressing thought?)

5. Try occasionally during the next twenty-four hours to turn quickly

about mentally and see whether you can observe your thinking, feeling,

or willing in the very act of taking place.

6. What becomes of our mind or consciousness while we are asleep? How

are we able to wake up at a certain hour previously determined? Can a

person have absolutely \_nothing\_ in his mind?

7. Have you noticed any children especially adept in expression? Have

you noticed any very backward? If so, in what form of expression in each

case?

8. Have you observed any instances of expression which you were at a

loss to interpret (remember that "expression" includes every form of

physical action, voice, speech, face, form, hand, etc.)?

CHAPTER II

ATTENTION

How do you rank in mental ability, and how effective are your mind's

grasp and power? The answer that must be given to these questions will

depend not more on your native endowment than on your skill in using

attention.

1. NATURE OF ATTENTION

It is by attention that we gather and mass our mental energy upon the

critical and important points in our thinking. In the last chapter we

saw that consciousness is not distributed evenly over the whole field,

but "piled up," now on this object of thought, now on that, in obedience

to interest or necessity. \_The concentration of the mind's energy on one

object of thought is attention.\_

THE NATURE OF ATTENTION.--Everyone knows what it is to attend. The story

so fascinating that we cannot leave it, the critical points in a game,

the interesting sermon or lecture, the sparkling conversation--all these

compel our attention. So completely is our mind's energy centered on

them and withdrawn from other things that we are scarcely aware of what

is going on about us.

We are also familiar with another kind of attention. For we all have

read the dull story, watched the slow game, listened to the lecture or

sermon that drags, and taken part in conversation that was a bore. We

gave these things our attention, but only with effort. Our mind's energy

seemed to center on anything rather than the matter in hand. A thousand

objects from outside enticed us away, and it required the frequent

"mental jerk" to bring us to the subject in hand. And when brought back

to our thought problem we felt the constant "tug" of mind to be free

again.

NORMAL CONSCIOUSNESS ALWAYS IN A STATE OF ATTENTION.--But this very

effort of the mind to free itself from one object of thought that it may

busy itself with another is \_because attention is solicited by this

other\_. Some object in our field of consciousness is always exerting an

appeal for attention; and to attend \_to\_ one thing is always to attend

\_away from\_ a multitude of other things upon which the thought might

rest. We may therefore say that attention is constantly \_selecting\_ in

our stream of thought those aspects that are to receive emphasis and

consideration. From moment to moment it determines the points at which

our mental energy shall be centered.

2. THE EFFECTS OF ATTENTION

ATTENTION MAKES ITS OBJECT CLEAR AND DEFINITE.--Whatever attention

centers upon stands out sharp and clear in consciousness. Whether it be

a bit of memory, an "air-castle," a sensation from an aching tooth, the

reasoning on an algebraic formula, a choice which we are making, the

setting of an emotion--whatever be the object to which we are attending,

that object is illumined and made to stand out from its fellows as the

one prominent thing in the mind's eye while the attention rests on it.

It is like the one building which the searchlight picks out among a city

full of buildings and lights up, while the remainder are left in the

semilight or in darkness.

ATTENTION MEASURES MENTAL EFFICIENCY.--In a state of attention the mind

may be likened to the rays of the sun which have been passed through a

burning glass. You may let all the rays which can pass through your

window pane fall hour after hour upon the paper lying on your desk, and

no marked effects follow. But let the same amount of sunlight be passed

through a lens and converged to a point the size of your pencil point,

and the paper will at once burst into flame. What the diffused rays

could not do in hours or in ages is now accomplished in seconds.

Likewise the mind, allowed to scatter over many objects, can accomplish

but little. We may sit and dream away an hour or a day over a page or a

problem without securing results. But let us call in our wits from their

wool-gathering and "buckle down to it" with all our might, withdrawing

our thoughts from everything else but this \_one thing\_, and

concentrating our mind on it. More can now be accomplished in minutes

than before in hours. Nay, \_things which could not be accomplished at

all before\_ now become possible.

Again, the mind may be compared to a steam engine which is constructed

to run at a certain pressure of steam, say one hundred and fifty pounds

to the square inch of boiler surface. Once I ran such an engine; and

well I remember a morning during my early apprenticeship when the

foreman called for power to run some of the lighter machinery, while my

steam gauge registered but seventy-five pounds. "Surely," I thought, "if

one hundred and fifty pounds will run all this machinery, seventy-five

pounds should run half of it," so I opened the valve. But the powerful

engine could do but little more than turn its own wheels, and refused

to do the required work. Not until the pressure had risen above one

hundred pounds could the engine perform half the work which it could at

one hundred and fifty pounds. And so with our mind. If it is meant to do

its best work under a certain degree of concentration, it cannot in a

given time do half the work with half the attention. Further, there will

be much \_which it cannot do at all\_ unless working under full pressure.

We shall not be overstating the case if we say that as attention

increases in arithmetical ratio, mental efficiency increases in

geometrical ratio. It is in large measure a difference in the power of

attention which makes one man a master in thought and achievement and

another his humble follower. One often hears it said that "genius is but

the power of sustained attention," and this statement possesses a large

element of truth.

3. HOW WE ATTEND

Someone has said that if our attention is properly trained we should be

able "to look at the point of a cambric needle for half an hour without

winking." But this is a false idea of attention. The ability to look at

the point of a cambric needle for half an hour might indicate a very

laudable power of concentration; but the process, instead of

enlightening us concerning the point of the needle, would result in our

passing into a hypnotic state. Voluntary attention to any one object can

be sustained for but a brief time--a few seconds at best. It is

essential that the object change, that we turn it over and over

incessantly, and consider its various aspects and relations. Sustained

voluntary attention is thus a repetition of successive efforts to bring

back the object to the mind. Then the subject grows and develops--it is

living, not dead.

ATTENTION A RELATING ACTIVITY.--When we are attending strongly to one

object of thought it does not mean that consciousness sits staring

vacantly at this one object, but rather that it uses it as a central

core of thought, and thinks into relation with this object the things

which belong with it. In working out some mathematical solution the

central core is the principle upon which the solution is based, and

concentration in this case consists in thinking the various conditions

of the problem in relation to this underlying principle. In the

accompanying diagram (Fig. 4) let A be the central core of some object

of thought, say a patch of cloud in a picture, and let \_a\_, \_b\_, \_c\_,

\_d\_, etc., be the related facts, or the shape, size, color, etc., of the

cloud. The arrows indicate the passing of our thought from cloud to

related fact, or from related fact to cloud, and from related fact to

related fact. As long as these related facts lead back to the cloud each

time, that long we are attending to the cloud and thinking about it. It

is when our thought fails to go back that we "wander" in our attention.

Then we leave \_a\_, \_b\_, \_c\_, \_d\_, etc., which are related to the cloud,

and, flying off to \_x\_, \_y\_, and \_z,\_ finally bring up heaven knows

where.

[Illustration: FIG. 4]

THE RHYTHMS OF ATTENTION.--Attention works in rhythms. This is to say

that it never maintains a constant level of concentration for any

considerable length of time, but regularly ebbs and flows. The

explanation of this rhythmic action would take us too far afield at this

point. When we remember, however, that our entire organism works within

a great system of rhythms--hunger, thirst, sleep, fatigue, and many

others--it is easy to see that the same law may apply to attention. The

rhythms of attention vary greatly, the fluctuations often being only a

few seconds apart for certain simple sensations, and probably a much

greater distance apart for the more complex process of thinking. The

seeming variation in the sound of a distant waterfall, now loud and now

faint, is caused by the rhythm of attention and easily allows us to

measure the rhythm for this particular sensation.

4. POINTS OF FAILURE IN ATTENTION

LACK OF CONCENTRATION.--There are two chief types of inattention whose

danger threatens every person. \_First\_, we may be thinking about the

right things, but not thinking \_hard\_ enough. We lack mental pressure.

Outside thoughts which have no relation to the subject in hand may not

trouble us much, but we do not attack our problem with vim. The current

in our stream of consciousness is moving too slowly. We do not gather up

all our mental forces and mass them on the subject before us in a way

that means victory. Our thoughts may be sufficiently focused, but they

fail to "set fire." It is like focusing the sun's rays while an eclipse

is on. They lack energy. They will not kindle the paper after they have

passed through the lens. This kind of attention means mental dawdling.

It means inefficiency. For the individual it means defeat in life's

battles; for the nation it means mediocrity and stagnation.

A college professor said to his faithful but poorly prepared class,

"Judging from your worn and tired appearance, young people, you are

putting in twice too many hours on study." At this commendation the

class brightened up visibly. "But," he continued, "judging from your

preparation, you do not study quite half hard enough."

Happy is the student who, starting in on his lesson rested and fresh,

can study with such concentration that an hour of steady application

will leave him mentally exhausted and limp. That is one hour of triumph

for him, no matter what else he may have accomplished or failed to

accomplish during the time. He can afford an occasional pause for rest,

for difficulties will melt rapidly away before him. He possesses one key

to successful achievement.

MENTAL WANDERING.--\_Second\_, we may have good mental power and be able

to think hard and efficiently on any one point, but lack the power to

think in a straight line. Every stray thought that comes along is a

"will-o'-the-wisp" to lead us away from the subject in hand and into

lines of thought not relating to it. Who has not started in to think on

some problem, and, after a few moments, been surprised to find himself

miles away from the topic upon which he started! Or who has not read

down a page and, turning to the next, found that he did not know a word

on the preceding page, his thoughts having wandered away, his eyes only

going through the process of reading! Instead of sticking to the \_a\_,

\_b\_, \_c\_, \_d\_, etc., of our topic and relating them all up to A, thereby

reaching a solution of the problem, we often jump at once to \_x\_, \_y\_,

\_z\_, and find ourselves far afield with all possibility of a solution

gone. We may have brilliant thoughts about \_x\_, \_y\_, \_z\_, but they are

not related to anything in particular, and so they pass from us and are

gone--lost in oblivion because they are not attached to something

permanent.

Such a thinker is at the mercy of circumstances, following blindly the

leadings of trains of thought which are his master instead of his

servant, and which lead him anywhere or nowhere without let or hindrance

from him. His consciousness moves rapidly enough and with enough force,

but it is like a ship without a helm. Starting for the intellectual port

\_A\_ by way of \_a\_, \_b\_, \_c\_, \_d\_, he is mentally shipwrecked at last on

the rocks \_x\_, \_y\_, \_z\_, and never reaches harbor. Fortunate is he who

can shut out intruding thoughts and think in a straight line. Even with

mediocre ability he may accomplish more by his thinking than the

brilliant thinker who is constantly having his mental train wrecked by

stray thoughts which slip in on his right of way.

5. TYPES OF ATTENTION

THE THREE TYPES OF ATTENTION.--Attention may be secured in three ways:

(1) It is demanded by some sudden or intense sensory stimulus or

insistent idea, or (2) it follows interest, or (3) it is compelled by

the will. If it comes in the first way, as from a thunderclap or a flash

of light, or from the persistent attempt of some unsought idea to secure

entrance into the mind, it is called \_involuntary\_ attention. This form

of attention is of so little importance, comparatively, in our mental

life that we shall not discuss it further.

If attention comes in the second way, following interest, it is called

\_nonvoluntary\_ or spontaneous attention; if in the third, compelled by

the will, \_voluntary\_ or active attention. Nonvoluntary attention has

its motive in some object external to consciousness, or else follows a

more or less uncontrolled current of thought which interests us;

voluntary attention is controlled from within--\_we\_ decide what we shall

attend to instead of letting interesting objects of thought determine it

for us.

INTEREST AND NONVOLUNTARY ATTENTION.--In nonvoluntary attention the

environment largely determines what we shall attend to. All that we have

to do with directing this kind of attention is in developing certain

lines of interest, and then the interesting things attract attention.

The things we see and hear and touch and taste and smell, the things we

like, the things we do and hope to do--these are the determining factors

in our mental life so long as we are giving nonvoluntary attention. Our

attention follows the beckoning of these things as the needle the

magnet. It is no effort to attend to them, but rather the effort would

be to keep from attending to them. Who does not remember reading a

story, perhaps a forbidden one, so interesting that when mother called

up the stairs for us to come down to attend to some duty, we replied,

"Yes, in a minute," and then went on reading! We simply could not stop

at that place. The minute lengthens into ten, and another call startles

us. "Yes, I'm coming;" we turn just one more leaf, and are lost again.

At last comes a third call in tones so imperative that it cannot be

longer ignored, and we lay the book down, but open to the place where we

left off, and where we hope soon to begin further to unravel the

delightful mystery. Was it an effort to attend to the reading? Ah, no!

it took the combined force of our will and of mother's authority to

drag the attention away. This is nonvoluntary attention.

Left to itself, then, attention simply obeys natural laws and follows

the line of least resistance. By far the larger portion of our attention

is of this type. Thought often runs on hour after hour when we are not

conscious of effort or struggle to compel us to cease thinking about

this thing and begin thinking about that. Indeed, it may be doubted

whether this is not the case with some persons for days at a time,

instead of hours. The things that present themselves to the mind are the

things which occupy it; the character of the thought is determined by

the character of our interests. It is this fact which makes it vitally

necessary that our interests shall be broad and pure if our thoughts are

to be of this type. It is not enough that we have the strength to drive

from our minds a wrong or impure thought which seeks entrance. To stand

guard as a policeman over our thoughts to see that no unworthy one

enters, requires too much time and energy. Our interests must be of such

a nature as to lead us away from the field of unworthy thoughts if we

are to be free from their tyranny.

THE WILL AND VOLUNTARY ATTENTION.--In voluntary attention there is a

conflict either between the will and interest or between the will and

the mental inertia or laziness, which has to be overcome before we can

think with any degree of concentration. Interest says, "Follow this

line, which is easy and attractive, or which requires but little

effort--follow the line of least resistance." Will says, "Quit that line

of dalliance and ease, and take this harder way which I direct--cease

the line of least resistance and take the one of greatest resistance."

When day dreams and "castles in Spain" attempt to lure you from your

lessons, refuse to follow; shut out these vagabond thoughts and stick to

your task. When intellectual inertia deadens your thought and clogs your

mental stream, throw it off and court forceful effort. If wrong or

impure thoughts seek entrance to your mind, close and lock your mental

doors to them. If thoughts of desire try to drive out thoughts of duty,

be heroic and insist that thoughts of duty shall have right of way. In

short, see that \_you\_ are the master of your thinking, and do not let it

always be directed without your consent by influences outside of

yourself.

It is just at this point that the strong will wins victory and the weak

will breaks down. Between the ability to control one's thoughts and the

inability to control them lies all the difference between right actions

and wrong actions; between withstanding temptation and yielding to it;

between an inefficient purposeless life and a life of purpose and

endeavor; between success and failure. For we act in accordance with

those things which our thought rests upon. Suppose two lines of thought

represented by \_A\_ and \_B\_, respectively, lie before you; that \_A\_ leads

to a course of action difficult or unpleasant, but necessary to success

or duty, and that \_B\_ leads to a course of action easy or pleasant, but

fatal to success or duty. Which course will you follow--the rugged path

of duty or the easier one of pleasure? The answer depends almost wholly,

if not entirely, on your power of attention. If your will is strong

enough to pull your thoughts away from the fatal but attractive \_B\_ and

hold them resolutely on the less attractive \_A\_, then \_A\_ will dictate

your course of action, and you will respond to the call for endeavor,

self-denial, and duty; but if your thoughts break away from the

domination of your will and allow the beckoning of your interests

alone, then \_B\_ will dictate your course of action, and you will follow

the leading of ease and pleasure. \_For our actions are finally and

irrevocably dictated by the things we think about.\_

NOT REALLY DIFFERENT KINDS OF ATTENTION.--It is not to be understood,

however, from what has been said, that there are \_really\_ different

kinds of attention. All attention denotes an active or dynamic phase of

consciousness. The difference is rather \_in the way we secure

attention\_; whether it is demanded by sudden stimulus, coaxed from us by

interesting objects of thought without effort on our part, or compelled

by force of will to desert the more interesting and take the direction

which we dictate.

6. IMPROVING THE POWER OF ATTENTION

While attention is no doubt partly a natural gift, yet there is probably

no power of the mind more susceptible to training than is attention. And

with attention, as with every other power of body and mind, the secret

of its development lies in its use. Stated briefly, the only way to

train attention is by attending. No amount of theorizing or resolving

can take the place of practice in the actual process of attending.

MAKING DIFFERENT KINDS OF ATTENTION REËNFORCE EACH OTHER.--A very close

relationship and interdependence exists between nonvoluntary and

voluntary attention. It would be impossible to hold our attention by

sheer force of will on objects which were forever devoid of interest;

likewise the blind following of our interests and desires would finally

lead to shipwreck in all our lives. Each kind of attention must support

and reënforce the other. The lessons, the sermons, the lectures, and

the books in which we are most interested, and hence to which we attend

nonvoluntarily and with the least effort and fatigue, are the ones out

of which, other things being equal, we get the most and remember the

best and longest. On the other hand, there are sometimes lessons and

lectures and books, and many things besides, which are not intensely

interesting, but which should be attended to nevertheless. It is at this

point that the will must step in and take command. If it has not the

strength to do this, it is in so far a weak will, and steps should be

taken to develop it. We are to "\_keep the faculty of effort alive in us

by a little gratuitous exercise every day\_." We are to be systematically

heroic in the little points of everyday life and experience. We are not

to shrink from tasks because they are difficult or unpleasant. Then,

when the test comes, we shall not find ourselves unnerved and untrained,

but shall be able to stand in the evil day.

THE HABIT OF ATTENTION.--Finally, one of the chief things in training

the attention is \_to form the habit of attending\_. This habit is to be

formed only by \_attending\_ whenever and wherever the proper thing to do

is to attend, whether "in work, in play, in making fishing flies, in

preparing for an examination, in courting a sweetheart, in reading a

book." The lesson, or the sermon, or the lecture, may not be very

interesting; but if they are to be attended to at all, our rule should

be to attend to them completely and absolutely. Not by fits and starts,

now drifting away and now jerking ourselves back, but \_all the time\_.

And, furthermore, the one who will deliberately do this will often find

the dull and uninteresting task become more interesting; but if it never

becomes interesting, he is at least forming a habit which will be

invaluable to him through life. On the other hand, the one who fails to

attend except when his interest is captured, who never exerts effort to

compel attention, is forming a habit which will be the bane of his

thinking until his stream of thought shall end.

7. PROBLEMS IN OBSERVATION AND INTROSPECTION

1. Which fatigues you more, to give attention of the nonvoluntary type,

or the voluntary? Which can you maintain longer? Which is the more

pleasant and agreeable to give? Under which can you accomplish more?

What bearing have these facts on teaching?

2. Try to follow for one or two minutes the "wave" in your

consciousness, and then describe the course taken by your attention.

3. Have you observed one class alert in attention, and another lifeless

and inattentive? Can you explain the causes lying back of this

difference? Estimate the relative amount of work accomplished under the

two conditions.

4. What distractions have you observed in the schoolroom tending to

break up attention?

5. Have you seen pupils inattentive from lack of (1) change, (2) pure

air, (3) enthusiasm on the part of the teacher, (4) fatigue, (5) ill

health?

6. Have you noticed a difference in the \_habit\_ of attention in

different pupils? Have you noticed the same thing for whole schools or

rooms?

7. Do you know of children too much given to daydreaming? Are you?

8. Have you seen a teacher rap the desk for attention? What type of

attention was secured? Does it pay?

9. Have you observed any instance in which pupils' lack of attention

should be blamed on the teacher? If so, what was the fault? The remedy?

10. Visit a school room or a recitation, and then write an account of

the types and degrees of attention you observed. Try to explain the

factors responsible for any failures in attention, and also those

responsible for the good attention shown.

CHAPTER III

THE BRAIN AND NERVOUS SYSTEM

A fine brain, or a good mind. These terms are often used

interchangeably, as if they stood for the same thing. Yet the brain is

material substance--so many cells and fibers, a pulpy protoplasmic mass

weighing some three pounds and shut away from the outside world in a

casket of bone. The mind is a spiritual thing--the sum of the processes

by which we think and feel and will, mastering our world and

accomplishing our destiny.

1. THE RELATIONS OF MIND AND BRAIN

INTERACTION OF MIND AND BRAIN.--How, then, come these two widely

different facts, mind and brain, to be so related in our speech? Why are

the terms so commonly interchanged?--It is because mind and brain are so

vitally related in their processes and so inseparably connected in their

work. No movement of our thought, no bit of sensation, no memory, no

feeling, no act of decision but is accompanied by its own particular

activity in the cells of the brain. It is this that the psychologist has

in mind when he says, \_no psychosis without its corresponding neurosis\_.

So far as our present existence is concerned, then, no mind ever works

except through some brain, and a brain without a mind becomes but a mass

of dead matter, so much clay. Mind and brain are perfectly adapted to

each other. Nor is this mere accident. For through the ages of man's

past history each has grown up and developed into its present state of

efficiency by working in conjunction with the other. Each has helped

form the other and determine its qualities. Not only is this true for

the race in its evolution, but for every individual as he passes from

infancy to maturity.

THE BRAIN AS THE MIND'S MACHINE.--In the first chapter we saw that the

brain does not create the mind, but that the mind works through the

brain. No one can believe that the brain secretes mind as the liver

secretes bile, or that it grinds it out as a mill does flour. Indeed,

just what their exact relation is has not yet been settled. Yet it is

easy to see that if the mind must use the brain as a machine and work

through it, then the mind must be subject to the limitations of its

machine, or, in other words, the mind cannot be better than the brain

through which it operates. A brain and nervous system that are poorly

developed or insufficiently nourished mean low grade of efficiency in

our mental processes, just as a poorly constructed or wrongly adjusted

motor means loss of power in applying the electric current to its work.

We will, then, look upon the mind and the brain as counterparts of each

other, each performing activities which correspond to activities in the

other, both inextricably bound together at least so far as this life is

concerned, and each getting its significance by its union with the

other. This view will lend interest to a brief study of the brain and

nervous system.

2. THE MIND'S DEPENDENCE ON THE EXTERNAL WORLD

But can we first see how in a general way the brain and nervous system

are primarily related to our thinking? Let us go back to the beginning

and consider the babe when it first opens its eyes on the scenes of its

new existence. What is in its mind? What does it think about? Nothing.

Imagine, if you can, a person born blind and deaf, and without the sense

of touch, taste, or smell. Let such a person live on for a year, for

five years, for a lifetime. What would he know? What ray of intelligence

would enter his mind? What would he think about? All would be dark to

his eyes, all silent to his ears, all tasteless to his mouth, all

odorless to his nostrils, all touchless to his skin. His mind would be a

blank. He would have no mind. He could not get started to think. He

could not get started to act. He would belong to a lower scale of life

than the tiny animal that floats with the waves and the tide in the

ocean without power to direct its own course. He would be but an inert

mass of flesh without sense or intelligence.

THE MIND AT BIRTH.--Yet this is the condition of the babe at birth. It

is born practically blind and deaf, without definite sense of taste or

smell. Born without anything to think about, and no way to get anything

to think about until the senses wake up and furnish some material from

the outside world. Born with all the mechanism of muscle and nerve ready

to perform the countless complex movements of arms and legs and body

which characterize every child, he could not successfully start these

activities without a message from the senses to set them going. At birth

the child probably has only the senses of contact and temperature

present with any degree of clearness; taste soon follows; vision of an

imperfect sort in a few days; hearing about the same time, and smell a

little later. The senses are waking up and beginning their acquaintance

with the outside world.

[Illustration: FIG. 5.--A NEURONE FROM A HUMAN SPINAL CORD. The central

portion represents the cell body. N, the nucleus; P, a pigmented or

colored spot; D, a dendrite, or relatively short fiber,--which branches

freely; A, an axon or long fiber, which branches but little.]

THE WORK OF THE SENSES.--And what a problem the senses have to solve! On

the one hand the great universe of sights and sounds, of tastes and

smells, of contacts and temperatures, and whatever else may belong to

the material world in which we live; and on the other hand the little

shapeless mass of gray and white pulpy matter called the brain,

incapable of sustaining its own shape, shut away in the darkness of a

bony case with no possibility of contact with the outside world, and

possessing no means of communicating with it except through the senses.

And yet this universe of external things must be brought into

communication with the seemingly insignificant but really wonderful

brain, else the mind could never be. Here we discover, then, the two

great factors which first require our study if we would understand the

growth of the mind--\_the material world without, and the brain within\_.

For it is the action and interaction of these which lie at the bottom of

the mind's development. Let us first look a little more closely at the

brain and the accompanying nervous system.

3. STRUCTURAL ELEMENTS OF THE NERVOUS SYSTEM

It will help in understanding both the structure and the working of the

nervous system to keep in mind that it contains \_but one fundamental

unit of structure\_. This is the neurone. Just as the house is built up

by adding brick upon brick, so brain, cord, nerves and organs of sense

are formed by the union of numberless neurones.

[Illustration: FIG. 6.--Neurones in different stages of development,

from \_a\_ to \_e\_. In \_a\_, the elementary cell body alone is present; in

\_c\_, a dendrite is shown projecting upward and an axon downward.--After

DONALDSON.]

THE NEURONE.--What, then, is a neurone? What is its structure, its

function, how does it act? A neurone is \_a protoplasmic cell, with its

outgrowing fibers\_. The cell part of the neurone is of a variety of

shapes, triangular, pyramidal, cylindrical, and irregular. The cells

vary in size from 1/250 to 1/3500 of an inch in diameter. In general the

function of the cell is thought to be to generate the nervous energy

responsible for our consciousness--sensation, memory, reasoning, feeling

and all the rest, and for our movements. The cell also provides for the

nutrition of the fibers.

[Illustration: FIG. 7.--Longitudinal (a) and Transverse (b) section of

nerve fiber. The heavy border represents the medullary, or enveloping

sheath, which becomes thicker in the larger fibers.--After DONALDSON.]

NEURONE FIBERS.--The neurone fibers are of two kinds, \_dendrites\_ and

\_axons\_. The dendrites are comparatively large in diameter, branch

freely, like the branches of a tree, and extend but a relatively short

distance from the parent cell. Axons are slender, and branch but little,

and then approximately at right angles. They reach a much greater

distance from the cell body than the dendrites. Neurones vary greatly in

length. Some of those found in the spinal cord and brain are not more

than 1/12 of an inch long, while others which reach from the extremities

to the cord, measure several feet. Both dendrites and axons are of

diameter so small as to be invisible except under the microscope.

NEUROGLIA.--Out of this simple structural element, the neurone, the

entire nervous system is built. True, the neurones are held in place,

and perhaps insulated, by a kind of soft cement called \_neuroglia\_. But

this seems to possess no strictly nervous function. The number of the

microscopic neurones required to make up the mass of the brain, cord and

peripheral nervous system is far beyond our mental grasp. It is computed

that the brain and cord contain some 3,000 millions of them.

COMPLEXITY OF THE BRAIN.--Something of the complexity of the brain

structure can best be understood by an illustration. Professor Stratton

estimates that if we were to make a model of the human brain, using for

the neurone fibers wires so small as to be barely visible to the eye, in

order to find room for all the wires the model would need to be the size

of a city block on the base and correspondingly high. Imagine a

telephone system of this complexity operating from one switch-board!

"GRAY" AND "WHITE" MATTER.--The "gray matter" of the brain and cord is

made up of nerve cells and their dendrites, and the terminations of

axons, which enter from the adjoining white matter. A part of the mass

of gray matter also consists of the neuroglia which surrounds the nerve

cells and fibers, and a network of blood vessels. The "white matter" of

the central system consists chiefly of axons with their enveloping or

medullary, sheath and neuroglia. The white matter contains no nerve

cells or dendrites. The difference in color of the gray and the white

matter is caused chiefly by the fact that in the gray masses the

medullary sheath, which is white, is lacking, thus revealing the ashen

gray of the nerve threads. In the white masses the medullary sheath is

present.

4. GROSS STRUCTURE OF THE NERVOUS SYSTEM

DIVISIONS OF THE NERVOUS SYSTEM.--The nervous system may be considered

in two divisions: (1) The \_central\_ system, which consists of the brain

and spinal cord, and (2) the \_peripheral\_ system, which comprises the

sensory and motor neurones connecting the periphery and the internal

organs with the central system and the specialized end-organs of the

senses. The \_sympathetic\_ system, which is found as a double chain of

nerve connections joining the roots of sensory and motor nerves just

outside the spinal column, does not seem to be directly related to

consciousness and so will not be discussed here. A brief description of

the nervous system will help us better to understand how its parts all

work together in so wonderful a way to accomplish their great result.

THE CENTRAL SYSTEM.--In the brain we easily distinguish three major

divisions--the \_cerebrum\_, the \_cerebellum\_ and the \_medulla oblongata\_.

The medulla is but the enlarged upper part of the cord where it connects

with the brain. It is about an inch and a quarter long, and is composed

of both medullated and unmedullated fibers--that is of both "white" and

"gray" matter. In the medulla, the unmedullated neurones which comprise

the center of the cord are passing to the outside, and the medullated to

the inside, thus taking the positions they occupy in the cerebrum. Here

also the neurones are crossing, or changing sides, so that those which

pass up the right side of the cord finally connect with the left side of

the brain, and vice versa.

THE CEREBELLUM.--Lying just back of the medulla and at the rear part of

the base of the cerebrum is the cerebellum, or "little brain,"

approximately as large as the fist, and composed of a complex

arrangement of white and gray matter. Fibers from the spinal cord enter

this mass, and others emerge and pass on into the cerebrum, while its

two halves also are connected with each other by means of cross fibers.

[Illustration: FIG. 8.--View of the under side of the brain. B, basis of

the crura; P, pons; Mo, medulla oblongata; Ce, cerebellum; Sc, spinal

cord.]

THE CEREBRUM.--The cerebrum occupies all the upper part of the skull

from the front to the rear. It is divided symmetrically into two

hemispheres, the right and the left. These hemispheres are connected

with each other by a small bridge of fibers called the \_corpus

callosum\_. Each hemisphere is furrowed and ridged with convolutions, an

arrangement which allows greater surface for the distribution of the

gray cellular matter over it. Besides these irregularities of surface,

each hemisphere is marked also by two deep clefts or \_fissures\_--the

fissure of Rolando, extending from the middle upper part of the

hemisphere downward and forward, passing a little in front of the ear

and stopping on a level with the upper part of it; and the fissure of

Sylvius, beginning at the base of the brain somewhat in front of the

ear and extending upward and backward at an acute angle with the base

of the hemisphere.

[Illustration: FIG. 9.--Diagrammatic side view of brain, showing

cerebellum (CB) and medulla oblongata (MO). F' F'' F''' are placed on

the first, second, and third frontal convolutions, respectively; AF, on

the ascending frontal; AP, on the ascending parietal; M, on the

marginal; A, on the angular. T' T'' T''' are placed on the first,

second, and third temporal convolutions. R-R marks the fissure of

Rolando; S-S, the fissure of Sylvius; PO, the parieto-occipital

fissure.]

The surface of each hemisphere may be thought of as mapped out into four

lobes: The frontal lobe, which includes the front part of the hemisphere

and extends back to the fissure of Rolando and down to the fissure of

Sylvius; the parietal lobe, which lies back of the fissure of Rolando

and above that of Sylvius and extends back to the occipital lobe; the

occipital lobe, which includes the extreme rear portion of the

hemisphere; and the temporal lobe, which lies below the fissure of

Sylvius and extends back to the occipital lobe.

THE CORTEX.--The gray matter of the hemispheres, unlike that of the

cord, lies on the surface. This gray exterior portion of the cerebrum is

called the \_cortex\_, and varies from one-twelfth to one-eighth of an

inch in thickness. The cortex is the seat of all consciousness and of

the control of voluntary movement.

[Illustration: FIG. 10.--Different aspects of sections of the spinal

cord and of the roots of the spinal nerves from the cervical region: 1,

different views of anterior median fissure; 2, posterior fissure; 3,

anterior lateral depression for anterior roots; 4, posterior lateral

depression for posterior roots; 5 and 6, anterior and posterior roots,

respectively; 7, complete spinal nerve, formed by the union of the

anterior and posterior roots.]

THE SPINAL CORD.--The spinal cord proceeds from the base of the brain

downward about eighteen inches through a canal provided for it in the

vertebræ of the spinal column. It is composed of white matter on the

outside, and gray matter within. A deep fissure on the anterior side and

another on the posterior cleave the cord nearly in twain, resembling the

brain in this particular. The gray matter on the interior is in the form

of two crescents connected by a narrow bar.

The \_peripheral\_ nervous system consists of thirty-one pairs of

\_nerves\_, with their end-organs, branching off from the cord, and twelve

pairs that have their roots in the brain. Branches of these forty-three

pairs of nerves reach to every part of the periphery of the body and to

all the internal organs.

[Illustration: FIG. 11.--The projection fibers of the brain. I-IX, the

first nine pairs of cranial nerves.]

It will help in understanding the peripheral system to remember that a

\_nerve\_ consists of a bundle of neurone fibers each wrapped in its

medullary sheath and sheath of Schwann. Around this bundle of neurones,

that is around the nerve, is still another wrapping, silvery-white,

called the neurilemma. The number of fibers going to make up a nerve

varies from about 5,000 to 100,000. Nerves can easily be identified in a

piece of lean beef, or even at the edge of a serious gash in one's own

flesh!

Bundles of sensory fibers constituting a sensory nerve root enter the

spinal cord on the posterior side through holes in the vertebræ. Similar

bundles of motor fibers in the form of a motor nerve root emerge from

the cord at the same level. Soon after their emergence from the cord,

these two nerves are wrapped together in the same sheath and proceed in

this way to the periphery of the body, where the sensory nerve usually

ends in a specialized \_end-organ\_ fitted to respond to some certain

stimulus from the outside world. The motor nerve ends in minute

filaments in the muscular organ which it governs. Both sensory and motor

nerves connect with fibers of like kind in the cord and these in turn

with the cortex, thus giving every part of the periphery direct

connection with the cortex.

[Illustration: FIG. 12.--Schematic diagram showing association fibers

connecting cortical centers with each other.--After JAMES and STARR.]

The \_end-organs\_ of the sensory nerves are nerve masses, some of them,

as the taste buds of the tongue, relatively simple; and others, as the

eye or ear, very complex. They are all alike in one particular; namely,

that each is fitted for its own particular work and can do no other.

Thus the eye is the end-organ of sight, and is a wonderfully complex

arrangement of nerve structure combined with refracting media, and

arranged to respond to the rapid ether waves of light. The ear has for

its essential part the specialized endings of the auditory nerve, and is

fitted to respond to the waves carried to it in the air, giving the

sensation of sound. The end-organs of touch, found in greatest

perfection in the finger tips, are of several kinds, all very

complicated in structure. And so on with each of the senses. Each

particular sense has some form of end-organ specially adapted to respond

to the kind of stimulus upon which its sensation depends, and each is

insensible to the stimuli of the others, much as the receiver of a

telephone will respond to the tones of our voice, but not to the touch

of our fingers as will the telegraph instrument, and \_vice versa\_. Thus

the eye is not affected by sounds, nor touch by light. Yet by means of

all the senses together we are able to come in contact with the material

world in a variety of ways.

5. LOCALIZATION OF FUNCTION IN THE NERVOUS SYSTEM

DIVISION OF LABOR.--Division of labor is the law in the organic world as

in the industrial. Animals of the lowest type, such as the amoeba, do

not have separate organs for respiration, digestion, assimilation,

elimination, etc., the one tissue performing all of these functions. But

in the higher forms each organ not only has its own specific work, but

even within the same organ each part has its own particular function

assigned. Thus we have seen that the two parts of the neurone probably

perform different functions, the cells generating energy and the fibers

transmitting it.

It will not seem strange, then, that there is also a division of labor

in the cellular matter itself in the nervous system. For example, the

little masses of ganglia which are distributed at intervals along the

nerves are probably for the purpose of reënforcing the nerve current,

much as the battery cells in the local telegraph office reënforce the

current from the central office. The cellular matter in the spinal cord

and lower parts of the brain has a very important work to perform in

receiving messages from the senses and responding to them in directing

the simpler reflex acts and movements which we learn to execute without

our consciousness being called upon, thus leaving the mind free from

these petty things to busy itself in higher ways. The cellular matter of

the cortex performs the highest functions of all, for through its

activity we have consciousness.

[Illustration: FIG. 13.--Side view of left hemisphere of human brain,

showing the principal localized areas.]

The gray matter of the cerebellum, the medulla, and the cord may receive

impressions from the senses and respond to them with movements, but

their response is in all cases wholly automatic and unconscious. A

person whose hemispheres had been injured in such a way as to interfere

with the activity of the cortex might still continue to perform most if

not all of the habitual movements of his life, but they would be

mechanical and not intelligent. He would lack all higher consciousness.

It is through the activity of this thin covering of cellular matter of

the cerebrum, the \_cortex\_, that our minds operate; here are received

stimuli from the different senses, and here sensations are experienced.

Here all our movements which are consciously directed have their origin.

And here all our thinking, feeling, and willing are done.

DIVISION OF LABOR IN THE CORTEX.--Nor does the division of labor in the

nervous system end with this assignment of work. The cortex itself

probably works essentially as a unit, yet it is through a shifting of

tensions from one area to another that it acts, now giving us a

sensation, now directing a movement, and now thinking a thought or

feeling an emotion. Localization of function is the rule here also.

Certain areas of the cortex are devoted chiefly to sensations, others to

motor impulses, and others to higher thought activities, yet in such a

way that all work together in perfect harmony, each reënforcing the

other and making its work significant. Thus the front portion of the

cortex seems to be devoted to the higher thought activities; the region

on both sides of the fissure of Rolando, to motor activities; and the

rear and lower parts to sensory activities; and all are bound together

and made to work together by the association fibers of the brain.

In the case of the higher thought activities, it is not probable that

one section of the frontal lobes of the cortex is set apart for

thinking, one for feeling, and one for willing, etc., but rather that

the whole frontal part of the cortex is concerned in each. In the motor

and sensory areas, however, the case is different; for here a still

further division of labor occurs. For example, in the motor region one

small area seems connected with movements of the head, one with the arm,

one with the leg, one with the face, and another with the organs of

speech; likewise in the sensory region, one area is devoted to vision,

one to hearing, one to taste and smell, and one to touch, etc. We must

bear in mind, however, that these regions are not mapped out as

accurately as are the boundaries of our states--that no part of the

brain is restricted wholly to either sensory or motor nerves, and that

no part works by itself independently of the rest of the brain. We name

a tract from the predominance of nerves which end there, or from the

chief functions which the area performs. The motor localization seems to

be the most perfect. Indeed, experimentation on the brains of monkeys

has been successful in mapping out motor areas so accurately that such

small centers as those connected with the bending of one particular leg

or the flexing of a thumb have been located. Yet each area of the cortex

is so connected with every other area by the millions of association

fibers that the whole brain is capable of working together as a unit,

thus unifying and harmonizing our thoughts, emotions, and acts.

6. FORMS OF SENSORY STIMULI

Let us next inquire how this mechanism of the nervous system is acted

upon in such a way as to give us sensations. In order to understand

this, we must first know that all forms of matter are composed of minute

atoms which are in constant motion, and by imparting this motion to the

air or the ether which surrounds them, are constantly radiating energy

in the form of minute waves throughout space. These waves, or

radiations, are incredibly rapid in some instances and rather slow in

others. In sending out its energy in the form of these waves, the

physical world is doing its part to permit us to form its acquaintance.

The end-organs of the sensory nerves must meet this advance half-way,

and be so constructed as to be affected by the different forms of energy

which are constantly beating upon them.

[Illustration: FIG. 14.--The prism's analysis of a bundle of light rays.

On the right are shown the relation of vibration rates to temperature

stimuli, to light and to chemical stimuli. The rates are given in

billions per second.--After WITMER.]

THE END-ORGANS AND THEIR RESPONSE TO STIMULI.--Thus the radiations of

ether from the sun, our chief source of light, are so rapid that

billions of them enter the eye in a second of time, and the retina is of

such a nature that its nerve cells are thrown into activity by these

waves; the impulse is carried over the optic nerve to the occipital lobe

of the cortex, and the sensation of sight is the result. The different

colors also, from the red of the spectrum to the violet, are the result

of different vibration rates in the waves of ether which strike the

retina; and in order to perceive color, the retina must be able to

respond to the particular vibration rate which represents each color.

Likewise in the sense of touch the end-organs are fitted to respond to

very rapid vibrations, and it is possible that the different qualities

of touch are produced by different vibration rates in the atoms of the

object we are touching. When we reach the ear, we have the organ which

responds to the lowest vibration rate of all, for we can detect a sound

made by an object which is vibrating from twenty to thirty times a

second. The highest vibration rate which will affect the ear is some

forty thousand per second.

Thus it is seen that there are great gaps in the different rates to

which our senses are fitted to respond--a sudden drop from billions in

the case of the eye to millions in touch, and to thousands or even tens

in hearing. This makes one wonder whether there are not many things in

nature which man has never discovered simply because he has not the

sense mechanism enabling him to become conscious of their existence.

There are undoubtedly "more things in heaven and earth than are dreamt

of in our philosophy."

DEPENDENCE OF THE MIND ON THE SENSES.--Only as the senses bring in the

material, has the mind anything with which to build. Thus have the

senses to act as messengers between the great outside world and the

brain; to be the servants who shall stand at the doorways of the

body--the eyes, the ears, the finger tips--each ready to receive its

particular kind of impulse from nature and send it along the right path

to the part of the cortex where it belongs, so that the mind can say, "A

sight," "A sound," or "A touch." Thus does the mind come to know the

universe of the senses. Thus does it get the material out of which

memory, imagination, and thought begin. Thus and only thus does the mind

secure the crude material from which the finished superstructure is

finally built.

CHAPTER IV

MENTAL DEVELOPMENT AND MOTOR TRAINING

Education was long looked upon as affecting the mind only; the body was

either left out of account or neglected. Later science has shown,

however, that the mind cannot be trained \_except as the nervous system

is trained and developed\_. For not sensation and the simpler mental

processes alone, but memory, imagination, judgment, reasoning and every

other act of the mind are dependent on the nervous system finally for

their efficiency. The little child gets its first mental experiences in

connection with certain movements or acts set up reflexly by the

pre-organized nervous system. From this time on movement and idea are so

inextricably bound together that they cannot be separated. The mind and

the brain are so vitally related that it is impossible to educate one

without performing a like office for the other; and it is likewise

impossible to neglect the one without causing the other to suffer in its

development.

1. FACTORS DETERMINING THE EFFICIENCY OF THE NERVOUS SYSTEM

DEVELOPMENT AND NUTRITION.--Ignoring the native differences in nervous

systems through the influence of heredity, the efficiency of a nervous

system is largely dependent on two factors: (1) The development of the

cells and fibers of which it is composed, and (2) its general tone of

health and vigor. The actual number of cells in the nervous system

increases but little if at all after birth. Indeed, it is doubtful

whether Edison's brain and nervous system has a greater number of cells

in it than yours or mine. The difference between the brain of a genius

and that of an ordinary man is not in the \_number\_ of cells which it

contains, but rather in the development of the cells and fibers which

are present, potentially, at least, in every nervous system. The

histologist tells us that in the nervous system of every child there are

tens of thousands of cells which are so immature and undeveloped that

they are useless; indeed, this is the case to some degree in every adult

person's nervous system as well. Thus each individual has inherent in

his nervous system potentialities of which he has never taken advantage,

the utilizing of which may make him a genius and the neglecting of which

will certainly leave him on the plane of mediocrity. The first problem

in education, then, is to take the unripe and inefficient nervous system

and so develop it in connection with the growing mind that the

possibilities which nature has stored in it shall become actualities.

UNDEVELOPED CELLS.--Professor Donaldson tells us on this point that: "At

birth, and for a long time after, many [nervous] systems contain cell

elements which are more or less immature, not forming a functional part

of the tissue, and yet under some conditions capable of further

development.... For the cells which are continually appearing in the

developing cortex no other source is known than the nuclei or granules

found there in its earliest stages. These elements are metamorphosed

neuroblasts--that is, elementary cells out of which the nervous matter

is developed--which have shrunken to a volume less than that which they

had at first, and which remain small until, in the subsequent process of

enlargement necessary for their full development, they expand into

well-marked cells. Elements intermediate between these granules and the

fully developed cells are always found, even in mature brains, and

therefore it is inferred that the latter are derived from the former.

The appearances there also lead to the conclusion that many elements

which might possibly develop in any given case are far beyond the number

that actually does so.... The possible number of cells latent and

functional in the central system is early fixed. At any age this number

is accordingly represented by the granules as well as by the cells which

have already undergone further development. During growth the proportion

of developed cells increases, and sometimes, owing to the failure to

recognize potential nerve cells in the granules, the impression is

carried away that this increase implies the formation of new elements.

As has been shown, such is not the case."[1]

DEVELOPMENT OF NERVE FIBERS.--The nerve \_fibers\_, no less than the

cells, must go through a process of development. It has already been

shown that the fibers are the result of a branching of cells. At birth

many of the cells have not yet thrown out branches, and hence the fibers

are lacking; while many of those which are already grown out are not

sufficiently developed to transmit impulses accurately. Thus it has been

found that most children at birth are able to support the weight of the

body for several seconds by clasping the fingers around a small rod, but

it takes about a year for the child to become able to stand. It is

evident that it requires more actual strength to cling to a rod than to

stand; hence the conclusion is that the difference is in the earlier

development of the nerve centers which have to do with clasping than of

those concerned in standing. Likewise the child's first attempts to feed

himself or do any one of the thousand little things about which he is so

awkward, are partial failures not so much because he has not had

practice as because his nervous machinery connected with those movements

is not yet developed sufficiently to enable him to be accurate. His

brain is in a condition which Flechsig calls "unripe." How, then, shall

the undeveloped cells and system ripen? How shall the undeveloped cells

and fibers grow to full maturity and efficiency?

2. DEVELOPMENT OF NERVOUS SYSTEM THROUGH USE

IMPORTANCE OF STIMULUS AND RESPONSE.--Like all other tissues of the

body, the nerve cells and fibers are developed by judicious use. The

sensory and association centers require the constant stimulus of nerve

currents running in from the various end-organs, and the motor centers

require the constant stimulus of currents running from them out to the

muscles. In other words, the conditions upon which both motor and

sensory development depend are: (1) A rich environment of sights and

sounds and tastes and smells, and everything else which serves as proper

stimulus to the sense organs, and to every form of intellectual and

social interest; and (2) no less important, an opportunity for the

freest and most complete forms of response and motor activity.

[Illustration: FIG. 15.--Schematic transverse section of the human brain

showing the projection of the motor fibers, their crossing in the

neighborhood of the medulla, and their termination in the different

areas of localized function in the cortex. S, fissure of Sylvius; M, the

medulla; VII, the roots of the facial nerves.]

An illustration of the effects of the lack of sensory stimuli on the

cortex is well shown in the case of Laura Bridgman, whose brain was

studied by Professor Donaldson after her death. Laura Bridgman was born

a normal child, and developed as other children do up to the age of

nearly three years. At this time, through an attack of scarlet fever,

she lost her hearing completely and also the sight of her left eye. Her

right eye was so badly affected that she could see but little; and it,

too, became entirely blind when she was eight. She lived in this

condition until she was sixty years old, when she died. Professor

Donaldson submitted the cortex of her brain to a most careful

examination, also comparing the corresponding areas on the two

hemispheres with each other. He found that as a whole the cortex was

thinner than in the case of normal individuals. He found also that the

cortical area connected with the left eye--namely, the right occipital

region--was much thinner than that for the right eye, which had retained

its sight longer than the other. He says: "It is interesting to notice

that those parts of the cortex which, according to the current view,

were associated with the defective sense organs were also particularly

thin. The cause of this thinness was found to be due, at least in part,

to the small size of the nerve cells there present. Not only were the

large and medium-sized cells smaller, but the impression made on the

observer was that they were also less numerous than in the normal

cortex."

EFFECT OF SENSORY STIMULI.--No doubt if we could examine the brain of a

person who has grown up in an environment rich in stimuli to the eye,

where nature, earth, and sky have presented a changing panorama of color

and form to attract the eye; where all the sounds of nature, from the

chirp of the insect to the roar of the waves and the murmur of the

breeze, and from the softest tones of the voice to the mightiest sweep

of the great orchestra, have challenged the ear; where many and varied

odors and perfumes have assailed the nostrils; where a great range of

tastes have tempted the palate; where many varieties of touch and

temperature sensations have been experienced--no doubt if we could

examine such a brain we should find the sensory areas of the cortex

excelling in thickness because its cells were well developed and full

sized from the currents which had been pouring into them from the

outside world. On the other hand, if we could examine a cortex which had

lacked any one of these stimuli, we should find some area in it

undeveloped because of this deficiency. Its owner therefore possesses

but the fraction of a brain, and would in a corresponding degree find

his mind incomplete.

NECESSITY FOR MOTOR ACTIVITY.--Likewise in the case of the motor areas.

Pity the boy or girl who has been deprived of the opportunity to use

every muscle to the fullest extent in the unrestricted plays and games

of childhood. For where such activities are not wide in their scope,

there some areas of the cortex will remain undeveloped, because unused,

and the person will be handicapped later in his life from lack of skill

in the activities depending on these centers. Halleck says in this

connection: "If we could examine the developing motor region with a

microscope of sufficient magnifying power, it is conceivable that we

might learn wherein the modification due to exercise consists. We might

also, under such conditions, be able to say, 'This is the motor region

of a piano player; the modifications here correspond precisely to those

necessary for controlling such movements of the hand.' Or, 'This is the

motor tract of a blacksmith; this, of an engraver; and these must be the

cells which govern the vocal organs of an orator.'" Whether or not the

microscope will ever reveal such things to us, there is no doubt that

the conditions suggested exist, and that back of every inefficient and

awkward attempt at physical control lies a motor area with its cells

undeveloped by use. No wonder that our processes of learning physical

adjustment and control are slow, for they are a growth in the brain

rather than a simple "learning how."

The training of the nervous system consists finally, then, in the

development and coördination of the neurones of which it is composed. We

have seen that the sensory cells are to be developed by the sensory

stimuli pouring in upon them, and the motor cells by the motor impulses

which they send out to the muscles. The sensory and the motor fibers

likewise, being an outgrowth of their respective cells, find their

development in carrying the impulses which result in sensation and

movement. Thus it is seen that the neurone is, in its development as in

its work, a unit.

DEVELOPMENT OF THE ASSOCIATION CENTERS.--To this simpler type of sensory

and motor development which we have been considering, we must add that

which comes from the more complex mental processes, such as memory,

thought, and imagination. For it is in connection with these that the

association fibers are developed, and the brain areas so connected that

they can work together as a unit. A simple illustration will enable us

to see more clearly how the nervous mechanism acts to bring this about.

Suppose that I am walking along a country road deeply engaged in

meditation, and that I come to a puddle of water in my pathway. I may

turn aside and avoid the obstruction without my attention being called

to it, and without interruption of my train of thought. The act has been

automatic. In this case the nerve current has passed from the eye (\_S\_)

over an afferent fiber to a sensory center (\_s\_) in the nervous system

below the cortex; from there it has been forwarded to a motor center

(\_m\_) in the same region, and on out over a motor fiber to the proper

muscles (\_M\_), which are to execute the required act. The act having

been completed, the sensory nerves connected with the muscles employed

report the fact back that the work is done, thus completing the circuit.

This event may be taken as an illustration of literally thousands of

acts which we perform daily without the intervention of consciousness,

and hence without involving the hemispheres.

[Illustration: FIG. 16.--Diagram illustrating the paths of association.]

If, however, instead of avoiding the puddle unconsciously, I do so from

consideration of the danger of wet feet and the disagreeableness of

soiled shoes and the ridiculous appearance I shall make, then the

current cannot take the short circuit, but must pass on up to the

cortex. Here it awakens consciousness to take notice of the obstruction,

and calls forth the images which aid in directing the necessary

movements. This simple illustration may be greatly complicated,

substituting for it one of the more complex problems which are

continually presenting themselves to us for solution, or the associated

trains of thought that are constantly occupying our minds. But the truth

of the illustration still holds. Whether in the simple or the complex

act, there is always a forward passing of the nerve current through the

sensory and thought centers, and on out through the motor centers to the

organs which are to be concerned in the motor response.

THE FACTORS INVOLVED IN A SIMPLE ACTION.--Thus it will be seen that in

the simplest act which can be considered there are the following

factors: (1) The stimulus which acts on the end-organ; (2) the ingoing

current over an afferent nerve; (3) the sensory or interpreting cells;

(4) the fibers connecting the sensory with a motor center; (5) the motor

cells; (6) the efferent nerve to carry the direction for the movement

outward to the muscle; (7) the motor response; and, finally, (8) the

report back that the act has been performed. With this in mind it fairly

bewilders one to think of the marvelous complexity of the work that is

going on in our nervous mechanism every moment of our life, even without

considering the higher thought processes at all. How, with these added,

the resulting complexity all works out into beautiful harmony is indeed

beyond comprehension.

3. EDUCATION AND THE TRAINING OF THE NERVOUS SYSTEM

Fortunately, many of the best opportunities for sensory and motor

training do not depend on schools or courses of study. The world is full

of stimuli to our senses and to our social natures; and our common lives

are made up of the responses we make to these stimuli,--the movements,

acts and deeds by which we fit ourselves into our world of environment.

Undoubtedly the most rapid and vital progress we make in our development

is accomplished in the years before we have reached the age to go to

school. Yet it is the business of education to see that we do not lack

any essential opportunity, to make sure that necessary lines of stimuli

or of motor training have not been omitted from our development.

EDUCATION TO SUPPLY OPPORTUNITIES FOR STIMULUS AND RESPONSE.--The great

problem of education is, on the physical side, it would seem, then, to

provide for ourselves and those we seek to educate as rich an

environment of sensory and social stimuli as possible; one whose

impressions will be full of suggestions to response in motor activity

and the higher thought processes; and then to give opportunity for

thought and for expression in acts and deeds in the largest possible

number of lines. And added to this must be frequent and clear sensory

and motor recall, a living over again of the sights and sounds and odors

and the motor activities we have once experienced. There must also be

the opportunity for the forming of worthy plans and ideals. For in this

way the brain centers which were concerned in the original sensation or

thought or movement are again brought into exercise, and their

development continued. Through recall and imagination we are able not

only greatly to multiply the effects of the immediate sensory and motor

stimuli which come to us, but also to improve our power of thinking by

getting a fund of material upon which the mind can draw.

ORDER OF DEVELOPMENT IN THE NERVOUS SYSTEM.--Nature has set the order in

which the powers of the nervous system shall develop. And we must follow

this order if we would obtain the best results. Stated in technical

terms, the order is \_from fundamental to accessory\_. This is to say that

the nerve centers controlling the larger and more general movements of

the body ripen first, and those governing the finer motor adjustments

later. For example, the larger body muscles of the child which are

concerned with sitting up come under control earlier than those

connected with walking. The arm muscles develop control earlier than the

finger muscles, and the head and neck muscles earlier than the eye

muscles. So also the more general and less highly specialized powers of

the mind ripen sooner than the more highly specialized. Perception and

observation precede powers of critical judgment and association. Memory

and imagination ripen earlier than reasoning and the logical ability.

This all means that our educational system must be planned to follow the

order of nature. Children of the primary grades should not be required

to write with fine pencils or pens which demand delicate finger

adjustments, since the brain centers for these finer coördinations are

not yet developed. Young children should not be set at work

necessitating difficult eye control, such as stitching through

perforated cardboard, reading fine print and the like, as their eyes

are not yet ready for such tasks. The more difficult analytical problems

of arithmetic and relations of grammar should not be required of pupils

at a time when the association areas of the brain are not yet ready for

this type of thinking. For such methods violate the law of nature, and

the child is sure to suffer the penalty.

4. IMPORTANCE OF HEALTH AND VIGOR OF THE NERVOUS SYSTEM

Parallel with opportunities for proper stimuli and response the nervous

system must possess good \_tonicity\_, or vigor. This depends in large

degree on general health and nutrition, with freedom from overfatigue.

No favorableness of environment nor excellence of training can result in

an efficient brain if the nerve energy has run low from depleted health,

want of proper nourishment, or exhaustion.

THE INFLUENCE OF FATIGUE.--Histologists find that the nuclei of nerve

cells are shrunk as much as fifty per cent by extreme fatigue.

Reasonable fatigue followed by proper recuperation is not harmful, but

even necessary if the best development is to be attained; but fatigue

without proper nourishment and rest is fatal to all mental operations,

and indeed finally to the nervous system itself, leaving it permanently

in a condition of low tone, and incapable of rallying to strong effort.

For rapid and complete recuperation the cells must have not only the

best of nourishment but opportunity for rest as well.

Extreme and long-continued fatigue is hostile to the development and

welfare of any nervous system, and especially to that of children. Not

only does overfatigue hinder growth, but it also results in the

formation of certain \_toxins\_, or poisons, in the organism, which are

particularly harmful to nervous tissue. It is these fatigue toxins that

account for many of the nervous and mental disorders which accompany

breakdowns from overwork. On the whole, the evil effects from mental

overstrain are more to be feared than from physical overstrain.

THE EFFECTS OF WORRY.--There is, perhaps, no greater foe to brain growth

and efficiency than the nervous and worn-out condition which comes from

loss of sleep or from worry. Experiments in the psychological

laboratories have shown that nerve cells shrivel up and lose their

vitality under loss of sleep. Let this go on for any considerable

length of time, and the loss is irreparable; for the cells can never

recuperate. This is especially true in the case of children or young

people. Many school boys and girls, indeed many college students, are

making slow progress in their studies not because they are mentally slow

or inefficient, not even chiefly because they lose time that should be

put on their lessons, but because they are incapacitating their brains

for good service through late hours and the consequent loss of sleep.

Add to this condition that of worry, which often accompanies it from the

fact of failure in lessons, and a naturally good and well-organized

nervous system is sure to fail. Worry, from whatever cause, should be

avoided as one would avoid poison, if we would bring ourselves to the

highest degree of efficiency. Not only does worry temporarily unfit the

mind for its best work, but its evil results are permanent, since the

mind is left with a poorly developed or undone nervous system through

which to work, even after the cause for worry has been removed and the

worry itself has ceased.

Not only should each individual seek to control the causes of worry in

his own life, but the home and the school should force upon childhood as

few causes for worry as may be. Children's worry over fears of the dark,

over sickness and death, over prospective but delayed punishment, over

the thousand and one real or imaginary troubles of childhood, should be

eliminated so far as possible. School examinations that prey on the

peace of mind, threats of failure of promotion, all nagging and sarcasm,

and whatever else may cause continued pain or worry to sensitive minds

should be barred from our schoolroom methods and practice. The price we

force the child to pay for results through their use is too great for

them to be tolerated. We must seek a better way.

THE FACTORS IN GOOD NUTRITION.--For the best nutrition there is

necessity first of all plenty of nourishing and healthful food. Science

and experience have both disproved the supposition that students should

be scantily fed. O'Shea claims that many brain workers are far short of

their highest grade of efficiency because of starving their brains from

poor diet. And not only must the food be of the right quality, but the

body must be in good health. Little good to eat the best of food unless

it is being properly digested and assimilated. And little good if all

the rest is as it should be, and the right amount of oxidation does not

go on in the brain so as to remove the worn-out cells and make place for

new ones. This warns us that pure air and a strong circulation are

indispensable to the best working of our brains. No doubt many students

who find their work too hard for them might locate the trouble in their

stomachs or their lungs or the food they eat, rather than in their

minds.

5. PROBLEMS FOR INTROSPECTION AND OBSERVATION

1. Estimate the mental progress made by the child during the first five

years and compare with that made during the second five years of its

life. To do this make a list, so far as you are able, of the

acquisitions of each period. What do you conclude as to the importance

of play and freedom in early education? Why not continue this method

instead of sending the child to school?

2. Which has the better opportunity for sensory training, the city child

or the country child? For social training? For motor development through

play? It is said by specialists that country children are not as good

players as city children. Why should this be the case?

3. Observe carefully some group of children for evidences of lack of

sensory training (Interest in sensory objects, skill in observation,

etc.). For lack of motor training (Failure in motor control,

awkwardness, lack of skill in play, etc.). Do you find that general

mental ability seems to be correlated with sensory and motor ability, or

not?

4. What sensory training can be had from (1) geography, (2) agriculture,

(3) arithmetic, (4) drawing? What lines of motor training ought the

school to afford, (1) in general, (2) for the hand, (3) in the grace and

poise of carriage or bearing, (4) in any other line? Make observation

tests of these points in one or more school rooms and report the

results.

5. Describe what you think must be the type of mental life of Helen

Keller. (Read "The World I Live In," by Helen Keller.)

6. Study groups of children for signs of deficiency in brain power from

lack of nutrition. From fatigue. From worry. From lack of sleep.

CHAPTER V

HABIT

Habit is our "best friend or worst enemy." We are "walking bundles of

habits." Habit is the "fly-wheel of society," keeping men patient and

docile in the hard or disagreeable lot which some must fill. Habit is a

"cable which we cannot break." So say the wise men. Let me know your

habits of life and you have revealed your moral standards and conduct.

Let me discover your intellectual habits, and I understand your type of

mind and methods of thought. In short, our lives are largely a daily

round of activities dictated by our habits in this line or that. Most of

our movements and acts are habitual; we think as we have formed the

habit of thinking; we decide as we are in the habit of deciding; we

sleep, or eat, or speak as we have grown into the habit of doing these

things; we may even say our prayers or perform other religious exercises

as matters of habit. But while habit is the veriest tyrant, yet its good

offices far exceed the bad even in the most fruitless or depraved life.

1. THE NATURE OF HABIT

Many people when they speak or think of habit give the term a very

narrow or limited meaning. They have in mind only certain moral or

personal tendencies usually spoken of as one's "habits." But in order to

understand habit in any thorough and complete way we must, as suggested

by the preceding paragraph, broaden our concept to include every

possible line of physical and mental activity. Habit may be defined as

\_the tendency of the nervous system to repeat any act that has been

performed once or many times\_.

THE PHYSICAL BASIS OF HABIT.--Habit is to be explained from the

standpoint of its physical basis. Habits are formed because the tissues

of our brains are capable of being modified by use, and of so retaining

the effects of this modification that the same act is easier of

performance each succeeding time. This results in the old act being

repeated instead of a new one being selected, and hence the old act is

perpetuated.

Even dead and inert matter obeys the same principles in this regard as

does living matter. Says M. Leon Dumont: "Everyone knows how a garment,

having been worn a certain time, clings to the shape of the body better

than when it was new; there has been a change in the tissue, and this

change is a new habit of cohesion; a lock works better after having been

used some time; at the outset more force was required to overcome

certain roughness in the mechanism. The overcoming of this resistance is

a phenomenon of habituation. It costs less trouble to fold a paper when

it has been folded already. This saving of trouble is due to the

essential nature of habit, which brings it about that, to reproduce the

effect, a less amount of the outward cause is required. The sounds of a

violin improve by use in the hands of an able artist, because the fibers

of the wood at last contract habits of vibration conformed to harmonic

relations. This is what gives such inestimable value to instruments that

have belonged to great masters. Water, in flowing, hollows out for

itself a channel, which grows broader and deeper; and, after having

ceased to flow, it resumes when it flows again the path traced for

itself before. Just so, the impressions of outer objects fashion for

themselves in the nervous system more and more appropriate paths, and

these vital phenomena recur under similar excitements from without, when

they have been interrupted for a certain time."[2]

ALL LIVING TISSUE PLASTIC.--What is true of inanimate matter is doubly

true of living tissue. The tissues of the human body can be molded into

almost any form you choose if taken in time. A child may be placed on

his feet at too early an age, and the bones of his legs form the habit

of remaining bent. The Flathead Indian binds a board on the skull of his

child, and its head forms the habit of remaining flat on the top. Wrong

bodily postures produce curvature of the spine, and pernicious modes of

dress deform the bones of the chest. The muscles may be trained into the

habit of keeping the shoulders straight or letting them droop; those of

the back, to keep the body well up on the hips, or to let it sag; those

of locomotion, to give us a light, springy step, or to allow a shuffling

carriage; those of speech, to give us a clear-cut, accurate

articulation, or a careless, halting one; and those of the face, to give

us a cheerful cast of countenance, or a glum and morose expression.

HABIT A MODIFICATION OF BRAIN TISSUE.--But the nervous tissue is the

most sensitive and easily molded of all bodily tissues. In fact, it is

probable that the real \_habit\_ of our characteristic walk, gesture, or

speech resides in the brain, rather than in the muscles which it

controls. So delicate is the organization of the brain structure and so

unstable its molecules, that even the perfume of the flower, which

assails the nose of a child, the song of a bird, which strikes his ear,

or the fleeting dream, which lingers but for a second in his sleep, has

so modified his brain that it will never again be as if these things had

not been experienced. Every sensory current which runs in from the

outside world; every motor current which runs out to command a muscle;

every thought that we think, has so modified the nerve structure through

which it acts, that a tendency remains for a like act to be repeated.

Our brain and nervous system is daily being molded into fixed habits of

acting by our thoughts and deeds, and thus becomes the automatic

register of all we do.

The old Chinese fairy story hits upon a fundamental and vital truth.

These celestials tell their children that each child is accompanied by

day and by night, every moment of his life, by an invisible fairy, who

is provided with a pencil and tablet. It is the duty of this fairy to

put down every deed of the child, both good and evil, in an indelible

record which will one day rise as a witness against him. So it is in

very truth with our brains. The wrong act may have been performed in

secret, no living being may ever know that we performed it, and a

merciful Providence may forgive it; but the inexorable monitor of our

deeds was all the time beside us writing the record, and the history of

that act is inscribed forever in the tissues of our brain. It may be

repented of bitterly in sackcloth and ashes and be discontinued, but its

effects can never be quite effaced; they will remain with us a handicap

till our dying day, and in some critical moment in a great emergency we

shall be in danger of defeat from that long past and forgotten act.

WE MUST FORM HABITS.--We \_must\_, then, form habits. It is not at all in

our power to say whether we will form habits or not; for, once started,

they go on forming themselves by day and night, steadily and

relentlessly. Habit is, therefore, one of the great factors to be

reckoned with in our lives, and the question becomes not, Shall we form

habits? but \_What habits we shall form.\_ And we have the determining of

this question largely in our own power, for habits do not just happen,

nor do they come to us ready made. We ourselves make them from day to

day through the acts we perform, and in so far as we have control over

our acts, in that far we can determine our habits.

2. THE PLACE OF HABIT IN THE ECONOMY OF OUR LIVES

Habit is one of nature's methods of economizing time and effort, while

at the same time securing greater skill and efficiency. This is easily

seen when it is remembered that habit tends towards \_automatic\_ action;

that is, towards action governed by the lower nerve centers and taking

care of itself, so to speak, without the interference of consciousness.

Everyone has observed how much easier in the performance and more

skillful in its execution is the act, be it playing a piano, painting a

picture, or driving a nail, when the movements involved have ceased to

be consciously directed and become automatic.

HABIT INCREASES SKILL AND EFFICIENCY.--Practically all increase in

skill, whether physical or mental, depends on our ability to form

habits. Habit holds fast to the skill already attained while practice or

intelligence makes ready for the next step in advance. Could we not form

habits we should improve but little in our way of doing things, no

matter how many times we did them over. We should now be obliged to go

through the same bungling process of dressing ourselves as when we

first learned it as children. Our writing would proceed as awkwardly in

the high school as the primary, our eating as adults would be as messy

and wide of the mark as when we were infants, and we should miss in a

thousand ways the motor skill that now seems so easy and natural. All

highly skilled occupations, and those demanding great manual dexterity,

likewise depend on our habit-forming power for the accurate and

automatic movements required.

So with mental skill. A great portion of the fundamentals of our

education must be made automatic--must become matters of habit. We set

out to learn the symbols of speech. We hear words and see them on the

printed page; associated with these words are meanings, or ideas. Habit

binds the word and the idea together, so that to think of the one is to

call up the other--and language is learned. We must learn numbers, so we

practice the "combinations," and with 4×6, or 3×8 we associate 24. Habit

secures this association in our minds, and lo! we soon know our

"tables." And so on throughout the whole range of our learning. We learn

certain symbols, or facts, or processes, and habit takes hold and

renders these automatic so that we can use them freely, easily, and with

skill, leaving our thought free for matters that cannot be made

automatic. One of our greatest dangers is that we shall not make

sufficiently automatic, enough of the necessary foundation material of

education. Failing in this, we shall at best be but blunderers

intellectually, handicapped because we failed to make proper use of

habit in our development.

For, as we have seen in an earlier chapter, there is a limit to our

mental energy and also to the number of objects to which we are able to

attend. It is only when attention has been freed from the many things

that can always be thought or done \_in the same way\_, that the mind can

devote itself to the real problems that require judgment, imagination or

reasoning. The writer whose spelling and punctuation do not take care of

themselves will hardly make a success of writing. The mathematician

whose number combinations, processes and formulæ are not automatic in

his mind can never hope to make progress in mathematical thinking. The

speaker who, while speaking, has to think of his gestures, his voice or

his enunciation will never sway audiences by his logic or his eloquence.

HABIT SAVES EFFORT AND FATIGUE.--We do most easily and with least

fatigue that which we are accustomed to do. It is the new act or the

strange task that tires us. The horse that is used to the farm wearies

if put on the road, while the roadster tires easily when hitched to the

plow. The experienced penman works all day at his desk without undue

fatigue, while the man more accustomed to the pick and the shovel than

to the pen, is exhausted by a half hour's writing at a letter. Those who

follow a sedentary and inactive occupation do not tire by much sitting,

while children or others used to freedom and action may find it a

wearisome task merely to remain still for an hour or two.

Not only would the skill and speed demanded by modern industry be

impossible without the aid of habit, but without its help none could

stand the fatigue and strain. The new workman placed at a high-speed

machine is ready to fall from weariness at the end of his first day. But

little by little he learns to omit the unnecessary movements, the

necessary movements become easier and more automatic through habit, and

he finds the work easier. We may conclude, then, that not only do

consciously directed movements show less skill than the same movements

made automatic by habit, but they also require more effort and produce

greater fatigue.

HABIT ECONOMIZES MORAL EFFORT.--To have to decide each time the question

comes up whether we will attend to this lecture or sermon or lesson;

whether we will persevere and go through this piece of disagreeable work

which we have begun; whether we will go to the trouble of being

courteous and kind to this or that poor or unlovely or dirty

fellow-mortal; whether we will take this road because it looks easy, or

that one because we know it to be the one we ought to take; whether we

will be strictly fair and honest when we might just as well be the

opposite; whether we will resist the temptation which dares us; whether

we will do this duty, hard though it is, which confronts us--to have to

decide each of these questions every time it presents itself is to put

too large a proportion of our thought and energy on things which should

take care of themselves. For all these things should early become so

nearly habitual that they can be settled with the very minimum of

expenditure of energy when they arise.

THE HABIT OF ATTENTION.--It is a noble thing to be able to attend by

sheer force of will when the interest lags, or some more attractive

thing appears, but far better is it so to have formed the habit of

attention that we naturally fall into that attitude when this is the

desirable thing. To understand what I mean, you only have to look over a

class or an audience and note the different ways which people have of

finally settling down to listening. Some with an attitude which says,

"Now here I am, ready to listen to you if you will interest me,

otherwise not." Others with a manner which says, "I did not really come

here expecting to listen, and you will have a large task if you

interest me; I never listen unless I am compelled to, and the

responsibility rests on you." Others plainly say, "I really mean to

listen, but I have hard work to control my thoughts, and if I wander I

shall not blame you altogether; it is just my way." And still others

say, "When I am expected to listen, I always listen whether there is

anything much to listen to or not. I have formed that habit, and so have

no quarrel with myself about it. You can depend on me to be attentive,

for I cannot afford to weaken my habit of attention whether you do well

or not." Every speaker will clasp these last listeners to his heart and

feed them on the choicest thoughts of his soul; they are the ones to

whom he speaks and to whom his address will appeal.

HABIT ENABLES US TO MEET THE DISAGREEABLE.--To be able to persevere in

the face of difficulties and hardships and carry through the

disagreeable thing in spite of the protests of our natures against the

sacrifice which it requires, is a creditable thing; but it is more

creditable to have so formed the habit of perseverance that the

disagreeable duty shall be done without a struggle, or protest, or

question. Horace Mann testifies of himself that whatever success he was

able to attain was made possible through the early habit which he formed

of never stopping to inquire whether he \_liked\_ to do a thing which

needed doing, but of doing everything equally well and without question,

both the pleasant and the unpleasant.

The youth who can fight out a moral battle and win against the

allurements of some attractive temptation is worthy the highest honor

and praise; but so long as he has to fight the same battle over and over

again, he is on dangerous ground morally. For good morals must finally

become habits, so ingrained in us that the right decision comes largely

without effort and without struggle. Otherwise the strain is too great,

and defeat will occasionally come; and defeat means weakness and at last

disaster, after the spirit has tired of the constant conflict. And so on

in a hundred lines. Good habits are more to be coveted than individual

victories in special cases, much as these are to be desired. For good

habits mean victories all along the line.

HABIT THE FOUNDATION OF PERSONALITY.--The biologist tells us that it is

the \_constant\_ and not the \_occasional\_ in the environment that

impresses itself on an organism. So also it is the \_habitual\_ in our

lives that builds itself into our character and personality. In a very

real sense we \_are\_ what we are in the habit of doing and thinking.

Without habit, personality could not exist; for we could never do a

thing twice alike, and hence would be a new person each succeeding

moment. The acts which give us our own peculiar individuality are our

habitual acts--the little things that do themselves moment by moment

without care or attention, and are the truest and best expression of our

real selves. Probably no one of us could be very sure which arm he puts

into the sleeve, or which foot he puts into the shoe, first; and yet

each of us certainly formed the habit long ago of doing these things in

a certain way. We might not be able to describe just how we hold knife

and fork and spoon, and yet each has his own characteristic and habitual

way of handling them. We sit down and get up in some characteristic way,

and the very poise of our heads and attitudes of our bodies are the

result of habit. We get sleepy and wake up, become hungry and thirsty at

certain hours, through force of habit. We form the habit of liking a

certain chair, or nook, or corner, or path, or desk, and then seek this

to the exclusion of all others. We habitually use a particular pitch of

voice and type of enunciation in speaking, and this becomes one of our

characteristic marks; or we form the habit of using barbarisms or

solecisms of language in youth, and these cling to us and become an

inseparable part of us later in life.

On the mental side the case is no different. Our thinking is as

characteristic as our physical acts. We may form the habit of thinking

things out logically, or of jumping to conclusions; of thinking

critically and independently, or of taking things unquestioningly on the

authority of others. We may form the habit of carefully reading good,

sensible books, or of skimming sentimental and trashy ones; of choosing

elevating, ennobling companions, or the opposite; of being a good

conversationalist and doing our part in a social group, or of being a

drag on the conversation, and needing to be "entertained." We may form

the habit of observing the things about us and enjoying the beautiful in

our environment, or of failing to observe or to enjoy. We may form the

habit of obeying the voice of conscience or of weakly yielding to

temptation without a struggle; of taking a reverent attitude of prayer

in our devotions, or of merely saying our prayers.

HABIT SAVES WORRY AND REBELLION.--Habit has been called the "balance

wheel" of society. This is because men readily become habituated to the

hard, the disagreeable, or the inevitable, and cease to battle against

it. A lot that at first seems unendurable after a time causes less

revolt. A sorrow that seems too poignant to be borne in the course of

time loses some of its sharpness. Oppression or injustice that arouses

the fiercest resentment and hate may finally come to be accepted with

resignation. Habit helps us learn that "what cannot be cured must be

endured."

3. THE TYRANNY OF HABIT

EVEN GOOD HABITS NEED TO BE MODIFIED.--But even in good habits there is

danger. Habit is the opposite of attention. Habit relieves attention of

unnecessary strain. Every habitual act was at one time, either in the

history of the race or of the individual, a voluntary act; that is, it

was performed under active attention. As the habit grew, attention was

gradually rendered unnecessary, until finally it dropped entirely out.

And herein lies the danger. Habit once formed has no way of being

modified unless in some way attention is called to it, for a habit left

to itself becomes more and more firmly fixed. The rut grows deeper. In

very few, if any, of our actions can we afford to have this the case.

Our habits need to be progressive, they need to grow, to be modified, to

be improved. Otherwise they will become an incrusting shell, fixed and

unyielding, which will limit our growth.

It is necessary, then, to keep our habitual acts under some surveillance

of attention, to pass them in review for inspection every now and then,

that we may discover possible modifications which will make them more

serviceable. We need to be inventive, constantly to find out better ways

of doing things. Habit takes care of our standing, walking, sitting; but

how many of us could not improve his poise and carriage if he would? Our

speech has become largely automatic, but no doubt all of us might remove

faults of enunciation, pronunciation or stress from our speaking. So

also we might better our habits of study and thinking, our methods of

memorizing, or our manner of attending.

THE TENDENCY OF "RUTS."--But this will require something of heroism. For

to follow the well-beaten path of custom is easy and pleasant, while to

break out of the rut of habit and start a new line of action is

difficult and disturbing. Most people prefer to keep doing things as

they always have done them, to continue reading and thinking and

believing as they have long been in the habit of doing, not so much

because they feel that their way is best, but because it is easier than

to change. Hence the great mass of us settle down on the plane of

mediocrity, and become "old fogy." We learn to do things passably well,

cease to think about improving our ways of doing them, and so fall into

a rut. Only the few go on. They make use of habit as the rest do, but

they also continue to attend at critical points of action, and so make

habit an \_ally\_ in place of accepting it as a \_tyrant\_.

4. HABIT-FORMING A PART OF EDUCATION

It follows from the importance of habit in our lives that no small part

of education should be concerned with the development of serviceable

habits. Says James, "Could the young but realize how soon they will

become mere walking bundles of habits, they would give more heed to

their conduct while in the plastic state. We are spinning our own fates,

good or evil, and never to be undone. Every smallest stroke of virtue or

of vice leaves its never-so-little scar." Any youth who is forming a

large number of useful habits is receiving no mean education, no matter

if his knowledge of books may be limited; on the other hand, no one who

is forming a large number of bad habits is being well educated, no

matter how brilliant his knowledge may be.

YOUTH THE TIME FOR HABIT-FORMING.--Childhood and youth is the great time

for habit-forming. Then the brain is plastic and easily molded, and it

retains its impressions more indelibly; later it is hard to modify, and

the impressions made are less permanent. It is hard to teach an old dog

new tricks; nor would he remember them if you could teach them to him,

nor be able to perform them well even if he could remember them. The

young child will, within the first few weeks of its life, form habits of

sleeping and feeding. It may in a few days be led into the habit of

sleeping in the dark, or requiring a light; of going to sleep lying

quietly, or of insisting upon being rocked; of getting hungry by the

clock, or of wanting its food at all times when it finds nothing else to

do, and so on. It is wholly outside the power of the mother or the nurse

to determine whether the child shall form habits, but largely within

their power to say what habits shall be formed, since they control his

acts.

As the child grows older, the range of his habits increases; and by the

time he has reached his middle teens, the greater number of his personal

habits are formed. It is very doubtful whether a boy who has not formed

habits of punctuality before the age of fifteen will ever be entirely

trustworthy in matters requiring precision in this line. The girl who

has not, before this age, formed habits of neatness and order will

hardly make a tidy housekeeper later in her life. Those who in youth

have no opportunity to habituate themselves to the usages of society may

study books on etiquette and employ private instructors in the art of

polite behavior all they please later in life, but they will never cease

to be awkward and ill at ease. None are at a greater disadvantage than

the suddenly-grown-rich who attempt late in life to surround themselves

with articles of art and luxury, though their habits were all formed

amid barrenness and want during their earlier years.

THE HABIT OF ACHIEVEMENT.--What youth does not dream of being great, or

noble, or a celebrated scholar! And how few there are who finally

achieve their ideals! Where does the cause of failure lie? Surely not in

the lack of high ideals. Multitudes of young people have "Excelsior!" as

their motto, and yet never get started up the mountain slope, let alone

toiling on to its top. They have put in hours dreaming of the glory

farther up, \_and have never begun to climb\_. The difficulty comes in not

realizing that the only way to become what we wish or dream that we may

become is \_to form the habit of being that thing\_. To form the habit of

achievement, of effort, of self-sacrifice, if need be. To form the habit

of deeds along with dreams; to form the habit of \_doing\_.

Who of us has not at this moment lying in wait for his convenience in

the dim future a number of things which he means to do just as soon as

this term of school is finished, or this job of work is completed, or

when he is not so busy as now? And how seldom does he ever get at these

things at all! Darwin tells that in his youth he loved poetry, art, and

music, but was so busy with his scientific work that he could ill spare

the time to indulge these tastes. So he promised himself that he would

devote his time to scientific work and make his mark in this. Then he

would have time for the things that he loved, and would cultivate his

taste for the fine arts. He made his mark in the field of science, and

then turned again to poetry, to music, to art. But alas! they were all

dead and dry bones to him, without life or interest. He had passed the

time when he could ever form the taste for them. He had formed his

habits in another direction, and now it was forever too late to form new

habits. His own conclusion is, that if he had his life to live over

again, he would each week listen to some musical concert and visit some

art gallery, and that each day he would read some poetry, and thereby

keep alive and active the love for them.

So every school and home should be a species of habit-factory--a place

where children develop habits of neatness, punctuality, obedience,

politeness, dependability and the other graces of character.

5. RULES FOR HABIT-FORMING

JAMES'S THREE MAXIMS FOR HABIT-FORMING.--On the forming of new habits

and the leaving off of old ones, I know of no better statement than that

of James, based on Bain's chapter on "Moral Habits." I quote this

statement at some length: "In the acquisition of a new habit, or the

leaving off of an old one, we must take care to \_launch ourselves with

as strong and decided an initiative as possible\_. Accumulate all the

possible circumstances which shall reënforce right motives; put yourself

assiduously in conditions that encourage the new way; make engagements

incompatible with the old; take a public pledge, if the case allows; in

short, develop your resolution with every aid you know. This will give

your new beginning such a momentum that the temptation to break down

will not occur as soon as it otherwise might; and every day during which

a breakdown is postponed adds to the chances of its not occurring at

all.

"The second maxim is: \_Never suffer an exception to occur until the new

habit is securely rooted in your life.\_ Each lapse is like letting fall

a ball of string which one is carefully winding up; a single slip undoes

more than a great many turns will wind again. \_Continuity\_ of training

is the great means of making the nervous system act infallibly right....

The need of securing success nerves one to future vigor.

"A third maxim may be added to the preceding pair: \_Seize the very first

possible opportunity to act on every resolution you make, and on every

emotional prompting you may experience in the direction of the habits

you aspire to gain.\_ It is not in the moment of their forming, but in

the moment of their producing \_motor effects\_, that resolves and

aspirations communicate the new 'set' to the brain."[3]

THE PREPONDERANCE OF GOOD HABITS OVER BAD.--And finally, let no one be

disturbed or afraid because in a little time you become a "walking

bundle of habits." For in so far as your good actions predominate over

your bad ones, that much will your good habits outweigh your bad habits.

Silently, moment by moment, efficiency is growing out of all worthy acts

well done. Every bit of heroic self-sacrifice, every battle fought and

won, every good deed performed, is being irradicably credited to you in

your nervous system, and will finally add its mite toward achieving the

success of your ambitions.

6. PROBLEMS IN OBSERVATION AND INTROSPECTION

1. Select some act which you have recently begun to perform and watch it

grow more and more habitual. Notice carefully for a week and see whether

you do not discover some habits which you did not know you had. Make a

catalog of your bad habits; of the most important of your good ones.

2. Set out to form some new habits which you desire to possess; also to

break some undesirable habit, watching carefully what takes place in

both cases, and how long it requires.

3. Try the following experiment and relate the results to the matter of

automatic control brought about by habit: Draw a star on a sheet of

cardboard. Place this on a table before you, with a hand-mirror so

arranged that you can see the star in the mirror. Now trace the outline

of the star with a pencil, looking steadily in the mirror to guide your

hand. Do not lift the pencil from the paper from the time you start

until you finish. Have others try this experiment.

4. Study some group of pupils for their habits (1) of attention, (2) of

speech, (3) of standing, sitting, and walking, (4) of study. Report on

your observations and suggest methods of curing bad habits observed.

5. Make a list of "mannerisms" you have observed, and suggest how they

may be cured.

6. Make a list of from ten to twenty habits which you think the school

and its work should especially cultivate. What ones of these are the

schools you know least successful in cultivating? Where does the trouble

lie?

CHAPTER VI

SENSATION

We can best understand the problems of sensation and perception if we

first think of the existence of two great worlds--the world of physical

nature without and the world of mind within. On the one hand is our

material environment, the things we see and hear and touch and taste and

handle; and on the other hand our consciousness, the means by which we

come to know this outer world and adjust ourselves to it. These two

worlds seem in a sense to belong to and require each other. For what

would be the meaning or use of the physical world with no mind to know

or use it; and what would be the use of a mind with nothing to be known

or thought about?

1. HOW WE COME TO KNOW THE EXTERNAL WORLD

There is a marvel about our coming to know the external world which we

shall never be able fully to understand. We have come by this knowledge

so gradually and unconsciously that it now appears to us as commonplace,

and we take for granted many things that it would puzzle us to explain.

KNOWLEDGE THROUGH THE SENSES.--For example, we say, "Of course I see

yonder green tree: it is about ten rods distant." But why "of course"?

Why should objects at a distance from us and with no evident connection

between us and them be known to us at all merely by turning our eyes in

their direction when there is light? Why not rather say with the blind

son of Professor Puiseaux of Paris, who, when asked if he would like to

be restored to sight, answered: "If it were not for curiosity I would

rather have long arms. It seems to me that my hands would teach me

better what is passing in the moon than your eyes or telescopes."

We listen and then say, "Yes, that is a certain bell ringing in the

neighboring village," as if this were the most simple thing in the

world. But why should one piece of metal striking against another a mile

or two away make us aware that there is a bell there at all, let alone

that it is a certain bell whose tone we recognize? Or we pass our

fingers over a piece of cloth and decide, "That is silk." But why,

merely by placing our skin in contact with a bit of material, should we

be able to know its quality, much less that it is cloth and that its

threads were originally spun by an insect? Or we take a sip of liquid

and say, "This milk is sour." But why should we be able by taking the

liquid into the mouth and bringing it into contact with the mucous

membrane to tell that it is milk, and that it possesses the quality

which we call \_sour\_? Or, once more, we get a whiff of air through the

open window in the springtime and say, "There is a lilac bush in bloom

on the lawn." Yet why, from inhaling air containing particles of lilac,

should we be able to know that there is anything outside, much less that

it is a flower and of a particular variety which we call lilac? Or,

finally, we hold a heated flatiron up near the cheek and say, "This is

too hot! it will burn the cloth." But why by holding this object a foot

away from the face do we know that it is there, let alone knowing its

temperature?

THE UNITY OF SENSORY EXPERIENCE.--Further, our senses come through

experience to have the power of fusing, or combining their knowledge, so

to speak, by which each expresses its knowledge in terms of the others.

Thus we take a glance out of the window and say that the day looks cold,

although we well know that we cannot see \_cold\_. Or we say that the

melon sounds green, or the bell sounds cracked, although a \_crack\_ or

\_greenness\_ cannot be heard. Or we say that the box feels empty,

although \_emptiness\_ cannot be felt. We have come to associate cold,

originally experienced with days which look like the one we now see,

with this particular appearance, and so we say we see the cold; sounds

like the one coming from the bell we have come to associate with cracked

bells, and that coming from the melon with green melons, until we say

unhesitatingly that the bell sounds cracked and the melon sounds green.

And so with the various senses. Each gleans from the world its own

particular bit of knowledge, but all are finally in a partnership and

what is each one's knowledge belongs to every other one in so far as the

other can use it.

THE SENSORY PROCESSES TO BE EXPLAINED.--The explanation of the ultimate

nature of knowledge, and how we reach it through contact with our

material environment, we will leave to the philosophers. And battles

enough they have over the question, and still others they will have

before the matter is settled. The easier and more important problem for

us is to describe the \_processes\_ by which the mind comes to know its

environment, and to see how it uses this knowledge in thinking. This

much we shall be able to do, for it is often possible to describe a

process and discover its laws even when we cannot fully explain its

nature and origin. We know the process of digestion and assimilation,

and the laws which govern them, although we do not understand the

ultimate nature and origin of \_life\_ which makes these possible.

THE QUALITIES OF OBJECTS EXIST IN THE MIND.--Yet even in the relatively

simple description which we have proposed many puzzles confront us, and

one of them appears at the very outset. This is that the qualities which

we usually ascribe to objects really exist in our own minds and not in

the objects at all. Take, for instance, the common qualities of light

and color. The physicist tells us that what we see as light is

occasioned by an incredibly rapid beating of ether waves on the retina

of the eye. All space is filled with this ether; and when it is

light--that is, when some object like the sun or other light-giving body

is present--the ether is set in motion by the vibrating molecules of the

body which is the source of light, its waves strike the retina, a

current is produced and carried to the brain, and we see light. This

means, then, that space, the medium in which we see objects, is not

filled with light (the sensation), but with very rapid waves of ether,

and that the light which we see really occurs in our own minds as the

mental response to the physical stimulus of ether waves. Likewise with

color. Color is produced by ether waves of different lengths and degrees

of rapidity.

Thus ether waves at the rate of 450 billions a second give us the

sensation of red; of 472 billions a second, orange; of 526 billions a

second, yellow; of 589 billions a second, green; of 640 billions a

second, blue; of 722 billions a second, indigo; of 790 billions a

second, violet. What exists outside of us, then, is these ether waves of

different rates, and not the colors (as sensations) themselves. The

beautiful yellow and crimson of a sunset, the variegated colors of a

landscape, the delicate pink in the cheek of a child, the blush of a

rose, the shimmering green of the lake--these reside not in the objects

themselves, but in the consciousness of the one who sees them. The

objects possess but the quality of reflecting back to the eye ether

waves of the particular rate corresponding to the color which we ascribe

to them. Thus "red" objects, and no others, reflect back ether waves of

a rate of 450 billions a second: "white" objects reflect all rates;

"black" objects reflect none.

The case is no different with regard to sound. When we speak of a sound

coming from a bell, what we really mean is that the vibrations of the

bell have set up waves in the air between it and our ear, which have

produced corresponding vibrations in the ear; that a nerve current was

thereby produced; and that a sound was heard. But the sound (i.e.,

sensation) is a mental thing, and exists only in our own consciousness.

What passed between the sounding object and ourselves was waves in the

intervening air, ready to be translated through the machinery of nerves

and brain into the beautiful tones and melodies and harmonies of the

mind. And so with all other sensations.

THE THREE SETS OF FACTORS.--What exists outside of us therefore is a

\_stimulus\_, some form of physical energy, of a kind suitable to excite

to activity a certain end-organ of taste, or touch, or smell, or sight,

or hearing; what exists within us is the \_nervous machinery\_ capable of

converting this stimulus into a nerve current which shall produce an

activity in the cortex of the brain; what results is the \_mental object\_

which we call a \_sensation\_ of taste, smell, touch, sight, or hearing.

2. THE NATURE OF SENSATION

SENSATION GIVES US OUR WORLD OF QUALITIES.--In actual experience

sensations are never known apart from the objects to which they belong.

This is to say that when we see \_yellow\_ or \_red\_ it is always in

connection with some surface, or object; when we taste \_sour\_, this

quality belongs to some substance, and so on with all the senses. Yet by

sensation we mean only \_the simple qualities of objects known in

consciousness as the result of appropriate stimuli applied to

end-organs\_. We shall later see how by perception these qualities fuse

or combine to form objects, but in the present chapter we shall be

concerned with the qualities only. Sensations are, then, the simplest

and most elementary knowledge we may get from the physical world,--the

red, the blue, the bitter, the cold, the fragrant, and whatever other

qualities may belong to the external world. We shall not for the present

be concerned with the objects or sources from which the qualities may

come.

To quote James on the meaning of sensation: "All we can say on this

point is that \_what we mean by sensations are first things in the way of

consciousness\_. They are the \_immediate\_ results upon consciousness of

nerve currents as they enter the brain, and before they have awakened

any suggestions or associations with past experience. But it is obvious

that \_such immediate sensations can be realized only in the earliest

days of life\_."

THE ATTRIBUTES OF SENSATION.--Sensations differ from each other in at

least four respects; namely, \_quality\_, \_intensity\_, \_extensity\_, and

\_duration\_.

It is a difference in \_quality\_ that makes us say, "This paper is red,

and that, blue; this liquid is sweet, and that, sour." Differences in

quality are therefore fundamental differences in \_kind\_. Besides the

quality-differences that exist within the same general field, as of

taste or vision, it is evident that there is a still more fundamental

difference existing between the various fields. One can, for example,

compare red with blue or sweet with sour, and tell which quality he

prefers. But let him try to compare red with sweet, or blue with sour,

and the quality-difference is so profound that there seems to be no

basis for comparison.

Differences in \_intensity\_ of sensation are familiar to every person who

prefers two lumps of sugar rather than one lump in his coffee; the sweet

is of the same quality in either case, but differs in intensity. In

every field of sensation, the intensity may proceed from the smallest

amount to the greatest amount discernible. In general, the intensity of

the sensation depends on the intensity of the stimulus, though the

condition of the sense-organ as regards fatigue or adaptation to the

stimulus has its effect. It is obvious that a stimulus may be too weak

to produce any sensation; as, for example, a few grains of sugar in a

cup of coffee or a few drops of lemon in a quart of water could not be

detected. It is also true that the intensity of the stimulus may be so

great that an increase in intensity produces no effect on the sensation;

as, for example, the addition of sugar to a solution of saccharine would

not noticeably increase its sweetness. The lowest and highest intensity

points of sensation are called the lower and upper \_limen\_, or

threshold, respectively.

By \_extensity\_ is meant the space-differences of sensations. The touch

of the point of a toothpick on the skin has a different space quality

from the touch of the flat end of a pencil. Low tones seem to have more

volume than high tones. Some pains feel sharp and others dull and

diffuse. The warmth felt from spreading the palms of the hands out to

the fire has a "bigness" not felt from heating one solitary finger. The

extensity of a sensation depends on the number of nerve endings

stimulated.

The \_duration\_ of a sensation refers to the time it lasts. This must not

be confused with the duration of the stimulus, which may be either

longer or shorter than the duration of the sensation. Every sensation

must exist for some space of time, long or short, or it would have no

part in consciousness.

3. SENSORY QUALITIES AND THEIR END-ORGANS

All are familiar with the "five senses" of our elementary physiologies,

sight, hearing, taste, smell, and touch. A more complete study of

sensation reveals nearly three times this number, however. This is to

say that the body is equipped with more than a dozen different kinds of

end-organs, each prepared to receive its own particular type of

stimulus. It must also be understood that some of the end-organs yield

more than one sense. The eye, for example, gives not only visual but

muscular sensations; the ear not only auditory, but tactual; the tongue

not only gustatory, but tactual and cold and warmth sensations.

SIGHT.--Vision is a \_distance\_ sense; we can see afar off. The stimulus

is \_chemical\_ in its action; this means that the ether waves, on

striking the retina, cause a chemical change which sets up the nerve

current responsible for the sensation.

The eye, whose general structure is sufficiently described in all

standard physiologies, consists of a visual apparatus designed to bring

the images of objects to a clear focus on the retina at the \_fovea\_, or

area of clearest vision, near the point of entrance of the optic nerve.

The sensation of sight coming from this retinal image unaided by other

sensations gives us but two qualities, \_light and color\_. The eye can

distinguish many different grades of light from purest white on through

the various grays to densest black. The range is greater still in color.

We speak of the seven colors of the spectrum, violet, indigo, blue,

green, yellow, orange, and red. But this is not a very serviceable

classification, since the average eye can distinguish about 35,000 color

effects. It is also somewhat bewildering to find that all these colors

seem to be produced from the four fundamental hues, red, green, yellow,

and blue, plus the various tints. These four, combined in varying

proportions and with different degrees of light (i.e., different shades

of gray), yield all the color effects known to the human eye. Herschel

estimates that the workers on the mosaics at Rome must have

distinguished 30,000 different color tones. The \_hue\_ of a color refers

to its fundamental quality, as red or yellow; the \_chroma\_, to its

saturation, or the strength of the color; and the \_tint,\_ to the amount

of brightness (i.e., white) it contains.

HEARING.--Hearing is also a distance sense. The action of its stimulus

is mechanical, which is to say that the vibrations produced in the air

by the sounding body are finally transmitted by the mechanism of the

middle ear to the inner ear. Here the impulse is conveyed through the

liquid of the internal ear to the nerve endings as so many tiny blows,

which produce the nerve current carried to the brain by the auditory

nerve.

The sensation of hearing, like that of sight, gives us two qualities:

namely, \_tones\_ with their accompanying pitch and timbre, and \_noises\_.

Tones, or musical sounds, are produced by isochronous or equal-timed

vibrations; thus \_C\_ of the first octave is produced by 256 vibrations a

second, and if this tone is prolonged the vibration rate will continue

uniformly the same. Noises, on the other hand, are produced by

vibrations which have no uniformity of vibration rate. The ear's

sensibility to pitch extends over about seven octaves. The seven-octave

piano goes down to 27-1/2 vibrations and reaches up to 3,500 vibrations.

Notes of nearly 50,000 vibrations can be heard by an average ear,

however, though these are too painfully shrill to be musical. Taking

into account this upper limit, the range of the ear is about eleven

octaves. The ear, having given us \_loudness\_ of tones, which depends on

the amplitude of the vibrations, \_pitch\_, which depends on the rapidity

of the vibrations, and \_timbre\_, or \_quality\_, which depends on the

complexity of the vibrations, has no further qualities of sound to

reveal.

TASTE.--The sense of taste is located chiefly in the tongue, over the

surface of which are scattered many minute \_taste-bulbs\_. These can be

seen as small red specks, most plentifully distributed along the edges

and at the tip of the tongue. The substance tasted must be in

\_solution\_, and come in contact with the nerve endings. The action of

the stimulus is \_chemical\_.

The sense of taste recognizes the four qualities of \_sour\_, \_sweet\_,

\_salt\_, and \_bitter\_. Many of the qualities which we improperly call

tastes are in reality a complex of taste, smell, touch, and temperature.

Smell contributes so largely to the sense of taste that many articles of

food become "tasteless" when we have a catarrh, and many nauseating

doses of medicine can be taken without discomfort if the nose is held.

Probably none of us, if we are careful to exclude all odors by plugging

the nostrils with cotton, can by taste distinguish between scraped

apple, potato, turnip, or beet, or can tell hot milk from tea or coffee

of the same temperature.

SMELL.--In the upper part of the nasal cavity lies a small brownish

patch of mucous membrane. It is here that the olfactory nerve endings

are located. The substance smelled must be volatile, that is, must exist

in gaseous form, and come in direct contact with the nerve endings.

Chemical action results in a nerve current.

The sensations of smell have not been classified so well as those of

taste, and we have no distinct names for them. Neither do we know how

many olfactory qualities the sense of smell is capable of revealing. The

only definite classification of smell qualities is that based on their

pleasantness or the opposite. We also borrow a few terms and speak of

\_sweet\_ or \_fragrant\_ odors and \_fresh\_ or \_close\_ smells. There is some

evidence when we observe animals, or even primitive men, that the human

race has been evolving greater sensibility to certain odors, while at

the same time there has been a loss of keenness of what we call scent.

VARIOUS SENSATIONS FROM THE SKIN.--The skin, besides being a protective

and excretory organ, affords a lodging-place for the end-organs giving

us our sense of pressure, pain, cold, warmth, tickle, and itch.

\_Pressure\_ seems to have for its end-organ the \_hair-bulbs\_ of the skin;

on hairless regions small bulbs called the \_corpuscles of Meissner\_

serve this purpose. \_Pain\_ is thought to be mediated by free nerve

endings. \_Cold\_ depends on end-organs called the \_bulbs of Krause\_; and

\_warmth\_ on the \_Ruffinian corpuscles\_.

Cutaneous or skin sensation may arise from either \_mechanical\_

stimulation, such as pressure, a blow, or tickling, from \_thermal\_

stimulation from hot or cold objects, from \_electrical\_ stimulation, or

from the action of certain \_chemicals\_, such as acids and the like.

Stimulated mechanically, the skin gives us but two sensation qualities,

\_pressure\_ and \_pain\_. Many of the qualities which we commonly ascribe

to the skin sensations are really a complex of cutaneous and muscular

sensations. \_Contact\_ is light pressure. \_Hardness\_ and \_softness\_

depend on the intensity of the pressure. \_Roughness\_ and \_smoothness\_

arise from interrupted and continuous pressure, respectively, and

require movement over the rough or smooth surface. \_Touch\_ depends on

pressure accompanied by the muscular sensations involved in the

movements connected with the act. Pain is clearly a different sensation

from pressure; but any of the cutaneous or muscular sensations may, by

excessive stimulation, be made to pass over into pain. All parts of the

skin are sensitive to pressure and pain; but certain parts, like the

finger tips, and the tip of the tongue, are more highly sensitive than

others. The skin varies also in its sensitivity to \_heat\_ and \_cold\_. If

we take a hot or a very cold pencil point and pass it rather lightly and

slowly over the skin, it is easy to discover certain spots from which a

sensation of warmth or of cold flashes out. In this way it is possible

to locate the end-organs of temperature very accurately.

[Illustration: FIG. 17.--Diagram showing distribution of hot and cold

spots on the back of the hand. C, cold spots; H, hot spots.]

THE KINÆSTHETIC SENSES.--The muscles, tendons, and joints also give rise

to perfectly definite sensations, but they have not been named as have

the sensations from most of the other end-organs. \_Weight\_ is the most

clearly marked of these sensations. It is through the sensations

connected with movements of muscles, tendons, and joints that we come to

judge \_form\_, \_size\_, and \_distance\_.

THE ORGANIC SENSES.--Finally, to the sensations mentioned so far must be

added those which come from the internal organs of the body. From the

alimentary canal we get the sensations of \_hunger\_, \_thirst\_, and

\_nausea\_; from the heart, lungs, and organs of sex come numerous

well-defined but unnamed sensations which play an important part in

making up the feeling-tone of our daily lives.

Thus we see that the senses may be looked upon as the sentries of the

body, standing at the outposts where nature and ourselves meet. They

discover the qualities of the various objects with which we come in

contact and hand them over to the mind in the form of sensations. And

these sensations are the raw material out of which we begin to construct

our material environment. Only as we are equipped with good organs of

sense, especially good eyes and ears, therefore, are we able to enter

fully into the wonderful world about us and receive the stimuli

necessary to our thought and action.

4. PROBLEMS IN OBSERVATION AND INTROSPECTION

1. Observe a schoolroom of children at work with the aim of discovering

any that show defects of vision or hearing. What are the symptoms? What

is the effect of inability to hear or see well upon interest and

attention?

2. Talk with your teacher about testing the eyes and ears of the

children of some school. The simpler tests for vision and hearing are

easily applied, and the expense for material almost nothing. What tests

should be used? Does your school have the test card for vision?

3. Use a rotator or color tops for mixing discs of white and black to

produce different shades of gray. Fix in mind the gray made of half

white and half black; three-fourths white and one-fourth black;

one-fourth-white and three-fourths black.

4. In the same way mix the two complementaries yellow and blue to

produce a gray; mix red and green in the same way. Try various

combinations of the four fundamental colors, and discover how different

colors are produced. Seek for these same colors in nature--sky, leaves,

flowers, etc.

5. Take a large wire nail and push it through a cork so that it can be

handled without touching the metal with the fingers. Now cool it in ice

or very cold water, then dry it and move the point slowly across the

back of the hand. Do you feel occasional thrills of cold as the point

passes over a bulb of Krause? Heat the nail with a match flame or over a

lamp, and perform the same experiment. Do you feel the thrills of heat

from the corpuscles of Ruffini?

6. Try stopping the nostrils with cotton and having someone give you

scraped apple, potato, onion, etc., and see whether, by taste alone, you

can distinguish the difference. Why cannot sulphur be tasted?

CHAPTER VII

PERCEPTION

No young child at first sees objects as we see them, or hears sounds as

we hear them. This power, the power of perception, is a gradual

development. It grows day by day out of the learner's experience in his

world of sights and sounds, and whatever other fields his senses respond

to.

1. THE FUNCTION OF PERCEPTION

NEED OF KNOWING THE MATERIAL WORLD.--It is the business of perception to

give us knowledge of our world of material \_objects\_ and their relations

in \_space\_ and \_time\_. The material world which we enter through the

gateways of the senses is more marvelous by far than any fairy world

created by the fancy of story-tellers; for it contains the elements of

all they have conceived and much more besides. It is more marvelous than

any structure planned and executed by the mind of man; for all the

wonders and beauties of the Coliseum or of St. Peter's existed in nature

before they were discovered by the architect and thrown together in

those magnificent structures. The material advancement of civilization

has been but the discovery of the objects, forces, and laws of nature,

and their use in inventions serviceable to men. And these forces and

laws of nature were discovered only as they were made manifest through

objects in the material world.

The problem lying before each individual who would enter fully into this

rich world of environment, then, is to discover at first hand just as

large a part of the material world about him as possible. In the most

humble environment of the most uneventful life is to be found the

material for discoveries and inventions yet undreamed of. Lying in the

shade of an apple tree under the open sky, Newton read from a falling

apple the fundamental principles of the law of gravitation which has

revolutionized science; sitting at a humble tea table Watt watched the

gurgling of the steam escaping from the kettle, and evolved the steam

engine therefrom; with his simple kite, Franklin drew down the lightning

from the clouds, and started the science of electricity; through

studying a ball, the ancient scholars conceived the earth to be a

sphere, and Columbus discovered America.

THE PROBLEM WHICH CONFRONTS THE CHILD.--Well it is that the child,

starting his life's journey, cannot see the magnitude of the task before

him. Cast amid a world of objects of whose very existence he is

ignorant, and whose meaning and uses have to be learned by slow and

often painful experience, he proceeds step by step through the senses in

his discovery of the objects about him. Yet, considered again, we

ourselves are after all but a step in advance of the child. Though we

are somewhat more familiar with the use of our senses than he, and know

a few more objects about us, yet the knowledge of the wisest of us is at

best pitifully meager compared with the richness of nature. So

impossible is it for us to know all our material environment, that men

have taken to becoming specialists. One man will spend his life in the

study of a certain variety of plants, while there are hundreds of

thousands of varieties all about him; another will study a particular

kind of animal life, perhaps too minute to be seen with the naked eye,

while the world is teeming with animal forms which he has not time in

his short day of life to stop to examine; another will study the land

forms and read the earth's history from the rocks and geological strata,

but here again nature's volume is so large that he has time to read but

a small fraction of the whole. Another studies the human body and learns

to read from its expressions the signs of health and sickness, and to

prescribe remedies for its ills; but in this field also he has found it

necessary to divide the work, and so we have specialists for almost

every organ of the body.

2. THE NATURE OF PERCEPTION

HOW A PERCEPT IS FORMED.--How, then, do we proceed to the discovery of

this world of objects? Let us watch the child and learn the secret from

him. Give the babe a ball, and he applies every sense to it to discover

its qualities. He stares at it, he takes it in his hands and turns it

over and around, he lifts it, he strokes it, he punches it and jabs it,

he puts it to his mouth and bites it, he drops it, he throws it and

creeps after it. He leaves no stone unturned to find out what that thing

really is. By means of the \_qualities\_ which come to him through the

avenues of sense, he constructs the \_object\_. And not only does he come

to know the ball as a material object, but he comes to know also its

uses. He is forming his own best definition of a ball in terms of the

sensations which he gets from it and the uses to which he puts it, and

all this even before he can name it or is able to recognize its name

when he hears it. How much better his method than the one he will have

to follow a little later when he goes to school and learns that "A ball

is a spherical body of any substance or size, used to play with, as by

throwing, kicking, or knocking, etc.!"

THE PERCEPT INVOLVES ALL RELATIONS OF THE OBJECT.--Nor is the case in

the least different with ourselves. When we wish to learn about a new

object or discover new facts about an old one, we do precisely as the

child does if we are wise. We apply to it every sense to which it will

afford a stimulus, and finally arrive at the object through its various

qualities. And just in so far as we have failed to use in connection

with it every sense to which it can minister, just in that degree will

we have an incomplete perception of it. Indeed, just so far as we have

failed finally to perceive it in terms of its functions or uses, in that

far also have we failed to know it completely. Tomatoes were for many

years grown as ornamental garden plants before it was discovered that

the tomatoes could minister to the taste as well as to the sight. The

clothing of civilized man gives the same sensation of texture and color

to the savage that it does to its owner, but he is so far from

perceiving it in the same way that he packs it away and continues to go

naked. The Orientals, who disdain the use of chairs and prefer to sit

cross-legged on the floor, can never perceive a chair just as we do who

use chairs daily, and to whom chairs are so saturated with social

suggestions and associations.

THE CONTENT OF THE PERCEPT.--The percept, then, always contains a basis

of \_sensation\_. The eye, the ear, the skin or some other sense organ

must turn in its supply of sensory material or there can be no percept.

But the percept contains more than just sensations. Consider, for

example, your percept of an automobile flashing past your windows. You

really \_see\_ but very little of it, yet you \_perceive\_ it as a very

familiar vehicle. All that your sense organs furnish is a more or less

blurred patch of black of certain size and contour, one or more objects

of somewhat different color whom you know to be passengers, and various

sounds of a whizzing, chugging or roaring nature. Your former experience

with automobiles enables you to associate with these meager sensory

details the upholstered seats, the whirling wheels, the swaying movement

and whatever else belongs to the full meaning of a motor car.

The percept that contained only sensory material, and lacked all memory

elements, ideas and meanings, would be no percept at all. And this is

the reason why a young child cannot see or hear like ourselves. It lacks

the associative material to give significance and meaning to the sensory

elements supplied by the end-organs. The dependence of the percept on

material from past experience is also illustrated in the common

statement that what one gets from an art exhibit or a concert depends on

what he brings to it. He who brings no knowledge, no memory, no images

from other pictures or music will secure but relatively barren percepts,

consisting of little besides the mere sensory elements. Truly, "to him

that hath shall be given" in the realm of perception.

THE ACCURACY OF PERCEPTS DEPENDS ON EXPERIENCE.--We must perceive

objects through our motor response to them as well as in terms of

sensations. The boy who has his knowledge of a tennis racket from

looking at one in a store window, or indeed from handling one and

looking it over in his room, can never know a tennis racket as does the

boy who plays with it on the court. Objects get their significance not

alone from their qualities, but even more from their use as related to

our own activities.

Like the child, we must get our knowledge of objects, if we are to get

it well, from the objects themselves at first hand, and not second hand

through descriptions of them by others. The fact that there is so much

of the material world about us that we can never hope to learn it all,

has made it necessary to put down in books many of the things which have

been discovered concerning nature. This necessity has, I fear, led many

away from nature itself to books--away from the living reality of things

to the dead embalming cases of words, in whose empty forms we see so

little of the significance which resides in the things themselves. We

are in danger of being satisfied with the \_forms\_ of knowledge without

its \_substance\_--with definitions contained in words instead of in

qualities and uses.

NOT DEFINITIONS, BUT FIRST-HAND CONTACT.--In like manner we come to know

distance, form and size. If we have never become acquainted with a mile

by actually walking a mile, running a mile, riding a bicycle a mile,

driving a horse a mile, or traveling a mile on a train, we might listen

for a long time to someone tell how far a mile is, or state the distance

from Chicago to Denver, without knowing much about it in any way except

word definitions. In order to understand a mile, we must come to know it

in as many ways as possible through sense activities of our own.

Although many children have learned that it is 25,000 miles around the

earth, probably no one who has not encircled the globe has any

reasonably accurate notion just how far this is. For words cannot take

the place of perceptions in giving us knowledge. In the case of shorter

distances, the same rule holds. The eye must be assisted by experience

of the muscles and tendons and joints in actually covering distance, and

learn to associate these sensations with those of the eye before the

eye alone can be able to say, "That tree is ten rods distant." Form and

size are to be learned in the same way. The hands must actually touch

and handle the object, experiencing its hardness or smoothness, the way

this curve and that angle feels, the amount of muscular energy it takes

to pass the hand over this surface and along that line, the eye taking

note all the while, before the eye can tell at a glance that yonder

object is a sphere and that this surface is two feet on the edge.

3. THE PERCEPTION OF SPACE

Many have been the philosophical controversies over the nature of space

and our perception of it. The psychologists have even quarreled

concerning whether we possess an \_innate\_ sense of space, or whether it

is a product of experience and training. Fortunately, for our present

purpose we shall not need to concern ourselves with either of these

controversies. For our discussion we may accept space for what common

sense understands it to be. As to our sense of space, whatever of this

we may possess at birth, it certainly has to be developed by use and

experience to become of practical value. In the perception of space we

must come to perceive \_distance\_, \_direction\_, \_size\_, and \_form\_. As a

matter of fact, however, size is but so much distance, and form is but

so much distance in this, that, or the other direction.

THE PERCEIVING OF DISTANCE.--Unquestionably the eye comes to be our

chief dependence in determining distance. Yet the muscle and joint

senses give us our earliest knowledge of distance. The babe reaches for

the moon simply because the eye does not tell it that the moon is out of

reach. Only as the child reaches for its playthings, creeps or walks

after them, and in a thousand ways uses its muscles and joints in

measuring distance, does the perception of distance become dependable.

At the same time the eye is slowly developing its power of judging

distance. But not for several years does visual perception of distance

become in any degree accurate. The eye's perception of distance depends

in part on the sensations arising from the muscles controlling the eye,

probably in part from the adjustment of the lens, and in part from the

retinal image. If one tries to look at the tip of his nose he easily

feels the muscle strain caused by the required angle of adjustment. We

come unconsciously to associate distance with the muscle sensations

arising from the different angles of vision. The part played by the

retinal image in judging distance is easily understood in looking at two

trees, one thirty feet and the other three hundred feet distant. We note

that the nearer tree shows the \_detail\_ of the bark and leaves, while

the more distant one lacks this detail. The nearer tree also reflects

more \_light\_ and \_color\_ than the one farther away. These minute

differences, registered as they are on the retinal image, come to stand

for so much of distance.

The ear also learns to perceive distance through differences in the

quality and the intensity of sound. Auditory perception of distance is,

however, never very accurate.

THE PERCEIVING OF DIRECTION.--The motor senses probably give us our

first perception of direction, as they do of distance. The child has to

reach this way or that way for his rattle; turn the eyes or head so far

in order to see an interesting object; twist the body, crawl or walk to

one side or the other to secure his bottle. In these experiences he is

gaining his first knowledge of direction.

Along with these muscle-joint experiences, the eye is also being

trained. The position of the image on the retina comes to stand for

direction, and the eye finally develops so remarkable a power of

perceiving direction that a picture hung a half inch out of plumb is a

source of annoyance. The ear develops some skill in the perception of

direction, but is less dependable than the eye.

4. THE PERCEPTION OF TIME

The philosophers and psychologists agree little better about our sense

of time than they do about our sense of space. Of this much, however, we

may be certain, our perception of time is subject to development and

training.

NATURE OF THE TIME SENSE.--How we perceive time is not so well

understood as our perception of space. It is evident, however, that our

idea of time is simpler than our idea of space--it has less of content,

less that we can describe. Probably the most fundamental part of our

idea of time is \_progression\_, or change, without which it is difficult

to think of time at all. The question then becomes, how do we perceive

change, or succession?

If one looks in upon his thought stream he finds that the movement of

consciousness is not uniformly continuous, but that his thought moves in

pulses, or short rushes, so to speak. When we are seeking for some fact

or conclusion, there is a moment of expectancy, or poising, and then the

leap forward to the desired point, or conclusion, from which an

immediate start is taken for the next objective point of our thinking.

It is probable that our sense of the few seconds of passing time that

we call the \_immediate present\_ consists of the recognition of the

succession of these pulsations of consciousness, together with certain

organic rhythms, such as heart beat and breathing.

NO PERCEPTION OF EMPTY TIME.--Our perception does not therefore act upon

empty time. Time must be filled with a procession of events, whether

these be within our own consciousness or in the objective world without.

All longer periods of time, such as hours, days, or years, are measured

by the events which they contain. Time filled with happenings that

interest and attract us seems short while passing, but longer when

looked back upon. On the other hand, time relatively empty of

interesting experience hangs heavy on our hands in passing, but, viewed

in retrospect, seems short. A fortnight of travel passes more quickly

than a fortnight of illness, but yields many more events for the memory

to review as the "filling" for time.

Probably no one has any very accurate feeling of the length, that is,

the actual \_duration\_ of a year--or even of a month! We therefore divide

time into convenient units, as weeks, months, years and centuries. This

allows us to think of time in mathematical terms where immediate

perception fails in its grasp.

5. THE TRAINING OF PERCEPTION

In the physical world as in the spiritual there are many people who,

"having eyes, see not and ears, hear not." For the ability to perceive

accurately and richly in the world of physical objects depends not alone

on good sense organs, but also on \_interest\_ and the habit of

\_observation\_. It is easy if we are indifferent or untrained to look at

a beautiful landscape, a picture or a cathedral without \_seeing\_ it; it

is easy if we lack interest or skill to listen to an orchestra or the

myriad sounds of nature without \_hearing\_ them.

PERCEPTION NEEDS TO BE TRAINED.--Training in perception does not depend

entirely on the work of the school. For the world about us exerts a

constant appeal to our senses. A thousand sights, sounds, contacts,

tastes, smells or other sensations, hourly throng in upon us, and the

appeal is irresistible. We must in some degree attend. We must observe.

Yet it cannot be denied that most of us are relatively unskilled in

perception; we do not know how, or take the trouble to observe. For

example, a stranger was brought into the classroom and introduced by the

instructor to a class of fifty college students in psychology. The class

thought the stranger was to address them, and looked at him with mild

curiosity. But, after standing before them for a few moments, he

suddenly withdrew, as had been arranged by the instructor. The class

were then asked to write such a description of the stranger as would

enable a person who had never seen him to identify him. But so poor had

been the observation of the class that they ascribed to him clothes of

four different colors, eyes and hair each of three different colors, a

tie of many different hues, height ranging from five feet and four

inches to over six feet, age from twenty-eight to forty-five years, and

many other details as wide of the mark. Nor is it probable that this

particular class was below the average in the power of perception.

SCHOOL TRAINING IN PERCEPTION.--The school can do much in training the

perception. But to accomplish this, the child must constantly be brought

into immediate contact with the physical world about him and taught to

observe. Books must not be substituted for things. Definitions must not

take the place of experiment or discovery. Geography and nature study

should be taught largely out of doors, and the lessons assigned should

take the child into the open for observation and investigation. All

things that live and grow, the sky and clouds, the sunset colors, the

brown of upturned soil, the smell of the clover field, or the new mown

hay, the sounds of a summer night, the distinguishing marks by which to

identify each family of common birds or breed of cattle--these and a

thousand other things that appeal to us from the simplest environment

afford a rich opportunity for training the perception. And he who has

learned to observe, and who is alert to the appeal of nature, has no

small part of his education already assured.

6. PROBLEMS IN OBSERVATION AND INTROSPECTION

1. Test your power of observation by walking rapidly past a well-filled

store window and then seeing how many of the objects you can name.

2. Suppose a tailor, a bootblack, a physician, and a detective are

standing on the street corner as you pass by. What will each one be most

likely to observe about you? \_Why?\_

3. Observe carefully green trees at a distance of a few rods; a quarter

of a mile; a mile; several miles. Describe differences (1) in color, (2)

in brightness, or light, and (3) in detail.

4. How many common birds can you identify? How many kinds of trees? Of

wild flowers? Of weeds?

5. Observe the work of an elementary school for the purpose of

determining:

a. Whether the instruction in geography, nature study, agriculture,

etc., calls for the use of the eyes, ears and fingers.

b. Whether definitions are used in place of first-hand information in

any subjects.

c. Whether the assignment of lessons to pupils includes work that would

require the use of the senses, especially out of doors.

d. Whether the work offered in arithmetic demands the use of the senses

as well as the reason.

e. Whether the language lessons make use of the power of observation.

CHAPTER VIII

MENTAL IMAGES AND IDEAS

As you sit thinking, a company of you together, your thoughts run in

many diverse lines. Yet with all this diversity, your minds possess this

common characteristic: \_Though your thinking all takes place in what we

call the present moment, it goes on largely in terms of past

experiences.\_

1. THE PART PLAYED BY PAST EXPERIENCE

PRESENT THINKING DEPENDS ON PAST EXPERIENCE.--Images or ideas of things

you have seen or heard or felt; of things you have thought of before and

which now recur to you; of things you remember, such as names, dates,

places, events; of things that you do not remember as a part of your

past at all, but that belong to it nevertheless--these are the things

which form a large part of your mental stream, and which give content to

your thinking. You may think of a thing that is going on now, or of one

that is to occur in the future; but, after all, you are dependent on

your past experience for the material which you put into your thinking

of the present moment.

Indeed, nothing can enter your present thinking which does not link

itself to something in your past experience. The savage Indian in the

primeval forest never thought about killing a deer with a rifle merely

by pulling a trigger, or of turning a battery of machine guns on his

enemies to annihilate them--none of these things were related to his

past experience; hence he could not think in such terms.

THE PRESENT INTERPRETED BY THE PAST.--Not only can we not think at all

except in terms of our past experience, but even if we could, the

present would be meaningless to us; for the present is interpreted in

the light of the past. The sedate man of affairs who decries athletic

sports, and has never taken part in them, cannot understand the wild

enthusiasm which prevails between rival teams in a hotly contested

event. The fine work of art is to the one who has never experienced the

appeal which comes through beauty, only so much of canvas and variegated

patches of color. Paul says that Jesus was "unto the Greeks,

foolishness." He was foolishness to them because nothing in their

experience with their own gods had been enough like the character of

Jesus to enable them to interpret Him.

THE FUTURE ALSO DEPENDS ON THE PAST.--To the mind incapable of using

past experience, the future also would be impossible; for we can look

forward into the future only by placing in its experiences the elements

of which we have already known. The savage who has never seen the

shining yellow metal does not dream of a heaven whose streets are paved

with gold, but rather of a "happy hunting ground." If you will analyze

your own dreams of the future you will see in them familiar pictures

perhaps grouped together in new forms, but coming, in their elements,

from your past experience nevertheless. All that would remain to a mind

devoid of a past would be the little bridge of time which we call the

"present moment," a series of unconnected \_nows\_. Thought would be

impossible, for the mind would have nothing to compare and relate.

Personality would not exist; for personality requires continuity of

experience, else we should be a new person each succeeding moment,

without memory and without plans. Such a mind would be no mind at all.

RANK DETERMINED BY ABILITY TO UTILIZE PAST EXPERIENCE.--So important is

past experience in determining our present thinking and guiding our

future actions, that the place of an individual in the scale of creation

is determined largely by the ability to profit by past experience. The

scientist tells us of many species of animals now extinct, which lost

their lives and suffered their race to die out because when, long ago,

the climate began to change and grow much colder, they were unable to

use the experience of suffering in the last cold season as an incentive

to provide shelter, or move to a warmer climate against the coming of

the next and more rigorous one. Man was able to make the adjustment;

and, providing himself with clothing and shelter and food, he survived,

while myriads of the lower forms perished.

The singed moth again and again dares the flame which tortures it, and

at last gives its life, a sacrifice to its folly; the burned child fears

the fire, and does not the second time seek the experience. So also can

the efficiency of an individual or a nation, as compared with other

individuals or nations, be determined. The inefficient are those who

repeat the same error or useless act over and over, or else fail to

repeat a chance useful act whose repetition might lead to success. They

are unable to learn their lesson and be guided by experience. Their past

does not sufficiently minister to their present, and through it direct

their future.

2. HOW PAST EXPERIENCE IS CONSERVED

PAST EXPERIENCE CONSERVED IN BOTH MENTAL AND PHYSICAL TERMS.--If past

experience plays so important a part in our welfare, how, then, is it to

be conserved so that we may secure its benefits? Here, as elsewhere, we

find the mind and body working in perfect unison and harmony, each doing

its part to further the interests of both. The results of our past

experience may be read in both our mental and our physical nature.

On the physical side past experience is recorded in modified structure

through the law of habit working on the tissues of the body, and

particularly on the delicate tissues of the brain and nervous system.

This is easily seen in its outward aspects. The stooped shoulders and

bent form of the workman tell a tale of physical toil and exposure; the

bloodless lips and pale face of the victim of the city sweat shop tell

of foul air, long hours, and insufficient food; the rosy cheek and

bounding step of childhood speak of fresh air, good food and happy play.

On the mental side past experience is conserved chiefly by means of

\_images\_, \_ideas\_, and \_concepts\_. The nature and function of concepts

will be discussed in a later chapter. It will now be our purpose to

examine the nature of images and ideas, and to note the part they play

in the mind's activities.

THE IMAGE AND THE IDEA.--To understand the nature of the image, and then

of the idea, we may best go back to the percept. You look at a watch

which I hold before your eyes and secure a percept of it. Briefly, this

is what happens: The light reflected from the yellow object, on striking

the retina, results in a nerve current which sets up a certain form of

activity in the cells of the visual brain area, and lo! a \_percept\_ of

the watch flashes in your mind.

Now I put the watch in my pocket, so that the stimulus is no longer

present to your eye. Then I ask you to think of my watch just as it

appeared as you were looking at it; or you may yourself choose to think

of it without my suggesting it to you. In either case \_the cellular

activity in the visual area of the cortex is reproduced\_ approximately

as it occurred in connection with the percept, and lo! an \_image\_ of the

watch flashes in your mind. An image is thus an approximate copy of a

former percept (or several percepts). It is aroused indirectly by means

of a nerve current coming by way of some other brain center, instead of

directly by the stimulation of a sense organ, as in the case of a

percept.

If, instead of seeking a more or less exact mental \_picture\_ of my

watch, you only think of its general \_meaning\_ and relations, the fact

that it is of gold, that it is for the purpose of keeping time, that it

was a present to me, that I wear it in my left pocket, you then have an

\_idea\_ of the watch. Our idea of an object is, therefore, the general

meaning of relations we ascribe to it. It should be remembered, however,

that the terms image and idea are employed rather loosely, and that

there is not yet general uniformity among writers in their use.

ALL OUR PAST EXPERIENCE POTENTIALLY AT OUR COMMAND.--Images may in a

certain sense take the place of percepts, and we can again experience

sights, sounds, tastes, and smells which we have known before, without

having the stimuli actually present to the senses. In this way all our

past experience is potentially available to the present. All the objects

we have seen, it is potentially possible again to see in the mind's eye

without being obliged to have the objects before us; all the sounds we

have heard, all the tastes and smells and temperatures we have

experienced, we may again have presented to our minds in the form of

mental images without the various stimuli being present to the

end-organs of the senses.

Through images and ideas the total number of objects in our experience

is infinitely multiplied; for many of the things we have seen, or heard,

or smelled, or tasted, we cannot again have present to the senses, and

without this power we would never get them again. And besides this fact,

it would be inconvenient to have to go and secure afresh each sensation

or percept every time we need to use it in our thought. While \_habit\_,

then, conserves our past experience on the physical side, the \_image\_

and the \_idea\_ do the same thing on the mental side.

3. INDIVIDUAL DIFFERENCES IN IMAGERY

IMAGES TO BE VIEWED BY INTROSPECTION.--The remainder of the description

of images will be easier to understand, for each of you can know just

what is meant in every case by appealing to your own mind. I beg of you

not to think that I am presenting something new and strange, a curiosity

connected with our thinking which has been discovered by scholars who

have delved more deeply into the matter than we can hope to do. Every

day--no, more than that, every hour and every moment--these images are

flitting through our minds, forming a large part of our stream of

consciousness. Let us see whether we can turn our attention within and

discover some of our images in their flight. Let us introspect.

I know of no better way to proceed than that adopted by Francis Galton

years ago, when he asked the English men of letters and science to think

of their breakfast tables, and then describe the images which appeared.

I am about to ask each one of you to do the same thing, but I want to

warn you beforehand that the images will not be so vivid as the sensory

experiences themselves. They will be much fainter and more vague, and

less clear and definite; they will be fleeting, and must be caught on

the wing. Often the image may fade entirely out, and the idea only be

left.

THE VARIED IMAGERY SUGGESTED BY ONE'S DINING TABLE.--Let each one now

recall the dining table as you last left it, and then answer questions

concerning it like the following:

Can I see clearly in my "mind's eye" the whole table as it stood spread

before me? Can I see all parts of it equally clearly? Do I get the snowy

white and gloss of the linen? The delicate coloring of the china, so

that I can see where the pink shades off into the white? The graceful

lines and curves of the dishes? The sheen of the silver? The brown of

the toast? The yellow of the cream? The rich red and dark green of the

bouquet of roses? The sparkle of the glassware?

Can I again hear the rattle of the dishes? The clink of the spoon

against the cup? The moving up of the chairs? The chatter of the voices,

each with its own peculiar pitch and quality? The twitter of a bird

outside the window? The tinkle of a distant bell? The chirp of a

neighborly cricket?

Can I taste clearly the milk? The coffee? The eggs? The bacon? The

rolls? The butter? The jelly? The fruit? Can I get the appetizing odor

of the coffee? Of the meat? The oranges and bananas? The perfume of the

lilac bush outside the door? The perfume from a handkerchief newly

treated to a spray of heliotrope?

Can I recall the touch of my fingers on the velvety peach? On the

smooth skin of an apple? On the fretted glassware? The feel of the fresh

linen? The contact of leather-covered or cane-seated chair? Of the

freshly donned garment? Can I get clearly the temperature of the hot

coffee in the mouth? Of the hot dish on the hand? Of the ice water? Of

the grateful coolness of the breeze wafted in through the open window?

Can I feel again the strain of muscle and joint in passing the heavy

dish? Can I feel the movement of the jaws in chewing the beefsteak? Of

the throat and lips in talking? Of the chest and diaphragm in laughing?

Of the muscles in sitting and rising? In hand and arm in using knife and

fork and spoon? Can I get again the sensation of pain which accompanied

biting on a tender tooth? From the shooting of a drop of acid from the

rind of the orange into the eye? The chance ache in the head? The

pleasant feeling connected with the exhilaration of a beautiful morning?

The feeling of perfect health? The pleasure connected with partaking of

a favorite food?

POWER OF IMAGERY VARIES IN DIFFERENT PEOPLE.--It is more than probable

that some of you cannot get perfectly clear images in all these lines,

certainly not with equal facility; for the imagery from any one sense

varies greatly from person to person. A celebrated painter was able,

after placing his subject in a chair and looking at him attentively for

a few minutes, to dismiss the subject and paint a perfect likeness of

him from the visual image which recurred to the artist every time he

turned his eyes to the chair where the sitter had been placed. On the

other hand, a young lady, a student in my psychology class, tells me

that she is never able to recall the looks of her mother when she is

absent, even if the separation has been only for a few moments. She can

get an image of the form, with the color and cut of the dress, but never

the features. One person may be able to recall a large part of a concert

through his auditory imagery, and another almost none.

In general it may be said that the power, or at least the use, of

imagery decreases with age. The writer has made a somewhat extensive

study of the imagery of certain high-school students, college students,

and specialists in psychology averaging middle age. Almost without

exception it was found that clear and vivid images played a smaller part

in the thinking of the older group than of the younger. More or less

abstract ideas and concepts seemed to have taken the place of the

concrete imagery of earlier years.

IMAGERY TYPES.--Although there is some difference in our ability to use

imagery of different sensory types, probably there is less variation

here than has been supposed. Earlier pedagogical works spoke of the

\_visual\_ type of mind, or the \_audile\_ type, or the \_motor\_ type, as if

the possession of one kind of imagery necessarily rendered a person

short in other types. Later studies have shown this view incorrect,

however. The person who has good images of one type is likely to excel

in all types, while one who is lacking in any one of the more important

types will probably be found short in all.[4] Most of us probably make

more use of visual and auditory than of other kinds of imagery, while

olfactory and gustatory images seem to play a minor rôle.

4. THE FUNCTION OF IMAGES

Binet says that the man who has not every type of imagery almost equally

well developed is only the fraction of a man. While this no doubt puts

the matter too strongly, yet images do play an important part in our

thinking.

IMAGES SUPPLY MATERIAL FOR IMAGINATION AND MEMORY.--Imagery supplies the

pictures from which imagination builds its structures. Given a rich

supply of images from the various senses, and imagination has the

material necessary to construct times and events long since past, or to

fill the future with plans or experiences not yet reached. Lacking

images, however, imagination is handicapped, and its meager products

reveal in their barrenness and their lack of warmth and reality the

poverty of material.

Much of our memory also takes the form of images. The face of a friend,

the sound of a voice, or the touch of a hand may be recalled, not as a

mere fact, but with almost the freshness and fidelity of a percept. That

much of our memory goes on in the form of ideas instead of images is

true. But memory is often both aided in its accuracy and rendered more

vital and significant through the presence of abundant imagery.

IMAGERY IN THE THOUGHT PROCESSES.--Since logical thinking deals more

with relations and meanings than with particular objects, images

naturally play a smaller part in reasoning than in memory and

imagination. Yet they have their place here as well. Students of

geometry or trigonometry often have difficulty in understanding a

theorem until they succeed in visualizing the surface or solid involved.

Thinking in the field of astronomy, mechanics, and many other sciences

is assisted at certain points by the ability to form clear and accurate

images.

THE USE OF IMAGERY IN LITERATURE.--Facility in the use of imagery

undoubtedly adds much to our enjoyment and appreciation of certain

forms of literature. The great writers commonly use all types of images

in their description and narration. If we are not able to employ the

images they used, many of their most beautiful pictures are likely to be

to us but so many words suggesting prosaic ideas.

Shakespeare, describing certain beautiful music, appeals to the sense of

smell to make himself understood:

... it came o'er my ear like the sweet sound

That breathes upon a bank of violets,

Stealing and giving odor!

\_Lady Macbeth\_ cries:

Here's the smell of the blood still:

All the perfumes of Arabia will not sweeten this little hand.

Milton has \_Eve\_ say of her dream of the fatal apple:

... The pleasant sav'ry smell

So quickened appetite, that I, methought,

Could not but taste.

Likewise with the sense of touch:

... I take thy hand, this hand

As soft as dove's down, and as white as it.

Imagine a person devoid of delicate tactile imagery, with senseless

finger tips and leaden footsteps, undertaking to interpret these

exquisite lines:

Thus I set my printless feet

O'er the cowslip's velvet head,

That bends not as I tread.

Shakespeare thus appeals to the muscular imagery:

At last, a little shaking of mine arm

And thrice his head thus waving up and down,

He raised a sigh so piteous and profound

As it did seem to shatter all his bulk

And end his being.

Many passages like the following appeal to the temperature images:

Freeze, freeze, thou bitter sky,

Thou dost not bite so nigh

As benefits forgot!

To one whose auditory imagery is meager, the following lines will lose

something of their beauty:

How sweet the moonlight sleeps upon this bank!

Here we will sit and let the sounds of music

Creep in our ears; soft stillness and the night

Become the touches of sweet harmony.

Note how much clear images will add to Browning's words:

Are there not two moments in the adventure of a diver--one when a

beggar he prepares to plunge, and one, when a prince he rises with

his pearl?

POINTS WHERE IMAGES ARE OF GREATEST SERVICE.--Beyond question, many

images come flooding into our minds which are irrelevant and of no

service in our thinking. No one has failed to note many such. Further,

we undoubtedly do much of our best thinking with few or no images

present. Yet we need images. Where, then, are they most needed? \_Images

are needed wherever the percepts which they represent would be of

service.\_ Whatever one could better understand or enjoy or appreciate by

seeing it, hearing it, or perceiving it through some other sense, he can

better understand, enjoy or appreciate through images than by means of

ideas only.

5. THE CULTIVATION OF IMAGERY

IMAGES DEPEND ON SENSORY STIMULI.--The power of imaging can be

cultivated the same as any other ability.

In the first place, we may put down as an absolute requisite \_such an

environment of sensory stimuli as will tempt every sense to be awake and

at its best\_, that we may be led into a large acquaintance with the

objects of our material environment. No one's stock of sensory images is

greater than the sum total of his sensory experiences. No one ever has

images of sights, or sounds, or tastes, or smells which he has never

experienced.

Likewise, he must have had the fullest and freest possible liberty in

motor activities. For not only is the motor act itself made possible

through the office of imagery, but the motor act clarifies and makes

useful the images. The boy who has actually made a table, or a desk, or

a box has ever afterward a different and a better image of one of these

objects than before; so also when he has owned and ridden a bicycle, his

image of this machine will have a different significance from that of

the image founded upon the visual perception alone of the wheel he

longingly looked at through the store window or in the other boy's

dooryard.

THE INFLUENCE OF FREQUENT RECALL.--But sensory experiences and motor

responses alone are not enough, though they are the basis of good

imagery. \_There must be frequent recall.\_ The sunset may have been never

so brilliant, and the music never so entrancing; but if they are never

thought of and dwelt upon after they were first experienced, little will

remain of them after a very short time. It is by repeating them often in

experience through imagery that they become fixed, so that they stand

ready to do our bidding when we need next to use them.

THE RECONSTRUCTION OF OUR IMAGES.--To richness of experience and

frequency of the recall of our images we must add one more factor;

namely, that of their \_reconstruction\_ or working over. Few if any

images are exact recalls of former percepts of objects. Indeed, such

would be neither possible nor desirable. The images which we recall are

recalled for a purpose, or in view of some future activity, and hence

must be \_selective\_, or made up of the elements of several or many

former related images.

Thus the boy who wishes to construct a box without a pattern to follow

recalls the images of numerous boxes he may have seen, and from them all

he has a new image made over from many former percepts and images, and

this new image serves him as a working model. In this way he not only

gets a copy which he can follow to make his box, but he also secures a

new product in the form of an image different from any he ever had

before, and is therefore by so much the richer. It is this working over

of our stock of old images into new and richer and more suggestive ones

that constitutes the essence of constructive imagination.

The more types of imagery into which we can put our thought, the more

fully is it ours and the better our images. The spelling lesson needs

not only to be taken in through the eye, that we may retain a visual

image of the words, but also to be recited orally, so that the ear may

furnish an auditory image, and the organs of speech a motor image of the

correct forms. It needs also to be written, and thus given into the

keeping of the hand, which finally needs most of all to know and retain

it.

The reading lesson should be taken in through both the eye and the ear,

and then expressed by means of voice and gesture in as full and complete

a way as possible, that it may be associated with motor images. The

geography lesson needs not only to be read, but to be drawn, or molded,

or constructed. The history lesson should be made to appeal to every

possible form of imagery. The arithmetic lesson must be not only

computed, but measured, weighed, and pressed into actual service.

Thus we might carry the illustration into every line of education and

experience, and the same truth holds. \_What we desire to comprehend

completely and retain well, we must apprehend through all available

senses and conserve in every possible type of image and form of

expression.\_

6. PROBLEMS IN INTROSPECTION AND OBSERVATION

1. Observe a reading class and try to determine whether the pupils

picture the scenes and events they read about. How can you tell?

2. Similarly observe a history class. Do the pupils realize the events

as actually happening, and the personages as real, living people?

3. Observe in a similar way a class in geography, and draw conclusions.

A pupil in computing the cost of plastering a certain room based the

figures on the room \_filled full of plaster\_. How might visual imagery

have saved the error?

4. Imagine a three-inch cube. Paint it. Then saw it up into inch cubes,

leaving them all standing in the original form. How many inch cubes have

paint on three faces? How many on two faces? How many on one face? How

many have no paint on them? Answer all these questions by referring to

your imagery alone.

5. Try often to recall images in the various sensory lines; determine in

what classes of images you are least proficient and try to improve in

these lines.

6. How is the singing teacher able, after his class has sung through

several scores, to tell that they are flatting?

7. Study your imagery carefully for a few days to see whether you can

discover your predominating type of imagery.

CHAPTER IX

IMAGINATION

Everyone desires to have a good imagination, yet not all would agree as

to what constitutes a good imagination. If I were to ask a group of you

whether you have good imaginations, many of you would probably at once

fall to considering whether you are capable of taking wild flights into

impossible realms of thought and evolving unrealities out of airy

nothings. You would compare yourself with great imaginative writers,

such as Stevenson, Poe, De Quincey, and judge your power of imagination

by your ability to produce such tales as made them famous.

1. THE PLACE OF IMAGINATION IN MENTAL ECONOMY

But such a measure for the imagination as that just stated is far too

narrow. A good imagination, like a good memory, is the one which serves

its owner best. If DeQuincey and Poe and Stevenson and Bulwer found the

type which led them into such dizzy flights the best for their

particular purpose, well and good; but that is not saying that their

type is the best for you, or that you may not rank as high in some other

field of imaginative power as they in theirs. While you may lack in

their particular type of imagination, they may have been short in the

type which will one day make you famous. The artisan, the architect, the

merchant, the artist, the farmer, the teacher, the professional

man--all need imagination in their vocations not less than the writers

need it in theirs, but each needs a specialized kind adapted to the

particular work which he has to do.

PRACTICAL NATURE OF IMAGINATION.--Imagination is not a process of

thought which must deal chiefly with unrealities and impossibilities,

and which has for its chief end our amusement when we have nothing

better to do than to follow its wanderings. It is, rather, a

commonplace, necessary process which illumines the way for our everyday

thinking and acting--a process without which we think and act by

haphazard chance or blind imitation. It is the process by which the

images from our past experiences are marshaled, and made to serve our

present. Imagination looks into the future and constructs our patterns

and lays our plans. It sets up our ideals and pictures us in the acts of

achieving them. It enables us to live our joys and our sorrows, our

victories and our defeats before we reach them. It looks into the past

and allows us to live with the kings and seers of old, or it goes back

to the beginning and we see things in the process of the making. It

comes into our present and plays a part in every act from the simplest

to the most complex. It is to the mental stream what the light is to the

traveler who carries it as he passes through the darkness, while it

casts its beams in all directions around him, lighting up what otherwise

would be intolerable gloom.

IMAGINATION IN THE INTERPRETATION OF HISTORY, LITERATURE, AND ART.--Let

us see some of the most common uses of the imagination. Suppose I

describe to you the battle of the Marne. Unless you can take the images

which my words suggest and build them into struggling, shouting,

bleeding soldiers; into forts and entanglements and breastworks; into

roaring cannon and whistling bullet and screaming shell--unless you can

take all these separate images and out of them get one great unified

complex, then my description will be to you only so many words largely

without content, and you will lack the power to comprehend the

historical event in any complete way. Unless you can read the poem, and

out of the images suggested by the words reconstruct the picture which

was in the mind of the author as he wrote "The Village Blacksmith" or

"Snowbound," the significance will have dropped out, and the throbbing

scenes of life and action become only so many dead words, like the shell

of the chrysalis after the butterfly has left its shroud. Without the

power of imagination, the history of Washington's winter at Valley Forge

becomes a mere formal recital, and you can never get a view of the

snow-covered tents, the wind-swept landscape, the tracks in the snow

marked by the telltale drops of blood, or the form of the heartbroken

commander as he kneels in the silent wood to pray for his army. Without

the power to construct this picture as you read, you may commit the

words, and be able to recite them, and to pass examination upon them,

but the living reality of it will forever escape you.

Your power of imagination determines your ability to interpret literature

of all kinds; for the interpretation of literature is nothing, after

all, but the reconstruction on our part of the pictures with their

meanings which were in the mind of the writer as he penned the words,

and the experiencing of the emotions which moved him as he wrote. Small

use indeed to read the history of the centuries unless we can see in it

living, acting people, and real events occurring in actual environments.

Small use to read the world's great books unless their characters are

to us real men and women--our brothers and sisters, interpreted to us by

the master minds of the ages. Anything less than this, and we are no

longer dealing with literature, but with words--like musical sounds

which deal with no theme, or like picture frames in which no picture has

been set. Nor is the case different in listening to a speaker. His words

are to you only so many sensations of sounds of such and such pitches

and intensities and quality, unless your mind keeps pace with his and

continually builds the pictures which fill his thought as he speaks.

Lacking imagination, the sculptures of Michael Angelo and the pictures

of Raphael are to you so many pieces of curiously shaped marble and

ingeniously colored canvas. What the sculptor and the painter have

placed before you must suggest to you images and thoughts from your own

experience, to fill out and make alive the marble and the canvas, else

to you they are dead.

IMAGINATION AND SCIENCE.--Nor is imagination less necessary in other

lines of study. Without this power of building living, moving pictures

out of images, there is small use to study science beyond what is

immediately present to our senses; for some of the most fundamental laws

of science rest upon conceptions which can be grasped only as we have

the power of imagination. The student who cannot get a picture of the

molecules of matter, infinitely close to each other and yet never

touching, all in vibratory motion, yet each within its own orbit, each a

complete unit in itself, yet capable of still further division into

smaller particles,--the student who cannot see all this in a clear

visual image can never at best have more than a most hazy notion of the

theory of matter. And this means, finally, that the explanations of

light and heat and sound, and much besides, will be to him largely a

jumble of words which linger in his memory, perchance, but which never

vitally become a possession of his mind.

So with the world of the telescope. You may have at your disposal all

the magnificent lenses and the accurate machinery owned by modern

observatories; but if you have not within yourself the power to build

what these reveal to you, and what the books tell you, into the solar

system and still larger systems, you can never study astronomy except in

a blind and piecemeal sort of way, and all the planets and satellites

and suns will never for you form themselves into a system, no matter

what the books may say about it.

EVERYDAY USES OF IMAGINATION.--But we may consider a still more

practical phase of imagination, or at least one which has more to do

with the humdrum daily life of most of us. Suppose you go to your

milliner and tell her how you want your spring hat shaped and trimmed.

And suppose you have never been able to see this hat \_in toto\_ in your

mind, so as to get an idea of how it will look when completed, but have

only a general notion, because you like red velvet, white plumes, and a

turned-up rim, that this combination will look well together. Suppose

you have never been able to see how you would look in this particular

hat with your hair done in this or that way. If you are in this helpless

state shall you not have to depend finally on the taste of the milliner,

or accept the "model," and so fail to reveal any taste or individuality

on your own part?

How many times have you been disappointed in some article of dress,

because when you planned it you were unable to see it all at once so as

to get the full effect; or else you could not see yourself in it, and so

be able to judge whether it suited you! How many homes have in them

draperies and rugs and wall paper and furniture which are in constant

quarrel because someone could not see before they were assembled that

they were never intended to keep company! How many people who plan their

own houses, would build them just the same again after seeing them

completed? The man who can see a building complete before a brick has

been laid or a timber put in place, who can see it not only in its

details one by one as he runs them over in his mind, but can see the

building in its entirety, is the only one who is safe to plan the

structure. And this is the man who is drawing a large salary as an

architect, for imaginations of this kind are in demand. Only the one who

can see in his "mind's eye," before it is begun, the thing he would

create, is capable to plan its construction. And who will say that

ability to work with images of these kinds is not of just as high a type

as that which results in the construction of plots upon which stories

are built!

THE BUILDING OF IDEALS AND PLANS.--Nor is the part of imagination less

marked in the formation of our life's ideals and plans. Everyone who is

not living blindly and aimlessly must have some ideal, some pattern, by

which to square his life and guide his actions. At some time in our life

I am sure that each of us has selected the person who filled most nearly

our notion of what we should like to become, and measured ourselves by

this pattern. But there comes a time when we must idealize even the most

perfect individual; when we invest the character with attributes which

we have selected from some other person, and thus worship at a shrine

which is partly real and partly ideal.

As time goes on, we drop out more and more of the strictly individual

element, adding correspondingly more of the ideal, until our pattern is

largely a construction of our own imagination, having in it the best we

have been able to glean from the many characters we have known. How

large a part these ever-changing ideals play in our lives we shall never

know, but certainly the part is not an insignificant one. And happy the

youth who is able to look into the future and see himself approximating

some worthy ideal. He has caught a vision which will never allow him to

lag or falter in the pursuit of the flying goal which points the

direction of his efforts.

IMAGINATION AND CONDUCT.--Another great field for imagination is with

reference to conduct and our relations with others. Over and over again

the thoughtless person has to say, "I am sorry; I did not think." The

"did not think" simply means that he failed to realize through his

imagination what would be the consequences of his rash or unkind words.

He would not be unkind, but he did not imagine how the other would feel;

he did not put himself in the other's place. Likewise with reference to

the effects of our conduct on ourselves. What youth, taking his first

drink of liquor, would continue if he could see a clear picture of

himself in the gutter with bloated face and bloodshot eyes a decade

hence? Or what boy, slyly smoking one of his early cigarettes, would

proceed if he could see his haggard face and nerveless hand a few years

farther along? What spendthrift would throw away his money on vanities

could he vividly see himself in penury and want in old age? What

prodigal anywhere who, if he could take a good look at himself

sin-stained and broken as he returns to his "father's house" after the

years of debauchery in the "far country" would not hesitate long before

he entered upon his downward career?

IMAGINATION AND THINKING.--We have already considered the use of

imagination in interpreting the thoughts, feelings and handiwork of

others. Let us now look a little more closely into the part it plays in

our own thinking. Suppose that, instead of reading a poem, we are

writing one; instead of listening to a description of a battle, we are

describing it; instead of looking at the picture, we are painting it.

Then our object is to make others who may read our language, or listen

to our words, or view our handiwork, construct the mental images of the

situation which furnished the material for our thought.

Our words and other modes of expression are but the description of the

flow of images in our minds, and our problem is to make a similar stream

flow through the mind of the listener; but strange indeed would it be to

make others see a situation which we ourselves cannot see; strange if we

could draw a picture without being able to follow its outlines as we

draw. Or suppose we are teaching science, and our object is to explain

the composition of matter to someone, and make him understand how light,

heat, etc., depend on the theory of matter; strange if the listener

should get a picture if we ourselves are unable to get it. Or, once

more, suppose we are to describe some incident, and our aim is to make

its every detail stand out so clearly that no one can miss a single one.

Is it not evident that we can never make any of these images more clear

to those who listen to us or read our words than they are to ourselves?

2. THE MATERIAL USED BY IMAGINATION

What is the material, the mental content, out of which imagination

builds its structures?

IMAGES THE STUFF OF IMAGINATION.--Nothing can enter the imagination the

elements of which have not been in our past experience and then been

conserved in the form of images. The Indians never dreamed of a heaven

whose streets are paved with gold, and in whose center stands a great

white throne. Their experience had given them no knowledge of these

things; and so, perforce, they must build their heaven out of the images

which they had at command, namely, those connected with the chase and

the forest. So their heaven was the "happy hunting ground," inhabited by

game and enemies over whom the blessed forever triumphed. Likewise the

valiant soldiers whose deadly arrows and keen-edged swords and

battle-axes won on the bloody field of Hastings, did not picture a

far-off day when the opposing lines should kill each other with mighty

engines hurling death from behind parapets a dozen miles away. Firearms

and the explosive powder were yet unknown, hence there were no images

out of which to build such a picture.

I do not mean that your imagination cannot construct an object which has

never before been in your experience as a whole, for the work of the

imagination is to do precisely this thing. It takes the various images

at its disposal and builds them into \_wholes\_ which may never have

existed before, and which may exist now only as a creation of the mind.

And yet we have put into this new product not a single \_element\_ which

was not familiar to us in the form of an image of one kind or another.

It is the \_form\_ which is new; the \_material\_ is old. This is

exemplified every time an inventor takes the two fundamental parts of a

machine, the \_lever\_ and the \_inclined plane\_, and puts them together in

relations new to each other and so evolves a machine whose complexity

fairly bewilders us. And with other lines of thinking, as in mechanics,

inventive power consists in being able to see the old in new relations,

and so constantly build new constructions out of old material. It is

this power which gives us the daring and original thinker, the Newton

whose falling apple suggested to him the planets falling toward the sun

in their orbits; the Darwin who out of the thigh bone of an animal was

able to construct in his imagination the whole animal and the

environment in which it must have lived, and so add another page to the

earth's history.

THE TWO FACTORS IN IMAGINATION.--From the simple facts which we have

just been considering, the conclusion is plain that our power of

imagination depends on two factors; namely, (1) \_the materials available

in the form of usable images capable of recall\_, and (2) \_our

constructive ability\_, or the power to group these images into new

\_wholes, the process being guided by some purpose or end\_. Without this

last provision, the products of our imagination are daydreams with their

"castles in Spain," which may be pleasing and proper enough on

occasions, but which as an habitual mode of thought are extremely

dangerous.

IMAGINATION LIMITED BY STOCK OF IMAGES.--That the mind is limited in its

imagination by its stock of images may be seen from a simple

illustration: Suppose that you own a building made of brick, but that

you find the old one no longer adequate for your needs, and so purpose

to build a new one; and suppose, further, that you have no material for

your new building except that contained in the old structure. It is

evident that you will be limited in constructing your new building by

the material which was in the old. You may be able to build the new

structure in any one of a multitude of different forms or styles of

architecture, so far as the material at hand will lend itself to that

style of building, and providing, further, that you are able to make

the plans. But you will always be limited finally by the character and

amount of material obtainable from the old structure. So with the mind.

The old building is your past experience, and the separate bricks are

the images out of which you must build your new structure through the

imagination. Here, as before, nothing can enter which was not already on

hand. Nothing goes into the new structure so far as its constructive

material is concerned except images, and there is nowhere to get images

but from the results of our past experience.

LIMITED ALSO BY OUR CONSTRUCTIVE ABILITY.--But not only is our

imaginative output limited by the \_amount\_ of material in the way of

images which we have at our command, but also and perhaps not less by

our \_constructive ability\_. Many persons might own the old pile of

bricks fully adequate for the new structure, and then fail to get the

new because they were unable to construct it. So, many who have had a

rich and varied experience in many lines are yet unable to muster their

images of these experiences in such a way that new products are

obtainable from them. These have the heavy, draft-horse kind of

intellect which goes plodding on, very possibly doing good service in

its own circumscribed range, but destined after all to service in the

narrow field with its low, drooping horizon. They are never able to take

a dash at a two-minute clip among equally swift competitors, or even

swing at a good round pace along the pleasant highways of an experience

lying beyond the confines of the narrow \_here\_ and \_now\_. These are the

minds which cannot discover relations; which cannot \_think\_. Minds of

this type can never be architects of their own fate, or even builders,

but must content themselves to be hod carriers.

THE NEED OF A PURPOSE.--Nor are we to forget that we cannot

intelligently erect our building until we know the \_purpose\_ for which

it is to be used. No matter how much building material we may have on

hand, nor how skillful an architect we may be, unless our plans are

guided by some definite aim, we shall be likely to end with a structure

that is fanciful and useless. Likewise with our thought structure.

Unless our imagination is guided by some aim or purpose, we are in

danger of drifting into mere daydreams which not only are useless in

furnishing ideals for the guidance of our lives, but often become

positively harmful when grown into a habit. The habit of daydreaming is

hard to break, and, continuing, holds our thought in thrall and makes it

unwilling to deal with the plain, homely things of everyday life. Who

has not had the experience of an hour or a day spent in a fairyland of

dreams, and awakened at the end to find himself rather dissatisfied with

the prosaic round of duties which confronted him! I do not mean to say

that we should \_never\_ dream; but I know of no more pernicious mental

habit than that of daydreaming carried to excess, for it ends in our

following every will-o'-the-wisp of fancy, and places us at the mercy of

every chance suggestion.

3. TYPES OF IMAGINATION

Although imagination enters every field of human experience, and busies

itself with every line of human interest, yet all its activities can be

classed under two different types. These are (1) \_reproductive\_, and (2)

\_creative\_ imagination.

REPRODUCTIVE IMAGINATION.--Reproductive imagination is the type we use

when we seek to reproduce in our minds the pictures described by others,

or pictures from our own past experience which lack the completeness

and fidelity to make them true memory.

The narration or description of the story book, the history or geography

text; the tale of adventure recounted by traveler or hunter; the account

of a new machine or other invention; fairy tales and myths--these or any

other matter that may be put into words capable of suggesting images to

us are the field for reproductive imagination. In this use of the

imagination our business is to follow and not lead, to copy and not

create.

CREATIVE IMAGINATION.--But we must have leaders, originators--else we

should but imitate each other and the world would be at a standstill.

Indeed, every person, no matter how humble his station or how humdrum

his life, should be in some degree capable of initiative and

originality. Such ability depends in no small measure on the power to

use creative imagination.

Creative imagination takes the images from our own past experience or

those gleaned from the work of others and puts them together in new and

original forms. The inventor, the writer, the mechanic or the artist who

possesses the spirit of creation is not satisfied with \_mere\_

reproduction, but seeks to modify, to improve, to originate. True, many

important inventions and discoveries have come by seeming accident, by

being stumbled upon. Yet it holds that the person who thus stumbles upon

the discovery or invention is usually one whose creative imagination is

actively at work \_seeking\_ to create or discover in his field. The

world's progress as a whole does not come by accident, but by creative

planning. Creative imagination is always found at the van of progress,

whether in the life of an individual or a nation.

4. TRAINING THE IMAGINATION

Imagination is highly susceptible of cultivation, and its training

should constitute one of the most important aims of education. Every

school subject, but especially such subjects as deal with description

and narration--history, literature, geography, nature study and

science--is rich in opportunities for the use of imagination. Skillful

teaching will not only find in these subjects a means of training the

imagination, but will so employ imagination in their study as to make

them living matter, throbbing with life and action, rather than so many

dead words or uninteresting facts.

GATHERING OF MATERIAL FOR IMAGINATION.--Theoretically, then, it is not

hard to see what we must do to cultivate our imagination. In the first

place, we must take care to secure a large and usable \_stock of images\_

from all fields of perception. It is not enough to have visual images

alone or chiefly, for many a time shall we need to build structures

involving all the other senses and the motor activities as well. This

means that we must have a first-hand contact with just as large an

environment as possible--large in the world of Nature with all her

varied forms suited to appeal to every avenue of sense; large in our

contact with people in all phases of experience, laughing with those who

laugh and weeping with those who weep; large in contact with books, the

interpreters of the men and events of the past. We must not only let all

these kinds of environment drift in upon us as they may chance to do,

but we must deliberately \_seek\_ to increase our stock of experience;

for, after all, experience lies at the bottom of imagination as of every

other mental process. And not only must we thus put ourselves in the way

of acquiring new experience, but we must by recall and reconstruction,

as we saw in an earlier discussion, keep our imagery fresh and usable.

For whatever serves to improve our images, at the same time is bettering

the very foundation of imagination.

WE MUST NOT FAIL TO BUILD.--In the second place, we must not fail \_to

build\_. For it is futile to gather a large supply of images if we let

the material lie unused. How many people there are who put in all their

time gathering material for their structure, and never take time to do

the building! They look and listen and read, and are so fully occupied

in absorbing the immediately present that they have no time to see the

wider significance of the things with which they deal. They are like the

students who are too busy studying to have time to think. They are so

taken up with receiving that they never perform the higher act of

combining. They are the plodding fact gatherers, many of them doing good

service, collecting material which the seer and the philosopher, with

their constructive power, build together into the greater wholes which

make our systems of thought. They are the ones who fondly think that, by

reading books full of wild tales and impossible plots, they are training

their imagination. For them, sober history, no matter how heroic or

tragic in its quiet movements, is too tame. They have not the patience

to read solid and thoughtful literature, and works of science and

philosophy are a bore. These are the persons who put in all their time

in looking at and admiring other people's houses, and never get time to

do any building for themselves.

WE SHOULD CARRY OUR IDEALS INTO ACTION.--The best training for the

imagination which I know anything about is that to be obtained by taking

our own material and from it building our own structure. It is true

that it will help to look through other people's houses enough to

discover their style of building: we should read. But just as it is not

necessary for us to put in all the time we devote to looking at houses,

in inspecting doll houses and Chinese pagodas, so it is not best for us

to get all our notions of imaginative structures from the marvelous and

the unreal; we get good training for the imagination from reading

"Hiawatha," but so can we from reading the history of the primitive

Indian tribes. The pictures in "Snowbound" are full of suggestion for

the imagination: but so is the history of the Puritans in New England.

But even with the best of models before us, it is not enough to follow

others' building. We must construct stories for ourselves, must work out

plots for our own stories; we must have time to meditate and plan and

build, not idly in the daydream, but purposefully, and then make our

images real by \_carrying them out in activity\_, if they are of such a

character that this is possible; we must build our ideals and work to

them in the common course of our everyday life; we must think for

ourselves instead of forever following the thinking of others; we must

\_initiate\_ as well as imitate.

5. PROBLEMS FOR OBSERVATION AND INTROSPECTION

1. Explain the cause and the remedy in the case of such errors as the

following:

Children who defined mountain as land 1,000 or more feet in height

said that the factory smokestack was higher than the mountain

because it "went straight up" and the mountain did not.

Children often think of the horizon as fastened to the earth.

Islands are thought of as floating on the water.

2. How would you stimulate the imagination of a child who does not seem

to picture or make real the descriptions in reading, geography, etc.? Is

it possible that such inability may come from an insufficient basis in

observation, and hence in images?

3. Classify the school subjects, including domestic science and manual

training, as to their ability to train (1) reproductive and (2) creative

imagination.

4. Do you ever skip the descriptive parts of a book and read the

narrative? As you read the description of a bit of natural scenery, does

it rise before you? As you study the description of a battle, can you

see the movements of the troops?

5. Have you ever planned a house as you think you would like it? Can you

see it from all sides? Can you see all the rooms in their various

finishings and furnishings?

6. What plans and ideals have you formed, and what ones are you at

present following? Can you describe the process by which your plans or

ideals change? Do you ever try to put yourself in the other person's

place?

7. Take some fanciful unreality which your imagination has constructed

and see whether you can select from it familiar elements from actual

experiences.

8. What use do you make of imagination in the common round of duties in

your daily life? What are you doing to improve your imagination?

CHAPTER X

ASSOCIATION

Whence came the thought that occupies you this moment, and what

determines the next that is to follow? Introspection reveals no more

interesting fact concerning our minds than that our thoughts move in a

connected and orderly array and not in a hit-and-miss fashion. Our

mental states do not throng the stream of consciousness like so many

pieces of wood following each other at random down a rushing current,

now this one ahead, now that. On the contrary, our thoughts come, one

after the other, as they are beckoned or \_caused\_. The thought now in

the focal point of your consciousness appeared because it sprouted out

of the one just preceding it; and the present thought, before it

departs, will determine its successor and lead it upon the scene. This

is to say that our thought stream possesses not only a continuity, but

also a \_unity\_; it has coherence and system. This coherence and system,

which operates in accordance with definite laws, is brought about by

what the psychologist calls \_association\_.

1. THE NATURE OF ASSOCIATION

We may define association, then, as the tendency among our thoughts to

form such a system of bonds with each other that the objects of

consciousness are vitally connected both (1) as they exist at any given

moment, and (2) as they occur in succession in the mental stream.

THE NEURAL BASIS OF ASSOCIATION.--The association of thoughts--ideas,

images, memory--or of a situation with its response, rests primarily on

a neural basis. Association is the result of habit working in neurone

groups. Its fundamental law is stated by James as follows: "When two

elementary brain-processes have been active together or in immediate

succession, one of them, on recurring, tends to propagate its excitement

into the other." This is but a technical statement of the simple fact

that nerve currents flow most easily over the neurone connections that

they have already used.

It is hard to teach an old dog new tricks, because the old tricks employ

familiar, much-used neural paths, while new tricks require the

connecting up of groups of neurones not in the habit of working

together; and the flow of nerve energy is more easily accomplished in

the neurones accustomed to working together. One who learns to speak a

foreign language late in life never attains the facility and ease that

might have been reached at an earlier age. This is because the neural

paths for speech are already set for his mother-tongue, and, with the

lessened plasticity of age, the new paths are hard to establish.

The connections between the various brain areas, or groups of neurones,

are, as we have seen in an earlier chapter, accomplished by means of

\_association fibers\_. This function requires millions of neurones, which

unite every part of the cortex with every other part, thus making it

possible for a neural activity going on in any particular center to

extend to any other center whatsoever. In the relatively unripe brain of

the child, the association fibers have not yet set up most of their

connections. The age at which memory begins is determined chiefly by

the development of a sufficient number of association fibers to bring

about recall. The more complex reasoning, which requires many different

associative connections, is impossible prior to the existence of

adequate neural development. It is this fact that makes it futile to

attempt to teach young children the more complicated processes of

arithmetic, grammar, or other subjects. They are not yet equipped with

the requisite brain machinery to grasp the necessary associations.

[Illustration: FIG. 18.--Diagrammatic scheme of association, in which V

stands for the visual, A for the auditory, G for the gustatory, M for

the motor, and T for the thought and feeling centers of the cortex.]

ASSOCIATION THE BASIS OF MEMORY.--Without the machinery and processes of

association we could have no memory. Let us see in a simple illustration

how association works in recall. Suppose you are passing an orchard and

see a tree loaded with tempting apples. You hesitate, then climb the

fence, pick an apple and eat it, hearing the owner's dog bark as you

leave the place. The accompanying diagram will illustrate roughly the

centers of the cortex which were involved in the act, and the

association fibers which connect them. (See Fig. 18.) Now let us see

how you may afterward remember the circumstance through association. Let

us suppose that a week later you are seated at your dining table, and

that you begin to eat an apple whose flavor reminds you of the one which

you plucked from the tree. From this start how may the entire

circumstance be recalled? Remember that the cortical centers connected

with the sight of the apple tree, with our thoughts about it, with our

movements in getting the apple, and with hearing the dog bark, were all

active together with the taste center, and hence tend to be thrown into

activity again from its activity. It is easy to see that we may (1) get

a visual image of the apple tree and its fruit from a current over the

gustatory-visual association fibers; (2) the thoughts, emotions, or

deliberations which we had on the former occasion may again recur to us

from a current over the gustatory-thought neurones; (3) we may get an

image of our movements in climbing the fence and picking the apple from

a current over the gustatory-motor fibers; or (4) we may get an auditory

image of the barking of the dog from a current over the

gustatory-auditory fibers. Indeed, we are \_sure\_ to get some one or more

of these unless the paths are blocked in some way, or our attention

leads off in some other direction.

FACTORS DETERMINING DIRECTION OF RECALL.--\_Which\_ of these we get first,

which of the images the taste percept calls to take its place as it

drops out of consciousness, will depend, other things being equal, on

which center was most keenly active in the original situation, and is at

the moment most permeable. If, at the time we were eating the stolen

fruit, our thoughts were keenly self-accusing for taking the apples

without permission, then the current will probably discharge through

the path gustatory-thought, and we shall recall these thoughts and their

accompanying feelings. But if it chances that the barking of the dog

frightened us badly, then more likely the discharge from the taste

center will be along the path gustatory-auditory, and we shall get the

auditory image of the dog's barking, which in turn may call up a visual

image of his savage appearance over the auditory-visual fibers. It is

clear, however, that, given any one of the elements of the entire

situation back, the rest are potentially possible to us, and any one may

serve as a "cue" to call up all the rest. Whether, given the starting

point, we get them all, depends solely on whether the paths are

sufficiently open between them for the current to discharge between

them, granting that the first experience made sufficient impression to

be retained.

Since this simple illustration may be made infinitely complex by means

of the millions of fibers which connect every center in the cortex with

every other center, and since, in passing from one experience to another

in the round of our daily activities, these various areas are all

involved in an endless chain of activities so intimately related that

each one can finally lead to all the others, we have here the machinery

both of retention and of recall--the mechanism by which our past may be

made to serve the present through being reproduced in the form of memory

images or ideas. Through this machinery we are unable to escape our

past, whether it be good or bad; for both the good and the bad alike are

brought back to us through its operations.

When the repetition of a series of acts has rendered habit secure, the

association is relatively certain. If I recite to you A-B-C-D, your

thought at once runs on to E, F, G. If I repeat, "Tell me not in

mournful numbers," association leads you to follow with "Life is but an

empty dream." Your neurone groups are accustomed to act in this way, so

the sequence follows. Memorizing anything from the multiplication table

to the most beautiful gems of poetic fervor consists, therefore, in the

setting up of the right associative connections in the brain.

ASSOCIATION IN THINKING.--All thinking proceeds by the discovery or

recognition of relations between the terms or objects of our thought.

The science of mathematics rests on the relations found to exist between

numbers and quantities. The principles and laws of natural science are

based on the relations established among the different forms of matter

and the energy that operates in this field. So also in the realm of

history, art, ethics, or any other field of human experience. Each fact

or event must be linked to other facts or events before it possesses

significance. Association therefore lies at the foundation of all

thinking, whether that of the original thinker who is creating our

sciences, planning and executing the events of history, evolving a

system of ethics, or whether one is only learning these fields as they

already exist by means of study. Other things being equal, he is the

best thinker who has his knowledge related part to part so that the

whole forms a unified and usable system.

ASSOCIATION AND ACTION.--Association plays an equally important part in

all our motor responses, the acts by which we carry on our daily lives,

do our work and our play, or whatever else may be necessary in meeting

and adapting ourselves to our environment. Some sensations are often

repeated, and demand practically the same response each time. In such

cases the associations soon become fixed, and the response certain and

automatic. For example, we sit at the table, and the response of eating

follows, with all its complex acts, as a matter of course. We lie down

in bed, and the response of sleep comes. We take our place at the piano,

and our fingers produce the accustomed music.

It is of course obvious that the influence of association extends to

moral action as well. In general, our conduct follows the trend of

established associations. We are likely to do in great moral crises

about as we are in the habit of doing in small ones.

2. THE TYPES OF ASSOCIATION

FUNDAMENTAL LAW OF ASSOCIATION.--Stated on the physiological side, the

law of habit as set forth in the definition of association in the

preceding section includes all the laws of association. In different

phrasing we may say: (1) Neurone groups accustomed to acting together

have the tendency to work in unison. (2) The more frequently such groups

act together the stronger will be the tendency for one to throw the

other into action. Also, (3) the more intense the excitement or tension

under which they act together the stronger will be the tendency for

activity in one to bring about activity in the other.

The corresponding facts may be expressed in psychological terms as

follows: (1) Facts accustomed to being associated together in the mind

have a tendency to reappear together. (2) The more frequently these

facts appear together the stronger the tendency for the presence of one

to insure the presence of the other. (3) The greater the tension,

excitement or concentration when these facts appear in conjunction with

each other, the more certain the presence of one is to cause the

presence of the other.

Several different types of association have been differentiated by

psychologists from Aristotle down. It is to be kept in mind, however,

that all association types \_go back to the elementary law of

habit-connections among the neurones\_ for their explanation.

ASSOCIATION BY CONTIGUITY.--The recurrence in our minds of many of the

elements from our past experience is due to the fact that at some time,

possibly at many times, the recurring facts were contiguous in

consciousness with some other element or fact which happens now to be

again present. All have had the experience of meeting some person whom

we had not seen for several months or years, and having a whole series

of supposedly forgotten incidents or events connected with our former

associations flood into the mind. Things we did, topics we discussed,

trips we took, games we played, now recur at the renewal of our

acquaintance. For these are the things that were contiguous in our

consciousness with our sense of the personality and appearance of our

friend. And who has not in similar fashion had a whiff of perfume or the

strains of a song recall to him his childhood days! Contiguity is again

the explanation.

AT THE MERCY OF OUR ASSOCIATIONS.--Through the law thus operating we are

in a sense at the mercy of our associations, which may be bad as well as

good. We may form certain lines of interest to guide our thought, and

attention may in some degree direct it, but one's mental make-up is,

after all, largely dependent on the character of his associations. Evil

thoughts, evil memories, evil imaginations--these all come about through

the association of unworthy or impure images along with the good in our

stream of thought. We may try to forget the base deed and banish it

forever from our thinking, but lo! in an unguarded moment the nerve

current shoots into the old path, and the impure thought flashes into

the mind, unsought and unwelcomed. Every young man who thinks he must

indulge in a little sowing of wild oats before he settles down to a

correct life, and so deals in unworthy thoughts and deeds, is putting a

mortgage on his future; for he will find the inexorable machinery of his

nervous system grinding the hated images of such things back into his

mind as surely as the mill returns to the sack of the miller what he

feeds into the hopper. He may refuse to harbor these thoughts, but he

can no more hinder their seeking admission to his mind than he can

prevent the tramp from knocking at his door. He may drive such images

from his mind the moment they are discovered, and indeed is guilty if he

does not; but not taking offense at this rebuff, the unwelcome thought

again seeks admission.

The only protection against the return of the undesirable associations

is to choose lines of thought as little related to them as possible. But

even then, do the best we may, an occasional "connection" will be set

up, we know not how, and the unwelcome image stands staring us in the

face, as the corpse of Eugene Aram's victim confronted him at every

turn, though he thought it safely buried. A minister of my acquaintance

tells me that in the holiest moments of his most exalted thought, images

rise in his mind which he loathes, and from which he recoils in horror.

Not only does he drive them away at once, but he seeks to lock and bar

the door against them by firmly resolving that he will never think of

them again. But alas! that is beyond his control. The tares have been

sown among the wheat, and will persist along with it until the end. In

his boyhood these images were given into the keeping of his brain cells,

and they are only being faithful to their trust.

ASSOCIATION BY SIMILARITY AND CONTRAST.--All are familiar with the fact

that like tends to suggest like. One friend reminds us of another friend

when he manifests similar traits of character, shows the same tricks of

manner, or has the same peculiarities of speech or gesture. The telling

of a ghost or burglar story in a company will at once suggest a similar

story to every person of the group, and before we know it the

conversation has settled down to ghosts or burglars. One boastful boy is

enough to start the gang to recounting their real or imaginary exploits.

Good and beautiful thoughts tend to call up other good and beautiful

thoughts, while evil thoughts are likely to produce after their own

kind; like produces like.

Another form of relationship is, however, quite as common as similars in

our thinking. In certain directions we naturally think in \_opposites\_.

Black suggests white, good suggests bad, fat suggests lean, wealth

suggests poverty, happiness suggests sorrow, and so on.

The tendency of our thought thus to group in similars and opposites is

clear when we go back to the fundamental law of association. The fact is

that we more frequently assemble our thoughts in these ways than in

haphazard relations. We habitually group similars together, or compare

opposites in our thinking; hence these are the terms between which

associative bonds are formed.

PARTIAL, OR SELECTIVE, ASSOCIATION.--The past is never wholly reinstated

in present consciousness. Many elements, because they had formed fewer

associations, or because they find some obstacle to recall, are

permanently dropped out and forgotten. In other words, association is

always \_selective\_, favoring now this item of experience, now that,

above the rest.

It is well that this is so; for to be unable to escape from the great

mass of minutiæ and unimportant detail in one's past would be

intolerable, and would so cumber the mind with useless rubbish as to

destroy its usefulness. We have surely all had some experience with the

type of persons whose associations are so complete and impartial that

all their conversation teems with unessential and irrelevant details.

They cannot recount the simplest incident in its essential points but,

slaves to literalness, make themselves insufferable bores by entering

upon every lane and by-path of circumstance that leads nowhere and

matters not the least in their story. Dickens, Thackeray, George Eliot,

Shakespeare, and many other writers have seized upon such characters and

made use of them for their comic effect. James, in illustrating this

mental type, has quoted the following from Miss Austen's "Emma":

"'But where could \_you\_ hear it?' cried Miss Bates. 'Where could you

possibly hear it, Mr. Knightley? For it is not five minutes since I

received Mrs. Cole's note--no, it cannot be more than five--or at least

ten--for I had got my bonnet and spencer on, just ready to come out--I

was only gone down to speak to Patty again about the pork--Jane was

standing in the passage--were not you, Jane?--for my mother was so

afraid that we had not any salting-pan large enough. So I said I would

go down and see, and Jane said: "Shall I go down instead? for I think

you have a little cold, and Patty has been washing the kitchen." "Oh, my

dear," said I--well, and just then came the note.'"

THE REMEDY.--The remedy for such wearisome and fruitless methods of

association is, as a matter of theory, simple and easy. It is to

emphasize, intensify, and dwell upon the \_significant and essential\_ in

our thinking. The person who listens to a story, who studies a lesson,

or who is a participant in any event must apply a \_sense of value\_,

recognizing and fixing the important and relegating the trivial and

unimportant to their proper level. Not to train one's self to think in

this discriminating way is much like learning to play a piano by

striking each key with equal force!

3. TRAINING IN ASSOCIATION

Since association is at bottom nothing but habit at work in the mental

processes, it follows that it, like other forms of habit, can be

encouraged or suppressed by training. Certainly, no part of one's

education is of greater importance than the character of his

associations. For upon these will largely depend not alone the \_content\_

of his mental stream, the stuff of his thinking, but also its

\_organization\_, or the use made of the thought material at hand. In

fact, the whole science of education rests on the laws and principles

involved in setting up right systems of associative connections in the

individual.

THE PLEASURE-PAIN MOTIVE IN ASSOCIATION.--A general law seems to obtain

throughout the animal world that associative responses accompanied by

pleasure tend to persist and grow stronger, while those accompanied by

pain tend to weaken and fall away. The little child of two years may not

understand the gravity of the offense in tearing the leaves out of

books, but if its hands are sharply spatted whenever they tear a book,

the association between the sight of books and tearing them will soon

cease. In fact, all punishment should have for its object the use of

pain in the breaking of associative bonds between certain situations and

wrong responses to them.

On the other hand, the dog that is being trained to perform his tricks

is rewarded with a tidbit or a pat when the right response has been

made. In this way the bond for this particular act is strengthened

through the use of pleasure. All matter studied and learned under the

stimulus of good feeling, enthusiasm, or a pleasurable sense of victory

and achievement not only tends to set up more permanent and valuable

associations than if learned under opposite conditions, but it also

exerts a stronger appeal to our interest and appreciation.

The influence of mental attitude on the matter we study raises a

question as to the wisdom of assigning the committing of poetry, or

Bible verses, or the reading of so many pages of a literary masterpiece

as a punishment for some offense. How many of us have carried away

associations of dislike and bitterness toward some gem of verse or prose

or Scripture because of having our learning of it linked up with the

thought of an imposed task set as penance for wrong-doing! One person

tells me that to this day she hates the sight of Tennyson because this

was the volume from which she was assigned many pages to commit in

atonement for her youthful delinquencies.

INTEREST AS A BASIS FOR ASSOCIATION.--Associations established under the

stimulus of strong interest are relatively broad and permanent, while

those formed with interest flagging are more narrow and of doubtful

permanence. This statement is, of course, but a particular application

of the law of attention. Interest brings the whole self into action.

Under its urging the mind is active and alert. The new facts learned are

completely registered, and are assimilated to other facts to which they

are related. Many associative connections are formed, hence the new

matter is more certain of recall, and possesses more significance and

meaning.

ASSOCIATION AND METHODS OF LEARNING.--The number and quality of our

associations depends in no small degree on our methods of learning. We

may be satisfied merely to impress what we learn on our memory,

committing it uncritically as so many facts to be stored away as a part

of our education. We may go a step beyond this and grasp the simplest

and most obvious meanings, but not seek for the deeper and more

fundamental relations. We may learn separate sections or divisions of a

subject, accepting each as a more or less complete unit, without

connecting these sections and divisions into a logical whole.

But all such methods are a mistake. They do not provide for the

associative bonds between the various facts or groups of facts in our

knowledge, without which our facts are in danger of becoming but so much

lumber in the mind. Meanings, relations, definitely recognized

associations, should attach to all that we learn. Better far a smaller

amount of \_usable\_ knowledge than any quantity of unorganized and

undigested information, even if the latter sometimes allows us to pass

examinations and receive honor grades. In short, real mastery demands

that we \_think\_, that is \_relate\_ and \_associate\_, instead of merely

\_absorbing\_ as we learn.

4. PROBLEMS IN OBSERVATION AND INTROSPECTION

1. Test the uncontrolled associations of a group of pupils by

pronouncing to the class some word, as \_blue\_, and having the members

write down 20 words in succession as rapidly as they can, taking in each

instance the first word that occurs to them. The difference in the

scope, or range, of associations, can easily be studied by applying this

test to, say, a fourth grade and an eighth grade and then comparing

results.

2. Have you ever been puzzled by the appearance in your mind of some

fact or incident not thought of before for years? Were you able to trace

out the associative connection that caused the fact to appear? Why are

we sometimes unable to recall, when we need them, facts that we

perfectly well know?

3. You have observed that it is possible to be able to spell certain

words when they occur in a spelling lesson, but to miss them when

employing them in composition. It is possible to learn a conjugation or

a declension in tabular form, and then not be able to use the correct

forms of words in speech or writing. Relate these facts to the laws of

association, and recommend a method of instruction that will remove the

discrepancy.

4. To test the quickness of association in a class of children, copy the

following words clearly in a vertical column on a chart; have your class

all ready at a given signal; then display the chart before them for

sixty seconds, asking them to write down on paper the exact \_opposite\_

of as many words as possible in one minute. Be sure that all know just

what they are expected to do.

Bad, inside, slow, short, little, soft, black, dark, sad, true,

dislike, poor, well, sorry, thick, full, peace, few, below, enemy.

Count the number of correct opposites got by each pupil.

5. Can you think of garrulous persons among your acquaintance the

explanation of whose tiresomeness is that their association is of the

\_complete\_ instead of the \_selective\_ type? Watch for such illustrations

in conversation and in literature (e.g., Juliet's nurse).

6. Observe children in the schoolroom for good and poor training in

association. Have you ever had anything that you otherwise presumably

would enjoy rendered distasteful because of unpleasant associations?

Pass your own methods of learning in review, and also inquire into the

methods used by children in study, to determine whether they are

resulting in the best possible use of association.

CHAPTER XI

MEMORY

Every hour of our lives we call upon memory to supply us with some fact

or detail from out our past. Let memory wholly fail us, and we find

ourselves helpless and out of joint in a world we fail to understand. A

poor memory handicaps one in the pursuit of education, hampers him in

business or professional success, and puts him at a disadvantage in

every relation of life. On the other hand, a good memory is an asset on

which the owner realizes anew each succeeding day.

1. THE NATURE OF MEMORY

Now that you come to think of it, you can recall perfectly well that

Columbus discovered America in 1492; that your house is painted white;

that it rained a week ago today. But where were these once-known facts,

now remembered so easily, while they were out of your mind? Where did

they stay while you were not thinking of them? The common answer is,

"Stored away in my memory." Yet no one believes that the memory is a

warehouse of facts which we pack away there when we for a time have no

use for them, as we store away our old furniture.

WHAT IS RETAINED.--The truth is that the simple question I asked you is

by no means an easy one, and I will answer it myself by asking you an

easier one: As we sit with the sunlight streaming into our room, where

is the darkness which filled it last night? And where will all this

light be at midnight tonight? Answer these questions, and the ones I

asked about your remembered facts will be answered. While it is true

that, regardless of the conditions in our little room, darkness still

exists wherever there is no light, and light still exists wherever there

is no darkness, yet for this particular room \_there is no darkness when

the sun shines in\_, and \_there is no light when the room is filled with

darkness\_. So in the case of a remembered fact. Although the fact that

Columbus discovered America some four hundred years ago, that your house

is of a white color, that it rained a week ago today, exists as a fact

regardless of whether your minds think of these things at all, yet the

truth remains as before: for the particular mind which remembers these

things, \_the facts did not exist while they were out of the mind\_.

\_It is not the remembered fact which is retained\_, BUT THE POWER TO

REPRODUCE THE FACT WHEN WE REQUIRE IT.

THE PHYSICAL BASIS OF MEMORY.--The power to reproduce a once-known fact

depends ultimately on the brain. This is not hard to understand if we go

back a little and consider that brain activity was concerned in every

perception we have ever had, and in every fact we have ever known.

Indeed, it was through a certain neural activity of the cortex that you

were able originally to know that Columbus discovered America, that your

house is white, and that it rained on a day in the past. Without this

cortical activity, these facts would have existed just as truly, but

\_you\_ would never have known them. Without this neural activity in the

brain there is no consciousness, and to it we must look for the

recurrence in consciousness of remembered facts, as well as for those

which appear for the first time.

HOW WE REMEMBER.--Now, if we are to have a once-known fact repeated in

consciousness, or in other words \_remembered\_, what we must do on the

physiological side is to provide for a repetition of the neural activity

which was at first responsible for the fact's appearing in

consciousness. The mental accompaniment of the repeated activity \_is the

memory\_. Thus, as \_memory is the approximate repetition of

once-experienced mental states or facts, together with the recognition

of their belonging to our past, so it is accomplished by an approximate

repetition of the once-performed neural process in the cortex which

originally accompanied these states or facts\_.

The part played by the brain in memory makes it easy to understand why

we find it so impossible to memorize or to recall when the brain is

fatigued from long hours of work or lack of sleep. It also explains the

derangement in memory that often comes from an injury to the brain, or

from the toxins of alcohol, drugs or disease.

DEPENDENCE OF MEMORY ON BRAIN QUALITY.--Differences in memory ability,

while depending in part on the training memory receives, rest ultimately

on the memory-quality of the brain. James tells us that four distinct

types of brains may be distinguished, and he describes them as follows:

Brains that are:

(1) Like \_marble\_ to receive and like \_marble\_ to retain.

(2) Like \_wax\_ to receive and like \_wax\_ to retain.

(3) Like \_marble\_ to receive and like \_wax\_ to retain.

(4) Like \_wax\_ to receive and like \_marble\_ to retain.

The first type gives us those who memorize slowly and with much heroic

effort, but who keep well what they have committed. The second type

represents the ones who learn in a flash, who can cram up a lesson in a

few minutes, but who forget as easily and as quickly as they learn. The

third type characterizes the unfortunates who must labor hard and long

for what they memorize, only to see it quickly slipping from their

grasp. The fourth type is a rare boon to its possessor, enabling him

easily to stock his memory with valuable material, which is readily

available to him upon demand.

The particular type of brain we possess is given us through heredity,

and we can do little or nothing to change the type. Whatever our type of

brain, however, we can do much to improve our memory by obeying the laws

upon which all good memory depends.

2. THE FOUR FACTORS INVOLVED IN MEMORY

Nothing is more obvious than that memory cannot return to us what has

never been given into its keeping, what has not been retained, or what

for any reason cannot be recalled. Further, if the facts given back by

memory are not recognized as belonging to our past, memory would be

incomplete. Memory, therefore, involves the following four factors: (1)

\_registration\_, (2) \_retention\_, (3) \_recall\_, (4) \_recognition\_.

REGISTRATION.--By registration we mean the learning or committing of the

matter to be remembered. On the brain side this involves producing in

the appropriate neurones the activities which, when repeated again

later, cause the fact to be recalled. It is this process that

constitutes what we call "impressing the facts upon the brain."

Nothing is more fatal to good memory than partial or faulty

registration. A thing but half learned is sure to be forgotten. We

often stop in the mastery of a lesson just short of the full impression

needed for permanent retention and sure recall. We sometimes say to our

teachers, "I cannot remember," when, as a matter of fact, we have never

learned the thing we seek to recall.

RETENTION.--Retention, as we have already seen, resides primarily in the

brain. It is accomplished through the law of habit working in the

neurones of the cortex. Here, as elsewhere, habit makes an activity once

performed more easy of performance each succeeding time. Through this

law a neural activity once performed tends to be repeated; or, in other

words, a fact once known in consciousness tends to be remembered. That

so large a part of our past is lost in oblivion, and out of the reach of

our memory, is probably much more largely due to a failure to \_recall\_

than to \_retain\_. We say that we have forgotten a fact or a name which

we cannot recall, try as hard as we may; yet surely all have had the

experience of a long-striven-for fact suddenly appearing in our memory

when we had given it up and no longer had use for it. It was retained

all the time, else it never could have come back at all.

An aged man of my acquaintance lay on his deathbed. In his childhood he

had first learned to speak German; but, moving with his family when he

was eight or nine years of age to an English-speaking community, he had

lost his ability to speak German, and had been unable for a third of a

century to carry on a conversation in his mother tongue. Yet during the

last days of his sickness he lost almost wholly the power to use the

English language, and spoke fluently in German. During all these years

his brain paths had retained the power to reproduce the forgotten words,

even though for so long a time the words could not be recalled. James

quotes a still more striking case of an aged woman who was seized with a

fever and, during her delirious ravings, was heard talking in Latin,

Hebrew and Greek. She herself could neither read nor write, and the

priests said she was possessed of a devil. But a physician unraveled the

mystery. When the girl was nine years of age, a pastor, who was a noted

scholar, had taken her into his home as a servant, and she had remained

there until his death. During this time she had daily heard him read

aloud from his books in these languages. Her brain had indelibly

retained the record made upon it, although for years she could not have

recalled a sentence, if, indeed, she had ever been able to do so.

RECALL.--Recall depends entirely on association. There is no way to

arrive at a certain fact or name that is eluding us except by means of

some other facts, names, or what-not so related to the missing term as

to be able to bring it into the fold. Memory arrives at any desired fact

only over a bridge of associations. It therefore follows that the more

associations set up between the fact to be remembered and related facts

already in the mind, the more certain the recall. Historical dates and

events should when learned be associated with important central dates

and events to which they naturally attach. Geographical names, places or

other information should be connected with related material already in

the mind. Scientific knowledge should form a coherent and related whole.

In short, everything that is given over to the memory for its keeping

should be linked as closely as possible to material of the same sort.

This is all to say that we should not expect our memory to retain and

reproduce isolated, unrelated facts, but should give it the advantage

of as many logical and well grounded associations as possible.

RECOGNITION.--A fact reproduced by memory but not recognized as

belonging to our past experience would impress us as a new fact. This

would mean that memory would fail to link the present to the past. Often

we are puzzled to know whether we have before met a certain person, or

on a former occasion told a certain story, or previously experienced a

certain present state of mind which seems half familiar. Such baffling

mental states are usually but instances of partial and incomplete

recognition. Recognition no longer applies to much of our knowledge; for

example, we say we remember that four times six is twenty-four, but

probably none of us can recall when and where we learned this fact--we

cannot \_recognize\_ it as belonging to our past experience. So with ten

thousand other things, which we \_know\_ rather than remember in the

strict sense.

3. THE STUFF OF MEMORY

What are the forms in which memory presents the past to us? What are the

elements with which it deals? What is the stuff of which it consists?

IMAGES AS THE MATERIAL OF MEMORY.--In the light of our discussion upon

mental imagery, and with the aid of a little introspection, the answer

is easy. I ask you to remember your home, and at once a visual image of

the familiar house, with its well-known rooms and their characteristic

furnishings, comes to your mind. I ask you to remember the last concert

you attended, or the chorus of birds you heard recently in the woods;

and there comes a flood of images, partly visual, but largely auditory,

from the melodies you heard. Or I ask you to remember the feast of

which you partook yesterday, and gustatory and olfactory images are

prominent among the others which appear. And so I might keep on until I

had covered the whole range of your memory; and, whether I ask you for

the simple trivial experiences of your past, for the tragic or crucial

experiences, or for the most abstruse and abstract facts which you know

and can recall, the case is the same: much of what memory presents to

you comes in the form of \_images\_ or of \_ideas\_ of your past.

IMAGES VARY AS TO TYPE.--We do not all remember what we call the same

fact in like images or ideas. When you remembered that Columbus

discovered America in 1492, some of you had an image of Columbus the

mariner standing on the deck of his ship, as the old picture shows him;

and accompanying this image was an idea of "long agoness." Others, in

recalling the same fact, had an image of the coast on which he landed,

and perchance felt the rocking of the boat and heard it scraping on the

sand as it neared the shore. And still others saw on the printed page

the words stating that Columbus discovered America in 1492. And so in an

infinite variety of images or ideas we may remember what we call the

same fact, though of course the fact is not really the same fact to any

two of us, nor to any one of us when it comes to us on different

occasions in different images.

OTHER MEMORY MATERIAL.--But sensory images are not the only material

with which memory has to deal. We may also recall the bare fact that it

rained a week ago today without having images of the rain. We may recall

that Columbus discovered America in 1492 without visual or other images

of the event. As a matter of fact we do constantly recall many facts of

abstract nature, such as mathematical or scientific formulæ with no

imagery other than that of the words or symbols, if indeed these be

present. Memory may therefore use as its stuff not only images, but also

a wide range of facts, ideas and meanings of all sorts.

4. LAWS UNDERLYING MEMORY

The development of a good memory depends in no small degree on the

closeness with which we follow certain well-demonstrated laws.

THE LAW OF ASSOCIATION.--The law of association, as we have already

seen, is fundamental. Upon it the whole structure of memory depends.

Stating this law in neural terms we may say: Brain areas which are

\_active together at the same time tend to establish associative paths\_,

so that when one of them is again active the other is also brought into

activity. Expressing the same truth in mental terms: If two facts or

experiences \_occur together in consciousness\_, and one of them is later

recalled, it tends to cause the other to appear also.

THE LAW OF REPETITION.--The law of repetition is but a restatement of

the law of habit, and may be formulated as follows: The \_more

frequently\_ a certain cortical activity occurs, the more easily is its

repetition brought about. Stating this law in mental terms we may say:

The more often a fact is recalled in consciousness the easier and more

certain the recall becomes. It is upon the law of repetition that

reviews and drills to fix things in the memory are based.

THE LAW OF RECENCY.--We may state the law of recency in physiological

terms as follows: The \_more recently\_ brain centers have been employed

in a certain activity, the more easily are they thrown into the same

activity. This, on the mental side, means: The more recently any facts

have been present in consciousness the more easily are they recalled. It

is in obedience to this law that we want to rehearse a difficult lesson

just before the recitation hour, or cram immediately before an

examination. The working of this law also explains the tendency of all

memories to fade out as the years pass by.

THE LAW OF VIVIDNESS.--The law of vividness is of primary importance in

memorizing. On the physical side it may be expressed as follows: The

\_higher the tension\_ or the more intense the activity of neural centers

the more easily the activity is repeated. The counterpart of this law in

mental terms is: \_The higher the degree of attention\_ or concentration

when the fact is registered the more certain it is of recall. Better far

one impression of a high degree of vividness than several repetitions

with the attention wandering or the brain too fatigued to respond. Not

drill alone, but drill with concentration, is necessary to sure

memory,--in proof of which witness the futile results on the part of the

small boy who "studies his spelling lesson over fifteen times," the

while he is at the same time counting his marbles.

5. RULES FOR USING THE MEMORY

Much careful and fruitful experimentation in the field of memory has

taken place in recent years. The scientists are now able to give us

certain simple rules which we can employ in using our memories, even if

we lack the time or opportunity to follow all their technical

discussions.

WHOLES VERSUS PARTS.--Probably most people in setting to work to commit

to memory a poem, oration, or other such material, have a tendency to

learn it first by stanzas or sections and then put the parts together to

form the whole. Many tests, however, have shown this to be a less

effective method than to go over the whole poem or oration time after

time, finally giving special attention to any particularly difficult

places. The only exception to this rule would seem to be in the case of

very long productions, which may be broken up into sections of

reasonable length. The method of committing by wholes instead of parts

not only economizes time and effort in the learning, but also gives a

better sense of unity and meaning to the matter memorized.

RATE OF FORGETTING.--The rate of forgetting is found to be very much

more rapid immediately following the learning than after a longer time

has elapsed. This is to say that of what one is going to forget of

matter committed to memory approximately one-half will fall away within

the first twenty-four hours and three-fourths within the first three

days. Since it is always economy to fix afresh matter that is fading out

before it has been wholly forgotten, it will manifestly pay to review

important memory material within the first day or two after it has once

been memorized.

DIVIDED PRACTICE.--If to commit a certain piece of material we must go

over it, say, ten different times, the results are found to be much

better when the entire number of repetitions are not had in immediate

succession, but with reasonable intervals between. This is due, no

doubt, to the well-known fact that associations tend to take form and

grow more secure even after we have ceased to think specifically of the

matter in hand. The intervals allow time for the associations to form

their connections. It is in this sense that James says we "learn to swim

during the winter and to skate during the summer."

FORCING THE MEMORY TO ACT.--In committing matter by reading it, the

memory should be forced into activity just as fast as it is able to

carry part of the material. If, after reading a poem over once, parts of

it can be repeated without reference to the text, the memory should be

compelled to reproduce these parts. So with all other material.

Re-reading should be applied only at such points as the memory has not

yet grasped.

NOT A MEMORY, BUT MEMORIES.--Professor James has emphasized the fact,

which has often been demonstrated by experimental tests, that we do not

possess a memory, but a collection of memories. Our memory may be very

good in one line and poor in another. Nor can we "train our memory" in

the sense of practicing it in one line and having the improvement extend

equally to other lines. Committing poetry may have little or no effect

in strengthening the memory for historical or scientific data. In

general, the memory must be trained in the specific lines in which it is

to excel. General training will not serve except as it may lead to

better modes of learning what is to be memorized.

6. WHAT CONSTITUTES A GOOD MEMORY

Let us next inquire what are the qualities which enter into what we call

a good memory. The merchant or politician will say, "Ability to remember

well people's faces and names"; the teacher of history, "The ability to

recall readily dates and events"; the teacher of mathematics, "The power

to recall mathematical formulæ"; the hotel waiter, "The ability to keep

in mind half-a-dozen orders at a time"; the manager of a corporation,

"The ability to recall all the necessary details connected with the

running of the concern." While these answers are very divergent, yet

they may all be true for the particular person testifying; for out of

them all there emerges this common truth, that \_the best memory is the

one which best serves its possessor\_. That is, one's memory not only

must be ready and exact, but must produce the right kind of material; it

must bring to us what we need in our thinking. A very easy corollary at

once grows out of this fact; namely, that in order to have the memory

return to us the right kind of matter, we must store it with the right

kind of images and ideas, for the memory cannot give back to us anything

which we have not first given into its keeping.

A GOOD MEMORY SELECTS ITS MATERIAL.--The best memory is not necessarily

the one which impartially repeats the largest number of facts of past

experience. Everyone has many experiences which he never needs to have

reproduced in memory; useful enough they may have been at the time, but

wholly useless and irrelevant later. They have served their purpose, and

should henceforth slumber in oblivion. They would be but so much rubbish

and lumber if they could be recalled. Everyone has surely met that

particular type of bore whose memory is so faithful to details that no

incident in the story he tells, no matter however trivial, is ever

omitted in the recounting. His associations work in such a tireless

round of minute succession, without ever being able to take a jump or a

short cut, that he is powerless to separate the wheat from the chaff; so

he dumps the whole indiscriminate mass into our long-suffering ears.

Dr. Carpenter tells of a member of Parliament who could repeat long

legal documents and acts of Parliament after one reading. When he was

congratulated on his remarkable gift, he replied that, instead of being

an advantage to him, it was often a source of great inconvenience,

because when he wished to recollect anything in a document he had read,

he could do it only by repeating the whole from the beginning up to the

point which he wished to recall. Maudsley says that the kind of memory

which enables a person "to read a photographic copy of former

impressions with his mind's eye is not, indeed, commonly associated with

high intellectual power," and gives as a reason that such a mind is

hindered by the very wealth of material furnished by the memory from

discerning the relations between separate facts upon which judgment and

reasoning depend. It is likewise a common source of surprise among

teachers that many of the pupils who could outstrip their classmates in

learning and memory do not turn out to be able men. But this, says

Whately, "is as reasonable as to wonder that a cistern if filled should

not be a perpetual fountain." It is possible for one to be so lost in a

tangle of trees that he cannot see the woods.

A GOOD MEMORY REQUIRES GOOD THINKING.--It is not, then, mere

re-presentation of facts that constitutes a good memory. The pupil who

can reproduce a history lesson by the page has not necessarily as good a

memory as the one who remembers fewer facts, but sees the relations

between those remembered, and hence is \_able to choose what he will

remember\_. Memory must be \_discriminative\_. It must fasten on that which

is important and keep that for us. Therefore we can agree that "\_the art

of remembering is the art of thinking\_." Discrimination must select the

important out of our mental stream, and these images must be associated

with as many others as possible which are already well fixed in memory,

and hence are sure of recall when needed. In this way the old will

always serve as a cue to call up the new.

MEMORY MUST BE SPECIALIZED.--And not only must memory, if it is to be a

good memory, omit the generally worthless, or trivial, or irrelevant,

and supply the generally useful, significant, and relevant, but it must

in some degree be a \_specialized memory\_. It must minister to the

particular needs and requirements of its owner. Small consolation to you

if you are a Latin teacher, and are able to call up the binomial theorem

or the date of the fall of Constantinople when you are in dire need of a

conjugation or a declension which eludes you. It is much better for the

merchant and politician to have a good memory for names and faces than

to be able to repeat the succession of English monarchs from Alfred the

Great to Edward VII and not be able to tell John Smith from Tom Brown.

It is much more desirable for the lawyer to be able to remember the

necessary details of his case than to be able to recall all the various

athletic records of the year; and so on.

In order to be a good memory for \_us\_, our memory must be faithful in

dealing with the material which constitutes the needs of our vocations.

Our memory may, and should, bring to us many things outside of our

immediate vocations, else our lives will be narrow; but its chief

concern and most accurate work must be along the path of our everyday

requirements at its hands. And this works out well in connection with

the physiological laws which were stated a little while since, providing

that our vocations are along the line of our interests. For the things

with which we work daily, and in which we are interested, will be often

thought of together, and hence will become well associated. They will be

frequently recalled, and hence more easily remembered; they will be

vividly experienced as the inevitable result of interest, and this goes

far to insure recall.

7. MEMORY DEVICES

Many devices have been invented for training or using the memory, and

not a few worthless "systems" have been imposed by conscienceless fakers

upon uninformed people. All memorizing finally must go back to the

fundamental laws of brain activity and the rules growing out of these

laws. There is no "royal road" to a good memory.

THE EFFECTS OF CRAMMING.--Not a few students depend on cramming for much

of their learning. If this method of study would yield as valuable

permanent results, it would be by far the most sensible and economical

method to use; for under the stress of necessity we often are able to

accomplish results much faster than when no pressure is resting upon us.

The difficulty is, however, that the results are not permanent; the

facts learned do not have time to seek out and link themselves to

well-established associates; learned in an hour, their retention is as

ephemeral as the application which gave them to us.

Facts which are needed but temporarily and which cannot become a part of

our body of permanent knowledge may profitably be learned by cramming.

The lawyer needs many details for the case he is trying, which not only

are valueless to him as soon as the case is decided, but would

positively be in his way. He may profitably cram such facts. But those

facts which are to become a permanent part of his mental equipment, such

as the fundamental principles of law, he cannot cram. These he must have

in a logical chain which will not leave their recall dependent upon a

chance cue. Crammed facts may serve us during a recitation or an

examination, but they never really become a part of us. Nothing can take

the place of the logical placing of facts if they are to be remembered

with facility, and be usable in thinking when recalled.

REMEMBERING ISOLATED FACTS.--But after all this is taken into

consideration there still remain a large number of facts which refuse to

fit into any connected or logical system. Or, if they do belong with

some system, their connection is not very close, and we have more need

for the few individual facts than for the system as a whole. Hence we

must have some means of remembering such facts other than by connecting

them with their logical associations. Such facts as may be typified by

the multiplication table, certain dates, events, names, numbers,

errands, and engagements of various kinds--all these need to be

remembered accurately and quickly when the occasion for them arises. We

must be able to recall them with facility, so that the occasion will not

have passed by before we can secure them and we have failed to do our

part because of the lapse.

With facts of this type the means of securing a good memory are the same

as in the case of logical memory, except that we must of necessity

forego the linking to naturally related associates. We can, however,

take advantage of the three laws which have been given. If these methods

are used faithfully, then we have done what we can in the way of

insuring the recall of facts of this type, unless we associate them with

some artificial cue, such as tying a thread around our finger to

remember an errand, or learning the multiplication table by singing it.

We are not to be too ready to excuse ourselves, however, if we have

forgotten to mail the letter or deliver the message; for our attention

may have been very lax when we recorded the direction in the first

place, and we may never have taken the trouble to think of the matter

between the time it was given into our keeping and the time we were to

perform the errand.

MNEMONIC DEVICES.--Many ingenious devices have been invented to assist

the memory. No doubt each one of you has some way of your own of

remembering certain things committed to you, or some much-needed fact

which has a tendency to elude you. You may not tie the traditional

string around your finger or place your watch in the wrong pocket; but

if not, you have invented some method which suits your convenience

better. While many books have been written, and many lectures given

exploiting mnemonic systems, they are, however, all founded upon the

same general principle: namely, that of \_association of ideas\_ in the

mind. They all make use of the same basis for memory that any of us use

every time we remember anything, from the commonest event which occurred

last hour to the most abstruse bit of philosophy which we may have in

our minds. They all tie the fact to be remembered to some other fact

which is sure of recall, and then trust the old fact to bring the new

along with it when it again comes into the mind.

Artificial devices may be permissible in remembering the class of facts

which have no logical associates in which we can relate them; but even

then I cannot help feeling that if we should use the same care and

ingenuity in carefully recording the seemingly unrelated facts that we

do in working out the device and making the association in it, we should

discover hidden relations for most of the facts we wish to remember, and

we should be able to insure their recall as certainly and in a better

way than through the device. Then, also, we should not be in danger of

handing over to the device various facts for which we should discover

relations, thus placing them in the logical body of our usable

knowledge where they belong.

8. PROBLEMS IN OBSERVATION AND INTROSPECTION

1. Carefully consider your own powers of memory and see whether you can

decide which of the four types of brain you have. Apply similar tests to

your classmates or a group of school children whom you have a chance to

observe. Be sure to take into account the effects of past training or

habits of memory.

2. Watch in your own memorizing and also that of school children for

failures in recall caused by lack of proper associations. Why is it

particularly hard to commit what one does not understand?

3. Observe a class in a recitation or an examination and seek to

discover whether any defects of memory revealed are to be explained by

lack of (1) repetition, (2) recency, (3) vividness in learning.

4. Make a study of your own class and also of a group of children in

school to discover their methods of memorizing. Have in mind the rules

for memorizing given in section 5 of this chapter.

5. Observe by introspection your method of recall of historical events

you have studied, and note whether \_images\_ form an important part of

your memory material; or does your recall consist chiefly of bare

\_facts\_? In how far does this depend on your method of \_learning\_ the

facts in the first place?

6. Carefully consider your experience from cramming your lessons. Does

the material learned in this way stay with you? Do you \_understand\_ it

and find yourself able to \_use\_ it as well as stuff learned during a

longer interval and with more time for associations to form?

CHAPTER XII

THINKING

No word is more constantly on our lips than the word \_think\_. A hundred

times a day we tell what we think about this thing or that. Any

exceptional power of thought classes us among the efficient of our

generation. It is in their ability to think that men stand preëminently

above the animals.

1. DIFFERENT TYPES OF THINKING

The term \_think\_, or \_thinking\_, is employed in so many different senses

that it will be well first of all to come to an understanding as to its

various uses. Four different types of thinking which we shall note

are:[5] (1) \_chance\_, or idle, thinking; (2) thinking in the form of

\_uncritical belief\_; (3) \_assimilative\_ thinking; and (4) \_deliberative\_

thinking.

CHANCE OR IDLE THINKING.--Our thinking is of the chance or idle kind

when we think to no conscious end. No particular problem is up for

solution, and the stream of thought drifts along in idleness. In such

thinking, immediate interest, some idle fancy, the impulse of the

moment, or the suggestions from our environment determine the train of

associations and give direction to our thought. In a sense, we surrender

our mental bark to the winds of circumstance to drive it whithersoever

they will without let or hindrance from us. Since no results are sought

from our thinking, none are obtained. The best of us spend more time in

these idle trains of thought than we would like to admit, while inferior

and untrained minds seldom rise above this barren thought level. Not

infrequently even when we are studying a lesson which demands our best

thought power we find that an idle chain of associations has supplanted

the more rigid type of thinking and appropriated the field.

UNCRITICAL BELIEF.--We often say that we think a certain thing is true

or false when we have, as a matter of fact, done little or no thinking

about it. We only \_believe\_, or uncritically accept, the common point of

view as to the truth or untruth of the matter concerned. The ancients

believed that the earth was flat, and the savages that eclipses were

caused by animals eating up the moon. Not a few people today believe

that potatoes and other vegetables should be planted at a certain phase

of the moon, that sickness is a visitation of Providence, and that

various "charms" are potent to bring good fortune or ward off disaster.

Probably not one in a thousand of those who accept such beliefs could

give, or have ever tried to give, any rational reason for their point of

view.

But we must not be too harsh toward such crude illustrations of

uncritical thinking. It is entirely possible that not all of us who

pride ourselves on our trained powers of thought could give good reasons

discovered by our own thinking why we think our political party, our

church, or our social organization is better than some other one. How

few of us, after all, really \_discover\_ our creed, \_join\_ a church, or

\_choose\_ a political party! We adopt the points of view of our nation or

our group much as we adopt their customs and dress--not because we are

convinced by thinking that they are best, but because they are less

trouble.

ASSIMILATIVE THINKING.--It is this type of thinking that occupies us

when we seek to appropriate new facts or ideas and understand them; that

is, relate them to knowledge already on hand. We think after this

fashion in much of our study in schools and textbooks. The problem for

our thought is not so much one of invention or discovery as of grasp and

assimilation. Our thinking is to apprehend meanings and relations, and

so unify and give coherence to our knowledge.

In the absence of this type of thinking one may commit to memory many

facts that he does not understand, gather much information that contains

little meaning to him, and even achieve very creditable scholastic

grades that stand for a small amount of education or development. For

all information, to become vital and usable, must be thought into

relation to our present active, functioning body of knowledge; therefore

assimilative thinking is fundamental to true mastery and learning.

DELIBERATIVE THINKING.--Deliberative thinking constitutes the highest

type of thought process. In order to do deliberative thinking there is

necessary, first of all, what Dewey calls a "split-road" situation. A

traveler going along a well-beaten highway, says Dr. Dewey, does not

deliberate; he simply keeps on going. But let the highway split into two

roads at a fork, only one of which leads to the desired destination, and

now a problem confronts him; he must take one road or the other, but

\_which\_? The intelligent traveler will at once go to \_seeking for

evidence\_ as to which road he should choose. He will balance this fact

against that fact, and this probability against that probability, in an

effort to arrive at a solution of his problem.

Before we can engage in deliberative thinking we must be confronted by

some problem, some such "\_split-road\_" situation in our mental

stream--we must have something to think about. It is this fact that

makes one writer say that the great purpose of one's education is not to

solve all his problems for him. It is rather to help him (1) to

\_discover\_ problems, or "\_split-road\_" situations, (2) to assist him in

gathering the facts necessary for their solution, and (3) to train him

in the weighing of his facts or evidence, that is, in deliberative

thinking. Only as we learn to recognize the true problems that confront

us in our own lives and in society about us can we become thinkers in

the best sense. Our own plans and projects, the questions of right and

wrong that are constantly arising, the social, political and religious

problems awaiting solution, all afford the opportunity and the necessity

for deliberative thinking. And unhappy is the pupil whose school work

does not set the problems and employ the methods which will insure

training in this as well as in the assimilative type of thinking. Every

school subject, besides supplying certain information to be "learned,"

should present its problems requiring true deliberative thinking within

the range of development and ability of the pupil, and no

subject--literature, history, science, language--is without many such

problems.

2. THE FUNCTION OF THINKING

All true thinking is for the purpose of discovering relations between

the things we think about. Imagine a world in which nothing is related

to anything else; in which every object perceived, remembered, or

imagined, stands absolutely by itself, independent and self-sufficient!

What a chaos it would be! We might perceive, remember, and imagine all

the various objects we please, but without the power to think them

together, they would all be totally unrelated, and hence have no

meaning.

MEANING DEPENDS ON RELATIONS.--To have a rational meaning for us, things

must always be defined in terms of other things, or in terms of their

uses. \_Fuel\_ is that which feeds \_fire\_. \_Food\_ is what is eaten for

\_nourishment\_. A \_locomotive\_ is a machine for \_drawing a train\_.

\_Books\_ are to \_read\_, \_pianos\_ to \_play\_, \_balls\_ to \_throw\_, \_schools\_

to \_instruct\_, \_friends\_ to \_enjoy\_, and so on through the whole list of

objects which we know or can define. Everything depends for its meaning

on its relation to other things; and the more of these relations we can

discover, the more fully do we see the meaning. Thus balls may have

other uses than to throw, schools other functions than to instruct, and

friends mean much more to us than mere enjoyment. And just in the degree

in which we have realized these different relations, have we defined the

object, or, in other words, have we seen its meaning.

THE FUNCTION OF THINKING IS TO DISCOVER RELATIONS.--Now it is by

\_thinking\_ that these relations are discovered. This is the function of

thinking. Thinking takes the various separate items of our experience

and discovers to us the relations existing among them, and builds them

together into a unified, related, and usable body of knowledge,

threading each little bit on the string of relationship which runs

through the whole. It was, no doubt, this thought which Tennyson had in

mind when he wrote:

Flower in the crannied wall,

I pluck you out of the crannies,

I hold you here, root and all, in my hand,

Little flower--but if I could understand

What you are, root and all, and all in all,

I should know what God and man is.

Starting in with even so simple a thing as a little flower, if he could

discover all the relations which every part bears to every other part

and to all other things besides, he would finally reach the meaning of

God and man. For each separate thing, be it large or small, forms a link

in an unbroken chain of relationships which binds the universe into an

ordered whole.

NEAR AND REMOTE RELATIONS.--The relations discovered through our

thinking may be very close and simple ones, as when a child sees the

relation between his bottle and his dinner; or they may be very remote

ones, as when Newton saw the relation between the falling of an apple

and the motion of the planets in their orbits. But whether simple or

remote, the seeing of the relationships is in both cases alike thinking;

for thinking is nothing, in its last analysis, but the discovering of

the relationships which exist between the various objects in our mental

stream.

Thinking passes through all grades of complexity, from the first faint

dawnings in the mind of the babe when it sees the relation between the

mother and its feeding, on to the mighty grasp of the sage who is able

to "think God's thoughts after Him." But it all comes to the same end

finally--the bringing to light of new meanings through the discovery of

new relations. And whatever does this is thinking.

CHILD AND ADULT THINKING.--What constitutes the difference in the

thinking of the child and that of the sage? Let us see whether we can

discover this difference. In the first place the relations seen by the

child are \_immediate\_ relations: they exist between simple percepts or

images; the remote and the general are beyond his reach. He has not had

sufficient experience to enable him to discover remote relations. He

cannot think things which are absent from him, or which he has never

known. The child could by no possibility have seen in the falling apple

what Newton saw; for the child knew nothing of the planets in their

orbits, and hence could not see relations in which these formed one of

the terms. The sage, on the other hand, is not limited to his immediate

percepts or their images. He can see remote relations. He can go beyond

individuals, and think in classes. The falling apple is not a mere

falling apple to him, but one of a \_class of falling bodies\_. Besides a

rich experience full of valuable facts, the trained thinker has acquired

also the habit of looking out for relations; he has learned that this is

the method \_par excellence\_ of increasing his store of knowledge and of

rendering effective the knowledge he has. He has learned how to think.

The chief business of the child is the collection of the materials of

thought, seeing only the more necessary and obvious relations as he

proceeds; his chief business when older grown is to seek out the network

of relations which unites this mass of material, and through this

process to systematize and give new meanings to the whole.

3. THE MECHANISM OF THINKING

It is evident from the foregoing discussion that we may include under

the term thinking all sorts of mental processes by which relations are

apprehended between different objects of thought. Thus young children

think as soon as they begin to understand something of the meaning of

the objects of their environment. Even animals think by means of simple

and direct associations. Thinking may therefore go on in terms of the

simplest and most immediate, or the most complex and distant

relationships.

SENSATIONS AND PERCEPTS AS ELEMENTS IN THINKING.--Relations seen between

sensations would mean something, but not much; relations seen between

\_objects\_ immediately present to the senses would mean much more; but

our thinking must go far beyond the present, and likewise far beyond

individual objects. It must be able to annihilate both time and space,

and to deal with millions of individuals together in one group or class.

Only in this way can our thinking go beyond that of the lower animals;

for a wise rat, even, may come to see the relation between a trap and

danger, or a horse the relation between pulling with his teeth at the

piece of string on the gate latch, and securing his liberty.

But it takes the farther-reaching mind of man to \_invent\_ the trap and

the latch. Perception alone does not go far enough. It is limited to

immediately present objects and their most obvious relations. The

perceptual image is likewise subject to similar limitations. While it

enables us to dispense with the immediate presence of the object, yet it

deals with separate individuals; and the world is too full of individual

objects for us to deal with them separately. It is in \_conception\_,

\_judgment\_, and \_reasoning\_ that true thinking takes place. Our next

purpose will therefore be to study these somewhat more closely, and see

how they combine in our thinking.

4. THE CONCEPT

Fortunately for our thinking, the great external world, with its

millions upon millions of individual objects, is so ordered that these

objects can be grouped into comparatively few great classes; and for

many purposes we can deal with the class as a whole instead of with the

separate individuals of the class. Thus there are an infinite number of

individual objects in the world which are composed of \_matter\_. Yet all

these myriads of individuals may be classed under the two great heads of

\_inanimate\_ and \_animate\_. Taking one of these again: all animate forms

may be classed as either \_plants\_ or \_animals\_. And these classes may

again be subdivided indefinitely. Animals include mammals, birds,

reptiles, insects, mollusks, and many other classes besides, each class

of which may be still further separated into its \_orders\_, \_families\_,

\_genera\_, \_species\_, and \_individuals\_. This arrangement economizes our

thinking by allowing us to think in large terms.

THE CONCEPTS SERVE TO GROUP AND CLASSIFY.--But the somewhat complicated

form of classification just described did not come to man ready-made.

Someone had to \_see\_ the relationship existing among the myriads of

animals of a certain class, and group these together under the general

term \_mammals\_. Likewise with birds, reptiles, insects, and all the

rest. In order to accomplish this, many individuals of each class had to

be observed, the qualities common to all members of the class

discriminated from those not common, and the common qualities retained

as the measure by which to test the admission of other individuals into

this class. The process of classification is made possible by what the

psychologist calls the \_concept\_. The concept enables us to think

\_birds\_ as well as bluebirds, robins, and wrens; it enables us to think

\_men\_ as well as Tom, Dick, and Harry. In other words, \_the concept lies

at the bottom of all thinking which rises above the seeing of the

simplest relations between immediately present objects\_.

GROWTH OF A CONCEPT.--We can perhaps best understand the nature of the

concept if we watch its growth in the thinking of a child. Let us see

how the child forms the concept \_dog\_, under which he is able finally to

class the several hundred or the several thousand different dogs with

which his thinking requires him to deal. The child's first acquaintance

with a dog is, let us suppose, with a pet poodle, white in color, and

named \_Gyp\_. At this stage in the child's experience, \_dog\_ and \_Gyp\_

are entirely synonymous, including Gyp's color, size, and all other

qualities which the child has discovered. But now let him see another

pet poodle which is like Gyp except that it is black in color. Here

comes the first cleavage between \_Gyp\_ and \_dog\_ as synonyms: \_dog\_ no

longer means white, but may mean \_black\_. Next let the child see a brown

spaniel. Not only will white and black now no longer answer to \_dog\_,

but the roly-poly poodle form also has been lost; for the spaniel is

more slender. Let the child go on from this until he has seen many

different dogs of all varieties: poodles, bulldogs, setters, shepherds,

cockers, and a host of others. What has happened to his \_dog\_, which at

the beginning meant the one particular little individual with which he

played?

\_Dog\_ is no longer white or black or brown or gray: \_color\_ is not an

essential quality, so it has dropped out; \_size\_ is no longer essential

except within very broad limits; \_shagginess\_ or \_smoothness\_ of coat is

a very inconstant quality, so this is dropped; \_form\_ varies so much

from the fat pug to the slender hound that it is discarded, except

within broad limits; \_good nature\_, \_playfulness\_, \_friendliness\_, and a

dozen other qualities are likewise found not to belong in common to

\_all\_ dogs, and so have had to go; and all that is left to his \_dog\_ is

\_four-footedness\_, and a certain general \_form\_, and a few other dog

qualities of habit of life and disposition. As the term \_dog\_ has been

gaining in \_extent\_, that is, as more individuals have been observed and

classed under it, it has correspondingly been losing in \_content\_, or it

has been losing in the specific qualities which belong to it. Yet it

must not be thought that the process is altogether one of elimination;

for new qualities which are present in all the individuals of a class,

but at first overlooked, are continually being discovered as experience

grows, and built into the developing concept.

DEFINITION OF CONCEPT.--A concept, then, is \_our general idea or notion

of a class of individual objects\_. Its function is to enable us to

classify our knowledge, and thus deal with classes or universals in our

thinking. Often the basis of a concept consists of an \_image\_, as when

you get a hazy visual image of a mass of people when I suggest \_mankind\_

to you. Yet the core, or the vital, functioning part of a concept is its

\_meaning\_. Whether this meaning attaches to an image or a word or stands

relatively or completely independent of either, does not so much matter;

but our meanings must be right, else all our thinking is wrong.

LANGUAGE AND THE CONCEPT.--We think in words. None has failed to watch

the flow of his thought as it is carried along by words like so many

little boats moving along the mental stream, each with its freight of

meaning. And no one has escaped the temporary balking of his thought by

failure to find a suitable word to convey the intended meaning. What

the grammarian calls the \_common nouns\_ of our language are the words by

which we name our concepts and are able to speak of them to others. We

define a common noun as "the name of a class," and we define a concept

as the meaning or idea we have of a class. It is easy to see that when

we have named these class \_ideas\_ we have our list of common nouns. The

study of the language of a people may therefore reveal much of their

type of thought.

THE NECESSITY FOR GROWING CONCEPTS.--The development of our concepts

constitutes a large part of our education. For it is evident that, since

thinking rests so fundamentally on concepts, progress in our mental life

must depend on a constant growth in the number and character of our

concepts. Not only must we keep on adding new concepts, but the old must

not remain static. When our concepts stop growing, our minds have ceased

to grow--we no longer learn. This arrest of development is often seen in

persons who have settled into a life of narrow routine, where the

demands are few and of a simple nature. Unless they rise above their

routine, they early become "old fogies." Their concepts petrify from

lack of use and the constant reconstruction which growth necessitates.

On the other hand, the person who has upon him the constant demand to

meet new situations or do better in old ones will keep on enriching his

old concepts and forming new ones, or else, unable to do this, he will

fail in his position. And the person who keeps on steadily enriching his

concepts has discovered the secret of perpetual youth so far as his

mental life is concerned. For him there is no old age; his thought will

be always fresh, his experience always accumulating, and his knowledge

growing more valuable and usable.

5. JUDGMENT

But in the building up of percepts and concepts, as well as in making

use of them after they are formed, another process of thinking enters;

namely, the process of \_judging\_.

NATURE OF JUDGMENT.--Judging enters more or less into all our thinking,

from the simplest to the most complex. The babe lies staring at his

bottle, and finally it dawns on his sluggish mind that this is the

object from which he gets his dinner. He has performed a judgment. That

is, he has alternately directed his attention to the object before him

and to his image of former nursing, discovered the relation existing

between the two, and affirmed to himself, "This is what gives me my

dinner." "Bottle" and "what-gives-me-my-dinner" are essentially

identical to the child. \_Judgment is, then, the affirmation of the

essential identity of meaning of two objects of thought.\_ Even if the

proposition in which we state our judgment has in it a negative, the

definition will still hold, for the mental process is the same in either

case. It is as much a judgment if we say, "The day is not-cold," as if

we say, "The day is cold."

JUDGMENT USED IN PERCEPTS AND CONCEPTS.--How judgment enters into the

forming of our percepts may be seen from the illustration just given.

The act by which the child perceived his bottle had in it a large

element of judging. He had to compare two objects of thought--the one

from past experience in the form of images, and the other from the

present object, in the form of sensations from the bottle--and then

affirm their essential identity. Of course it is not meant that what I

have described \_consciously\_ takes place in the mind of the child; but

some such process lies at the bottom of every perception, whether of

the child or anyone else.

Likewise it may be seen that the forming of concepts depends on

judgment. Every time that we meet a new object which has to be assigned

its place in our classification, judgment is required. Suppose the

child, with his immature concept \_dog\_, sees for the first time a

greyhound. He must compare this new specimen with his concept \_dog\_, and

decide that this is or is not a dog. If he discovers the identity of

meaning in the essentials of the two objects of thought, his judgment

will be affirmative, and his concept will be modified in whatever extent

\_greyhound\_ will affect it.

JUDGMENT LEADS TO GENERAL TRUTHS.--But judgment goes much farther than

to assist in building percepts and concepts. It takes our concepts after

they are formed and discovers and affirms relations between them, thus

enabling us finally to relate classes as well as individuals. It carries

our thinking over into the realm of the universal, where we are not

hampered by particulars. Let us see how this is done. Suppose we have

the concept \_man\_ and the concept \_animal\_, and that we think of these

two concepts in their relation to each other. The mind analyzes each

into its elements, compares them, and finds the essential identity of

meaning in a sufficient number to warrant the judgment, \_man is an

animal\_. This judgment has given a new bit of knowledge, in that it has

discovered to us a new relation between two great classes, and hence

given both, in so far, a new meaning and a wider definition. And as this

new relation does not pertain to any particular man or any particular

animal, but includes all individuals in each class, it has carried us

over into universals, so that we have a \_general\_ truth and will not

have to test each individual man henceforth to see whether he fits into

this relation.

Judgments also, as we will see later, constitute the material for our

reasoning. Hence upon their validity will depend the validity of our

reasoning.

THE VALIDITY OF JUDGMENTS.--Now, since every judgment is made up of an

affirmation of relation existing between two terms, it is evident that

the validity of the judgment will depend on the thoroughness of our

knowledge of the terms compared. If we know but few of the attributes of

either term of the judgment, the judgment is clearly unsafe. Imperfect

concepts lie at the basis of many of our wrong judgments. A young man

complained because his friend had been expelled from college for alleged

misbehavior. He said, "Mr. A---- was the best boy in the institution."

It is very evident that someone had made a mistake in judgment. Surely

no college would want to expel the best boy in the institution. Either

my complainant or the authorities of the college had failed to

understand one of the terms in the judgment. Either "Mr. A----" or "the

best boy in the institution" had been wrongly interpreted by someone.

Likewise, one person will say, "Jones is a good man," while another will

say, "Jones is a rascal." Such a discrepancy in judgment must come from

a lack of acquaintance with Jones or a lack of knowledge of what

constitutes a good man or a rascal.

No doubt most of us are prone to make judgments with too little

knowledge of the terms we are comparing, and it is usually those who

have the least reason for confidence in their judgments who are the most

certain that they cannot be mistaken. The remedy for faulty judgments

is, of course, in making ourselves more certain of the terms involved,

and this in turn sends us back for a review of our concepts or the

experience upon which the terms depend. It is evident that no two

persons can have just the same concepts, for all have not had the same

experience out of which their concepts came. The concepts may be named

the same, and may be nearly enough alike so that we can usually

understand each other; but, after all, I have mine and you have yours,

and if we could each see the other's in their true light, no doubt we

should save many misunderstandings and quarrels.

6. REASONING

All the mental processes which we have so far described find their

culmination and highest utility in \_reasoning\_. Not that reasoning comes

last in the list of mental activities, and cannot take place until all

the others have been completed, for reasoning is in some degree present

almost from the dawn of consciousness. The difference between the

reasoning of the child and that of the adult is largely one of

degree--of reach. Reasoning goes farther than any of the other processes

of cognition, for it takes the relations expressed in judgments and out

of these relations evolves still other and more ultimate relations.

NATURE OF REASONING.--It is hard to define reasoning so as to describe

the precise process which occurs; for it is so intermingled with

perception, conception, and judgment, that one can hardly separate them

even for purposes of analysis, much less to separate them functionally.

We may, however, define reasoning provisionally as \_thinking by means of

a series of judgments with the purpose of arriving at some definite end

or conclusion\_. What does this mean? Professor Angell has stated the

matter so clearly that I will quote his illustration of the case:

"Suppose that we are about to make a long journey which necessitates

the choice from among a number of possible routes. This is a case of the

genuinely problematic kind. It requires reflection, a weighing of the

\_pros\_ and \_cons\_, and giving of the final decision in favor of one or

other of several alternatives. In such a case the procedure of most of

us is after this order. We think of one route as being picturesque and

wholly novel, but also as being expensive. We think of another as less

interesting, but also as less expensive. A third is, we discover, the

most expedient, but also the most costly of the three. We find ourselves

confronted, then, with the necessity of choosing with regard to the

relative merits of cheapness, beauty, and speed. We proceed to consider

these points in the light of all our interests, and the decision more or

less makes itself. We find, for instance, that we must, under the

circumstances, select the cheapest route."

HOW JUDGMENTS FUNCTION IN REASONING.--Such a line of thinking is very

common to everyone, and one that we carry out in one form or another a

thousand times every day we live. When we come to look closely at the

steps involved in arriving at a conclusion, we detect a series of

judgments--often not very logically arranged, to be sure, but yet so

related that the result is safely reached in the end. We compare our

concept of, say, the first route and our concept of picturesqueness,

decide they agree, and affirm the judgment, "This route is picturesque."

Likewise we arrive at the judgment, "This route is also expensive, it is

interesting, etc." Then we take the other routes and form our judgments

concerning them. These judgments are all related to each other in some

way, some of them being more intimately related than others. Which

judgments remain as the significant ones, the ones which are used to

solve the problem finally, depends on which concepts are the most vital

for us with reference to the ultimate end in view. If time is the chief

element, then the form of our reasoning would be something like this:

"Two of the routes require more than three days: hence I must take the

third route." If economy is the important end, the solution would be as

follows: "Two routes cost more than $1,000; I cannot afford to pay more

than $800; I therefore must patronize the third route."

In both cases it is evident that the conclusion is reached through a

comparison of two or more judgments. This is the essential difference

between judgment and reasoning. Whereas judgment discovers relations

between concepts, \_reasoning discovers relations between judgments, and

from this evolves a new judgment which is the conclusion sought\_. The

example given well illustrates the ordinary method by which we reason to

conclusions.

DEDUCTION AND THE SYLLOGISM.--Logic may take the conclusion, with the

two judgments on which it is based, and form the three into what is

called a \_syllogism\_, of which the following is a classical type:

All men are mortal;

Socrates is a man,

Therefore

Socrates is mortal.

The first judgment is in the form of a proposition which is called the

\_major premise\_, because it is general in its nature, including all men.

The second is the \_minor premise\_, since it deals with a particular man.

The third is the \_conclusion\_, in which a new relation is discovered

between Socrates and mortality.

This form of reasoning is \_deductive\_, that is, it proceeds from the

general to the particular. Much of our reasoning is an abbreviated form

of the syllogism, and will readily expand into it. For instance, we say,

"It will rain tonight, for there is lightning in the west." Expanded

into the syllogism form it would be, "Lightning in the west is a sure

sign of rain; there is lightning in the west this evening; therefore, it

will rain tonight." While we do not commonly think in complete

syllogisms, it is often convenient to cast our reasoning in this form to

test its validity. For example, a fallacy lurks in the generalization,

"Lightning in the west is a sure sign of rain." Hence the conclusion is

of doubtful validity.

INDUCTION.--Deduction is a valuable form of reasoning, but a moment's

reflection will show that something must precede the syllogism in our

reasoning. The \_major premise must be accounted for\_. How are we able to

say that all men are mortal, and that lightning in the west is a sure

sign of rain? How was this general truth arrived at? There is only one

way, namely, through the observation of a large number of particular

instances, or through \_induction\_.

Induction is the method of proceeding from the particular to the

general. Many men are observed, and it is found that all who have been

observed have died under a certain age. It is true that not all men have

been observed to die, since many are now living, and many more will no

doubt come and live in the world whom \_we\_ cannot observe, since

mortality will have overtaken us before their advent. To this it may be

answered that the men now living have not yet lived up to the limit of

their time, and, besides, they have within them the causes working whose

inevitable effect has always been and always will be death; likewise

with the men yet unborn, they will possess the same organism as we,

whose very nature necessitates mortality. In the case of the

premonitions of rain, the generalization is not so safe, for there have

been exceptions. Lightning in the west at night is not always followed

by rain, nor can we find inherent causes as in the other case which

necessitates rain as an effect.

THE NECESSITY FOR BROAD INDUCTION.--Thus it is seen that our

generalizations, or major premises, are of all degrees of validity. In

the case of some, as the mortality of man, millions of cases have been

observed and no exceptions found, but on the contrary, causes discovered

whose operation renders the result inevitable. In others, as, for

instance, in the generalization once made, "All cloven-footed animals

chew their cud," not only had the examination of individual cases not

been carried so far as in the former case when the generalization was

made, but there were found no inherent causes residing in cloven-footed

animals which make it necessary for them to chew their cud. That is,

cloven feet and cud-chewing do not of necessity go together, and the

case of the pig disproves the generalization.

In practically no instance, however, is it possible for us to examine

every case upon which a generalization is based; after examining a

sufficient number of cases, and particularly if there are supporting

causes, we are warranted in making the "inductive leap," or in

proceeding at once to state our generalization as a working hypothesis.

Of course it is easy to see that if we have a wrong generalization, if

our major premise is invalid, all that follows in our chain of reasoning

will be worthless. This fact should render us careful in making

generalizations on too narrow a basis of induction. We may have observed

that certain red-haired people of our acquaintance are quick-tempered,

but we are not justified from this in making the general statement that

all red-haired people are quick-tempered. Not only have we not examined

a sufficient number of cases to warrant such a conclusion, but we have

found in the red hair not even a cause of quick temper, but only an

occasional concomitant.

THE INTERRELATION OF INDUCTION AND DEDUCTION.--Induction and deduction

must go hand in hand in building up our world of knowledge. Induction

gives us the particular facts out of which our system of knowledge is

built, furnishes us with the data out of which general truths are

formed; deduction allows us to start with the generalization furnished

us by induction, and from this vantage ground to organize and

systematize our knowledge and, through the discovery of its relations,

to unify it and make it usable. Deduction starts with a general truth

and asks the question, "What new relations are made necessary among

particular facts by this truth?" Induction starts with particulars, and

asks the question, "To what general truth do these separate facts lead?"

Each method of reasoning needs the other. Deduction must have induction

to furnish the facts for its premises; induction must have deduction to

organize these separate facts into a unified body of knowledge. "He only

sees well who sees the whole in the parts, and the parts in the whole."

7. PROBLEMS IN OBSERVATION AND INTROSPECTION

1. Watch your own thinking for examples of each of the four types

described. Observe a class of children in a recitation or at study and

try to decide which type is being employed by each child. What

proportion of the time supposedly given to study is given over to

\_chance\_ or idle thinking? To \_assimilative\_ thinking? To \_deliberative\_

thinking?

2. Observe children at work in school with the purpose of determining

whether they are being taught to \_think\_, or only to memorize certain

facts. Do you find that definitions whose meaning is not clear are often

required of children? Which should come first, the definition or the

meaning and application of it?

3. It is of course evident from the relation of induction and deduction

that the child's natural mode of learning a subject is by induction.

Observe the teaching of children to determine whether inductive methods

are commonly used. Outline an inductive lesson in arithmetic,

physiology, geography, civics, etc.

4. What concepts have you now which you are aware are very meager? What

is your concept of \_mountain?\_ How many have you seen? Have you any

concepts which you are working very hard to enrich?

5. Recall some judgment which you have made and which proved to be

false, and see whether you can now discover what was wrong with it. Do

you find the trouble to be an inadequate concept? What constitutes "good

judgment"? "poor judgment"? Did you ever make a mistake in an example

in, say, percentage, by saying "This is the base," when it proved not to

be? What was the cause of the error?

6. Can you recall any instance in which you made too hasty a

generalization when you had observed but few cases upon which to base

your premise? What of your reasoning which followed?

7. See whether you can show that validity of reasoning rests ultimately

on correct perceptions. What are you doing at present to increase your

power of thinking?

8. How ought this chapter to help one in making a better teacher? A

better student?

CHAPTER XIII

INSTINCT

Nothing is more wonderful than nature's method of endowing each

individual at the beginning with all the impulses, tendencies and

capacities that are to control and determine the outcome of the life.

The acorn has the perfect oak tree in its heart; the complete butterfly

exists in the grub; and man at his highest powers is present in the babe

at birth. Education \_adds\_ nothing to what heredity supplies, but only

develops what is present from the first.

We are a part of a great unbroken procession of life, which began at the

beginning and will go on till the end. Each generation receives, through

heredity, the products of the long experience through which the race has

passed. The generation receiving the gift today lives its own brief

life, makes its own little contribution to the sum total and then passes

on as millions have done before. Through heredity, the achievements, the

passions, the fears, and the tragedies of generations long since

moldered to dust stir our blood and tone our nerves for the conflict of

today.

1. THE NATURE OF INSTINCT

Every child born into the world has resting upon him an unseen hand

reaching out from the past, pushing him out to meet his environment, and

guiding him in the start upon his journey. This impelling and guiding

power from the past we call \_instinct\_. In the words of Mosso: "Instinct

is the voice of past generations reverberating like a distant echo in

the cells of the nervous system. We feel the breath, the advice, the

experience of all men, from those who lived on acorns and struggled like

wild beasts, dying naked in the forests, down to the virtue and toil of

our father, the fear and love of our mother."

THE BABE'S DEPENDENCE ON INSTINCT.--The child is born ignorant and

helpless. It has no memory, no reason, no imagination. It has never

performed a conscious act, and does not know how to begin. It must get

started, but how? It has no experience to direct it, and is unable to

understand or imitate others of its kind. It is at this point that

instinct comes to the rescue. The race has not given the child a mind

ready made--that must develop; but it has given him a ready-made nervous

system, ready to respond with the proper movements when it receives the

touch of its environment through the senses.

And this nervous system has been so trained during a limitless past that

its responses are the ones which are necessary for the welfare of its

owner. It can do a hundred things without having to wait to learn them.

Burdette says of the new-born child, "Nobody told him what to do. Nobody

taught him. He knew. Placed suddenly on the guest list of this old

caravansary, he knew his way at once to two places in it--his bedroom

and the dining-room." A thousand generations of babies had done the same

thing in the same way, and each had made it a little easier for this

particular baby to do his part without learning how.

DEFINITION OF INSTINCT.--\_Instincts are the tendency to act in certain

definite ways, without previous education and without a conscious end in

view.\_ They are a tendency to \_act\_; for some movement, or motor

adjustment, is the response to an instinct. They do not require previous

\_education\_, for none is possible with many instinctive acts: the duck

does not have to be taught to swim or the baby to suck. They have no

conscious \_end\_ in view, though the result may be highly desirable.

Says James: "The cat runs after the mouse, runs or shows fight before

the dog, avoids falling from walls and trees, shuns fire and water,

etc., not because he has any notion either of life or death, or of self,

or of preservation. He has probably attained to no one of these

conceptions in such a way as to react definitely upon it. He acts in

each case separately, and simply because he cannot help it; being so

framed that when that particular running thing called a mouse appears in

his field of vision he \_must\_ pursue; that when that particular barking

and obstreperous thing called a dog appears he \_must\_ retire, if at a

distance, and scratch if close by; that he \_must\_ withdraw his feet from

water and his face from flame, etc. His nervous system is to a great

extent a pre-organized bundle of such reactions. They are as fatal as

sneezing, and exactly correlated to their special excitants as it to its

own."[6]

You ask, Why does the lark rise on the flash of a sunbeam from his

meadow to the morning sky, leaving a trail of melody to mark his flight?

Why does the beaver build his dam, and the oriole hang her nest? Why are

myriads of animal forms on the earth today doing what they were

countless generations ago? Why does the lover seek the maid, and the

mother cherish her young? \_Because the voice of the past speaks to the

present, and the present has no choice but to obey.\_

INSTINCTS ARE RACIAL HABITS.--Instincts are the habits of the race which

it bequeaths to the individual; the individual takes these for his

start, and then modifies them through education, and thus adapts himself

to his environment. Through his instincts, the individual is enabled to

short-cut racial experience, and begin at once on life activities which

the race has been ages in acquiring. Instinct preserves to us what the

race has achieved in experience, and so starts us out where the race

left off.

UNMODIFIED INSTINCT IS BLIND.--Many of the lower animal forms act on

instinct blindly, unable to use past experience to guide their acts,

incapable of education. Some of them carry out seemingly marvelous

activities, yet their acts are as automatic as those of a machine and as

devoid of foresight. A species of mud wasp carefully selects clay of

just the right consistency, finds a somewhat sheltered nook under the

eaves, and builds its nest, leaving one open door. Then it seeks a

certain kind of spider, and having stung it so as to benumb without

killing, carries it into the new-made nest, lays its eggs on the body of

the spider so that the young wasps may have food immediately upon

hatching out, then goes out and plasters the door over carefully to

exclude all intruders. Wonderful intelligence? Not intelligence at all.

Its acts were dictated not by plans for the future, but by pressure from

the past. Let the supply of clay fail, or the race of spiders become

extinct, and the wasp is helpless and its species will perish. Likewise

the \_race\_ of bees and ants have done wonderful things, but \_individual\_

bees and ants are very stupid and helpless when confronted by any novel

conditions to which their race has not been accustomed.

Man starts in as blindly as the lower animals; but, thanks to his higher

mental powers, this blindness soon gives way to foresight, and he is

able to formulate purposeful ends and adapt his activities to their

accomplishment. Possessing a larger number of instincts than the lower

animals have, man finds possible a greater number of responses to a more

complex environment than do they. This advantage, coupled with his

ability to reconstruct his experience in such a way that he secures

constantly increasing control over his environment, easily makes man the

superior of all the animals, and enables him to exploit them for his own

further advancement.

2. LAW OF THE APPEARANCE AND DISAPPEARANCE OF INSTINCTS

No child is born with all its instincts ripe and ready for action. Yet

each individual contains within his own inner nature the law which

determines the order and time of their development.

INSTINCTS APPEAR IN SUCCESSION AS REQUIRED.--It is not well that we

should be started on too many different lines of activity at once, hence

our instincts do not all appear at the same time. Only as fast as we

need additional activities do they ripen. Our very earliest activities

are concerned chiefly with feeding, hence we first have the instincts

which prompt us to take our food and to cry for it when we are hungry.

Also we find useful such abbreviated instincts, called \_reflexes\_, as

sneezing, snuffling, gagging, vomiting, starting, etc.; hence we have

the instincts enabling us to do these things. Soon comes the time for

teething, and, to help the matter along, the instinct of biting enters,

and the rubber ring is in demand. The time approaches when we are to

feed ourselves, so the instinct arises to carry everything to the mouth.

Now we have grown strong and must assume an erect attitude, hence the

instinct to sit up and then to stand. Locomotion comes next, and with it

the instinct to creep and walk. Also a language must be learned, and we

must take part in the busy life about us and do as other people do; so

the instinct to imitate arises that we may learn things quickly and

easily.

We need a spur to keep us up to our best effort, so the instinct of

emulation emerges. We must defend ourselves, so the instinct of

pugnacity is born. We need to be cautious, hence the instinct of fear.

We need to be investigative, hence the instinct of curiosity. Much

self-directed activity is necessary for our development, hence the play

instinct. It is best that we should come to know and serve others, so

the instincts of sociability and sympathy arise. We need to select a

mate and care for offspring, hence the instinct of love for the other

sex, and the parental instinct. This is far from a complete list of our

instincts, and I have not tried to follow the order of their

development, but I have given enough to show the origin of many of our

life's most important activities.

MANY INSTINCTS ARE TRANSITORY.--Not only do instincts ripen by degrees,

entering our experience one by one as they are needed, but they drop out

when their work is done. Some, like the instinct of self-preservation,

are needed our lifetime through, hence they remain to the end. Others,

like the play instinct, serve their purpose and disappear or are

modified into new forms in a few years, or a few months. The life of the

instinct is always as transitory as is the necessity for the activity

to which it gives rise. No instinct remains wholly unaltered in man, for

it is constantly being made over in the light of each new experience.

The instinct of self-preservation is modified by knowledge and

experience, so that the defense of the man against threatened danger

would be very different from that of the child; yet the instinct to

protect oneself in \_some\_ way remains. On the other hand, the instinct

to romp and play is less permanent. It may last into adult life, but few

middle-aged or old people care to race about as do children. Their

activities are occupied in other lines, and they require less physical

exertion.

Contrast with these two examples such instincts as sucking, creeping,

and crying, which are much more fleeting than the play instinct, even.

With dentition comes another mode of eating, and sucking is no more

serviceable. Walking is a better mode of locomotion than creeping, so

the instinct to creep soon dies. Speech is found a better way than

crying to attract attention to distress, so this instinct drops out.

Many of our instincts not only would fail to be serviceable in our later

lives, but would be positively in the way. Each serves its day, and then

passes over into so modified a form as not to be recognized, or else

drops out of sight altogether.

SEEMINGLY USELESS INSTINCTS.--Indeed it is difficult to see that some

instincts serve a useful purpose at any time. The pugnacity and

greediness of childhood, its foolish fears, the bashfulness of

youth--these seem to be either useless or detrimental to development.

In order to understand the workings of instinct, however, we must

remember that it looks in two directions; into the future for its

application, and into the past for its explanation. We should not be

surprised if the experiences of a long past have left behind some

tendencies which are not very useful under the vastly different

conditions of today.

Nor should we be too sure that an activity whose precise function in

relation to development we cannot discover has no use at all. Each

instinct must be considered not alone in the light of what it means to

its possessor today, but of what it means to all his future development.

The tail of a polliwog seems a very useless appendage so far as the

adult frog is concerned, yet if the polliwog's tail is cut off a perfect

frog never develops.

INSTINCTS TO BE UTILIZED WHEN THEY APPEAR.--A man may set the stream to

turning his mill wheels today or wait for twenty years--the power is

there ready for him when he wants it. Instincts must be utilized when

they present themselves, else they disappear--never, in most cases, to

return. Birds kept caged past the flying time never learn to fly well.

The hunter must train his setter when the time is ripe, or the dog can

never be depended upon. Ducks kept away from the water until full grown

have almost as little inclination for it as chickens.

The child whom the pressure of circumstances or unwise authority of

parents keeps from mingling with playmates and participating in their

plays and games when the social instinct is strong upon him, will in

later life find himself a hopeless recluse to whom social duties are a

bore. The boy who does not hunt and fish and race and climb at the

proper time for these things, will find his taste for them fade away,

and he will become wedded to a sedentary life. The youth and maiden must

be permitted to "dress up" when the impulse comes to them, or they are

likely ever after to be careless in their attire.

INSTINCTS AS STARTING POINTS.--Most of our habits have their rise in

instincts, and all desirable instincts should be seized upon and

transformed into habits before they fade away. Says James in his

remarkable chapter on Instinct: "In all pedagogy the great thing is to

strike while the iron is hot, and to seize the wave of the pupils'

interest in each successive subject before its ebb has come, so that

knowledge may be got and a habit of skill acquired--a headway of

interest, in short, secured, on which afterwards the individual may

float. There is a happy moment for fixing skill in drawing, for making

boys collectors in natural history, and presently dissectors and

botanists; then for initiating them into the harmonies of mechanics and

the wonders of physical and chemical law. Later, introspective

psychology and the metaphysical and religious mysteries take their turn;

and, last of all, the drama of human affairs and worldly wisdom in the

widest sense of the term. In each of us a saturation point is soon

reached in all these things; the impetus of our purely intellectual zeal

expires, and unless the topic is associated with some urgent personal

need that keeps our wits constantly whetted about it, we settle into an

equilibrium, and live on what we learned when our interest was fresh and

instinctive, without adding to the store."

There is a tide in the affairs of men

Which, taken at the flood, leads on to fortune;

Omitted, all the voyage of their life

Is bound in shallows and in miseries.

THE MORE IMPORTANT HUMAN INSTINCTS.--It will be impossible in this brief

statement to give a complete catalogue of the human instincts, much

less to discuss each in detail. We must content ourselves therefore with

naming the more important instincts, and finally discussing a few of

them: \_Sucking\_, \_biting\_, \_chewing\_, \_clasping objects with the

fingers\_, \_carrying to the mouth\_, \_crying\_, \_smiling\_, \_sitting up\_,

\_standing\_, \_locomotion\_, \_vocalization\_, \_imitation\_, \_emulation\_,

\_pugnacity\_, \_resentment\_, \_anger\_, \_sympathy\_, \_hunting and fighting\_,

\_fear\_, \_acquisitiveness\_, \_play\_, \_curiosity\_, \_sociability\_,

\_modesty\_, \_secretiveness\_, \_shame\_, \_love\_, \_and jealousy\_ may be said

to head the list of our instincts. It will be impossible in our brief

space to discuss all of this list. Only a few of the more important will

be noticed.

3. THE INSTINCT OF IMITATION

No individual enters the world with a large enough stock of instincts to

start him doing all the things necessary for his welfare. Instinct

prompts him to eat when he is hungry, but does not tell him to use a

knife and fork and spoon; it prompts him to use vocal speech, but does

not say whether he shall use English, French, or German; it prompts him

to be social in his nature, but does not specify that he shall say

please and thank you, and take off his hat to ladies. The race did not

find the specific \_modes\_ in which these and many other things are to be

done of sufficient importance to crystallize them in instincts, hence

the individual must learn them as he needs them. The simplest way of

accomplishing this is for each generation to copy the ways of doing

things which are followed by the older generation among whom they are

born. This is done largely through \_imitation\_.

NATURE OF IMITATION.--\_Imitation is the instinct to respond to a

suggestion from another by repeating his act.\_ The instinct of

imitation is active in the year-old child, it requires another year or

two to reach its height, then it gradually grows less marked, but

continues in some degree throughout life. The young child is practically

helpless in the matter of imitation. Instinct demands that he shall

imitate, and he has no choice but to obey. His environment furnishes the

models which he must imitate, whether they are good or bad. Before he is

old enough for intelligent choice, he has imitated a multitude of acts

about him; and habit has seized upon these acts and is weaving them into

conduct and character. Older grown we may choose what we will imitate,

but in our earlier years we are at the mercy of the models which are

placed before us.

If our mother tongue is the first we hear spoken, that will be our

language; but if we first hear Chinese, we will learn that with almost

equal facility. If whatever speech we hear is well spoken, correct, and

beautiful, so will our language be; if it is vulgar, or incorrect, or

slangy, our speech will be of this kind. If the first manners which

serve us as models are coarse and boorish, ours will resemble them; if

they are cultivated and refined, ours will be like them. If our models

of conduct and morals are questionable, our conduct and morals will be

of like type. Our manner of walking, of dressing, of thinking, of saying

our prayers, even, originates in imitation. By imitation we adopt

ready-made our social standards, our political faith, and our religious

creeds. Our views of life and the values we set on its attainments are

largely a matter of imitation.

INDIVIDUALITY IN IMITATION.--Yet, given the same model, no two of us

will imitate precisely alike. Your acts will be yours, and mine will be

mine. This is because no two of us have just the same heredity, and

hence cannot have precisely similar instincts. There reside in our

different personalities different powers of invention and originality,

and these determine by how much the product of imitation will vary from

the model. Some remain imitators all their lives, while others use

imitation as a means to the invention of better types than the original

models. The person who is an imitator only, lacks individuality and

initiative; the nation which is an imitator only is stagnant and

unprogressive. While imitation must be blind in both cases at first, it

should be increasingly intelligent as the individual or the nation

progresses.

CONSCIOUS AND UNCONSCIOUS IMITATION.--The much-quoted dictum that "all

consciousness is motor" has a direct application to imitation. It only

means that \_we have a tendency to act on whatever idea occupies the

mind\_. Think of yawning or clearing the throat, and the tendency is

strong to do these things. We naturally respond to smile with smile and

to frown with frown. And even the impressions coming to us from our

material environment have their influence on our acts. Our response to

these ideas may be a conscious one, as when a boy purposely stutters in

order to mimic an unfortunate companion; or it may be unconscious, as

when the boy unknowingly falls into the habit of stammering from hearing

this kind of speech. The child may consciously seek to keep himself neat

and clean so as to harmonize with a pleasant and well-kept home, or he

may unconsciously become slovenly and cross-tempered from living in an

ill-kept home where constant bickering is the rule.

Often we deliberately imitate what seems to us desirable in other

people, but probably far the greater proportion of the suggestions to

which we respond are received and acted upon unconsciously. In

conscious imitation we can select what models we shall imitate, and

therefore protect ourselves in so far as our judgment of good and bad

models is valid. In unconscious imitation, however, we are constantly

responding to a stream of suggestions pouring in upon us hour after hour

and day after day, with no protection but the leadings of our interests

as they direct our attention now to this phase of our environment, and

now to that.

INFLUENCE OF ENVIRONMENT.--No small part of the influences which mold

our lives comes from our material environment. Good clothes, artistic

homes, beautiful pictures and decoration, attractive parks and lawns,

well-kept streets, well-bound books--all these have a direct moral and

educative value; on the other hand, squalor, disorder, and ugliness are

an incentive to ignorance and crime.

Hawthorne tells in "The Great Stone Face" of the boy Ernest, listening

to the tradition of a coming Wise Man who one day is to rule over the

Valley. The story sinks deep into the boy's heart, and he thinks and

dreams of the great and good man; and as he thinks and dreams, he spends

his boyhood days gazing across the valley at a distant mountain side

whose rocks and cliffs nature had formed into the outlines of a human

face remarkable for the nobleness and benignity of its expression. He

comes to love this Face and looks upon it as the prototype of the coming

Wise Man, until lo! as he dwells upon it and dreams about it, the

beautiful character which its expression typifies grows into his own

life, and he himself becomes the long-looked-for Wise Man.

THE INFLUENCE OF PERSONALITY.--More powerful than the influence of

material environment, however, is that of other personalities upon

us--the touch of life upon life. A living personality contains a power

which grips hold of us, electrifies us, inspires us, and compels us to

new endeavor, or else degrades and debases us. None has failed to feel

at some time this life-touch, and to bless or curse the day when its

influence came upon him. Either consciously or unconsciously such a

personality becomes our ideal and model; we idolize it, idealize it, and

imitate it, until it becomes a part of us. Not only do we find these

great personalities living in the flesh, but we find them also in books,

from whose pages they speak to us, and to whose influence we respond.

And not in the \_great\_ personalities alone does the power to influence

reside. From \_every life\_ which touches ours, a stream of influence

great or small is entering our life and helping to mold it. Nor are we

to forget that this influence is reciprocal, and that we are reacting

upon others up to the measure of the powers that are in us.

4. THE INSTINCT OF PLAY

Small use to be a child unless one can play. Says Karl Groos: "Perhaps

the very existence of youth is due in part to the necessity for play;

the animal does not play because he is young, but he is young because he

must play." Play is a constant factor in all grades of animal life. The

swarming insects, the playful kitten, the frisking lambs, the racing

colt, the darting swallows, the maddening aggregation of

blackbirds--these are but illustrations of the common impulse of all the

animal world to play. Wherever freedom and happiness reside, there play

is found; wherever play is lacking, there the curse has fallen and

sadness and oppression reign. Play is the natural rôle in the paradise

of youth; it is childhood's chief occupation. To toil without play,

places man on a level with the beasts of burden.

THE NECESSITY FOR PLAY.--But why is play so necessary? Why is this

impulse so deep-rooted in our natures? Why not compel our young to

expend their boundless energy on productive labor? Why all this waste?

Why have our child labor laws? Why not shut recesses from our schools,

and so save time for work? Is it true that all work and no play makes

Jack a dull boy? Too true. For proof we need but gaze at the dull and

lifeless faces of the prematurely old children as they pour out of the

factories where child labor is employed. We need but follow the

children, who have had a playless childhood, into a narrow and barren

manhood. We need but to trace back the history of the dull and brutish

men of today, and find that they were the playless children of

yesterday. Play is as necessary to the child as food, as vital as

sunshine, as indispensable as air.

The keynote of play is \_freedom\_, freedom of physical activity, and

mental initiative. In play the child makes his own plans, his

imagination has free rein, originality is in demand, and constructive

ability is placed under tribute. Here are developed a thousand

tendencies which would never find expression in the narrow treadmill of

labor alone. The child needs to learn to work; but along with his work

must be the opportunity for free and unrestricted activity, which can

come only through play. The boy needs a chance to be a barbarian, a

hero, an Indian. He needs to ride his broomstick on a dangerous raid,

and to charge with lath sword the redoubts of a stubborn enemy. He needs

to be a leader as well as a follower. In short, without in the least

being aware of it, he needs to develop himself through his own

activity--he needs freedom to play. If the child be a girl, there is no

difference except in the character of the activities employed.

PLAY IN DEVELOPMENT AND EDUCATION.--And it is precisely out of these

play activities that the later and more serious activities of life

emerge. Play is the gateway by which we best enter the various fields of

the world's work, whether our particular sphere be that of pupil or

teacher in the schoolroom, of man in the busy marts of trade or in the

professions, or of farmer or mechanic. Play brings the \_whole self\_ into

the activity; it trains to habits of independence and individual

initiative, to strenuous and sustained effort, to endurance of hardship

and fatigue, to social participation and the acceptance of victory and

defeat. And these are the qualities needed by the man of success in his

vocation.

These facts make the play instinct one of the most important in

education. Froebel was the first to recognize the importance of play,

and the kindergarten was an attempt to utilize its activities in the

school. The introduction of this new factor into education has been

attended, as might be expected, by many mistakes. Some have thought to

recast the entire process of education into the form of games and plays,

and thus to lead the child to possess the "Promised Land" through

aimlessly chasing butterflies in the pleasant fields of knowledge. It is

needless to say that they have not succeeded. Others have mistaken the

shadow for the substance, and introduced games and plays into the

schoolroom which lack the very first element of play; namely, \_freedom

of initiative and action\_ on the part of the child. Educational

theorists and teachers have invented games and occupations and taught

them to the children, who go through with them much as they would with

any other task, enjoying the activity but missing the development which

would come through a larger measure of self-direction.

WORK AND PLAY ARE COMPLEMENTS.--Work cannot take the place of play,

neither can play be substituted for work. Nor are the two antagonistic,

but each is the complement of the other; for the activities of work grow

immediately out of those of play, and each lends zest to the other.

Those who have never learned to work and those who have never learned to

play are equally lacking in their development. Further, it is not the

name or character of an activity which determines whether it is play for

the participant, but \_his attitude toward the activity\_. If the activity

is performed for its own sake and not for some ulterior end, if it grows

out of the interest of the child and involves the free and independent

use of his powers of body and mind, if it is \_his\_, and not someone's

else--then the activity possesses the chief characteristics of play.

Lacking these, it cannot be play, whatever else it may be.

Play, like other instincts, besides serving the present, looks in two

directions, into the past and into the future. From the past come the

shadowy interests which, taking form from the touch of our environment,

determine the character of the play activities. From the future come the

premonitions of the activities that are to be. The boy adjusting himself

to the requirements of the game, seeking control over his companions or

giving in to them, is practicing in miniature the larger game which he

will play in business or profession a little later. The girl in her

playhouse, surrounded by a nondescript family of dolls and pets, is

unconsciously looking forward to a more perfect life when the

responsibilities shall be a little more real. So let us not grudge our

children the play day of youth.

5. OTHER USEFUL INSTINCTS

Many other instincts ripen during the stage of youth and play their part

in the development of the individual.

CURIOSITY.--It is inherent in every normal person to want to investigate

and \_know\_. The child looks out with wonder and fascination on a world

he does not understand, and at once begins to ask questions and try

experiments. Every new object is approached in a spirit of inquiry.

Interest is omnivorous, feeding upon every phase of environment. Nothing

is too simple or too complex to demand attention and exploration, so

that it vitally touches the child's activities and experience.

The momentum given the individual by curiosity toward learning and

mastering his world is incalculable. Imagine the impossible task of

teaching children what they had no desire or inclination to know! Think

of trying to lead them to investigate matters concerning which they felt

only a supreme indifference! Indeed one of the greatest problems of

education is to keep curiosity alive and fresh so that its compelling

influence may promote effort and action. One of the greatest secrets of

eternal youth is also found in retaining the spontaneous curiosity of

youth after the youthful years are past.

MANIPULATION.--This is the rather unsatisfactory name for the universal

tendency to \_handle\_, \_do\_ or \_make\_ something. The young child builds

with its blocks, constructs fences and pens and caves and houses, and a

score of other objects. The older child, supplied with implements and

tools, enters upon more ambitious projects and revels in the joy of

creation as he makes boats and boxes, soldiers and swords, kites,

play-houses and what-not. Even as adults we are moved by a desire to

express ourselves through making or creating that which will represent

our ingenuity and skill. The tendency of children to destroy is not from

wantonness, but rather from a desire to manipulate.

Education has but recently begun to make serious use of this important

impulse. The success of all laboratory methods of teaching, and of such

subjects as manual training and domestic science, is abundant proof of

the adage that we learn by doing. We would rather construct or

manipulate an object than merely learn its verbal description. Our

deepest impulses lead to creation rather than simple mental

appropriation of facts and descriptions.

THE COLLECTING INSTINCT.--The words \_my\_ and \_mine\_ enter the child's

vocabulary at a very early age. The sense of property ownership and the

impulse to make collections of various kinds go hand in hand. Probably

there are few of us who have not at one time or another made collections

of autographs, postage stamps, coins, bugs, or some other thing of as

little intrinsic value. And most of us, if we have left youth behind,

are busy even now in seeking to collect fortunes, works of art, rare

volumes or other objects on which we have set our hearts.

The collecting instinct and the impulse to ownership can be made

important agents in the school. The child who, in nature study,

geography or agriculture, is making a collection of the leaves, plants,

soils, fruits, or insects used in the lessons has an incentive to

observation and investigation impossible from book instruction alone.

One who, in manual training or domestic science, is allowed to own the

article made will give more effort and skill to its construction than if

the work be done as a mere school task.

THE DRAMATIC INSTINCT.--Every person is, at one stage of his

development, something of an actor. All children like to "dress up" and

impersonate someone else--in proof of which, witness the many play

scenes in which the character of nurse, doctor, pirate, teacher,

merchant or explorer is taken by children who, under the stimulus of

their spontaneous imagery and as yet untrammeled by self-consciousness,

freely enter into the character they portray. The dramatic impulse never

wholly dies out. When we no longer aspire to do the acting ourselves we

have others do it for us in the theaters or the movies.

Education finds in the dramatic instinct a valuable aid. Progressive

teachers are using it freely, especially in the teaching of literature

and history. Its application to these fields may be greatly increased,

and also extended more generally to include religion, morals, and art.

THE IMPULSE TO FORM GANGS AND CLUBS.--Few boys and girls grow up without

belonging at some time to a secret gang, club or society. Usually this

impulse grows out of two different instincts, the \_social\_ and the

\_adventurous\_. It is fundamental in our natures to wish to be with our

kind--not only our human kind, but those of the same age, interests and

ambitions. The love of secrecy and adventure is also deep seated in us.

So we are clannish; and we love to do the unusual, to break away from

the commonplace and routine of our lives. There is often a thrill of

satisfaction--even if it be later followed by remorse--in doing the

forbidden or the unconventional.

The problem here as in the case of many other instincts is one of

guidance rather than of repression. Out of the gang impulse we may

develop our athletic teams, our debating and dramatic clubs, our

tramping clubs, and a score of other recreational, benevolent, or

social organizations. Not repression, but proper expression should be

our ideal.

6. FEAR

Probably in no instinct more than in that of fear can we find the

reflections of all the past ages of life in the world with its manifold

changes, its dangers, its tragedies, its sufferings, and its deaths.

FEAR HEREDITY.--The fears of childhood "are remembered at every step,"

and so are the fears through which the race has passed. Says

Chamberlain: "Every ugly thing told to the child, every shock, every

fright given him, will remain like splinters in the flesh, to torture

him all his life long. The bravest old soldier, the most daring young

reprobate, is incapable of forgetting them all--the masks, the bogies,

ogres, hobgoblins, witches, and wizards, the things that bite and

scratch, that nip and tear, that pinch and crunch, the thousand and one

imaginary monsters of the mother, the nurse, or the servant, have had

their effect; and hundreds of generations have worked to denaturalize

the brains of children. Perhaps no animal, not even those most

susceptible to fright, has behind it the fear heredity of the child."

President Hall calls attention to the fact that night is now the safest

time of the twenty-four hours; serpents are no longer our most deadly

enemies; strangers are not to be feared; neither are big eyes or teeth;

there is no adequate reason why the wind, or thunder, or lightning

should make children frantic as they do. But "the past of man forever

seems to linger in his present"; and the child, in being afraid of these

things, is only summing up the fear experiences of the race and

suffering all too many of them in his short childhood.

FEAR OF THE DARK.--Most children are afraid in the dark. Who does not

remember the terror of a dark room through which he had to pass, or,

worse still, in which he had to go to bed alone, and there lie in cold

perspiration induced by a mortal agony of fright! The unused doors which

would not lock, and through which he expected to see the goblin come

forth to get him! The dark shadows back under the bed where he was

afraid to look for the hidden monster which he was sure was hiding there

and yet dare not face! The lonely lane through which the cows were to be

driven late at night, while every fence corner bristled with shapeless

monsters lying in wait for boys!

And that hated dark closet where he was shut up "until he could learn to

be good!" And the useless trapdoor in the ceiling. How often have we

lain in the dim light at night and seen the lid lift just a peep for

ogre eyes to peer out, and, when the terror was growing beyond

endurance, close down, only to lift once and again, until from sheer

weariness and exhaustion we fell into a troubled sleep and dreamed of

the hideous monster which inhabited the unused garret! Tell me that the

old trapdoor never bent its hinges in response to either man or monster

for twenty years? I know it is true, and yet I am not convinced. My

childish fears have left a stronger impression than proof of mere facts

can ever overrule.

FEAR OF BEING LEFT ALONE.--And the fear of being left alone. How big and

dreadful the house seemed with the folks all gone! How we suddenly made

close friends with the dog or the cat, even, in order that this bit of

life might be near us! Or, failing in this, we have gone out to the barn

among the chickens and the pigs and the cows, and deserted the empty

house with its torture of loneliness. What was there so terrible in

being alone? I do not know. I know only that to many children it is a

torture more exquisite than the adult organism is fitted to experience.

But why multiply the recollections? They bring a tremor to the strongest

of us today. Who of us would choose to live through those childish fears

again? Dream fears, fears of animals, fears of furry things, fears of

ghosts and of death, dread of fatal diseases, fears of fire and of

water, of strange persons, of storms, fears of things unknown and even

unimagined, but all the more fearful! Would you all like to relive your

childhood for its pleasures if you had to take along with them its

sufferings? Would the race choose to live its evolution over again? I do

not know. But, for my own part, I should very much hesitate to turn the

hands of time backward in either case. Would that the adults at life's

noonday, in remembering the childish fears of life's morning, might feel

a sympathy for the children of today, who are not yet escaped from the

bonds of the fear instinct. Would that all might seek to quiet every

foolish childish fear, instead of laughing at it or enhancing it!

7. OTHER UNDESIRABLE INSTINCTS

We are all provided by nature with some instincts which, while they may

serve a good purpose in our development, need to be suppressed or at

least modified when they have done their work.

SELFISHNESS.--All children, and perhaps all adults, are selfish. The

little child will appropriate all the candy, and give none to his

playmate. He will grow angry and fight rather than allow brother or

sister to use a favorite plaything. He will demand the mother's

attention and care even when told that she is tired or ill, and not

able to minister to him. But all of this is true to nature and, though

it needs to be changed to generosity and unselfishness, is, after all, a

vital factor in our natures. For it is better in the long run that each

one \_should\_ look out for himself, rather than to be so careless of his

own interests and needs as to require help from others. The problem in

education is so to balance selfishness and greed with unselfishness and

generosity that each serves as a check and a balance to the other. Not

elimination but equilibrium is to be our watchword.

PUGNACITY, OR THE FIGHTING IMPULSE.--Almost every normal child is a

natural fighter, just as every adult should possess the spirit of

conquest. The long history of conflict through which our race has come

has left its mark in our love of combat. The pugnacity of children,

especially of boys, is not so much to be deprecated and suppressed as

guided into right lines and rendered subject to right ideals. The boy

who picks a quarrel has been done a kindness when given a drubbing that

will check this tendency. On the other hand, one who risks battle in

defense of a weaker comrade does no ignoble thing. Children need very

early to be taught the baseness of fighting for the sake of conflict,

and the glory of going down to defeat fighting in a righteous cause. The

world could well stand more of this spirit among adults!

\* \* \* \* \*

Let us then hear the conclusion of the whole matter. The undesirable

instincts do not need encouragement. It is better to let them fade away

from disuse, or in some cases even by attaching punishment to their

expression. They are echoes from a distant past, and not serviceable in

this better present. \_The desirable instincts we are to seize upon and

utilize as starting points for the development of useful interests,

good habits, and the higher emotional life. We should take them as they

come, for their appearance is a sure sign that the organism is ready for

and needs the activity they foreshadow; and, furthermore, if they are

not used when they present themselves, they disappear, never to return.\_

8. PROBLEMS IN OBSERVATION AND INTROSPECTION

1. What instincts have you noticed developing in children? What ones

have you observed to fade away? Can you fix the age in both cases? Apply

these questions to your own development as you remember it or can get it

by tradition from your elders.

2. What use of imitation may be made in teaching (1) literature, (2)

composition, (3) music, (4) good manners, (5) morals?

3. Should children be \_taught\_ to play? Make a list of the games you

think all children should know and be able to play. It has been said

that it is as important for a people to be able to use their leisure

time wisely as to use their work time profitably. Why should this be

true?

4. Observe the instruction of children to discover the extent to which

use is made of the \_constructive\_ instinct. The \_collecting\_ instinct.

The \_dramatic\_ instinct. Describe a plan by which each of these

instincts can be successfully used in some branch of study.

5. What examples can you recount from your own experience of conscious

imitation? of unconscious imitation? of the influence of environment?

What is the application of the preceding question to the esthetic

quality of our school buildings?

6. Have you ever observed that children under a dozen years of age

usually cannot be depended upon for "team work" in their games? How do

you explain this fact?

CHAPTER XIV

FEELING AND ITS FUNCTIONS

In the psychical world as well as the physical we must meet and overcome

inertia. Our lives must be compelled by motive forces strong enough to

overcome this natural inertia, and enable us besides to make headway

against many obstacles. \_The motive power that drives us consists

chiefly of our feelings and emotions.\_ Knowledge, cognition, supplies

the rudder that guides our ship, but feeling and emotion supply the

power.

To convince one's head is, therefore, not enough; his feelings must be

stirred if you would be sure of moving him to action. Often have we

\_known\_ that a certain line of action was right, but failed to follow it

because feeling led in a different direction. When decision has been

hanging in the balance we have piled on one side obligation, duty, sense

of right, and a dozen other reasons for action, only to have them all

outweighed by the one single: \_It is disagreeable.\_ Judgment, reason,

and experience may unite to tell us that a contemplated course is

unwise, and imagination may reveal to us its disastrous consequences,

and yet its pleasures so appeal to us that we yield. Our feelings often

prove a stronger motive than knowledge and will combined; they are a

factor constantly to be reckoned with among our motives.

1. THE NATURE OF FEELING

It will be our purpose in the next few chapters to study the \_affective\_

content of consciousness--the feelings and emotions. The present chapter

will be devoted to the feelings and the one that follows to the

emotions.

THE DIFFERENT FEELING QUALITIES.--At least six (some writers say even

more) distinct and qualitatively different feeling states are easily

distinguished. These are: \_pleasure\_, \_pain\_; \_desire\_, \_repugnance\_;

\_interest\_, \_apathy.\_ Pleasure and pain, and desire and repugnance, are

directly opposite or antagonistic feelings. Interest and apathy are not

opposites in a similar way, since apathy is but the absence of interest,

and not its antagonist. In place of the terms pleasure and pain, the

\_pleasant\_ and the \_unpleasant\_, or the \_agreeable\_ and the

\_disagreeable\_, are often used. \_Aversion\_ is frequently employed as a

synonym for repugnance.

It is somewhat hard to believe on first thought that feeling comprises

but the classes given. For have we not often felt the pain from a

toothache, from not being able to take a long-planned trip, from the

loss of a dear friend? Surely these are very different classes of

feelings! Likewise we have been happy from the very joy of living, from

being praised for some well-doing, or from the presence of friend or

lover. And here again we seem to have widely different classes of

feelings.

We must remember, however, that feeling is always based on something

\_known\_. It never appears alone in consciousness as \_mere\_ pleasures or

pains. The mind must have something about which to feel. The "what" must

precede the "how." What we commonly call a feeling \_is a complex state

of consciousness in which feeling predominates\_, but which has,

nevertheless, \_a basis of sensation, or memory, or some other cognitive

process\_. And what so greatly varies in the different cases of the

illustrations just given is precisely this knowledge element, and not

the feeling element. A feeling of unpleasantness is a feeling of

unpleasantness whether it comes from an aching tooth or from the loss of

a friend. It may differ in degree, and the entire mental states of which

the feeling is a part may differ vastly, but the simple feeling itself

is of the same quality.

FEELING ALWAYS PRESENT IN MENTAL CONTENT.--No phase of our mental life

is without the feeling element. We look at the rainbow with its

beautiful and harmonious blending of colors, and a feeling of pleasure

accompanies the sensation; then we turn and gaze at the glaring sun, and

a disagreeable feeling is the result. A strong feeling of pleasantness

accompanies the experience of the voluptuous warmth of a cozy bed on a

cold morning, but the plunge between the icy sheets on the preceding

evening was accompanied by the opposite feeling. The touch of a hand may

occasion a thrill of ecstatic pleasure, or it may be accompanied by a

feeling equally disagreeable. And so on through the whole range of

sensation; we not only \_know\_ the various objects about us through

sensation and perception, but we also \_feel\_ while we know. Cognition,

or the knowing processes, gives us our "whats"; and feeling, or the

affective processes, gives us our "hows." What is yonder object? A

bouquet. How does it affect you? Pleasurably.

If, instead of the simpler sensory processes which we have just

considered, we take the more complex processes, such as memory,

imagination, and thinking, the case is no different. Who has not reveled

in the pleasure accompanying the memories of past joys? On the other

hand, who is free from all unpleasant memories--from regrets, from pangs

of remorse? Who has not dreamed away an hour in pleasant anticipation of

some desired object, or spent a miserable hour in dreading some calamity

which imagination pictured to him? Feeling also accompanies our thought

processes. Everyone has experienced the feeling of the pleasure of

intellectual victory over some difficult problem which had baffled the

reason, or over some doubtful case in which our judgment proved correct.

And likewise none has escaped the feeling of unpleasantness which

accompanies intellectual defeat. Whatever the contents of our mental

stream, "we find in them, everywhere present, a certain color of passing

estimate, an immediate sense that they are worth something to us at any

given moment, or that they then have an interest to us."

THE SEEMING NEUTRAL FEELING ZONE.--It is probable that there is so

little feeling connected with many of the humdrum and habitual

experiences of our everyday lives, that we are but slightly, if at all,

aware of a feeling state in connection with them. Yet a state of

consciousness with absolutely no feeling side to it is as unthinkable as

the obverse side of a coin without the reverse. Some sort of feeling

tone or mood is always present. The width of the affective neutral

zone--that is, of a feeling state so little marked as not to be

discriminated as either pleasure or pain, desire or aversion--varies

with different persons, and with the same person at different times. It

is conditioned largely by the amount of attention given in the direction

of feeling, and also on the fineness of the power of feeling

discrimination. It is safe to say that the zero range is usually so

small as to be negligible.

2. MOOD AND DISPOSITION

The sum total of all the feeling accompanying the various sensory and

thought processes at any given time results in what we may call our

\_feeling tone\_, \_or mood.\_

HOW MOOD IS PRODUCED.--During most of our waking hours, and, indeed,

during our sleeping hours as well, a multitude of sensory currents are

pouring into the cortical centers. At the present moment we can hear the

rumble of a wagon, the chirp of a cricket, the chatter of distant

voices, and a hundred other sounds besides. At the same time the eye is

appealed to by an infinite variety of stimuli in light, color, and

objects; the skin responds to many contacts and temperatures; and every

other type of end-organ of the body is acting as a "sender" to telegraph

a message in to the brain. Add to these the powerful currents which are

constantly being sent to the cortex from the visceral organs--those of

respiration, of circulation, of digestion and assimilation. And then

finally add the central processes which accompany the flight of images

through our minds--our meditations, memories, and imaginations, our

cogitations and volitions.

Thus we see what a complex our feelings must be, and how impossible to

have any moment in which some feeling is not present as a part of our

mental stream. It is this complex, now made up chiefly on the basis of

the sensory currents coming in from the end-organs or the visceral

organs, and now on the basis of those in the cortex connected with our

thought life, which constitutes the entire feeling tone, or \_mood\_.

MOOD COLORS ALL OUR THINKING.--Mood depends on the character of the

aggregate of nerve currents entering the cortex, and changes as the

character of the current varies. If the currents run on much the same

from hour to hour, then our mood is correspondingly constant; if the

currents are variable, our mood also will be variable. Not only is mood

dependent on our sensations and thoughts for its quality, but it in turn

colors our entire mental life. It serves as a background or setting

whose hue is reflected over all our thinking. Let the mood be somber and

dark, and all the world looks gloomy; on the other hand, let the mood be

bright and cheerful, and the world puts on a smile.

It is told of one of the early circuit riders among the New England

ministry, that he made the following entries in his diary, thus well

illustrating the point: "Wed. Eve. Arrived at the home of Bro. Brown

late this evening, hungry and tired after a long day in the saddle. Had

a bountiful supper of cold pork and beans, warm bread, bacon and eggs,

coffee, and rich pastry. I go to rest feeling that my witness is clear;

the future is bright; I feel called to a great and glorious work in this

place. Bro. Brown's family are godly people." The next entry was as

follows: "Thur. Morn. Awakened late this morning after a troubled night.

I am very much depressed in soul; the way looks dark; far from feeling

called to work among this people, I am beginning to doubt the safety of

my own soul. I am afraid the desires of Bro. Brown and his family are

set too much on carnal things." A dyspeptic is usually a pessimist, and

an optimist always keeps a bright mood.

MOOD INFLUENCES OUR JUDGMENTS AND DECISIONS.--The prattle of children

may be grateful music to our ears when we are in one mood, and

excruciatingly discordant noise when we are in another. What appeals to

us as a good practical joke one day, may seem a piece of unwarranted

impertinence on another. A proposition which looks entirely plausible

under the sanguine mood induced by a persuasive orator, may appear

wholly untenable a few hours later. Decisions which seemed warranted

when we were in an angry mood, often appear unwise or unjust when we

have become more calm. Motives which easily impel us to action when the

world looks bright, fail to move us when the mood is somber. The

feelings of impending peril and calamity which are an inevitable

accompaniment of the "blues," are speedily dissipated when the sun

breaks through the clouds and we are ourselves again.

MOOD INFLUENCES EFFORT.--A bright and hopeful mood quickens every power

and enhances every effort, while a hopeless mood limits power and

cripples effort. The football team which goes into the game discouraged

never plays to the limit. The student who attacks his lesson under the

conviction of defeat can hardly hope to succeed, while the one who

enters upon his work confident of his power to master it has the battle

already half won. The world's best work is done not by those who live in

the shadow of discouragement and doubt, but by those in whose breast

hope springs eternal. The optimist is a benefactor of the race if for no

other reason than the sheer contagion of his hopeful spirit; the

pessimist contributes neither to the world's welfare nor its happiness.

Youth's proverbial enthusiasm and dauntless energy rest upon the supreme

hopefulness which characterizes the mood of the young. For these

reasons, if for no other, the mood of the schoolroom should be one of

happiness and good cheer.

DISPOSITION A RESULTANT OF MOODS.--The sum total of our moods gives us

our \_disposition\_. Whether these are pleasant or unpleasant, cheerful or

gloomy, will depend on the predominating character of the moods which

enter into them. As well expect to gather grapes of thorns or figs of

thistles, as to secure a desirable disposition out of undesirable moods.

A sunny disposition never comes from gloomy moods, nor a hopeful one out

of the "blues." And it is our disposition, more than the power of our

reason, which, after all, determines our desirability as friends and

companions.

The person of surly disposition can hardly make a desirable companion,

no matter what his intellectual qualities may be. We may live very

happily with one who cannot follow the reasoning of a Newton, but it is

hard to live with a person chronically subject to "black moods." Nor can

we put the responsibility for our disposition off on our ancestors. It

is not an inheritance, but a growth. Slowly, day by day, and mood by

mood, we build up our disposition until finally it comes to characterize

us.

TEMPERAMENT.--Some are, however, more predisposed to certain types of

mood than are others. The organization of our nervous system which we

get through heredity undoubtedly has much to do with the feeling tone

into which we most easily fall. We call this predisposition

\_temperament\_. On the effects of temperament, our ancestors must divide

the responsibility with us. I say \_divide\_ the responsibility, for even

if we find ourselves predisposed toward a certain undesirable type of

moods, there is no reason why we should give up to them. Even in spite

of hereditary predispositions, we can still largely determine for

ourselves what our moods are to be.

If we have a tendency toward cheerful, quiet, and optimistic moods, the

psychologist names our temperament the \_sanguine\_; if we are tense,

easily excited and irritable, with a tendency toward sullen or angry

moods, the \_choleric\_; if we are given to frequent fits of the "blues,"

if we usually look on the dark side of things and have a tendency toward

moods of discouragement and the "dumps," the \_melancholic\_; if hard to

rouse, and given to indolent and indifferent moods, the \_phlegmatic\_.

Whatever be our temperament, it is one of the most important factors in

our character.

3. PERMANENT FEELING ATTITUDES, OR SENTIMENTS

Besides the more or less transitory feeling states which we have called

moods, there exists also a class of feeling attitudes, which contain

more of the complex intellectual element, are withal of rather a higher

nature, and much more permanent than our moods. We may call these our

\_sentiments\_, or \_attitudes\_. Our sentiments comprise the somewhat

constant level of feeling combined with cognition, which we name

\_sympathy\_, \_friendship\_, \_love\_, \_patriotism\_, \_religious faith\_,

\_selfishness\_, \_pride\_, \_vanity, etc.\_ Like our dispositions, our

sentiments are a growth of months and years. Unlike our dispositions,

however, our sentiments are relatively independent of the physiological

undertone, and depend more largely upon long-continued experience and

intellectual elements as a basis. A sluggish liver might throw us into

an irritable mood and, if the condition were long continued, might

result in a surly disposition; but it would hardly permanently destroy

one's patriotism and make him turn traitor to his country. One's feeling

attitude on such matters is too deep seated to be modified by changing

whims.

HOW SENTIMENTS DEVELOP.--Sentiments have their beginning in concrete

experiences in which feeling is a predominant element, and grow through

the multiplication of these experiences much as the concept is

developed through many percepts. There is a residual element left

behind each separate experience in both cases. In the case of the

concept the residual element is intellectual, and in the case of the

sentiment it is a complex in which the feeling element is predominant.

How this comes about is easily seen by means of an illustration or two.

The mother feeds her child when he is hungry, and an agreeable feeling

is produced; she puts him into the bath and snuggles him in her arms,

and the experiences are pleasant. The child comes to look upon the

mother as one whose especial function is to make things pleasant for

him, so he comes to be happy in her presence, and long for her in her

absence. He finally grows to love his mother not alone for the countless

times she has given him pleasure, but for what she herself is. The

feelings connected at first wholly with pleasant experiences coming

through the ministrations of the mother, strengthened no doubt by

instinctive tendencies toward affection, and later enhanced by a fuller

realization of what a mother's care and sacrifice mean, grow at last

into a deep, forceful, abiding sentiment of love for the mother.

THE EFFECT OF EXPERIENCE.--Likewise with the sentiment of patriotism. In

so far as our patriotism is a true patriotism and not a noisy clamor, it

had its rise in feelings of gratitude and love when we contemplated the

deeds of heroism and sacrifice for the flag, and the blessings which

come to us from our relations as citizens to our country. If we have had

concrete cases brought to our experience, as, for example, our property

saved from destruction at the hands of a mob or our lives saved from a

hostile foreign foe, the patriotic sentiment will be all the stronger.

So we may carry the illustration into all the sentiments. Our religious

sentiments of adoration, love, and faith have their origin in our belief

in the care, love, and support from a higher Being typified to us as

children by the care, love, and support of our parents. Pride arises

from the appreciation or over-appreciation of oneself, his attainments,

or his belongings. Selfishness has its genesis in the many instances in

which pleasure results from ministering to self. In all these cases it

is seen that our sentiments develop out of our experiences: they are the

permanent but ever-growing results which we have to show for experiences

which are somewhat long continued, and in which a certain feeling

quality is a strong accompaniment of the cognitive part of the

experience.

THE INFLUENCE OF SENTIMENT.--Our sentiments, like our dispositions, are

not only a natural growth from the experiences upon which they are fed,

but they in turn have large influence in determining the direction of

our further development. Our sentiments furnish the soil which is either

favorable or hostile to the growth of new experiences. One in whom the

sentiment of true patriotism is deep-rooted will find it much harder to

respond to a suggestion to betray his country's honor on battlefield, in

legislative hall, or in private life, than one lacking in this

sentiment. The boy who has a strong sentiment of love for his mother

will find this a restraining influence in the face of temptation to

commit deeds which would wound her feelings. A deep and abiding faith in

God is fatal to the growth of pessimism, distrust, and a self-centered

life. One's sentiments are a safe gauge of his character. Let us know a

man's attitude or sentiments on religion, morality, friendship, honesty,

and the other great questions of life, and little remains to be known.

If he is right on these, he may well be trusted in other things; if he

is wrong on these, there is little to build upon.

Literature has drawn its best inspiration and choicest themes from the

field of our sentiments. The sentiment of friendship has given us our

David and Jonathan, our Damon and Pythias, and our Tennyson and Hallam.

The sentiment of love has inspired countless masterpieces; without its

aid most of our fiction would lose its plot, and most of our poetry its

charm. Religious sentiment inspired Milton to write the world's greatest

epic, "Paradise Lost." The sentiment of patriotism has furnished an

inexhaustible theme for the writer and the orator. Likewise if we go

into the field of music and art, we find that the best efforts of the

masters are clustered around some human sentiment which has appealed to

them, and which they have immortalized by expressing it on canvas or in

marble, that it may appeal to others and cause the sentiment to grow in

us.

SENTIMENTS AS MOTIVES.--The sentiments furnish the deepest, the most

constant, and the most powerful motives which control our lives. Such

sentiments as patriotism, liberty, and religion have called a thousand

armies to struggle and die on ten thousand battlefields, and have given

martyrs courage to suffer in the fires of persecution. Sentiments of

friendship and love have prompted countless deeds of self-sacrifice and

loving devotion. Sentiments of envy, pride, and jealousy have changed

the boundary lines of nations, and have prompted the committing of ten

thousand unnamable crimes. Slowly day by day from the cradle to the

grave we are weaving into our lives the threads of sentiment, which at

last become so many cables to bind us to good or evil.

4. PROBLEMS IN OBSERVATION AND INTROSPECTION

1. Are you subject to the "blues," or other forms of depressed feeling?

Are your moods very changeable, or rather constant? What kind of a

disposition do you think you have? How did you come by it; that is, in

how far is it due to hereditary temperament, and in how far to your

daily moods?

2. Can you recall an instance in which some undesirable mood was caused

by your physical condition? By some disturbing mental condition? What is

your characteristic mood in the morning after sleeping in an

ill-ventilated room? After sitting for half a day in an ill-ventilated

schoolroom? After eating indigestible food before going to bed?

3. Observe a number of children or your classmates closely and see

whether you can determine the characteristic mood of each. Observe

several different schools and see whether you can note a characteristic

mood for each room. Try to determine the causes producing the

differences noted. (Physical conditions in the room, personality of the

teacher, methods of governing, teaching, etc.)

4. When can you do your best work, when you are happy, or unhappy?

Cheerful, or "blue"? Confident and hopeful, or discouraged? In a spirit

of harmony and coöperation with your teacher, or antagonistic? Now

relate your conclusions to the type of atmosphere that should prevail in

the schoolroom or the home. Formulate a statement as to why the "spirit"

of the school is all-important. (Effect on effort, growth, disposition,

sentiments, character, etc.)

5. Can you measure more or less accurately the extent to which your

feelings serve as \_motives\_ in your life? Are feelings alone a safe

guide to action? Make a list of the important sentiments that should be

cultivated in youth. Now show how the work of the school may be used to

strengthen worthy sentiments.

CHAPTER XV

THE EMOTIONS

Feeling and emotion are not to be looked upon as two different \_kinds\_

of mental processes. In fact, emotion is but \_a feeling state of a high

degree of intensity and complexity\_. Emotion transcends the simpler

feeling states whenever the exciting cause is sufficient to throw us out

of our regular routine of affective experience. The distinction between

emotion and feeling is a purely arbitrary one, since the difference is

only one of complexity and degree, and many feelings may rise to the

intensity of emotions. A feeling of sadness on hearing of a number of

fatalities in a railway accident may suddenly become an emotion of grief

if we learn that a member of our family is among those killed. A feeling

of gladness may develop into an emotion of joy, or a feeling of

resentment be kindled into an emotion of rage.

1. THE PRODUCING AND EXPRESSING OF EMOTION

Nowhere more than in connection with our emotions are the close

inter-relations of mind and body seen. All are familiar with the fact

that the emotion of anger tends to find expression in the blow, love in

the caress, fear in flight, and so on. But just how our organism acts in

\_producing\_ an emotion is less generally understood. Professor James and

Professor Lange have shown us that emotion not only tends to produce

some characteristic form of response, but that \_the emotion is itself

caused by certain deep-seated physiological reactions\_. Let us seek to

understand this statement a little more fully.

PHYSIOLOGICAL EXPLANATION OF EMOTION.--We must remember first of all

that \_all\_ changes in mental states are accompanied by corresponding

physiological changes. Hard, concentrated thinking quickens the heart

beat; keen attention is accompanied by muscular tension; certain sights

or sounds increase the rate of breathing; offensive odors produce

nausea, and so on. So complete and perfect is the response of our

physical organism to mental changes that one psychologist declares it

possible, had we sufficiently delicate apparatus, to measure the

reactions caused throughout the body of a sleeping child by the shadow

from a passing cloud falling upon the closed eyelids.

The order of the entire event resulting in an emotion is as follows: (1)

Something is \_known\_; some object enters consciousness coming either

from immediate perception or through memory or imagination. This fact,

or thing known, must be of such nature that it will, (2) set up

deep-seated and characteristic \_organic response\_; (3) the feeling

\_accompanying and caused by these physiological reactions constitutes

the emotion\_. For example, we may be passing along the street in a

perfectly calm and equable state of mind, when we come upon a teamster

who is brutally beating an exhausted horse because it is unable to draw

an overloaded wagon up a slippery incline. The facts grasped as we take

in the situation constitute the \_first\_ element in an emotional response

developing in our consciousness. But instantly our muscles begin to grow

tense, the heart beat and breath quicken, the face takes on a different

expression, the hands clench--the entire organism is reacting to the

disturbing situation; the \_second\_ factor in the rising emotion, the

physiological response, thus appears. Along with our apprehension of the

cruelty and the organic disturbances which result we feel waves of

indignation and anger surging through us. This is the \_third\_ factor in

the emotional event, or the emotion itself. In some such way as this are

all of our emotions aroused.

ORIGIN OF CHARACTERISTIC EMOTIONAL REACTIONS.--Why do certain facts or

objects of consciousness always cause certain characteristic organic

responses?

In order to solve this problem we shall have first to go beyond the

individual and appeal to the history of the race. What the race has

found serviceable, the individual repeats. But even then it is hard to

see why the particular type of physical response such as shrinking,

pallor, and trembling, which naturally follow stimuli threatening harm,

should be the best. It is easy to see, however, that the feeling which

prompts to flight or serves to deter from harm's way might be useful. It

is plain that there is an advantage in the tense muscle, the set teeth,

the held breath, and the quickened pulse which accompany the emotion of

anger, and also in the feeling of anger itself, which prompts to the

conflict. But even if we are not able in every case to determine at this

day why all the instinctive responses and their correlate of feeling

were the best for the life of the race, we may be sure that such was the

case; for Nature is inexorable in her dictates that only that shall

persist which has proved serviceable in the largest number of cases.

An interesting question arises at this point as to why we feel emotion

accompanying some of our motor responses, and not others. Perceptions

are crowding in upon us hour after hour; memory, thought, and

imagination are in constant play; and a continuous motor discharge

results each moment in physical expressions great or small. Yet, in

spite of these facts, feeling which is strong enough to rise to an

emotion is only an occasional thing. If emotion accompanies any form of

physical expression, why not all? Let us see whether we can discover any

reason. One day I saw a boy leading a dog along the street. All at once

the dog slipped the string over its head and ran away. The boy stood

looking after the dog for a moment, and then burst into a fit of rage.

What all had happened? The moment before the dog broke away everything

was running smoothly in the experience of the boy. There was no

obstruction to his thought or his plans. Then in an instant the

situation changes. The smooth flow of experience is checked and baffled.

The discharge of nerve currents which meant thought, plans, action, is

blocked. A crisis has arisen which requires readjustment. The nerve

currents must flow in new directions, giving new thought, new plans, new

activities--the dog must be recaptured. It is in connection with this

damming up of nerve currents from following their wonted channels that

the emotion emerges. Or, putting it into mental terms, the emotion

occurs when the ordinary current of our thought is violently

disturbed--when we meet with some crisis which necessitates a

readjustment of our thought relations and plans, either temporarily or

permanently.

THE DURATION OF AN EMOTION.--If the required readjustment is but

temporary, then the emotion is short-lived, while if the readjustment is

necessarily of longer duration, the emotion also will live longer. The

fear which follows the thunder is relatively brief; for the shock is

gone in a moment, and our thought is but temporarily disturbed. If the

impending danger is one that persists, however, as of some secret

assassin threatening our life, the fear also will persist. The grief of

a child over the loss of someone dear to him is comparatively short,

because the current of the child's life has not been so closely bound up

in a complexity of experiences with the lost object as in the case of an

older person, and hence the readjustment is easier. The grief of an

adult over the loss of a very dear friend lasts long, for the object

grieved over has so become a part of the bereaved one's experience that

the loss requires a very complete readjustment of the whole life. In

either case, however, as this readjustment is accomplished the emotion

gradually fades away.

EMOTIONS ACCOMPANYING CRISES IN EXPERIENCE.--If our description of the

feelings has been correct, it will be seen that the simpler and milder

feelings are for the common run of our everyday experience; they are the

common valuers of our thought and acts from hour to hour. The emotions,

or more intense feeling states, are, however, the occasional high tide

of feeling which occurs in crises or emergencies. We are angry on some

particular provocation, we fear some extraordinary factor in our

environment, we are joyful over some unusual good fortune.

2. THE CONTROL OF EMOTIONS

DEPENDENCE ON EXPRESSION.--Since all emotions rest upon some form of

physical or physiological expression primarily, and upon some thought

back of this secondarily, it follows that the first step in controlling

an emotion is to secure \_the removal of the state of consciousness\_

which serves as its basis. This may be done, for instance, with a child,

either by banishing the terrifying dog from his presence, or by

convincing him that the dog is harmless. The motor response will then

cease, and the emotion pass away. If the thought is persistent, however,

through the continuance of its stimulus, then what remains is to seek to

control the physical expression, and in that way suppress the emotion.

If, instead of the knit brow, the tense muscles, the quickened heart

beat, and all the deeper organic changes which go along with these, we

can keep a smile on the face, the muscles relaxed, the heart beat

steady, and a normal condition in all the other organs, we shall have no

cause to fear an explosion of anger. If we are afraid of mice and feel

an almost irresistible tendency to mount a chair every time we see a

mouse, we can do wonders in suppressing the fear by resolutely refusing

to give expression to these tendencies. Inhibition of the expression

inevitably means the death of the emotion.

This fact has its bad side as well as its good in the feeling life, for

it means that good emotions as well as bad will fade out if we fail to

allow them expression. We are all perfectly familiar with the fact in

our own experience that an interest which does not find means of

expression soon passes away. Sympathy unexpressed ere long passes over

into indifference. Even love cannot live without expression. Religious

emotion which does not go out in deeds of service cannot persist. The

natural end and aim of our emotions is to serve as motives to activity;

and missing this opportunity, they have not only failed in their office,

but will themselves die of inaction.

RELIEF THROUGH EXPRESSION.--Emotional states not only have their rise

in organic reactions, but they also tend to result in acts. When we are

angry, or in love, or in fear, we have the impulse \_to do something

about it\_. And, while it is true that emotion may be inhibited by

suppressing the physical expressions on which it is founded, so may a

state of emotional tension be relieved by some forms of expression. None

have failed to experience the relief which comes to the overcharged

nervous system from a good cry. There is no sorrow so bitter as a dry

sorrow, when one cannot weep. A state of anger or annoyance is relieved

by an explosion of some kind, whether in a blow or its equivalent in

speech. We often feel better when we have told a man "what we think of

him."

At first glance this all seems opposed to what we have been laying down

as the explanation of emotion. Yet it is not so if we look well into the

case. We have already seen that emotion occurs when there is a blocking

of the usual pathways of discharge for the nerve currents, which must

then seek new outlets, and thus result in the setting up of new motor

responses. In the case of grief, for example, there is a disturbance in

the whole organism; the heart beat is deranged, the blood pressure

diminished, and the nerve tone lowered. What is needed is for the

currents which are finding an outlet in directions resulting in these

particular responses to find a pathway of discharge which will not

produce such deep-seated results. This may be found in crying. The

energy thus expended is diverted from producing internal disturbances.

Likewise, the explosion in anger may serve to restore the equilibrium of

disturbed nerve currents.

RELIEF DOES NOT FOLLOW IF IMAGE IS HELD BEFORE THE MIND.--All this is

true, however, only when the expression does not serve to keep the idea

before the mind which was originally responsible for the emotion. A

person may work himself into a passion of anger by beginning to talk

about an insult and, as he grows increasingly violent, bringing the

situation more and more sharply into his consciousness. The effect of

terrifying images is easily to be observed in the case of one's starting

to run when he is afraid after night. There is probably no doubt that

the running would relieve his fear providing he could do it and not

picture the threatening something as pursuing him. But, with his

imagination conjuring up dire images of frightful catastrophes at every

step, all control is lost and fresh waves of terror surge over the

shrinking soul.

GROWING TENDENCY TOWARD EMOTIONAL CONTROL.--Among civilized peoples

there is a constantly growing tendency toward emotional control.

Primitive races express grief, joy, fear, or anger much more freely than

do civilized races. This does not mean that primitive man feels more

deeply than civilized man; for, as we have already seen, the crying,

laughing, or blustering is but a small part of the whole physical

expression, and one's entire organism may be stirred to its depths

without any of these outward manifestations. Man has found it advisable

as he has advanced in civilization not to reveal all he feels to those

around him. The face, which is the most expressive part of the body, has

come to be under such perfect control that it is hard to read through it

the emotional state, although the face of civilized man is capable of

expressing far more than is that of the savage. The same difference is

observable between the child and the adult. The child reveals each

passing shade of emotion through his expression, while the adult may

feel much that he does not show.

3. CULTIVATION OF THE EMOTIONS

There is no other mental factor which has more to do with the enjoyment

we get out of life than our feelings and emotions.

THE EMOTIONS AND ENJOYMENT.--Few of us would care to live at all, if all

feeling were eliminated from human experience. True, feeling often makes

us suffer; but in so far as life's joys triumph over its woes, do our

feelings minister to our enjoyment. Without sympathy, love, and

appreciation, life would be barren indeed. Moreover, it is only through

our own emotional experience that we are able to interpret the feeling

side of the lives about us. Failing in this, we miss one of the most

significant phases of social experience, and are left with our own

sympathies undeveloped and our life by so much impoverished.

The interpretation of the subtler emotions of those about us is in no

small degree an art. The human face and form present a constantly

changing panorama of the soul's feeling states to those who can read

their signs. The ability to read the finer feelings, which reveal

themselves in expression too delicate to be read by the eye of the gross

or unsympathetic observer, lies at the basis of all fine interpretation

of personality. Feelings are often too deep for outward expression, and

we are slow to reveal our deepest selves to those who cannot appreciate

and understand them.

HOW EMOTIONS DEVELOP.--Emotions are to be cultivated as the intellect or

the muscles are to be cultivated; namely, through proper exercise. Our

thought is to dwell on those things to which proper emotions attach, and

to shun lines which would suggest emotions of an undesirable type.

Emotions which are to be developed must, as has already been said, find

expression; we must act in response to their leadings, else they become

but idle vaporings. If love prompts us to say a kind word to a suffering

fellow mortal, the word must be spoken or the feeling itself fades away.

On the other hand, the emotions which we wish to suppress are to be

refused expression. The unkind and cutting word is to be left unsaid

when we are angry, and the fear of things which are harmless left

unexpressed and thereby doomed to die.

THE EMOTIONAL FACTOR IN OUR ENVIRONMENT.--Much material for the

cultivation of our emotions lies in the everyday life all about us if we

can but interpret it. Few indeed of those whom we meet daily but are

hungering for appreciation and sympathy. Lovable traits exist in every

character, and will reveal themselves to the one who looks for them.

Miscarriages of justice abound on all sides, and demand our indignation

and wrath and the effort to right the wrong. Evil always exists to be

hated and suppressed, and dangers to be feared and avoided. Human life

and the movement of human affairs constantly appeal to the feeling side

of our nature if we understand at all what life and action mean.

A certain blindness exists in many people, however, which makes our own

little joys, or sorrows, or fears the most remarkable ones in the world,

and keeps us from realizing that others may feel as deeply as we. Of

course this self-centered attitude of mind is fatal to any true

cultivation of the emotions. It leads to an emotional life which lacks

not only breadth and depth, but also perspective.

LITERATURE AND THE CULTIVATION OF THE EMOTIONS.--In order to increase

our facility in the interpretation of the emotions through teaching us

what to look for in life and experience, we may go to literature. Here

we find life interpreted for us in the ideal by masters of

interpretation; and, looking through their eyes, we see new depths and

breadths of feeling which we had never before discovered. Indeed,

literature deals far more in the aggregate with the feeling side than

with any other aspect of human life. And it is just this which makes

literature a universal language, for the language of our emotions is

more easily interpreted than that of our reason. The smile, the cry, the

laugh, the frown, the caress, are understood all around the world among

all peoples. They are universal.

There is always this danger to be avoided, however. We may become so

taken up with the overwrought descriptions of the emotions as found in

literature or on the stage that the common humdrum of everyday life

around us seems flat and stale. The interpretation of the writer or the

actor is far beyond what we are able to make for ourselves, so we take

their interpretation rather than trouble ourselves to look in our own

environment for the material which might appeal to our emotions. It is

not rare to find those who easily weep over the woes of an imaginary

person in a book or on the stage unable to feel sympathy for the real

suffering which exists all around them. The story is told of a lady at

the theater who wept over the suffering of the hero in the play; and at

the moment she was shedding the unnecessary tears, her own coachman,

whom she had compelled to wait for her in the street, was frozen to

death. Our seemingly prosaic environment is full of suggestions to the

emotional life, and books and plays should only help to develop in us

the power rightly to respond to these suggestions.

HARM IN EMOTIONAL OVEREXCITEMENT.--Danger may exist also in still

another line; namely, that of emotional overexcitement. There is a great

nervous strain in high emotional tension. Nothing is more exhausting

than a severe fit of anger; it leaves its victim weak and limp. A severe

case of fright often incapacitates one for mental or physical labor for

hours, or it may even result in permanent injury. The whole nervous tone

is distinctly lowered by sorrow, and even excessive joy may be harmful.

In our actual, everyday life, there is little danger from emotional

overexcitement unless it be in the case of fear in children, as was

shown in the discussion on instincts, and in that of grief over the loss

of objects that are dear to us. Most of our childish fears we could just

as well avoid if our elders were wiser in the matter of guarding us

against those that are unnecessary. The griefs we cannot hope to escape,

although we can do much to control them. Long-continued emotional

excitement, unless it is followed by corresponding activity, gives us

those who weep over the wrongs of humanity, but never do anything to

right them; who are sorry to the point of death over human suffering,

but cannot be induced to lend their aid to its alleviation. We could

very well spare a thousand of those in the world who merely feel, for

one who acts, James tells us.

We should watch, then, that our good feelings do not simply evaporate as

feelings, but that they find some place to apply themselves to

accomplish good; that we do not, like Hamlet, rave over wrongs which

need to be righted, but never bring ourselves to the point where we take

a hand in their righting. If our emotional life is to be rich and deep

in its feeling and effective in its results on our acts and character,

it must find its outlet in deeds.

4. EMOTIONS AS MOTIVES

Emotion is always dynamic, and our feelings constitute our strongest

motives to action and achievement.

HOW OUR EMOTIONS COMPEL US.--Love has often done in the reformation of a

fallen life what strength of will was not able to accomplish; it has

caused dynasties to fall, and has changed the map of nations. Hatred is

a motive hardly less strong. Fear will make savage beasts out of men who

fall under its sway, causing them to trample helpless women and children

under feet, whom in their saner moments they would protect with their

lives. Anger puts out all the light of reason, and prompts peaceful and

well-meaning men to commit murderous acts.

Thus feeling, from the faintest and simplest feeling of interest, the

various ranges of pleasures and pain, the sentiments which underlie all

our lives, and so on to the mighty emotions which grip our lives with an

overpowering strength, constitutes a large part of the motive power

which is constantly urging us on to do and dare. Hence it is important

from this standpoint, also, that we should have the right type of

feelings and emotions well developed, and the undesirable ones

eliminated.

EMOTIONAL HABITS.--Emotion and feeling are partly matters of habit. That

is, we can form emotional as well as other habits, and they are as hard

to break. Anger allowed to run uncontrolled leads into habits of angry

outbursts, while the one who habitually controls his temper finds it

submitting to the habit of remaining within bounds. One may cultivate

the habit of showing his fear on all occasions, or of discouraging its

expression. He may form the habit of jealousy or of confidence. It is

possible even to form the habit of falling in love, or of so

suppressing the tender emotions that love finds little opportunity for

expression.

And here, as elsewhere, habits are formed through performing the acts

upon which the habit rests. If there are emotional habits we are

desirous of forming, what we have to do is to indulge the emotional

expression of the type we desire, and the habit will follow. If we wish

to form the habit of living in a chronic state of the blues, then all we

have to do is to be blue and act blue sufficiently, and this form of

emotional expression will become a part of us. If we desire to form the

habit of living in a happy, cheerful state, we can accomplish this by

encouraging the corresponding expression.

5. PROBLEMS IN OBSERVATION AND INTROSPECTION

1. What are the characteristic bodily expressions by which you can

recognize a state of anger? Fear? Jealousy? Hatred? Love? Grief? Do you

know persons who are inclined to be too expressive emotionally? Who show

too little emotional expression? How would you classify yourself in this

respect?

2. Are you naturally responsive to the emotional tone of others; that

is, are you sympathetic? Are you easily affected by reading emotional

books? By emotional plays or other appeals? What is the danger from

overexciting the emotions without giving them a proper outlet in some

practical activity?

3. Have you observed a tendency among adults not to take seriously the

emotions of a child; for example, to look upon childish grief as

trivial, or fear as something to be laughed at? Is the child's emotional

life as real as that of the adult? (See Ch. IX, Betts, "Fathers and

Mothers.")

4. Have you known children to repress their emotions for fear of being

laughed at? Have you known parents or others to remark about childish

love affairs to the children themselves in a light or joking way? Ought

this ever to be done?

5. Note certain children who give way to fits of anger; what is the

remedy? Note other children who cry readily; what would you suggest as a

cure? (Why should ridicule not be used?)

6. Have you observed any teacher using the lesson in literature or

history to cultivate the finer emotions? What emotions have you seen

appealed to by a lesson in nature study? What emotions have you observed

on the playground that needed restraint? Do you think that on the whole

the emotional life of the child receives enough consideration in the

school? In the home?

CHAPTER XVI

INTEREST

The feeling that we call interest is so important a motive in our lives

and so colors our acts and gives direction to our endeavors that we will

do well to devote a chapter to its discussion.

1. THE NATURE OF INTEREST

We saw in an earlier chapter that personal habits have their rise in

race habits or instincts. Let us now see how interest helps the

individual to select from his instinctive acts those which are useful to

build into personal habits. Instinct impartially starts the child in the

performance of many different activities, but does not dictate what

particular acts shall be retained to serve as the basis for habits.

Interest comes in at this point and says, "This act is of more value

than that act; continue this act and drop that." Instinct prompts the

babe to countless movements of body and limb. Interest picks out those

that are most vitally connected with the welfare of the organism, and

the child comes to prefer these rather than the others. Thus it is that

out of the random movements of arms and legs and head and body we

finally develop the coördinated activities which are infinitely more

useful than the random ones were. And these activities, originating in

instincts, and selected by interest, are soon crystallized into habits.

INTEREST A SELECTIVE AGENT.--The same truth holds for mental activities

as for physical. A thousand channels lie open for your stream of thought

at this moment, but your interest has beckoned it into the one

particular channel which, for the time, at least, appears to be of the

greatest subjective value; and it is now following that channel unless

your will has compelled it to leave that for another. Your thinking as

naturally follows your interest as the needle does the magnet, hence

your thought activities are conditioned largely by your interests. This

is equivalent to saying that your mental habits rest back finally upon

your interests.

Everyone knows what it is to be interested; but interest, like other

elementary states of consciousness, cannot be rigidly defined. (1)

Subjectively considered, interest may be looked upon as \_a feeling

attitude which assigns our activities their place in a subjective scale

of values\_, and hence selects among them. (2) Objectively considered, an

interest is \_the object which calls forth the feeling\_. (3) Functionally

considered, interest is \_the dynamic phase of consciousness\_.

INTEREST SUPPLIES A SUBJECTIVE SCALE OF VALUES.--If you are interested

in driving a horse rather than in riding a bicycle, it is because the

former has a greater subjective value to you than the latter. If you are

interested in reading these words instead of thinking about the next

social function or the last picnic party, it is because at this moment

the thought suggested appeals to you as of more value than the other

lines of thought. From this it follows that your standards of values are

revealed in the character of your interests. The young man who is

interested in the race track, in gaming, and in low resorts confesses by

the fact that these things occupy a high place among the things which

appeal to him as subjectively valuable. The mother whose interests are

chiefly in clubs and other social organizations places these higher in

her scale of values than her home. The reader who can become interested

only in light, trashy literature must admit that matter of this type

ranks higher in his subjective scale of values than the works of the

masters. Teachers and students whose strongest interest is in grade

marks value these more highly than true attainment. For, whatever may be

our claims or assertions, interest is finally an infallible barometer of

the values we assign to our activities.

In the case of some of our feelings it is not always possible to ascribe

an objective side to them. A feeling of ennui, of impending evil, or of

bounding vivacity, may be produced by an unanalyzable complex of causes.

But interest, while it is related primarily to the activities of the

self, is carried over from the activity to the object which occasions

the activity. That is, interest has both an objective and a subjective

side. On the subjective side a certain activity connected with

self-expression is worth so much; on the objective side a certain object

is worth so much as related to this self-expression. Thus we say, I have

an interest in books or in business; my daily activities, my

self-expression, are governed with reference to these objects. They are

my interests.

INTEREST DYNAMIC.--Many of our milder feelings terminate within

ourselves, never attaining sufficient force as motives to impel us to

action. Not so with interest. Its very nature is dynamic. Whatever it

seizes upon becomes \_ipso facto\_ an object for some activity, for some

form of expression of the self. Are we interested in a new book, we must

read it; in a new invention, we must see it, handle it, test it; in some

vocation or avocation, we must pursue it. Interest is impulsive. It

gives its possessor no opportunity for lethargic rest and quiet, but

constantly urges him to action. Grown ardent, interest becomes

enthusiasm, "without which," says Emerson, "nothing great was ever

accomplished." Are we an Edison, with a strong interest centered in

mechanical invention, it will drive us day and night in a ceaseless

activity which scarcely gives us time for food and sleep. Are we a

Lincoln, with an undying interest in the Union, this motive will make

possible superhuman efforts for the accomplishment of our end. Are we

man or woman anywhere, in any walk of life, so we are dominated by

mighty interests grown into enthusiasm for some object, we shall find

great purposes growing within us, and our life will be one of activity

and achievement. On the contrary, a life which has developed no great

interest lacks motive power. Of necessity such a life must be devoid of

purpose and hence barren of results, counting little while it is being

lived, and little missed by the world when it is gone.

HABIT ANTAGONISTIC TO INTEREST.--While, as we have seen, interest is

necessary to the formation of habits, yet habits once formed are

antagonistic to interest. That is, acts which are so habitually

performed that they "do themselves" are accompanied by a minimum of

interest. They come to be done without attentive consciousness, hence

interest cannot attach to their performance. Many of the activities

which make up the daily round of our lives are of this kind. As long as

habit is being modified in some degree, as long as we are improving in

our ways of doing things, interest will still cling to the process; but

let us once settle into an unmodified rut, and interest quickly fades

away. We then have the conditions present which make of us either a

machine or a drudge.

2. DIRECT AND INDIRECT INTEREST

We may have an interest either (1) in the doing of an act, or (2) in the

end sought through the doing. In the first instance we call the interest

\_immediate\_ or \_direct\_; in the second instance, \_mediate\_ or

\_indirect\_.

INTEREST IN THE END VERSUS INTEREST IN THE ACTIVITY.--If we do not find

an interest in the doing of our work, or if it has become positively

disagreeable so that we loathe its performance, then there must be some

ultimate end for which the task is being performed, and in which there

is a strong interest, else the whole process will be the veriest

drudgery. If the end is sufficiently interesting it may serve to throw a

halo of interest over the whole process connected with it. The following

instance illustrates this fact:

A twelve-year-old boy was told by his father that if he would make the

body of an automobile at his bench in the manual training school, the

father would purchase the running gear for it and give the machine to

the boy. In order to secure the coveted prize, the boy had to master the

arithmetic necessary for making the calculations, and the drawing

necessary for making the plans to scale before the teacher in manual

training would allow him to take up the work of construction. The boy

had always lacked interest in both arithmetic and drawing, and

consequently was dull in them. Under the new incentive, however, he took

hold of them with such avidity that he soon surpassed all the remainder

of the class, and was able to make his calculations and drawings within

a term. He secured his automobile a few months later, and still retained

his interest in arithmetic and drawing.

INDIRECT INTEREST AS A MOTIVE.--Interest of the indirect type, which

does not attach to the process, but comes from some more or less

distant end, most of us find much less potent than interest which is

immediate. This is especially true unless the end be one of intense

desire and not too distant. The assurance to a boy that he must get his

lessons well because he will need to be an educated man ten years hence

when he goes into business for himself does not compensate for the lack

of interest in the lessons of today.

Yet it is necessary in the economy of life that both children and adults

should learn to work under the incitement of indirect interests. Much of

the work we do is for an end which is more desirable than the work

itself. It will always be necessary to sacrifice present pleasure for

future good. Ability to work cheerfully for a somewhat distant end saves

much of our work from becoming drudgery. If interest is removed from

both the process and the end, no inducement is left to work except

compulsion; and this, if continued, results in the lowest type of

effort. It puts a man on a level with the beast of burden, which

constantly shirks its work.

INDIRECT INTEREST ALONE INSUFFICIENT.--Interest coming from an end

instead of inhering in the process may finally lead to an interest in

the work itself; but if it does not, the worker is in danger of being

left a drudge at last. To be more than a slave to his work one must

ultimately find the work worth doing for its own sake. The man who

performs his work solely because he has a wife and babies at home will

never be an artist in his trade or profession; the student who masters a

subject only because he must know it for an examination is not

developing the traits of a scholar. The question of interest in the

process makes the difference between the one who works because he loves

to work and the one who toils because he must--it makes the difference

between the artist and the drudge. The drudge does only what he must

when he works, the artist all he can. The drudge longs for the end of

labor, the artist for it to begin. The drudge studies how he may escape

his labor, the artist how he may better his and ennoble it.

To labor when there is joy in the work is elevating, to labor under the

lash of compulsion is degrading. It matters not so much what a man's

occupation as how it is performed. A coachman driving his team down the

crowded street better than anyone else could do it, and glorying in that

fact, may be a true artist in his occupation, and be ennobled through

his work. A statesman molding the affairs of a nation as no one else

could do it, or a scholar leading the thought of his generation is

subject to the same law; in order to give the best grade of service of

which he is capable, man must find a joy in the performance of the work

as well as in the end sought through its performance. No matter how high

the position or how refined the work, the worker becomes a slave to his

labor unless interest in its performance saves him.

3. TRANSITORINESS OF CERTAIN INTERESTS

Since our interests are always connected with our activities it follows

that many interests will have their birth, grow to full strength, and

then fade away as the corresponding instincts which are responsible for

the activities pass through these same stages. This only means that

interest in play develops at the time when the play activities are

seeking expression; that interest in the opposite sex becomes strong

when instinctive tendencies are directing the attention to the choice of

a mate; and that interest in abstract studies comes when the

development of the brain enables us to carry on logical trains of

thought. All of us can recall many interests which were once strong, and

are now weak or else have altogether passed away. Hide-and-seek,

Pussy-wants-a-corner, excursions to the little fishing pond, securing

the colored chromo at school, the care of pets, reading

blood-and-thunder stories or sentimental ones--interest in these things

belongs to our past, or has left but a faint shadow. Other interests

have come, and these in turn will also disappear and other new ones yet

appear as long as we keep on acquiring new experience.

INTERESTS MUST BE UTILIZED WHEN THEY APPEAR.--This means that we must

take advantage of interests when they appear if we wish to utilize and

develop them. How many people there are who at one time felt an interest

impelling them to cultivate their taste for music, art, or literature

and said they would do this at some convenient season, and finally found

themselves without a taste for these things! How many of us have felt an

interest in some benevolent work, but at last discovered that our

inclination had died before we found time to help the cause! How many of

us, young as we are, do not at this moment lament the passing of some

interest from our lives, or are now watching the dying of some interest

which we had fondly supposed was as stable as Gibraltar? The drawings of

every interest which appeals to us is a voice crying, "Now is the

appointed time!" What impulse urges us today to become or to do, we must

begin at once to be or perform, if we would attain to the coveted end.

THE VALUE OF A STRONG INTEREST.--Nor are we to look upon these

transitory interests as useless. They come to us not only as a race

heritage, but they impel us to activities which are immediately useful,

or else prepare us for the later battles of life. But even aside from

this important fact it is worth everything just to be interested. For it

is only through the impulsion of interest that we first learn to put

forth effort in any true sense of the word, and interest furnishes the

final foundation upon which volition rests. Without interest the

greatest powers may slumber in us unawakened, and abilities capable of

the highest attainment rest satisfied with commonplace mediocrity. No

one will ever know how many Gladstones and Leibnitzes the world has lost

simply because their interests were never appealed to in such a way as

to start them on the road to achievement. It matters less what the

interest be, so it be not bad, than that there shall be some great

interest to compel endeavor, test the strength of endurance, and lead to

habits of achievement.

4. SELECTION AMONG OUR INTERESTS

I said early in the discussion that interest is selective among our

activities, picking out those which appear to be of the most value to

us. In the same manner there must be a selection among our interests

themselves.

THE MISTAKE OF FOLLOWING TOO MANY INTERESTS.--It is possible for us to

become interested in so many lines of activity that we do none of them

well. This leads to a life so full of hurry and stress that we forget

life in our busy living. Says James with respect to the necessity of

making a choice among our interests:

"With most objects of desire, physical nature restricts our choice to

but one of many represented goods, and even so it is here. I am often

confronted by the necessity of standing by one of my empirical selves

and relinquishing the rest. Not that I would not, if I could, be both

handsome and fat, and well dressed, and a great athlete, and make a

million a year; be a wit, a bon vivant, and a lady-killer, as well as a

philosopher; a philanthropist, statesman, warrior, and African explorer,

as well as a 'tone poet' and saint. But the thing is simply impossible.

The millionaire's work would run counter to the saint's; the bon vivant

and the philosopher and the lady-killer could not well keep house in the

same tenement of clay. Such different characters may conceivably at the

outset of life be alike possible to man. But to make any one of them

actual, the rest must more or less be suppressed. The seeker of his

truest, strongest, deepest self must review the list carefully, and pick

out the one on which to stake his salvation."

INTERESTS MAY BE TOO NARROW.--On the other hand, it is just as possible

for our interests to be too narrow as too broad. The one who has

cultivated no interests outside of his daily round of humdrum activities

does not get enough out of life. It is possible to become so engrossed

with making a living that we forget to live--to become so habituated to

some narrow treadmill of labor with the limited field of thought

suggested by its environment, that we miss the richest experiences of

life. Many there are who live a barren, trivial, and self-centered life

because they fail to see the significant and the beautiful which lie

just beyond where their interests reach! Many there are so taken up with

their own petty troubles that they have no heart or sympathy for fellow

humanity! Many there are so absorbed with their own little achievements

that they fail to catch step with the progress of the age!

SPECIALIZATION SHOULD NOT COME TOO EARLY.--It is not well to specialize

too early in our interests. We miss too many rich fields which lie ready

for the harvesting, and whose gleaning would enrich our lives. The

student who is so buried in books that he has no time for athletic

recreations or social diversions is making a mistake equally with the

one who is so enthusiastic an athlete and social devotee that he

neglects his studies. Likewise, the youth who is so taken up with the

study of one particular line that he applies himself to this at the

expense of all other lines is inviting a distorted growth. Youth is the

time for pushing the sky line back on all sides; it is the time for

cultivating diverse and varied lines of interests if we would grow into

a rich experience in our later lives. The physical must be developed,

but not at the expense of the mental, and vice versa. The social must

not be neglected, but it must not be indulged to such an extent that

other interests suffer. Interest in amusements and recreations should be

cultivated, but these should never run counter to the moral and

religious.

Specialization is necessary, but specialization in our interests should

rest upon a broad field of fundamental interests, in order that the

selection of the special line may be an intelligent one, and that our

specialty shall not prove a rut in which we become so deeply buried that

we are lost to the best in life.

A PROPER BALANCE TO BE SOUGHT.--It behooves us, then, to find a proper

balance in cultivating our interests, making them neither too broad nor

too narrow. We should deliberately seek to discover those which are

strong enough to point the way to a life vocation, but this should not

be done until we have had an opportunity to become acquainted with

various lines of interests. Otherwise our decision in this important

matter may be based merely on a whim.

We should also decide what interests we should cultivate for our own

personal development and happiness, and for the service we are to render

in a sphere outside our immediate vocation. We should consider

avocations as well as vocations. Whatever interests are selected should

be carried to efficiency. Better a reasonable number of carefully

selected interests well developed and resulting in efficiency than a

multitude of interests which lead us into so many fields that we can at

best get but a smattering of each, and that by neglecting the things

which should mean the most to us. Our interests should lead us to live

what Wagner calls a "simple life," but not a narrow one.

5. INTEREST FUNDAMENTAL IN EDUCATION

Some educators have feared that in finding our occupations interesting,

we shall lose all power of effort and self-direction; that the will, not

being called sufficiently into requisition, must suffer from non-use;

that we shall come to do the interesting and agreeable things well

enough, but fail before the disagreeable.

INTEREST NOT ANTAGONISTIC TO EFFORT.--The best development of the will

does not come through our being forced to do acts in which there is

absolutely no interest. Work done under compulsion never secures the

full self in its performance. It is done mechanically and usually under

such a spirit of rebellion on the part of the doer, that the advantage

of such training may well be doubted. Nor are we safe in assuming that

tasks done without interest as the motive are always performed under the

direction of the will. It is far more likely that they are done under

some external compulsion, and that the will has, after all, but very

little to do with it. A boy may get an uninteresting lesson at school

without much pressure from his will, providing he is sufficiently afraid

of the master. In order that the will may receive training through

compelling the performance of certain acts, it must have a reasonably

free field, with external pressure removed. The compelling force must

come from within, and not from without.

On the other hand, there is not the least danger that we shall ever find

a place in life where all the disagreeable is removed, and all phases of

our work made smooth and interesting. The necessity will always be

rising to call upon effort to take up the fight and hold us to duty

where interest has failed. And it is just here that there must be no

failure, else we shall be mere creatures of circumstance, drifting with

every eddy in the tide of our life, and never able to breast the

current. Interest is not to supplant the necessity for stern and

strenuous endeavor but rather to call forth the largest measure of

endeavor of which the self is capable. It is to put at work a larger

amount of power than can be secured in any other way; in place of

supplanting the will, it is to give it its point of departure and render

its service all the more effective.

INTEREST AND CHARACTER.--Finally, we are not to forget that bad

interests have the same propulsive power as good ones, and will lead to

acts just as surely. And these acts will just as readily be formed into

habits. It is worth noticing that back of the act lies an interest; in

the act lies the seed of a habit; ahead of the act lies behavior, which

grows into conduct, this into character, and character into destiny. Bad

interests should be shunned and discouraged. But even that is not

enough. Good interests must be installed in the place of the bad ones

from which we wish to escape, for it is through substitution rather

than suppression that we are able to break from the bad and adhere to

the good.

Our interests are an evolution. Out of the simple interests of the child

grow the more complex interests of the man. Lacking the opportunity to

develop the interests of childhood, the man will come somewhat short of

the full interests of manhood. The great thing, then, in educating a

child is to discover the fundamental interests which come to him from

the race and, using these as a starting point, direct them into

constantly broadening and more serviceable ones. Out of the early

interest in play is to come the later interest in work; out of the early

interest in collecting treasure boxes full of worthless trinkets and old

scraps comes the later interest in earning and retaining ownership of

property; out of the interest in chums and playmates come the larger

social interests; out of interest in nature comes the interest of the

naturalist. And so one by one we may examine the interests which bear

the largest fruit in our adult life, and we find that they all have

their roots in some early interest of childhood, which was encouraged

and given a chance to grow.

6. ORDER OF DEVELOPMENT OF OUR INTERESTS

The order in which our interests develop thus becomes an important

question in our education. Nor is the order an arbitrary one, as might

appear on first thought; for interest follows the invariable law of

attaching to the activity for which the organism is at that time ready,

and which it then needs in its further growth. That we are sometimes

interested in harmful things does not disprove this assertion. The

interest in its fundamental aspect is good, and but needs more healthful

environment or more wise direction. While space forbids a full

discussion of the genetic phase of interest here, yet we may profit by a

brief statement of the fundamental interests of certain well-marked

periods in our development.

THE INTERESTS OF EARLY CHILDHOOD.--The interests of early childhood are

chiefly connected with ministering to the wants of the organism as

expressed in the appetites, and in securing control of the larger

muscles. Activity is the preëminent thing--racing and romping are worth

doing for their own sake alone. Imitation is strong, curiosity is

rising, and imagination is building a new world. Speech is a joy,

language is learned with ease, and rhyme and rhythm become second

nature. The interests of this stage are still very direct and immediate.

A distant end does not attract. The thing must be worth doing for the

sake of the doing. Since the young child's life is so full of action,

and since it is out of acts that habits grow, it is doubly desirous

during this period that environment, models, and teaching should all

direct his interests and activities into lines that will lead to

permanent values.

THE INTERESTS OF LATER CHILDHOOD.--In the period from second dentition

to puberty there is a great widening in the scope of interests, as well

as a noticeable change in their character. Activity is still the

keynote; but the child is no longer interested merely in the doing, but

is now able to look forward to the end sought. Interests which are

somewhat indirect now appeal to him, and the how of things attracts his

attention. He is beginning to reach outside of his own little circle,

and is ready for handicraft, reading, history, and science. Spelling,

writing, and arithmetic interest him partly from the activities

involved, but more as a means to an end.

Interest in complex games and plays increases, but the child is not yet

ready for games which require team work. He has not come to the point

where he is willing to sacrifice himself for the good of all. Interest

in moral questions is beginning, and right and wrong are no longer

things which may or may not be done without rebuke or punishment. The

great problem at this stage is to direct the interest into ways of

adapting the means to ends and into willingness to work under voluntary

attention for the accomplishment of the desired end.

THE INTERESTS OF ADOLESCENCE.--Finally, with the advent of puberty,

comes the last stage in the development of interests before adult life.

This period is not marked by the birth of new interests so much as by a

deepening and broadening of those already begun. The end sought becomes

an increasingly larger factor, whether in play or in work. Mere activity

itself no longer satisfies. The youth can now play team games; for his

social interests are taking shape, and he can subordinate himself for

the good of the group. Interest in the opposite sex takes on a new

phase, and social form and mode of dress receive attention. A new

consciousness of self emerges, and the youth becomes introspective.

Questions of the ultimate meaning of things press for solution, and what

and who am I, demands an answer.

At this age we pass from a régime of obedience to one of self-control,

from an ethics of authority to one of individualism. All the interests

are now taking on a more definite and stable form, and are looking

seriously toward life vocations. This is a time of big plans and

strenuous activity. It is a crucial period in our life, fraught with

pitfalls and dangers, with privileges and opportunities. At this

strategic point in our life's voyage we may anchor ourselves with right

interests to a safe manhood and a successful career; or we may, with

wrong interests, bind ourselves to a broken life of discouragement and

defeat.

7. PROBLEMS IN OBSERVATION AND INTROSPECTION

1. Try making a list of your most important interests in order of their

strength. Suppose you had made such a list five years ago, where would

it have differed from the present list? Are you ever obliged to perform

any activities in which you have little or no interest, either directly

or indirectly? Can you name any activities in which you once had a

strong interest but which you now perform chiefly from force of habit

and without much interest?

2. Have you any interests of which you are not proud? On the other hand,

do you lack certain interests which you feel that you should possess?

What interests are you now trying especially to cultivate? To suppress?

Have you as broad a field of interests as you can well take care of?

Have you so many interests that you are slighting the development of

some of the more important ones?

3. Observe several recitations for differences in the amount of interest

shown. Account for these differences. Have you ever observed an

enthusiastic teacher with an uninterested class? A dull, listless

teacher with an interested class?

4. A father offers his son a dollar for every grade on his term report

which is above ninety; what type of interest relative to studies does

this appeal to? What do you think of the advisability of giving prizes

in connection with school work?

5. Most children in the elementary school are not interested in

technical grammar; why not? Histories made up chiefly of dates and lists

of kings or presidents are not interesting; what is the remedy? Would

you call any teaching of literature, history, geography, or science

successful which fails to develop an interest in the subject?

6. After careful observation, make a statement of the differences in the

typical play interests of boys and girls; of children of the third grade

and the eighth grade.

CHAPTER XVII

THE WILL

The fundamental fact in all ranges of life from the lowest to the

highest is \_activity\_, \_doing\_. Every individual, either animal or man,

is constantly meeting situations which demand response. In the lower

forms of life, this response is very simple, while in the higher forms,

and especially in man, it is very complex. The bird sees a nook

favorable for a nest, and at once appropriates it; a man sees a house

that strikes his fancy, and works and plans and saves for months to

secure money with which to buy it. It is evident that the larger the

possible number of responses, and the greater their diversity and

complexity, the more difficult it will be to select and compel the right

response to any given situation. Man therefore needs some special power

of control over his acts--he requires a \_will.\_

1. THE NATURE OF THE WILL

There has been much discussion and not a little controversy as to the

true nature of the will. Just what \_is\_ the will, and what is the

content of our mental stream when we are in the act of willing? Is there

at such times a new and distinctly different content which we do not

find in our processes of knowledge or emotion--such as perception,

memory, judgment, interest, desire? Or do we find, when we are engaged

in an act of the will, that the mental stream contains only the

familiar old elements of attention, perception, judgment, desire,

purpose, etc., \_all organized or set for the purpose of accomplishing or

preventing some act\_?

THE CONTENT OF THE WILL.--We shall not attempt here to settle the

controversy suggested by the foregoing questions, nor, for immediately

practical purposes, do we need to settle it. It is perhaps safe to say,

however, that whenever we are willing the mental content consists of

elements of cognition and feeling \_plus a distinct sense of effort\_,

with which everyone is familiar. Whether this sense of effort is a new

and different element, or only a complex of old and familiar mental

processes, we need not now decide.

THE FUNCTION OF THE WILL.--Concerning the function of the will there can

be no haziness or doubt. \_Volition concerns itself wholly with acts,

responses.\_ The will always has to do with causing or inhibiting some

action, either physical or mental. We need to go to the dentist, tell

some friend we were in the wrong, hold our mind to a difficult or

uninteresting task, or do some other disagreeable thing from which we

shirk. It is at such points that we must call upon the will.

Again, we must restrain our tongue from speaking the unkind word, keep

from crying out when the dentist drills the tooth, check some unworthy

line of thought. We must here also appeal to the will. We may conclude

then that the will is needed whenever the physical or mental activity

must be controlled \_with effort\_. Some writers have called the work of

the will in compelling action its \_positive\_ function, and in inhibiting

action its \_negative\_ function.

HOW THE WILL EXERTS ITS COMPULSION.--How does the will bring its

compulsion to bear? It is not a kind of mental policeman who can take

us by the collar, so to speak, and say \_do this\_, or \_do not do that\_.

The secret of the will's power of control lies in \_attention\_. It is the

line of action that we hold the mind upon with an attitude of intending

to perform it that we finally follow. It is the thing we keep thinking

about that we finally do.

On the other hand, let us resolutely hold the mind away from some

attractive but unsuitable line of action, directing our thoughts to an

opposite course, or to some wholly different subject, and we have

effectually blocked the wrong response. To control our acts is therefore

to control our thoughts, and strength of will can be measured by our

ability to direct our attention.

2. THE EXTENT OF VOLUNTARY CONTROL OVER OUR ACTS

A relatively small proportion of our acts, or responses, are controlled

by volition. Nature, in her wise economy, has provided a simpler and

easier method than to have all our actions performed or checked with

conscious effort.

CLASSES OF ACTS OR RESPONSE.--Movements or acts, like other phenomena,

do not just happen. They never occur without a cause back of them.

Whether they are performed with a conscious end in view or without it,

the fact remains the same--something must lie back of the act to account

for its performance. During the last hour, each of us has performed many

simple movements and more or less complex acts. These acts have varied

greatly in character. Of many we were wholly unconscious. Others were

consciously performed, but without feeling of effort on our part. Still

others were accomplished only with effort, and after a struggle to

decide which of two lines of action we should take. Some of our acts

were reflex, some were chiefly instinctive, and some were volitional.

SIMPLE REFLEX ACTS.--First, there are going on within every living

organism countless movements of which he is in large part unconscious,

which he does nothing to initiate, and which he is largely powerless to

prevent. Some of them are wholly, and others almost, out of the reach

and power of his will. Such are the movements of the heart and vascular

system, the action of the lungs in breathing, the movements of the

digestive tract, the work of the various glands in their process of

secretion. The entire organism is a mass of living matter, and just

because it is living no part of it is at rest.

Movements of this type require no external stimulus and no direction,

they are \_reflex\_; they take care of themselves, as long as the body is

in health, without let or hindrance, continuing whether we sleep or

wake, even if we are in hypnotic or anæsthetic coma. With movements of

reflex type we shall have no more concern, since they are almost wholly

physiological, and come scarcely at all within the range of the

consciousness.

INSTINCTIVE ACTS.--Next there are a large number of such acts as closing

the eyes when they are threatened, starting back from danger, crying out

from pain or alarm, frowning and striking when angry. These may roughly

be classed as instinctive, and have already been discussed under that

head. They differ from the former class in that they require some

stimulus to set the act off. We are fully conscious of their

performance, although they are performed without a conscious end in

view. Winking the eyes serves an important purpose, but that is not why

we wink; starting back from danger is a wise thing to do, but we do not

stop to consider this before performing the act.

And so it is with a multitude of reflex and instinctive acts. They are

performed immediately upon receiving an appropriate stimulus, because we

possess an organism calculated to act in a definite way in response to

certain stimuli. There is no need for, and indeed no place for, anything

to come in between the stimulus and the act. The stimulus pulls the

trigger of the ready-set nervous system, and the act follows at once.

Acts of these reflex and instinctive types do not come properly within

the range of volition, hence we will not consider them further.

AUTOMATIC OR SPONTANEOUS ACTS.--Growing out of these reflex and

instinctive acts is a broad field of action which may be called

\_automatic\_ or \_spontaneous\_. The distinguishing feature of this type of

action is that all such acts, though performed now largely without

conscious purpose or intent, were at one time purposed acts, performed

with effort; this is to say that they were volitional. Such acts as

writing, or fingering the keyboard of a piano, were once consciously

purposed, volitional acts selected from many random or reflex movements.

The effects of experience and habit are such, however, that soon the

mere presence of pencil and paper, or the sight of the keyboard, is

enough to set one scribbling or playing. Stated differently, certain

objects and situations come to suggest certain characteristic acts or

responses so strongly that the action follows immediately on the heels

of the percept of the object, or the idea of the act. James calls such

action \_ideo-motor\_. Many illustrations of this type of acts will occur

to each of us: A door starts to blow shut, and we spring up and avert

the slam. The memory of a neglected engagement comes to us, and we have

started to our feet on the instant. A dish of nuts stands before us, and

we find ourselves nibbling without intending to do so.

THE CYCLE FROM VOLITIONAL TO AUTOMATIC.--It is of course evident that no

such acts, though they were at one time in our experience volitional,

now require effort or definite intention for their performance. The law

covering this point may be stated as follows: \_All volitional acts, when

repeated, tend, through the effects of habit, to become automatic, and

thus relieve the will from the necessity of directing them.\_

[Illustration: FIG. 19.--Star for mirror drawing. The mirror breaks up

the automatic control previously developed, and requires one to start

out much as the child does at the beginning. See text for directions.]

To illustrate this law try the following experiment: Draw on a piece of

cardboard a star, like figure 19, making each line segment two inches.

Seat yourself at a table with the star before you, placing a mirror back

of the star so that it can be seen in the mirror. Have someone hold a

screen a few inches above the table so as to hide the star from your

direct view, but so that you can see it in the mirror. Now reach your

hand under the screen and trace with a pencil around the star from left

to right, not taking your pencil off the paper until you get clear

around. Keep track of how long it takes to go around and also note the

irregular wanderings of your pencil. Try this experiment five times

over, noting the decrease in time and effort required, and the increase

in efficiency as the movements tend to become automatic.

VOLITIONAL ACTION.--While it is obvious that the various types of action

already described include a very large proportion of all our acts, yet

they do not include all. For there are some acts that are neither reflex

nor instinctive nor automatic, but that have to be performed under the

stress of compulsion and effort. We constantly meet situations where the

necessity for action or restraint runs counter to our inclinations. We

daily are confronted by the necessity of making decisions in which the

mind must be compelled by effort to take this direction or that

direction. Conflicting motives or tendencies create frequent necessity

for coercion. It is often necessary to drive our bark counter to the

current of our desires or our habits, or to enter into conflict with a

temptation.

VOLITION ACTS IN THE MAKING OF DECISIONS.--Everyone knows for himself

the state of inward unrest which we call indecision. A thought enters

the mind which would of itself prompt an act; but before the act can

occur, a contrary idea appears and the act is checked; another thought

comes favoring the act, and is in turn counterbalanced by an opposing

one. The impelling and inhibiting ideas we call \_motives\_ or \_reasons\_

for and against the proposed act. While we are balancing the motives

against each other, we are said to \_deliberate\_. This process of

deliberation must go on, if we continue to think about the matter at

all, until one set of ideas has triumphed over the other and secured the

attention. When this has occurred, we have \_decided\_, and the

deliberation is at an end. We have exercised the highest function of the

will and made a \_choice\_.

Sometimes the battle of motives is short, the decision being reached as

soon as there is time to summon all the reasons on both sides of the

question. At other times the conflict may go on at intervals for days or

weeks, neither set of motives being strong enough to vanquish the other

and dictate the decision. When the motives are somewhat evenly balanced

we wisely pause in making a decision, because when one line of action is

taken, the other cannot be, and we hesitate to lose either opportunity.

A state of indecision is usually highly unpleasant, and no doubt more

than one decision has been hastened in our lives simply that we might be

done with the unpleasantness attendant on the consideration of two

contrary and insistent sets of motives.

It is of the highest importance when making a decision of any

consequence that we should be fair in considering all the reasons on

both sides of the question, allowing each its just weight. Nor is this

as easy as it might appear; for, as we saw in our study of the emotions,

our feeling attitude toward any object that occupies the mind is largely

responsible for the subjective value we place upon it. It is easy to be

so prejudiced toward or against a line of action that the motives

bearing upon it cannot get fair consideration. To be able to eliminate

this personal factor to such an extent that the evidence before us on a

question may be considered on its merits is a rare accomplishment.

TYPES OF DECISION.--A decision may be reached in a variety of ways, the

most important ones of which may now briefly be described after the

general plan suggested by Professor James:

THE REASONABLE TYPE.--One of the simplest types of decision is that in

which the preponderance of motives is clearly seen to be on one side or

the other, and the only rational thing to do is to decide in accordance

with the weight of evidence. Decisions of this type are called

\_reasonable\_. If we discover ten reasons why we should pursue a certain

course of action, and only one or two reasons of equal weight why we

should not, then the decision ought not to be hard to make. The points

to watch in this case are (a) that we have really discovered all the

important reasons on both sides of the case, and (b) that our feelings

of personal interest or prejudice have not given some of the motives an

undue weight in our scale of values.

ACCIDENTAL TYPE: EXTERNAL MOTIVES.--It is to be doubted whether as many

of our decisions are made under immediate stress of volition as we

think. We may be hesitating between two sets of motives, unable to

decide between them, when a third factor enters which is not really

related to the question at all, but which finally dictates the decision

nevertheless. For example, we are considering the question whether we

shall go on an excursion or stay at home and complete a piece of work.

The benefits coming from the recreation, and the pleasures of the trip,

are pitted against the expense which must be incurred and the

desirability of having the work done on time. At this point, while as

yet we have been unable to decide, a friend comes along, and we seek to

evade the responsibility of making our own decision by appealing to him,

"You tell me what to do!" How few of us have never said in effect if not

in words, "I will do this or that if you will"! How few have never taken

advantage of a rainy day to stay from church or shirk an undesirable

engagement! How few have not allowed important questions to be decided

by some trivial or accidental factor not really related to the choice in

the least!

This form of decision is \_accidental decision\_. It does not rest on

motives which are vitally related to the case, but rather on the

accident of external circumstances. The person who habitually makes his

decisions in this way lacks power of will. He does not hold himself to

the question until he has gathered the evidence before him, and then

himself direct his attention to the best line of action and so secure

its performance. He drifts with the tide, he goes with the crowd, he

shirks responsibility.

ACCIDENTAL TYPE: SUBJECTIVE MOTIVES.--A second type of \_accidental\_

decision may occur when we are hesitating between two lines of action

which are seemingly about equally desirable, and no preponderating

motive enters the field; when no external factor appears, and no

advising friend comes to the rescue. Then, with the necessity for

deciding thrust upon us, we tire of the worry and strain of deliberation

and say to ourselves, "This thing must be settled one way or the other

pretty soon; I am tired of the whole matter." When we have reached this

point we are likely to shut our eyes to the evidence in the case, and

decide largely upon the whim or mood of the moment. Very likely we

regret our decision the next instant, but without any more cause for

the regret than we had for the decision.

It is evident that such a decision as this does not rest on valid

motives but rather on the accident of subjective conditions. Habitual

decisions of this type are an evidence of a mental laziness or a mental

incompetence which renders the individual incapable of marshaling the

facts bearing on a case. He cannot hold them before his mind and weigh

them against each other until one side outweighs the other and dictates

the decision. Of course the remedy for this weakness of decision lies in

not allowing oneself to be pushed into a decision simply to escape the

unpleasantness of a state of indecision, or the necessity of searching

for further evidence which will make the decision easier.

On the other hand, it is possible to form a habit of \_indecision\_, of

undue hesitancy in coming to conclusions when the evidence is all before

us. This gives us the mental dawdler, the person who will spend several

minutes in an agony of indecision over whether to carry an umbrella on

this particular trip; whether to wear black shoes or tan shoes today;

whether to go calling or to stay at home and write letters this

afternoon. Such a person is usually in a stew over some inconsequential

matter, and consumes so much time and energy in fussing over trivial

things that he is incapable of handling larger ones. If we are certain

that we have all the facts in a given case before us, and have given

each its due weight so far as our judgment will enable us to do, then

there is nothing to be gained by delaying the decision. Nor is there any

occasion to change the decision after it has once been made unless new

evidence is discovered bearing on the case.

DECISION UNDER EFFORT.--The highest type of decision is that in which

effort is the determining factor. The pressure of external circumstances

and inward impulse is not enough to overcome a calm and determined \_I

will\_. Two possible lines of action may lie open before us. Every

current of our being leads toward the one; in addition, inclination,

friends, honors, all beckon in the same direction. From the other course

our very nature shrinks; duty alone bids us take this line, and promises

no rewards except the approval of conscience. Here is the crucial point

in human experience; the supreme test of the individual; the last

measure of man's independence and power. Winning at this point man has

exercised his highest prerogative--that of independent choice; failing

here, he reverts toward the lower forms and is a creature of

circumstance, no longer the master of his own destiny, but blown about

by the winds of chance. And it behooves us to win in this battle. We may

lose in a contest or a game and yet not fail, because we have done our

best; if we fail in the conflict of motives we have planted a seed of

weakness from which we shall at last harvest defeat.

Jean Valjean, the galley slave of almost a score of years, escapes and

lives an honest life. He wins the respect and admiration of friends; he

is elected mayor of his town, and honors are heaped on him. At the

height of his prosperity he reads one day that a man has been arrested

in another town for the escaped convict, Jean Valjean, and is about to

be sent to the galleys. Now comes the supreme test in Jean Valjean's

life. Shall he remain the honored, respected citizen and let an innocent

man suffer in his stead, or shall he proclaim himself the long-sought

criminal and again have the collar riveted on his neck and take his

place at the oars? He spends one awful night of conflict in which

contending motives make a battle ground of his soul. But in the morning

he has won. He has saved his manhood. His conscience yet lives--and he

goes and gives himself up to the officers. Nor could he do otherwise and

still remain a \_man\_.

3. STRONG AND WEAK WILLS

Many persons will admit that their memory or imagination or power of

perception is not good, but few will confess to a weak will. Strength of

will is everywhere lauded as a mark of worth and character. How can we

tell whether our will is strong or weak?

NOT A WILL, BUT WILLS.--First of all we need to remember that, just as

we do not have a memory, but a system of memories, so we do not possess

a will, but many different wills. By this I mean that the will must be

called upon and tested at every point of contact in experience before we

have fully measured its strength. Our will may have served us reasonably

well so far, but we may not yet have met any great number of hard tests

because our experience and temptations have been limited.

Nor must we forget to take into account both the negative and the

positive functions of the will. Many there are who think of the will

chiefly in its negative use, as a kind of a check or barrier to save us

\_from\_ doing certain things. That this is an important function cannot

be denied. But the positive is the higher function. There are many men

and women who are able to resist evil, but able to do little good. They

are good enough, but not good for much. They lack the power of effort

and self-compulsion to hold them up to the high standards and stern

endeavor necessary to save them from inferiority or mediocrity. It is

almost certain that for most who read these words the greatest test of

their will power will be in the positive instead of the negative

direction.

OBJECTIVE TESTS A FALSE MEASURE OF WILL POWER.--The actual amount of

volition exercised in making a decision cannot be measured by objective

results. The fact that you follow the pathway of duty, while I falter

and finally drift into the byways of pleasure, is not certain evidence

that you have put forth the greater power of will. In the first place,

the allurements which led me astray may have had no charms for you.

Furthermore, you may have so formed the habit of pursuing the pathway of

duty when the two paths opened before you, that your well-trained feet

unerringly led you into the narrow way without a struggle. Of course you

are on safer ground than I, and on ground that we should all seek to

attain. But, nevertheless, I, although I fell when I should have stood,

may have been fighting a battle and manifesting a power of resistance of

which you, under similar temptation, would have been incapable. The only

point from which a conflict of motives can be safely judged is that of

the soul which is engaged in the struggle.

4. VOLITIONAL TYPES

Several fairly well-marked volitional types may be discovered. It is, of

course, to be understood that these types all grade by insensible

degrees into each other, and that extreme types are the exception rather

than the rule.

THE IMPULSIVE TYPE.--The \_impulsive\_ type of will goes along with a

nervous organism of the hair-trigger kind. The brain is in a state of

highly unstable equilibrium, and a relatively slight current serves to

set off the motor centers. Action follows before there is time for a

counteracting current to intervene. Putting it in mental terms, we act

on an idea which presents itself before an opposing one has opportunity

to enter the mind. Hence \_the action is largely or wholly ideo-motor and

but slightly or not at all deliberate\_. It is this type of will which

results in the hasty word or deed, or the rash act committed on the

impulse of the moment and repented of at leisure; which compels the

frequent, "I didn't think, or I would not have done it!" The impulsive

person may undoubtedly have credited up to him many kind words and noble

deeds. In addition, he usually carries with him an air of spontaneity

and whole-heartedness which goes far to atone for his faults. The fact

remains, however, that he is too little the master of his acts, that he

is guided too largely by external circumstances or inward caprice. He

lacks balance.

Impulsive action is not to be confused with quick decision and rapid

action. Many of the world's greatest and safest leaders have been noted

for quickness of decision and for rapidity of action in carrying out

their decisions. It must be remembered, however, that these men were

making decisions in fields well known to them. They were specialists in

this line of deliberation. The motives for and against certain lines of

action had often been dwelt upon. All possible contingencies had been

imaged many times over, and a valuation placed upon the different

decisions. The various concepts had long been associated with certain

definite lines of action. Deliberation under such conditions can be

carried on with lightning rapidity, each motive being checked off as

worth so much the instant it presents itself, and action can follow

immediately when attention settles on the proper motive to govern the

decision. This is not impulse, but abbreviated deliberation. These

facts suggest to us that we should think much and carefully over matters

in which we are required to make quick decisions.

Of course the remedy for the over-impulsive type is to cultivate

deliberative action. When the impulse comes to act without

consideration, pause to give the other side of the question an

opportunity to be heard. Check the motor response to ideas that suggest

action until you have reviewed the field to see whether there are

contrary reasons to be taken into account. Form the habit of waiting for

all evidence before deciding. "Think twice" before you act.

THE OBSTRUCTED WILL.--The opposite of the impulsive type of will is the

\_obstructed\_ or \_balky\_ will. In this type there is too much inhibition,

or else not enough impulsion. Images which should result in action are

checkmated by opposing images, or do not possess vitality enough as

motives to overcome the dead weight of inertia which clogs mental

action. The person knows well enough what he should do, but he cannot

get started. He "cannot get the consent of his will." It may be the

student whose mind is tormented by thoughts of coming failure in

recitation or examination, but who yet cannot force himself to the

exertion necessary safely to meet the ordeal. It may be the dissolute

man who tortures himself in his sober moments with remorse and the

thought that he was intended for better things, but who, waking from his

meditations, goes on in the same old way. It may be the child undergoing

punishment, who is to be released from bondage as soon as he will

promise to be good, but who cannot bring himself to say the necessary

words. It not only may be, but is, man or woman anywhere who has ideals

which are known to be worthy and noble, but which fail to take hold. It

is anyone who is following a course of action which he knows is beneath

him.

No one can doubt that the moral tragedies, the failures and the

shipwrecks in life come far more from the breaking of the bonds which

should bind right ideals to action than from a failure to perceive the

truth. Men differ far more in their deeds than in their standards of

action.

The remedy for this diseased type of will is much easier to prescribe

than to apply. It is simply to refuse to attend to the contrary thoughts

which are blocking action, and to cultivate and encourage those which

lead to action of the right kind. It is seeking to vitalize our good

impulses and render them effective by acting on them whenever

opportunity offers. Nothing can be accomplished by moodily dwelling on

the disgrace of harboring the obstructing ideas. Thus brooding over them

only encourages them. What we need is to get entirely away from the line

of thought in which we have met our obstruction, and approach the matter

from a different direction. The child who is in a fit of sulks does not

so much need a lecture on the disagreeable habit he is forming as to

have his thoughts led into lines not connected with the grievance which

is causing him the trouble. The stubborn child does not need to have his

will "broken," but rather to have it strengthened. He may be compelled

to do what he does not want to do; but if this is accomplished through

physical force instead of by leading to thoughts connected with the

performance of the act, it may be doubted whether the will has in any

degree been strengthened. Indeed it may rather be depended upon that the

will has been weakened; for an opportunity for self-control, through

which alone the will develops, has been lost. The ultimate remedy for

rebellion often lies in greater freedom at the proper time. This does

not mean that the child should not obey rightful authority promptly and

explicitly, but that just as little external authority as possible

should intervene to take from the child the opportunity for

\_self\_-compulsion.

THE NORMAL WILL.--The golden mean between these two abnormal types of

will may be called the \_normal\_ or \_balanced\_ will. Here there is a

proper ratio between impulsion and inhibition. Ideas are not acted upon

the instant they enter the mind without giving time for a survey of the

field of motives, neither is action "sicklied o'er with the pale cast of

thought" to such an extent that it becomes impossible. The evidence is

all considered and each motive fully weighed. But this once done,

decision follows. No dilatory and obstructive tactics are allowed. The

fleeting impulse is not enough to persuade to action, neither is action

unduly delayed after the decision is made.

5. TRAINING THE WILL

The will is to be trained as we train the other powers of the

mind--through the exercise of its normal function. The function of the

will is to direct or control in the actual affairs of life. Many

well-meaning persons speak of training the will as if we could separate

it from the interests and purposes of our daily living, and in some way

put it through its paces merely for the sake of adding to its general

strength. This view is all wrong. There is, as we have seen, no such

thing as \_general\_ power of will. Will is always required in specific

acts and emergencies, and it is precisely upon such matters that it must

be exercised if it is to be cultivated.

WILL TO BE TRAINED IN COMMON ROUND OF DUTIES.--What is needed in

developing the will is a deep moral interest in whatever we set out to

do, and a high purpose to do it up to the limit of our powers. Without

this, any artificial exercises, no matter how carefully they are devised

or how heroically they are carried out, cannot but fail to fit us for

the real tests of life; with it, artificial exercises are superfluous.

It matters not so much what our vocation as how it is performed. The

most commonplace human experience is rich in opportunities for the

highest form of expression possible to the will--that of directing us

into right lines of action, and of holding us to our best in the

accomplishment of some dominant purpose.

There is no one set form of exercise which alone will serve to train the

will. The student pushing steadily toward his goal in spite of poverty

and grinding labor; the teacher who, though unappreciated and poorly

paid, yet performs every duty with conscientious thoroughness; the man

who stands firm in the face of temptation; the person whom heredity or

circumstance has handicapped, but who, nevertheless, courageously fights

his battle; the countless men and women everywhere whose names are not

known to fame, but who stand in the hard places, bearing the heat and

the toil with brave, unflinching hearts--these are the ones who are

developing a moral fiber and strength of will which will stand in the

day of stress. Better a thousand times such training as this in the

thick of life's real conflicts than any volitional calisthenics or

priggish self-denials entered into solely for the training of the will!

SCHOOL WORK AND WILL TRAINING.--The work of the school offers as good an

opportunity for training powers of will as of memory or reasoning. On

the side of inhibition there is always the necessity for self-restraint

and control so that the rights of others may not be infringed upon.

Temptations to unfairness or insincerity in lessons and examinations are

always to be met. The social relations of the school necessitate the

development of personal poise and independence.

On the positive side the opportunities for the exercise of will power

are always at hand in the school. Every lesson gives the pupil a chance

to measure his strength and determination against the resistance of the

task. High standards are to be built up, ideals maintained, habits

rendered secure.

The great problem for the teacher in this connection is so to organize

both control and instruction that the largest possible opportunity is

given to pupils for the exercise of their own powers of will in all

school relations.

6. FREEDOM OF THE WILL, OR THE EXTENT OF ITS CONTROL

We have seen in this discussion that will is a mode of control--control

of our thoughts and, through our thoughts, of our actions. Will may be

looked upon, then, as the culmination of the mental life, the highest

form of directive agent within us. Beginning with the direction of the

simplest movements, it goes on until it governs the current of our life

in the pursuit of some distant ideal.

LIMITATIONS OF THE WILL.--Just how far the will can go in its control,

just how far man is a free moral agent, has long been one of the mooted

questions among the philosophers. But some few facts are clear. If the

will can exercise full control over all our acts, it by this very fact

determines our character; and character spells destiny. There is not the

least doubt, however, that the will in thus directing us in the

achievement of a destiny works under two limitations: \_First\_, every

individual enters upon life with a large stock of \_inherited

tendencies\_, which go far to shape his interests and aspirations. And

these are important factors in the work of volition. \_Second\_, we all

have our setting in the midst of a great \_material and social

environment\_, which is largely beyond our power to modify, and whose

influences are constantly playing upon us and molding us according to

their type.

THESE LIMITATIONS THE CONDITIONS OF FREEDOM.--Yet there is nothing in

this thought to discourage us. For these very limitations have in them

our hope of a larger freedom. Man's heredity, coming to him through ages

of conflict with the forces of nature, with his brother man, and with

himself, has deeply instilled in him the spirit of independence and

self-control. It has trained him to deliberate, to choose, to achieve.

It has developed in him the power \_to will\_. Likewise man's environment,

in which he must live and work, furnishes the problems which his life

work is to solve, and \_out of whose solution will receives its only true

development\_.

It is through the action and interaction of these two factors, then,

that man is to work out his destiny. What he \_is\_, coupled with what he

may \_do\_, leads him to what he may \_become\_. Every man possesses in some

degree a spark of divinity, a sovereign individuality, a power of

independent initiative. This is all he needs to make him free--free to

do his best in whatever walk of life he finds himself. If he will but do

this, the doing of it will lead him into a constantly growing freedom,

and he can voice the cry of every earnest heart:

Build thee more stately mansions, O my soul!

As the swift seasons roll!

Leave thy low-vaulted past!

Let each new temple, nobler than the last,

Shut thee from heaven with a dome more vast,

Till thou at length art free,

Leaving thine outgrown shell by life's unresting sea!

7. PROBLEMS IN OBSERVATION AND INTROSPECTION

1. Give illustrations from your own experience of the various types of

action mentioned in this discussion. From your own experience of the

last hour, what examples of impulsive action can you give? Would it have

been better in some cases had you stopped to deliberate?

2. Are you easily influenced by prejudice or personal preference in

making decisions? What recent decisions have been thus affected? Can you

classify the various ones of your decisions which you can recall under

the four types mentioned in the text? Under which class does the largest

number fall? Have you a tendency to drift with the crowd? Are you

independent in deciding upon and following out a line of action? What is

the value of advice? Ought advice to do more than to assist in getting

all the evidence on a case before the one who is to decide?

3. Can you judge yourself well enough to tell to which volitional type

you belong? Are you over-impulsive? Are you stubborn? What is the

difference between stubbornness and firmness? Suppose you ask your

instructor, or a friend, to assist you in classifying yourself as to

volitional type. Are you troubled with indecision; that is, do you have

hard work to decide in trivial matters even after you know all the facts

in the case? What is the cause of these states of indecision? The

remedy?

4. Have you a strong power of will? Can you control your attention? Do

you submit easily to temptation? Can you hold yourself up to a high

degree of effort? Can you persevere? Have you ever failed in the

attainment of some cherished ideal because you could not bring yourself

to pay the price in the sacrifice or effort necessary?

5. Consider the class work and examinations of schools that you know.

Does the system of management and control throw responsibility on the

pupils in a way to develop their powers of will?

6. What motives or incentives can be used to encourage pupils to use

self-compulsion to maintain high standards of excellence in their

studies and conduct? Does it pay to be heroic in one's self-control?

CHAPTER XVIII

SELF-EXPRESSION AND DEVELOPMENT

We have already seen that the mind and the body are associated in a

copartnership in which each is an indispensable and active member. We

have seen that the body gets its dignity and worth from its relation

with the mind, and that the mind is dependent on the body for the crude

material of its thought, and also for the carrying out of its mandates

in securing adaptation to our environment. We have seen as a corollary

of these facts that the efficiency of both mind and body is conditioned

by the manner in which each carries out its share of the mutual

activities. Let us see something more of this interrelation.

1. INTER-RELATION OF IMPRESSION AND EXPRESSION

\_No impression without corresponding expression\_ has become a maxim in

both physiology and psychology. Inner life implies self-expression in

external activities. The stream of impressions pouring in upon us hourly

from our environment must have means of expression if development is to

follow. We cannot be passive recipients, but must be active participants

in the educational process. We must not only be able to \_know\_ and

\_feel\_, but to \_do\_.

[Illustration: FIG. 20]

THE MANY SOURCES OF IMPRESSIONS.--The nature of the impressions which

come to us and how they all lead on toward ultimate expression is shown

in the accompanying diagram (Fig. 20). Our material environment is

thrusting impressions upon us every moment of our life; also, the

material objects with which we deal have become so saturated with social

values that each comes to us with a double significance, and what an

object \_means\_ often stands for more than what it \_is\_. From the lives

of people with whom we daily mingle; from the wider circle whose lives

do not immediately touch ours, but who are interpreted to us by the

press, by history and literature; from the social institutions into

which have gone the lives of millions, and of which our lives form a

part, there come to us constantly a flood of impressions whose influence

cannot be measured. So likewise with religious impressions. God is all

about us and within us. He speaks to us from every nook and corner of

nature, and communes with us through the still small voice from within,

if we will but listen. The Bible, religious instruction, and the lives

of good people are other sources of religious impressions constantly

tending to mold our lives. The beautiful in nature, art, and human

conduct constantly appeals to us in æssthetic impressions.

ALL IMPRESSIONS LEAD TOWARD EXPRESSION.--Each of these groups of

impressions may be subdivided and extended into an almost indefinite

number and variety, the different groups meeting and overlapping, it is

true, yet each preserving reasonably distinct characteristics. A common

characteristic of them all, as shown in the diagram, is that they all

point toward expression. The varieties of light, color, form, and

distance which we get through vision are not merely that we may know

these phenomena of nature, but that, knowing them, we may use the

knowledge in making proper responses to our environment. Our power to

know human sympathy and love through our social impressions are not

merely that we may feel these emotions, but that, feeling them, we may

act in response to them.

It is impossible to classify logically in any simple scheme all the

possible forms of expression. The diagram will serve, however, to call

attention to some of the chief modes of bodily expression, and also to

the results of the bodily expressions in the arts and vocations. Here

again the process of subdivision and extension can be carried out

indefinitely. The laugh can be made to tell many different stories.

Crying may express bitter sorrow or uncontrollable joy. Vocal speech may

be carried on in a thousand tongues. Dramatic action may be made to

portray the whole range of human feelings. Plays and games are wide

enough in their scope to satisfy the demands of all ages and every

people. The handicrafts cover so wide a range that the material progress

of civilization can be classed under them, and indeed without their

development the arts and vocations would be impossible. Architecture,

sculpture, painting, music, and literature have a thousand possibilities

both in technique and content. Likewise the modes of society, conduct,

and religion are unlimited in their forms of expression.

LIMITATIONS OF EXPRESSION.--While it is more blessed to give than to

receive, it is somewhat harder in the doing; for more of the self is,

after all, involved in expression than in impression. Expression needs

to be cultivated as an art; for who can express all he thinks, or feels,

or conceives? Who can do his innermost self justice when he attempts to

express it in language, in music, or in marble? The painter answers when

praised for his work, "If you could but see the picture I intended to

paint!" The pupil says, "I know, but I cannot tell." The friend says, "I

wish I could tell you how sorry I am." The actor complains, "If I could

only portray the passion as I feel it, I could bring all the world to my

feet!" The body, being of grosser structure than the mind, must always

lag somewhat behind in expressing the mind's states; yet, so perfect is

the harmony between the two, that with a body well trained to respond to

the mind's needs, comparatively little of the spiritual need be lost in

its expression through the material.

2. THE PLACE OF EXPRESSION IN DEVELOPMENT

Nor are we to think that cultivation of expression results in better

power of expression alone, or that lack of cultivation results only in

decreased power of expression.

INTELLECTUAL VALUE OF EXPRESSION.--There is a distinct mental value in

expression. An idea always assumes new clearness and wider relations

when it is expressed. Michael Angelo, making his plans for the great

cathedral, found his first concept of the structure expanding and

growing more beautiful as he developed his plans. The sculptor,

beginning to model the statue after the image which he has in his mind,

finds the image growing and becoming more expressive and beautiful as

the clay is molded and formed. The writer finds the scope and worth of

his book growing as he proceeds with the writing. The student, beginning

doubtfully on his construction in geometry, finds the truth growing

clearer as he proceeds. The child with a dim and hazy notion of the

meaning of the story in history or literature discovers that the meaning

grows clear as he himself works out its expression in speech, in the

handicrafts, or in dramatic representation.

So we may apply the test to any realm of thought whatever, and the law

holds good: \_It is not in its apprehension, but in its expression, that

a truth finally becomes assimilated to our body of usable knowledge.\_

And this means that in all training of the body through its motor

expression we are to remember that the mind must be behind the act; that

the intellect must guide the hand; that the object is not to make

skillful fingers alone, but to develop clear and intelligent thought as

well.

MORAL VALUE OF EXPRESSION.--Expression also has a distinct moral value.

There are many more people of good intentions than of moral character in

the world. The rugged proverb tells us that the road to hell is paved

with good intentions. And how easy it is to form good resolutions. Who

of us has not, after some moral struggle, said, "I will break the bonds

of this habit: I will enter upon that heroic line of action!" and then,

satisfied for the time with having made the resolution, continued in the

old path, until we were surprised later to find that we had never got

beyond the resolution.

It is not in the moment of the resolve but in the moment when the

resolve is carried out in action that the moral value inheres. To take a

stand on a question of right and wrong means more than to show one's

allegiance to the right--it clears one's own moral vision and gives him

command of himself. Expression is, finally, the only true test for our

morality. Lacking moral expression, we may stand in the class of those

who are merely good, but we can never enter the class of those who are

good for something. One cannot but wonder what would happen if all the

people in the world who are morally right should give expression to

their moral sentiments, not in words alone, but in deeds. Surely the

millennium would speedily come, not only among the nations, but in the

lives of men.

RELIGIOUS VALUE OF EXPRESSION.--True religious experience demands

expression. The older conception of a religious life was to escape from

the world and live a life of communion and contemplation in some

secluded spot, ignoring the world thirsting without. Later religious

teaching, however, recognized the fact that religion cannot consist in

drinking in blessings alone, no matter how ecstatic the feeling which

may accompany the process; that it is not the receiving, but this along

with the giving that enriches the life. To give the cup of cold water,

to visit the widow and the fatherless, to comfort and help the needy and

forlorn--this is not only scriptural but it is psychological. Only as

religious feeling goes out into religious expression, can we have a

normal religious experience.

SOCIAL VALUE OF EXPRESSION.--The criterion of an education once was, how

much does he know? The world did not expect an educated man to \_do\_

anything; he was to be put on a pedestal and admired from a distance.

But this criterion is now obsolete. Society cares little how much we

know if it does not enable us to do. People no longer admire mere

knowledge, but insist that the man of education shall put his shoulder

to the wheel and lend a hand wherever help is needed. Education is no

longer to set men apart from their fellows, but to make them more

efficient comrades and helpers in the world's work. Not the man who

\_knows\_ chemistry and botany, but he who can use this knowledge to make

two blades of grass grow where but one grew before, is the true

benefactor of his race. In short, the world demands services returned

for opportunities afforded; it expects social expression to result from

education.

And this is also best for the individual, for only through social

service can we attain to a full realization of the social values in our

environment. Only thus can we enter fully into the social heritage of

the ages which we receive from books and institutions; only thus can we

come into the truest and best relations with humanity in a common

brotherhood; only thus can we live the broader and more significant

life, and come to realize the largest possible social self.

3. EDUCATIONAL USE OF EXPRESSION

The educational significance of the truths illustrated in the diagram

and the discussion has been somewhat slow in taking hold in our schools.

This has been due not alone to the slowness of the educational world to

grasp a new idea, but also to the practical difficulties connected with

adapting the school exercises as well to the expression side of

education as to the impression. From the fall of Athens on down to the

time of Froebel the schools were constituted on the theory that pupils

were to \_receive\_ education; that they were to \_drink in\_ knowledge,

that their minds were to be \_stored\_ with facts. Children were to "be

seen and not heard." Education was largely a process of gorging the

memory with information.

EASIER TO PROVIDE FOR THE IMPRESSION SIDE OF EDUCATION.--Now it is

evident that it is far easier to provide for the passive side of

education than for the active side. All that is needed in the former

case is to have teachers and books reasonably full of information, and

pupils sufficiently docile to receive it. But in the latter case, the

equipment must be more extensive. If the child is to be allowed to carry

out his impressions into action, if he is actually to \_do\_ something

himself, then he must be supplied with adequate equipment.

So far as the home life was concerned, the child of several generations

ago was at a decided advantage over the child of today on the expression

side of his education. The homes of that day were beehives of industry,

in which a dozen handicrafts were taught and practiced. The buildings,

the farm implements, and most of the furniture of the home were made

from the native timber. The material for the clothing of the family was

produced on the farm, made into cloth, and finally into garments in the

home. Nearly all the supplies for the table came likewise from the farm.

These industries demanded the combined efforts of the family, and each

child did his or her part.

But that day is past. One-half of our people live in cities and towns,

and even in the village and on the farm the handicrafts of the home have

been relegated to the factory, and everything comes into the home ready

for use. The telephone, the mail carrier, and the deliveryman do all the

errands even, and the child in the home is deprived of responsibility

and of nearly all opportunity for manual expression. This is no one's

fault, for it is just one phase of a great industrial readjustment in

society. Yet the fact remains that the home has lost an important

element in education, which the school must supply if we are not to be

the losers educationally by the change.

THE SCHOOL TO TAKE UP THE HANDICRAFTS.--And modern educational method is

insisting precisely on this point. A few years ago the boy caught

whittling in school was a fit subject for a flogging; the boy is today

given bench and tools, and is instructed in their use. Then the child

was punished for drawing pictures; now we are using drawing as one of

the best modes of expression. Then instruction in singing was intrusted

to an occasional evening class, which only the older children could

attend, and which was taught by some itinerant singing master; today we

make music one of our most valuable school exercises. Then all play time

was so much time wasted; now we recognize play as a necessary and

valuable mode of expression and development. Then dramatic

representation was confined to the occasional exhibition or evening

entertainment; now it has become a recognized part of our school work.

Then it was a crime for pupils to communicate with each other in school;

now a part of the school work is planned so that pupils work in groups,

and thus receive social training. Then our schoolrooms were destitute of

every vestige of beauty; today many of them are artistic and beautiful.

This statement of the case is rather over-optimistic if applied to our

whole school system, however. For there are still many schools in which

all forms of handicraft are unknown, and in which the only training in

artistic expression is that which comes from caricaturing the teacher.

Singing is still an unknown art to many teachers. The play instinct is

yet looked upon with suspicion and distrust in some quarters. A large

number of our schoolrooms are as barren and ugly today as ever, and

contain an atmosphere as stifling to all forms of natural expression. We

can only comfort ourselves with Holmes's maxim, that it matters not so

much where we stand as in what direction we are moving. And we certainly

are moving toward a larger development and greater efficiency in

expression on the part of those who pass through our schools.

EXPRESSION AND CHARACTER.--Finally, all that has been said in this

discussion has direct reference to what we call character--that

mysterious something which we so often hear eulogized and so seldom

analyzed. Character has two distinct phases, which may be called the

\_subjective\_ phase and the \_social\_ phase; or, stating it differently,

character is both what we \_are\_ and what we \_do\_. The first of these has

to do with the nature of the real, innermost self; and the last, with

the modes in which this self finds expression. And it is fair to say

that those about us are concerned with what we are chiefly from its

relation to what we do.

Character is not a thing, but a process; it is the succession of our

thoughts and acts from hour to hour. It is not something which we can

hoard and protect and polish unto a more perfect day, but it is the

everyday self in the process of living. And the only way in which it can

be made or marred is through the nature of this stream of thoughts and

acts which constitute the day's life--is through \_being\_ or \_doing\_ well

or ill.

TWO LINES OF DEVELOPMENT.--The cultivation of character must, then,

ignore neither of these two lines. To neglect the first is to forget

that it is out of the abundance of the heart that the mouth speaks; that

a corrupt tree cannot bring forth good fruit; that the act is the true

index of the soul. To omit the second is to leave the character half

formed, the will weak, and the life inefficient and barren of results.

The mind must be supplied with noble ideas and high ideals, with right

emotions and worthy ambitions. On the other hand, the proper connection

must be established between these mental states and appropriate acts.

And the acts must finally grow into habits, so that we naturally and

inevitably translate our ideas and ideals, our emotions and ambitions

into deeds. Our character must be strong not in thought and feeling

alone, but also in the power to return to the world its finished

product in the form of service.

4. PROBLEMS IN INTROSPECTION AND OBSERVATION

1. Do you find that you understand better some difficult point or

problem after you have succeeded in stating it? Do you remember better

what you have expressed?

2. In which particular ones of your studies do you think you could have

done better if you had been given more opportunity for expression?

Explain the psychology of the maxim, we learn to do by doing.

3. Observe various schools at work for the purpose of determining

whether opportunities for expression in the recitations are adequate.

Have you ever seen a class when listless from listening liven up when

they were given something to \_do\_ themselves?

4. Make a study of the types of laughter you hear. Why is some laughter

much more pleasant than other laughter? What did a noted sculptor mean

when he said that a smile at the eyes cannot be depended upon as can one

at the mouth?

5. What examples have you observed in children's plays showing their

love for dramatic representation? What handicrafts are the most suitable

for children of primary grades? for the grammar school? for the high

school?

6. Do you number those among your acquaintance who seem bright enough,

so far as learning is concerned, but who cannot get anything

accomplished? Is the trouble on the expression side of their character?

What are you doing about your own powers of expression? Are you seeking

to cultivate expression in new lines? Is there danger in attempting too

many lines?

INDEX

Action, automatic, 275

classes of, 273

factors involved in, 59

reflex, 274

volitional, 276

Activity, necessity for motor, 56

Adolescence, interests of, 269

Association, and action, 149

chapter on, 144

development of centers, 57

laws of, 150

and methods of learning, 157

and memory, 146

nature of, 144

neural basis of, 145

partial or selective, 153

pleasure-pain motive in, 155

and thinking, 149

training in, 155

types of, 150

Attention, chapter on, 15

effects of, 16

and efficiency, 17

points of failure in, 20

habit of, 27, 73

improvement of, 26

method of, 18

Attention, nature of, 15

rhythms of, 20

types of, 22

Belief, in thinking, 180

Brain, chapter on, 30

and nervous system, 30

quality and memory, 162

relations of mind and, 30

Cerebellum, the, 37

Cerebrum, the, 37

Concept, the, 187

definition of, 189

function of, 187

growth of, 188

and language, 189

Consciousness, content of, 10

known by introspection, 2

the mind or, 1

nature of, 4

personal character of, 1

as a stream, 5

where it resides, 12

Cord, the spinal, 40

Cortex, the, 39

division of labor in, 45

Decision, under effort, 281

types of, 279

Decision and will, 277

Deduction, 196

Development, of association centers, 57

chapter on, 50

and instinct, 209

mental and motor training, 50

of nervous system, 60

through play, 215

Direction, perception of, 105

Disposition, and mood, 232, 230

and temperament, 233

Education, as habit forming, 78

Emotion, chapter on, 239

control of, 243, 246

cultivation of, 247

and feeling, 239

James-Lange theory of, 239

as a motive, 251

physiological explanation of, 240

End-Organ(s) of hearing, 92

kinæsthetic, 96

and sensory qualities, 91

of skin, 94

of smell, 94

of taste, 93

of vision, 91

Environment, influence of, 213

Expression, and character, 303

educational use of, 301

Expression, and impression, 296

learning to interpret, 4

limitations of, 297

self-, and development, 294, 298

Fatigue, and habit, 72

and nervous system, 62

Fear, instinct of, 221

types of, 222

Feeling, chapter on, 226

effects of, 230

and mood, 230

nature of, 227

qualities, 227

Forgetting, rate of, 170

Habit, of attention, 27, 73

chapter on, 66

effects of, 70

emotional, 257

forming as education, 78

and life economy, 70

nature of, 66

and personality, 75

physical basis of, 67

rules for forming, 81

tyranny of, 77

Handicrafts, and education, 302

Hearing, 92

Idea, and image, 111, 114

Image(ry), ability in, 118

chapter on, 111

classes of, 117

Image(ry), cultivation of, 123

and past experience, 111

functions of, 120

and ideas, 111, 114

and imagination, 134

types of, 119

Imagination, chapter on, 127

and conduct, 133

cultivation of, 136, 140

function of, 127

the stuff of, 134

and thinking, 134

types of, 138

Imitation, conscious and unconscious, 212

individuality in, 211

the instinct of, 210

in learning, 211

Induction, 197

Instinct(s), chapter on, 201

definition of, 202

of fear, 221

of imitation, 210

laws of, 205

nature of, 201

of play, 214

as starting points in development, 209

transitory nature of, 206

various undesirable, 222

various useful, 218

Interest(s), chapter on, 254

direct and indirect, 258

and education, 265

and habit, 257

nature of, 254

Interest(s) and nonvoluntary attention, 23

order of development of, 267

selection among, 262

transitoriness of certain, 260

Introspection, 2

and imagery, 116

method of, 3

James, quoted, 81

theory of emotion, 239

Judgment, functions of, 192

nature of, 191

in percepts and concepts, 191

and reasoning, 195

validity of, 193

Knowledge, raw material of, 96

through senses, 84

Language, and the concept, 189

Laws, of association, 150

of instinct, 205

of memory, 168

Learning, and association, 157

Localization of function in cortex, 43

Meaning, dependence on relations, 193

Memorizing, rules for, 169

Memory, and association, 146

and brain quality, 162

chapter on, 160

devices, 175

factors involved in, 163

what constitutes good, 171

laws of, 168

material of, 166

nature of, 160

physical basis of, 161

Mind, or consciousness, at birth, 32

and brain, 30

chapter on, 1

dependence on senses, 48

and external world, 32

Mood, and disposition, 230, 232

influence of, 231

how produced, 230

Motive, emotion as a, 257

Neuroglia, 35

Neurone, the, 34

Nerve cells, and nutrition, 50

undeveloped, 57

Nerve fibers, 57

Nervous system, and association, 145

and consciousness, 12

division of labor in, 43

factors determining efficiency of, 50

and fatigue, 62

gross structure of, 36

Nervous system, and nutrition, 64

order of development, 60

structural elements in, 34

and worry, 62

Objects, defined through perception, 101

physical qualities of, 87, 89

Percept, content of, 101

functions of, 103

Perception, chapter on, 98

of direction, 105

function of, 98

nature of, 100

of space, 104

of time, 106

training of, 108

Personality, and habit, 75

influence of, 213

Play, and education, 215

instinct of, 214

and work, 217

Qualities, sensory, auditory, 92

cutaneous, 94

kinæsthetic, 96

objects known through, 85

olfactory, 94

organic, 96

taste, 93

visual, 91

Reason, and judgment, 193

nature of, 193

and the syllogism, 196

Registration, and attention, 163

and memory, 163

recall, 165

recognition, 166

Rhythm, of attention, 20

Self expression and development, 294

Sensation, attributes of, 89

chapter on, 84

cutaneous, 94

factors conditioning, 88

kinæsthetic, 96

nature of, 89

organic, 96

qualities of, 85

qualities of auditory, 92

qualities of olfactory, 94

qualities of taste, 93

qualities of visual, 91

Senses, dependence of mind on, 48

knowledge through, 84

work of, 33

Sentiments, development of, 235

influence of, 236

nature of, 234

Smell, 94

Space, perception of, 104

Stimuli, education and, 60

effects of sensory, 55

end-organs and, 47

sensory, 46

Stimuli, and response, 53

Syllogism, the 196

Taste, 93

Temperament, 233

Thinking, and association, 149

chapter on, 179

child and adult, 184

elements in, 186

good and memory, 171

types of, 179

Time, perception of, 106

Validity, of judgment, 193

Vision, 91

Volition, see will, 271

and decision, 277

Volitional types, 284

Will, and attention, 24

chapter on, 271

content of, 272

freedom of, 290

function of, 272

measure of power, 284

nature of, 271

strong and weak, 283

training of, 288

types of, 285

Work, and play, 217

Worry, effects of, 62

Youth, and habit-forming, 79

\* \* \* \* \* \*

A VALUABLE BOOK FOR TEACHERS

PRINCIPLES OF EDUCATIONAL PRACTICE

By PAUL KLAPPER, Ph.D., Department of Education, College of the City of

New York. 8vo, Cloth, $1.75.

This book studies the basic principles underlying sound and progressive

pedagogy. In its scope and organization it aims to give (1) a

comprehensive and systematic analysis of the principles of education,

(2) the modern trend and interpretation of educational thought, (3) a

transition from pure psychology to methods of teaching and discipline,

and (4) practical applications of educational theory to the problems

that confront the teacher in the course of daily routine. Every

practical pedagogical solution that is offered has actually stood the

test of classroom demonstration.

The book opens with a study of the function of education and a contrast

of the modern social conception with those aims which have been guiding

ideals in previous educational systems. Part II deals with the

physiological aspects of education. Part III is taken up with the

problem of socializing the child through the curriculum and the school

discipline. The last part of the book, Part IV, The Mental Aspect of

Education, is developed under the following sections: \_Section A.\_ The

Instinctive Aspect of Mind. Mind and its development through

self-expression. Self-activity. Instincts. \_Section B.\_ Intellectual

Aspect of Mind. The functions of Intellect, Perception, Apperception,

Memory, Imagination, Thought Activities. The Doctrine of Formal

Discipline and its influence upon educational endeavor. \_Section C.\_

Emotional Aspect of Mind. \_Section D.\_ Volitional Aspect of Mind. Study

of will, kinds of volitional action, habit vs. deliberative

consciousness. The Education of the Will. Education and Social

Responsibility, the problems of ethical instruction, and the social

functions of the School.

In order to increase the usefulness of the book to teachers of education

there is added a classified bibliography for systematic, intensive

reference reading and a list of suggested problems suitable for advanced

work.

D. APPLETON AND COMPANY

NEW YORK--CHICAGO

\* \* \* \* \* \*

APPLETONS' NEW TEACHERS' BOOKS

A STUDENT'S TEXT-BOOK IN THE HISTORY OF EDUCATION

By Stephen Pierce Duggan, Ph. D.

Head of the Department of Education, College of the City of New York

12mo., Cloth, $1.30 net

Professor Duggan has produced the text-book in the history of education

which has been such a need in our pedagogical work. Growing out of his

work as a teacher and lecturer, this book combines the practical

pedagogy of a teacher with the scholarship of an undisputed authority on

education and its study. There is no book in this field containing such

a fund of useful material arranged along such a skillful outline. An

experience of years is here condensed and solidified into a splendid

unit.

"A Student's Text-Book in the History of Education" presents an

authentic account of every educational system which has influenced our

present-day scheme of pedagogy from the times of the Hebrews to the Age

of the Montessori method. No time is wasted on detailed considerations

of other systems. Professor Duggan's book aids the teacher by giving him

a better understanding of present-day problems in education; by

explaining how Western Civilization developed the educational ideals,

content, organization, and practices which characterize it today; and by

developing the manner in which each people has worked out the solution

of the great problem of reconciling individual liberty with social

stability.

D. APPLETON AND COMPANY

New York--Chicago

\* \* \* \* \* \*

APPLETONS' NEW TEACHERS' BOOKS

EDUCATION FOR SOCIAL EFFICIENCY

By Irving King, Ph. D.

\_Professor of Education, The State University of Iowa,

Iowa City, Iowa\_.

12mo., Cloth, $1.50 net

Written not so much for the educational specialist as for the practical

needs of busy teachers, "Education For Social Efficiency" presents

through the medium of illustration, a social view of education which is

very prominent. It shows concretely various ways in which parents as

well as teachers may contribute something towards the realization of the

ideal of social efficiency as the goal of our educational enterprise.

The idea that the school, especially the country school, should provide

more than instruction in lessons for the scholars is Professor King's

main point. Excellent chapters are included on The School as a Social

Center, The School and Social Progress, and the Social Aim of Education.

In discussing the rural schools particularly, the author writes on The

Rural School and the Rural Community, Adapting the Country School to

Country Needs, and an especially valuable chapter on The Consolidated

School and Socially Efficient Education for the Country.

The response with which Professor King's "Education for Social

Efficiency" has met throughout the country is evidenced by the fact that

the States of Iowa, Missouri, Tennessee, South Dakota, and Virginia have

adopted it for reading circle use. It has also been adopted by the

National Bureau of Education for use in its Rural Teachers' Reading

Circles.

D. APPLETON AND COMPANY

New York--Chicago

\* \* \* \* \* \*

FOOTNOTES:

Footnote 1: Donaldson, "The Growth of the Brain," pp. 74, 238.

Footnote 2: Quoted by James, "Psychology," Briefer Course, p. 135.

Footnote 3: "Psychology," vol. i, pp. 123, 124; also, "Briefer Course,"

p. 145.

Footnote 4: See Betts, "The Distribution and Functions of Mental

Imagery."

Footnote 5: Cf. Dewey, "How We Think," p. 2 ff.

Footnote 6: "Psychology," p. 391.

\*\*\*END OF THE PROJECT GUTENBERG EBOOK THE MIND AND ITS EDUCATION\*\*\*

\*\*\*\*\*\*\* This file should be named 20220-8.txt or 20220-8.zip \*\*\*\*\*\*\*

This and all associated files of various formats will be found in:

http://www.gutenberg.org/dirs/2/0/2/2/20220

Updated editions will replace the previous one--the old editions

will be renamed.

Creating the works from public domain print editions means that no

one owns a United States copyright in these works, so the Foundation

(and you!) can copy and distribute it in the United States without

permission and without paying copyright royalties. Special rules,

set forth in the General Terms of Use part of this license, apply to

copying and distributing Project Gutenberg-tm electronic works to

protect the PROJECT GUTENBERG-tm concept and trademark. Project

Gutenberg is a registered trademark, and may not be used if you

charge for the eBooks, unless you receive specific permission. If you

do not charge anything for copies of this eBook, complying with the

rules is very easy. You may use this eBook for nearly any purpose

such as creation of derivative works, reports, performances and

research. They may be modified and printed and given away--you may do

practically ANYTHING with public domain eBooks. Redistribution is

subject to the trademark license, especially commercial

redistribution.

\*\*\* START: FULL LICENSE \*\*\*

THE FULL PROJECT GUTENBERG LICENSE

PLEASE READ THIS BEFORE YOU DISTRIBUTE OR USE THIS WORK

To protect the Project Gutenberg-tm mission of promoting the free

distribution of electronic works, by using or distributing this work

(or any other work associated in any way with the phrase "Project

Gutenberg"), you agree to comply with all the terms of the Full Project

Gutenberg-tm License (available with this file or online at

http://www.gutenberg.org/license).

Section 1. General Terms of Use and Redistributing Project Gutenberg-tm

electronic works

1.A. By reading or using any part of this Project Gutenberg-tm

electronic work, you indicate that you have read, understand, agree to

and accept all the terms of this license and intellectual property

(trademark/copyright) agreement. If you do not agree to abide by all

the terms of this agreement, you must cease using and return or destroy

all copies of Project Gutenberg-tm electronic works in your possession.

If you paid a fee for obtaining a copy of or access to a Project

Gutenberg-tm electronic work and you do not agree to be bound by the

terms of this agreement, you may obtain a refund from the person or

entity to whom you paid the fee as set forth in paragraph 1.E.8.

1.B. "Project Gutenberg" is a registered trademark. It may only be

used on or associated in any way with an electronic work by people who

agree to be bound by the terms of this agreement. There are a few

things that you can do with most Project Gutenberg-tm electronic works

even without complying with the full terms of this agreement. See

paragraph 1.C below. There are a lot of things you can do with Project

Gutenberg-tm electronic works if you follow the terms of this agreement

and help preserve free future access to Project Gutenberg-tm electronic

works. See paragraph 1.E below.

1.C. The Project Gutenberg Literary Archive Foundation ("the Foundation"

or PGLAF), owns a compilation copyright in the collection of Project

Gutenberg-tm electronic works. Nearly all the individual works in the

collection are in the public domain in the United States. If an

individual work is in the public domain in the United States and you are

located in the United States, we do not claim a right to prevent you from

copying, distributing, performing, displaying or creating derivative

works based on the work as long as all references to Project Gutenberg

are removed. Of course, we hope that you will support the Project

Gutenberg-tm mission of promoting free access to electronic works by

freely sharing Project Gutenberg-tm works in compliance with the terms of

this agreement for keeping the Project Gutenberg-tm name associated with

the work. You can easily comply with the terms of this agreement by

keeping this work in the same format with its attached full Project

Gutenberg-tm License when you share it without charge with others.

1.D. The copyright laws of the place where you are located also govern

what you can do with this work. Copyright laws in most countries are in

a constant state of change. If you are outside the United States, check

the laws of your country in addition to the terms of this agreement

before downloading, copying, displaying, performing, distributing or

creating derivative works based on this work or any other Project

Gutenberg-tm work. The Foundation makes no representations concerning

the copyright status of any work in any country outside the United

States.

1.E. Unless you have removed all references to Project Gutenberg:

1.E.1. The following sentence, with active links to, or other immediate

access to, the full Project Gutenberg-tm License must appear prominently

whenever any copy of a Project Gutenberg-tm work (any work on which the

phrase "Project Gutenberg" appears, or with which the phrase "Project

Gutenberg" is associated) is accessed, displayed, performed, viewed,

copied or distributed:

This eBook is for the use of anyone anywhere at no cost and with

almost no restrictions whatsoever. You may copy it, give it away or

re-use it under the terms of the Project Gutenberg License included

with this eBook or online at www.gutenberg.org

1.E.2. If an individual Project Gutenberg-tm electronic work is derived

from the public domain (does not contain a notice indicating that it is

posted with permission of the copyright holder), the work can be copied

and distributed to anyone in the United States without paying any fees

or charges. If you are redistributing or providing access to a work

with the phrase "Project Gutenberg" associated with or appearing on the

work, you must comply either with the requirements of paragraphs 1.E.1

through 1.E.7 or obtain permission for the use of the work and the

Project Gutenberg-tm trademark as set forth in paragraphs 1.E.8 or

1.E.9.

1.E.3. If an individual Project Gutenberg-tm electronic work is posted

with the permission of the copyright holder, your use and distribution

must comply with both paragraphs 1.E.1 through 1.E.7 and any additional

terms imposed by the copyright holder. Additional terms will be linked

to the Project Gutenberg-tm License for all works posted with the

permission of the copyright holder found at the beginning of this work.

1.E.4. Do not unlink or detach or remove the full Project Gutenberg-tm

License terms from this work, or any files containing a part of this

work or any other work associated with Project Gutenberg-tm.

1.E.5. Do not copy, display, perform, distribute or redistribute this

electronic work, or any part of this electronic work, without

prominently displaying the sentence set forth in paragraph 1.E.1 with

active links or immediate access to the full terms of the Project

Gutenberg-tm License.

1.E.6. You may convert to and distribute this work in any binary,

compressed, marked up, nonproprietary or proprietary form, including any

word processing or hypertext form. However, if you provide access to or

distribute copies of a Project Gutenberg-tm work in a format other than

"Plain Vanilla ASCII" or other format used in the official version

posted on the official Project Gutenberg-tm web site (www.gutenberg.org),

you must, at no additional cost, fee or expense to the user, provide a

copy, a means of exporting a copy, or a means of obtaining a copy upon

request, of the work in its original "Plain Vanilla ASCII" or other

form. Any alternate format must include the full Project Gutenberg-tm

License as specified in paragraph 1.E.1.

1.E.7. Do not charge a fee for access to, viewing, displaying,

performing, copying or distributing any Project Gutenberg-tm works

unless you comply with paragraph 1.E.8 or 1.E.9.

1.E.8. You may charge a reasonable fee for copies of or providing

access to or distributing Project Gutenberg-tm electronic works provided

that

- You pay a royalty fee of 20% of the gross profits you derive from

the use of Project Gutenberg-tm works calculated using the method

you already use to calculate your applicable taxes. The fee is

owed to the owner of the Project Gutenberg-tm trademark, but he

has agreed to donate royalties under this paragraph to the

Project Gutenberg Literary Archive Foundation. Royalty payments

must be paid within 60 days following each date on which you

prepare (or are legally required to prepare) your periodic tax

returns. Royalty payments should be clearly marked as such and

sent to the Project Gutenberg Literary Archive Foundation at the

address specified in Section 4, "Information about donations to

the Project Gutenberg Literary Archive Foundation."

- You provide a full refund of any money paid by a user who notifies

you in writing (or by e-mail) within 30 days of receipt that s/he

does not agree to the terms of the full Project Gutenberg-tm

License. You must require such a user to return or

destroy all copies of the works possessed in a physical medium

and discontinue all use of and all access to other copies of

Project Gutenberg-tm works.

- You provide, in accordance with paragraph 1.F.3, a full refund of any

money paid for a work or a replacement copy, if a defect in the

electronic work is discovered and reported to you within 90 days

of receipt of the work.

- You comply with all other terms of this agreement for free

distribution of Project Gutenberg-tm works.

1.E.9. If you wish to charge a fee or distribute a Project Gutenberg-tm

electronic work or group of works on different terms than are set

forth in this agreement, you must obtain permission in writing from

both the Project Gutenberg Literary Archive Foundation and Michael

Hart, the owner of the Project Gutenberg-tm trademark. Contact the

Foundation as set forth in Section 3 below.

1.F.

1.F.1. Project Gutenberg volunteers and employees expend considerable

effort to identify, do copyright research on, transcribe and proofread

public domain works in creating the Project Gutenberg-tm

collection. Despite these efforts, Project Gutenberg-tm electronic

works, and the medium on which they may be stored, may contain

"Defects," such as, but not limited to, incomplete, inaccurate or

corrupt data, transcription errors, a copyright or other intellectual

property infringement, a defective or damaged disk or other medium, a

computer virus, or computer codes that damage or cannot be read by

your equipment.

1.F.2. LIMITED WARRANTY, DISCLAIMER OF DAMAGES - Except for the "Right

of Replacement or Refund" described in paragraph 1.F.3, the Project

Gutenberg Literary Archive Foundation, the owner of the Project

Gutenberg-tm trademark, and any other party distributing a Project

Gutenberg-tm electronic work under this agreement, disclaim all

liability to you for damages, costs and expenses, including legal

fees. YOU AGREE THAT YOU HAVE NO REMEDIES FOR NEGLIGENCE, STRICT

LIABILITY, BREACH OF WARRANTY OR BREACH OF CONTRACT EXCEPT THOSE

PROVIDED IN PARAGRAPH F3. YOU AGREE THAT THE FOUNDATION, THE

TRADEMARK OWNER, AND ANY DISTRIBUTOR UNDER THIS AGREEMENT WILL NOT BE

LIABLE TO YOU FOR ACTUAL, DIRECT, INDIRECT, CONSEQUENTIAL, PUNITIVE OR

INCIDENTAL DAMAGES EVEN IF YOU GIVE NOTICE OF THE POSSIBILITY OF SUCH

DAMAGE.

1.F.3. LIMITED RIGHT OF REPLACEMENT OR REFUND - If you discover a

defect in this electronic work within 90 days of receiving it, you can

receive a refund of the money (if any) you paid for it by sending a

written explanation to the person you received the work from. If you

received the work on a physical medium, you must return the medium with

your written explanation. The person or entity that provided you with

the defective work may elect to provide a replacement copy in lieu of a

refund. If you received the work electronically, the person or entity

providing it to you may choose to give you a second opportunity to

receive the work electronically in lieu of a refund. If the second copy

is also defective, you may demand a refund in writing without further

opportunities to fix the problem.

1.F.4. Except for the limited right of replacement or refund set forth

in paragraph 1.F.3, this work is provided to you 'AS-IS', WITH NO OTHER

WARRANTIES OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO

WARRANTIES OF MERCHANTIBILITY OR FITNESS FOR ANY PURPOSE.

1.F.5. Some states do not allow disclaimers of certain implied

warranties or the exclusion or limitation of certain types of damages.

If any disclaimer or limitation set forth in this agreement violates the

law of the state applicable to this agreement, the agreement shall be

interpreted to make the maximum disclaimer or limitation permitted by

the applicable state law. The invalidity or unenforceability of any

provision of this agreement shall not void the remaining provisions.

1.F.6. INDEMNITY - You agree to indemnify and hold the Foundation, the

trademark owner, any agent or employee of the Foundation, anyone

providing copies of Project Gutenberg-tm electronic works in accordance

with this agreement, and any volunteers associated with the production,

promotion and distribution of Project Gutenberg-tm electronic works,

harmless from all liability, costs and expenses, including legal fees,

that arise directly or indirectly from any of the following which you do

or cause to occur: (a) distribution of this or any Project Gutenberg-tm

work, (b) alteration, modification, or additions or deletions to any

Project Gutenberg-tm work, and (c) any Defect you cause.

Section 2. Information about the Mission of Project Gutenberg-tm

Project Gutenberg-tm is synonymous with the free distribution of

electronic works in formats readable by the widest variety of computers

including obsolete, old, middle-aged and new computers. It exists

because of the efforts of hundreds of volunteers and donations from

people in all walks of life.

Volunteers and financial support to provide volunteers with the

assistance they need, is critical to reaching Project Gutenberg-tm's

goals and ensuring that the Project Gutenberg-tm collection will

remain freely available for generations to come. In 2001, the Project

Gutenberg Literary Archive Foundation was created to provide a secure

and permanent future for Project Gutenberg-tm and future generations.

To learn more about the Project Gutenberg Literary Archive Foundation

and how your efforts and donations can help, see Sections 3 and 4

and the Foundation web page at http://www.gutenberg.org/fundraising/pglaf.

Section 3. Information about the Project Gutenberg Literary Archive

Foundation

The Project Gutenberg Literary Archive Foundation is a non profit

501(c)(3) educational corporation organized under the laws of the

state of Mississippi and granted tax exempt status by the Internal

Revenue Service. The Foundation's EIN or federal tax identification

number is 64-6221541. Contributions to the Project Gutenberg

Literary Archive Foundation are tax deductible to the full extent

permitted by U.S. federal laws and your state's laws.

The Foundation's principal office is located at 4557 Melan Dr. S.

Fairbanks, AK, 99712., but its volunteers and employees are scattered

throughout numerous locations. Its business office is located at

809 North 1500 West, Salt Lake City, UT 84116, (801) 596-1887, email

business@pglaf.org. Email contact links and up to date contact

information can be found at the Foundation's web site and official

page at http://www.gutenberg.org/about/contact

For additional contact information:

Dr. Gregory B. Newby

Chief Executive and Director

gbnewby@pglaf.org

Section 4. Information about Donations to the Project Gutenberg

Literary Archive Foundation

Project Gutenberg-tm depends upon and cannot survive without wide

spread public support and donations to carry out its mission of

increasing the number of public domain and licensed works that can be

freely distributed in machine readable form accessible by the widest

array of equipment including outdated equipment. Many small donations

($1 to $5,000) are particularly important to maintaining tax exempt

status with the IRS.

The Foundation is committed to complying with the laws regulating

charities and charitable donations in all 50 states of the United

States. Compliance requirements are not uniform and it takes a

considerable effort, much paperwork and many fees to meet and keep up

with these requirements. We do not solicit donations in locations

where we have not received written confirmation of compliance. To

SEND DONATIONS or determine the status of compliance for any

particular state visit http://www.gutenberg.org/fundraising/donate

While we cannot and do not solicit contributions from states where we

have not met the solicitation requirements, we know of no prohibition

against accepting unsolicited donations from donors in such states who

approach us with offers to donate.

International donations are gratefully accepted, but we cannot make

any statements concerning tax treatment of donations received from

outside the United States. U.S. laws alone swamp our small staff.

Please check the Project Gutenberg Web pages for current donation

methods and addresses. Donations are accepted in a number of other

ways including checks, online payments and credit card donations.

To donate, please visit:

http://www.gutenberg.org/fundraising/donate

Section 5. General Information About Project Gutenberg-tm electronic

works.

Professor Michael S. Hart is the originator of the Project Gutenberg-tm

concept of a library of electronic works that could be freely shared

with anyone. For thirty years, he produced and distributed Project

Gutenberg-tm eBooks with only a loose network of volunteer support.

Project Gutenberg-tm eBooks are often created from several printed

editions, all of which are confirmed as Public Domain in the U.S.

unless a copyright notice is included. Thus, we do not necessarily

keep eBooks in compliance with any particular paper edition.

Most people start at our Web site which has the main PG search facility:

http://www.gutenberg.org

This Web site includes information about Project Gutenberg-tm,

including how to make donations to the Project Gutenberg Literary

Archive Foundation, how to help produce our new eBooks, and how to

subscribe to our email newsletter to hear about new eBooks.