eBook Terms & Conditions
www.forgottenbooks.org

1. This eBook* may be
   a. Distributed without modification or sale.
   b. Copied for personal and educational use.
   c. Printed for personal and educational use.

2. This eBook* may NOT be
   a. Sold individually or as part of a package.
      b. Modified in any way.
      c. Reversed-engineered.

This eBook* and all its content including images
are Copyright © 2013 Forgotten Books

*“eBook” refers to this PDF and any of its content including pages and images in either electronic or printed form.
The paperback edition of this book can be purchased from

amazon.com
amazon.co.uk
amazon.de
amazon.fr
amazon.es
amazon.it

Over 1,000,000 eBooks are available to read at

Forgotten Books

www.forgottenbooks.org
Over
1,000,000 eBooks
are available to read at

Forgotten Books

www.ForgottenBooks.org

Alchemy

“In changing the base metals into gold and silver by the projection of the Stone, it follows (by an accelerated process) the method of nature, and therefore is natural.”

The New Pearl of Great Price, by Peter Bonus, 1338 AD

www.ForgottenBooks.org/Alchemy
Free App Download

Available on the
App Store

Windows Store

ANDROID APP ON
Google play

Enjoy over
1,000,000 Books
wherever you go

www.ForgottenBooks.org/apps
THE

TEACHING OF GEOGRAPHY

BY

WILLIAM J. SUTHERLAND, M. A.

PRESIDENT STATE NORMAL SCHOOL, PLATTEVILLE, WISCONSIN

SCOTT, FORESMAN AND COMPANY

CHICAGO   ATLANTIC   NEW YORK
PREFACE.

To all students of geography it is a lamentable fact that there is even yet a lack of respect for this branch of science. Though we have a "new geography" rich and vital in its possibilities to contribute to twentieth century education, yet all too many teachers are oblivious of the significance and value of the subject and, in the schoolroom, are rattling the dry bones of formal statement and definition. Their view of the subject, and their method of teaching it, restricts its value and curtails the interest which it ought to enlist from pupils. The object of this volume is, first of all, to present and instill in the minds of teachers the true nature of modern geography. Therefore Part I is devoted to the "Nature and Scope of Geography." It is hoped that its careful study will result in establishing a correct and broad view of a subject whose content is rich in educative possibilities.

Part II of the volume is devoted to "Methods of Teaching Geography." It is true that a better conception of the subject would, in itself, correct, to considerable extent, the old and irrational methods of presentation. And yet, the more explicit suggestions and directions which are given
in Part II, may be of use to teachers generally in teaching children the subject-matter. It may be quite proper to state that the general view as here held, together with the discussion of method, and the "Practical Suggestions," are the direct outgrowth of the author's years of experience in teaching the subject to children and to prospective and active teachers. The method suggested is thought to be educationally sound in the light of present day educational progress.

Part III is devoted to "Practical Suggestions." Instruction in geography should be concrete and real. Through excursions, illustrative materials, pictures and current literature, the vitalizing contact with life may be secured. Hence suggestions looking to this end are given. The bibliographies at the end of the various chapters will indicate the sources from which the author has secured inspiration and help.

The author is especially indebted to Professor H. L. Roberts of the Department of Geography and Geology, State Normal School, Cape Girardeau, Missouri, for reading and criticising the manuscript; and to Professor W. W. Martin, head of the Training Department of the same institution, for hints and suggestions.

Acknowledgement for suggestions is made to Principal L. L. Everly of the Teachers' Training School of St. Paul; to Professor Thomas Gentle of the Training Department, State Normal School, Platteville, Wisconsin, for valuable suggestions and for testing materials and methods
in actual class teaching; and to Professor C. M. Sanford, also of the State Normal School, Platteville, Wisconsin, for valuable assistance.

Hoping that this volume will meet the needs of teachers anxious to do better work in a very rich and important subject of elementary education, it is respectfully submitted.

William J. Sutherland.

Platteville, Wisconsin, Sept. 25, 1909.
PART ONE: THE NATURE AND SCOPE OF GEOGRAPHY

CHAPTER I

INTRODUCTION: THE NATURE OF GEOGRAPHY

General attitude toward the subject.
What a comprehensive treatment must recognize.
Physiographic processes as explaining conditions of the earth's surface.
Geography includes a study of the earth's surface in its present condition.
Physiographic processes and features as conditioning the life of the earth.
Man's adjustment to favorable earth conditions, and his transformation of unfavorable.
Social side of geography.

CHAPTER II

GEOGRAPHIC CONDITIONS AND EFFECTS, OR CONTROLS AND RESPONSES

Importance of physical conditions and their relationship to life.
The idea of geographic controls and responses.
Classification and brief discussion of controls.

(a) Temperature.
(b) Moisture.
(c) Soils and rocks.
(d) The atmosphere.
(e) Organic controls.
(f) Topographic and barrier controls.
(g) Human and social controls.

Summary.
CHAPTER III

Phases of Geographical Study

The Phases stated.

Observational geography.
(a) Aim of.
(b) Importance of basal ideas.
(c) Nature study and observational geography not differentiated.
(d) Teachers should cultivate an interest in observational geography.

Representative geography.
(a) The character of representative geography: a form of expression.
(b) Educative value of expression.

Descriptive geography.
(a) A medium through which the child can secure earth knowledge beyond the circle of observed phenomena.
(b) Descriptive geography finds a place in the intermediate grades.
(c) Character of the knowledge gained through descriptive geography. Notion of the world as a whole reached inductively.

Rational geography.
(a) The causal element introduced.
(b) Importance of the causal or rational element.

The social phase of geography.
(a) What knowledge is of most worth to the child?
(b) The social phase dominant in commercial and economic geography.

CHAPTER IV

The Relation of Geography to the Sciences.

The relation of geography to geology.
The relation of geography to meteorology.
The relation of geography to physical sciences.
The relation of geography to biological sciences.
The relation of geography to agriculture.
All science related to geography.
Much science rightfully belongs to geography; to eliminate it impoverishes the subject.

CHAPTER V
THE RELATION OF GEOGRAPHY TO HISTORY
Geography the basis of history.
The "old" geography ignored geographic influence.
Illustrations of geographic influence in history.
(a) Physiography and industrial history in New England.
(b) A case of geographic influence in Illinois.

CHAPTER VI
THE AIMS OF GEOGRAPHICAL STUDY
The aims as defined by leading educators.
The aims of the "Paris Commercial Geography Society." Various aims discussed.
Adjustment to environment as an aim.
(a) Place adjustment. Distribution of population.
(b) Economic adjustment.
(c) Political or social adjustment.
Introductory and correlative aims.
The practical value aims.
The culture value aims.

CHAPTER VII
HUMAN AND SOCIAL GEOGRAPHY
The human side of geography.
(a) The true meaning of human geography.
(b) Illustrations of.
The social side of geography.
(a) Geography and social efficiency.
(b) The usefulness of geographical materials.
(c) Geography involves principles of economics.
(d) Study of geography contributes to rational citizenship.
(e) Study of geography and nature contributes to the development of a humane spirit.
CHAPTER VIII

Geography and Life ........................................... 109

Life dependent upon environment.
Man a response to physiographic conditions.
   (a) Man in tropical regions.
   (b) Man in arctic regions.
   (c) Man in temperate regions.

Life a process of establishing an equilibrium with environment.

Re-creation of environment an evidence of civilization.

Restricted and unrestricted habitable areas.

Geography and history in England.

Geography and history in Illinois.

Many ways in which geography functions in life.

PART TWO: THE TEACHING OF GEOGRAPHY

CHAPTER IX

The Teacher’s Preparation .................................... 125

Diversified relationships of geography require a breadth of view in the teacher’s equipment.

Tests of geographical material. Danger of irrelevancy.

Knowledge of principles of first importance.

Brief discussion of the physiographic processes and their effects.
   (a) Diastrophism and the part it plays in determining the contour and relief of land masses.
   (b) Vulcanism and its effects.
   (c) Gradation and the cycle.

General notions the best test of a teacher’s intellectual equipment.

Ability to interpret local environment essential.

The teacher’s preparation must include a knowledge of books, maps, and illustrative materials and their uses.

The teacher’s preparation should include an appreciation of the value of geography to society and the ability to make useful applications.
**TABLE OF CONTENTS**

<table>
<thead>
<tr>
<th>CHAPTER X</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Better Method in Geography</td>
<td>137</td>
</tr>
</tbody>
</table>

General method determined by:

(a) The nature of the subject.
(b) The needs of the child.

Suggested lines of improvement in teaching geography.
The empirical method condemned.
Subject-matter should be presented in the form of pertinent problems.
An illustrative lesson.

**CHAPTER XI**

An Inductive Lesson

The theory:

Organization of the subject-matter by the teacher.

(a) Selection of the principle to be taught.
(b) Assemblage of well-chosen data for bringing out the principle.
(c) Selection of a problem for the pupil.
(d) The choice of good preparatory experiences for adjusting pupil to problem.

Realization of the plan of the lesson.

(a) Making the preparatory step.
(b) Stating the problem.
(c) The analysis of the first datum.
(d) The comparison of the data analyzed.
(e) The statement of the result of the comparison.

The application:

Explanatory statement.
The working plan of the lesson on the "Cause for the location of cities."
Some advantages of such a lesson over the traditional lesson.
The deductive phase of this lesson.
CHAPTER XII

A Deductive Development Lesson

Steps.
(a) The problem stated.
(b) Exercise to secure data.
(c) Review to recall principles.
(d) Making the inferences.
(e) Verifying the inferences.

CHAPTER XIII

Regional Geography

A proper unit of study assists in organization of materials.
Advantages of physiographic region as the unit for areal geography.
Regional study correlates descriptive, causal, political, commercial and social phases into a systematic whole.
Summary of advantages of regional treatment.

CHAPTER XIV

Generalization and Organization of Geographical Materials

The causal element.
Need of organization in teaching geography.
The rational or causal element the organizing principle.
Unorganized materials of little value and easily lost.

CHAPTER XV

The Use of Text Books

An undesirable use of the text.
The importance of good assignments.
What can be secured through a wise use of the text book.
Suggestions relative to assignments from text books.
Memorizing often the result of poorly assigned text book lessons.
Right attitude of teacher toward the text book.
PART THREE: PRACTICAL SUGGESTIONS

CHAPTER XVI

The Value of Magazine Articles and Government Publications in Teaching Geography

Why magazine articles and official reports are valuable.
(a) They supplement brief text book.
(b) They are reliable and up to date.
(c) They are usually well illustrated.
(d) They emphasize the social side of geography.

Summary.

CHAPTER XVII

The Value of Pictures in Teaching Geography

Why pictures are valuable.
(a) They constitute an economic medium for conveyance of ideas.
(b) They furnish unity of impression.
(c) They are accurate.
(d) They are attractive and stimulate interest.

Suggestions as to use of pictures.
(a) Make good use of the pictures in the text book.
(b) Illustrations of the use of text-book pictures.
(c) How to use stereoscopic views.
(d) The value of the stereopticon.

CHAPTER XVIII

The Value of Illustrative Materials and Field Work...

The School Museum.
(a) Directions for building.
(b) Suggestive materials.

The Industrial Excursion.
(a) The value of.
(b) Suggestions relating to excursions.

Physiographic Field Work.
(a) The importance of.
(b) Suggested field studies.
CHAPTER XIX

Suggestions on Weather Study.... 217

Suggested helps.
Some simple apparatus and directions for making.
Practical exercises.
(a) With the helior.
(b) To show atmospheric pressure.
(c) To show convection currents in air and water.

Suggestions on the study of cyclonic storms.
(a) Convection currents.
(b) Lows.
(c) The storm center.
(d) The shifting of the winds.

Exercises on the daily weather map.
Exercises to show that air absorbs and deposits moisture.
Exercises to show forms of heat energy.

Suggestions on:
(a) Wind velocities.
(b) State of sky.
(c) Weather record.

CHAPTER XX

Maps and Models and Their Uses 235

General discussion of maps.
Characteristics of good maps.
Kinds of maps.
Map drawing.

Suggested map exercises based upon:
(a) United States Geological Survey maps.
(b) On standard atlases.
(c) On outline maps.

The use of graphs.
Models, and how to make them.
(a) Paper pulp models.
(b) Salt and flour.
(c) Sand models.
(d) Plasticine models.
(e) Chalk and pencil models.
### CHAPTER XXI

**Suggestions on the Study of Soils**

- The origin of soils.
- Local soils characterized by underlying rocks.
- Law that controls deposition of sediments.
- The Blue Grass region.
- Transported soils.
  - (a) Alluvial.
  - (b) Glacial drift.
  - (c) Loess.
- The Mississippi delta.
- The prairie plains.
- The loess of Mississippi.
- Lava soils.
- Elements of soil fertility.
- Soils likely to be poor in:
  - (a) Nitrogen.
  - (b) Phosphorus.
  - (c) Potassium.
- Methods of restoring.
- Suggestions for simple out-door study.

### CHAPTER XXII

**Suggestions Relative to Placing Emphasis in Teaching Geography**

- Emphasis upon definite statements.
  - (a) Pronunciation and spelling.
  - (b) Definitions, as in mathematical geography.
  - (c) General directions and locations.
  - (d) Statements of physiographic and economic principles, facts, and laws.
  - (e) Statistical units to serve as keys.
- Emphasis upon the rational phase of geography.

### APPENDIX

**Bibliography**

- Of the pedagogy of geography.
- Of subject matter.
- A small but valuable library for a country school.
- Suggested map equipment for a country school.
- Suggested equipment for a village or grammar school.
- Information relating to maps, globes, charts, etc.
<table>
<thead>
<tr>
<th>Membership Level</th>
<th>Price</th>
<th>Description</th>
<th>Purchase Button</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 Books per month</td>
<td>$2.99/month</td>
<td>Monthly payment $0.30 per book</td>
<td>Purchase</td>
</tr>
<tr>
<td>100 Books per month</td>
<td>$4.99/month</td>
<td>Monthly payment $0.05 per book</td>
<td>Purchase</td>
</tr>
<tr>
<td>10 Books per year</td>
<td>$19.99/year</td>
<td>Yearly payment $0.17 per book</td>
<td>Purchase Save $15.89</td>
</tr>
<tr>
<td>100 Books per year</td>
<td>$35.99/year</td>
<td>Yearly payment $0.03 per book</td>
<td>Purchase Save $23.89</td>
</tr>
</tbody>
</table>

Memberships can be cancelled at any time.
rapid healing. The study of elementary chemistry should inform pupils of the danger of typhoid fever that attends the use of contaminated drinking water, and the instruction should put them in possession of a few simple tests for detecting its impurities. Geography should make farmer boys realize the unwisdom of cultivating side-hill slopes as surface erosion will soon steal from the field the choicest part of the soil. Civilization is becoming more and more complex, and this complexity multiplies the adjustments of the efficient citizen. Life is too strenuous and competition too strong to insure success to him who would learn in the school of life, or to him whose school training has ignored the "new duties which new occasions teach."

This new educational situation has invited new subjects of study, eliminated parts of old subjects, while others, time-honored and familiar, seem to have been transformed and enriched many fold through a better understanding of their ability to contribute to present-day needs. Viewed in this light, the subject of discussion has proved its worth, established its claim to a prominent place in the curriculum of popular education and won the significant title of the "new geography."

At the outset a brief survey of the nature of geography may be quite in order.

The field of study with which geography is concerned is large indeed! Considered in its broad sense it touches many of the departments of
human knowledge. It includes the conception of
the earth in space, which for grandeur is sur-
passed only by astronomy, a science which treats
of entire systems of heavenly bodies with indi-
vidual characteristics and relationships. Mani-
foldness, then, is a chief characteristic of geog-
raphy. An exhaustive study of the subject in
its larger meaning would lead the student into the
by-paths of many associated sciences, depart-
ments of which are recognized elements of
geography, and which, taken together, extend this
field of study to almost unconquerable limits.

As a science, geography may be called funda-
mental. It is the meeting place of all the sci-
ences. Within the envelopes of the earth abide
every factor and force of physical science in
either latent or dynamic, stable or unstable con-
dition; while on the surface of the earth resides
a world of life, which is comprehended through
the biological sciences.

In its truest sense the nature of geography is
that of relationship. It is not the mere existence
of towering mountains, wind-swept table-lands
and fertile valleys that interest us most, but
rather the reasons or explanations for their
being; not the unrelated fact that the earth
abounds with life, but rather the deeper signifi-
cance of why there is life and why in successive
regions there flourish "murmuring pines and
hemlocks," fields of wheat full and fair, or giant
cacti in undisputed supremacy. In its newer as-
ppect geography is concerned with multitudes of
relationships, a comprehension of which is of the highest value to the student. The pleasures of travel and the delights in nature study come not alike to all. It is to him who can comprehend cause and consequence that satisfaction and appreciation come.

From the standpoint of inherent interest, geography, owing to its influence on life, ranks very high. It is concrete and can be studied on a broad scale. Having so many points of attack there are many opportunities to awaken the interests of pupils. Its application to life is made easily and directly; and pupils respond readily with genuine interest because its materials and principles are immediately useful. Whether it be at the brookside with its features in miniature, in field or forest where life responds to local conditions, in the factory where earth-products are transformed, or at the commercial center where the world’s goods are exchanged, the interests are alike stimulated and the desire for knowledge developed.

Notwithstanding its richness of content, there has been in the past a decided lack of appreciation of geography. This is due to a meager understanding of the subject. Added respect can be secured only through a deeper and clearer knowledge. The impulse and inspiration which a few of our distinguished educators are lending to geography at the present time, make the outlook much brighter. It is certainly true that the subject deserves better teaching to merit so many
years of the pupil's time. Of course the same can be said with even added emphasis of some other subjects of the curriculum. There is but one solution in any case, and that is the economy which will result from better teaching.

Because of indefinite limits and breadth of scope, geography may be more difficult to organize than some subjects, but it loses none of its richness. The fact that geography has been considered a composite science may have led some to feel that it is subordinate or unnecessary; or, that the overlapping of physics, chemistry, geology, astronomy, etc., really covers the ground and meets all demands for it. Prof. Davis denies that geography is more composite than physics or chemistry or physiology. Dr. Harris has also taken the same view. It can easily be shown that one science cannot be drawn away from its allies without annihilation. There is no need of trespassing anywhere. The term geography is gaining in significance. It is a broad, rich and deep subject, which has for departments geology, physiography, meteorology, astronomy, oceanography, and ontography. Let the teacher who feels that geography is a narrow or shallow field, test his knowledge in any of the above subjects. If he can conduct a good test his respect for this department of science will be increased. He will find the subject matter exact, rational, difficult, far-reaching, and touching human experience at an infinite number of points, and in myriads of ways.
Before further discussion let us consider the nature of geography. Any comprehensive treatment must take into account:

1. The forces which have made and sculptured the earth’s surface.
2. The present condition of the earth’s surface, so affected by the atmosphere and by water, that it forms a habitat for life.
3. The relationships, or responses, that obtain between the organic and inorganic worlds.
4. The manifold needs of mankind and the uses made of environment—organic, inorganic and social—to satisfy these needs.

The study of the forces and processes by which the earth’s surface has been given form leads to physiography and geology. To ignore these forces in geography is to teach fact without explanation or significance. The failure of geography in the past is due to the fact that it has been made a mere memory drill on unrelated items and isolated facts. Comparatively, the fact side has been overdone; the rational side neglected. When pupils come to see that geography is a study of cause and effect, and not a study of fact without apparent cause, they will begin to have courage and interest. The teacher’s knowledge must be broad and accurate. He must correlate fact and force, and thus put his subject on a reasonable basis. The teacher must have a clear outline of the earth’s history, and must under-
stand the great physiographic processes that have wrought through the ages.

The study of the earth as it is has a practical value, and the information should be definite and exact. But when these facts are learned independently of their antecedent causes, and also independently of their consequent effects, one must realize that the fact side alone is uninteresting and insignificant. Geographic facts drawn away from these relations appeal only to the memory, and their mastery becomes almost wholly formal. Shorn of these relations there can be no organizing principle, and instead of well-arranged categories, we have a multiplicity of items. Geography has been subject to abuse in the past because there has been little of organization displayed in its treatment.

Geography is science only when the units of its subject-matter are articulated for a purpose. Facts concerning the present crust should be studied, not as an end in themselves, but as data which explain organic adaptation. Surface, soil, temperature and rainfall are to be considered individually as conditions and causes, which control organic responses. But it is easy, indeed, to wander about too much in this field. Matter may be interesting but quite irrelevant. The old practice of looking up interesting facts concerning places is, in the end, of little value. No greater sin can be committed than that of sending children to encyclopedias without the careful guid-
ance of a teacher who knows what he wants and why he wants it.

Men succeed best when they apply their energies in the direction that nature's force is exerted. Adjustment to inorganic conditions has often been tedious and slow, as is shown in the industrial history of New England; but gradually men have discovered the fields in which human endeavor meets with the most generous reward. The attention now given to forestry, the improved methods of irrigation, the systematic study of agriculture, all emphasize the wisdom of a clearer understanding of nature and a better adjustment to it.

Geography deals also with the relations which exist between earth in a broad sense, and life. Higher forms of life can proceed only from a modification of conditions, or from the establishment of new conditions, secured through a rearrangement of geographical factors. The problem of farmer and gardener is to discover the best relationship between plants and soil. Production is increased and the period of diminishing returns set farther in the future, as a result of the best adjustment. Geography becomes, then, rational knowledge, and mere facts and statistics are forced into subordinate positions. The prosperity of Kentucky is due largely to the raising of fine stock in the famous Blue Grass region. But this region exists because in an ancient sea were deposited the calcareous remains of marine life, and the weathering of the lime-
Sorry, this page is unavailable to Free Members
You may continue reading on the following page

Upgrade your Forgotten Books Membership to view this page

<table>
<thead>
<tr>
<th>10</th>
<th>$2.99 / month</th>
<th>10 Books per month</th>
<th>Monthly payment</th>
<th>$0.30 per book</th>
<th>Purchase</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>$4.99 / month</td>
<td>100 Books per month</td>
<td>Monthly payment</td>
<td>$0.05 per book</td>
<td>Purchase</td>
</tr>
<tr>
<td>10</td>
<td>$19.99 / year</td>
<td>10 Books per month</td>
<td>Yearly payment</td>
<td>$0.17 per book</td>
<td>Save $15.89</td>
</tr>
<tr>
<td>100</td>
<td>$35.99 / year</td>
<td>100 Books per month</td>
<td>Yearly payment</td>
<td>$0.03 per book</td>
<td>Save $23.89</td>
</tr>
</tbody>
</table>

Memberships can be cancelled at anytime
THE TEACHING OF GEOGRAPHY

confined to the physical side of life. Fundamentally, man's interests are social. Geography deals with some of these social relations under the heads of commerce, education, religion and government; hence, the aim of these phases of geography is the commercial, intellectual, religious and political adjustment.

SUGGESTIONS AND QUESTIONS.

1. Why is geography well adapted to further the aims of the new education?

2. Compare geography with other studies in richness of content.

3. What is the chief characteristic of the new geography?

4. In judging comparative values of school subjects what is the standard of estimating values?

5. Which is more important in geography, knowledge of facts or knowledge of relationships? Illustrate.

6. Of what value is a knowledge of the earth's surface in its present condition?

7. Write six sentences which will characterize the nature of geography.

BIBLIOGRAPHY.


Dryer, Chas. R.—"What is Geography?" Pamphlet, Moore and Langen Press, Terre Haute, Ind.


Redway, J. W.—"The New Basis of Geography."
CHAPTER II.

Geographic Conditions and Effects, or Controls and Responses.

Topics to be Considered.

The importance of geographical environment; what power man has over environment.
A classification of the factors or controls of environment; a brief discussion of each.
Illustrations of man's modification of environment; induced definitions of control and response; geography a study of controls and responses.

The old geography gave little intimation of the relationship that exists between controls and responses. Arbitrary facts characterized its teaching. There was little suggestion that the modifications and distributions of life, and the industries and characteristics of peoples, were responses to the guidance of surrounding forces, or geographic influences. Such a view of geography robs it of its richness and reduces the subject from a science to the mere data of relationship. Life is everywhere conditioned by environment. "Historic events, business transactions, and industrial operations all have place relations and are subject to conditions embodied in their physical surroundings. This precludes no
other element in the setting of the event, for there are time relations, legal relations, and several other classes of non-material environmental elements, which in the present discussion are simply waived the more clearly to see the physical stratum," is the statement of George D. Hubbard.

Man can modify his environment, physical and social, but he cannot re-create it. So if reservoirs or streams are convenient, he can irrigate arid lands; if old waterways are discovered, canals are quite feasible; if a river current is too weak to carry its load and so obstructs commerce, jetties are practicable. In the most successful endeavor, men must consider well both the favorable and unfavorable elements of their environment, and finally choose the line of least resistance. Nature must favor human undertaking if the highest success is attained.

In order that beginners may secure somewhat of the significance of this topic, and since those who are interested may be inconveniently situated with reference to libraries, a short discussion will be given under the following heads:

1. Temperature Controls.
2. Moisture Controls.
3. Soil and Rock Controls.
4. Atmospheric Controls.
5. Organic Controls.
6. Topographic and Barrier Controls.
7. Human and Social Controls.
1. The distribution of plant life, and to a considerable extent its form, are dependent upon temperature. If the temperature falls below the freezing point for much of the year, plant life is prohibited, and since animals are largely dependent upon plants for their habitat and food supply, terrestrial animal life disappears. The extreme tundra regions offer examples of this kind. Life in arctic regions is largely aquatic since land temperatures fall so low that life becomes extinct. The temperature of water, except at or near the surface, does not fall to the freezing point. Water is, therefore, a medium in which life may exist.

According to temperature and the responses which follow, land masses naturally break up into climatic and life provinces, topics well treated by Russell.* That temperature is very important as a control over distribution of life is attested by Merriam* in the following words: "It is now pretty generally conceded that temperature and humidity are the chief factors governing the distribution of life, and that temperature is more potent than humidity."

The physical condition and character of peoples are to a considerable degree responses to temperature. The monotonous cold of the arctic regions and the blazing heat of the equatorial, have deadening effects upon the inhabitants. Stature and complexion are changed and mental and moral qualities caused to deteriorate. In those regions, where there are sudden changes in

* See Bibliography.
temperature and a succession of seasons, man is stimulated in many ways, and here we find the highest degree of development. Further reference to the influence of climate is made in the chapter on "Geography and Life."

2. The best portions of our country have an annual rainfall of 30 to 60 inches, such regions being well suited, so far as moisture is concerned, to agriculture. Farm crops cannot be produced successfully where the annual rainfall is much below 20, though the introduction of "dry farming" is overcoming to some extent the lack of moisture. Where the annual rainfall is below 10 the country becomes nearly barren, bunch grass and sage brush being common forms of the sparse vegetation. In regions of generous rainfall, forests abound. In Washington, where the annual precipitation is from 60 to 100 inches, stand the majestic fir forests. Forests gradually disappear on approaching arid lands or deserts. In cold or arid regions, nature conserves the limited amount of moisture by decreasing the evaporation area of foliage. Hence the "needle" of conifers is a moisture adaptation, as is the total absence of leaves in certain desert species. Again, the roots of some desert plants attain a length equal to five times the height, so eager are they to secure moisture.

Special responses are seen in animals also. Schirmer has pointed out that the camel's hump is a reserve from which nourishment is supplied during long privation from hunger.
The nomadic habit of oriental people is a response to environment, chiefly to the arid conditions. Such people are compelled to go from place to place in order to secure pasturage and water for their herds, and hence they are alert, enduring, and generally intelligent.

3. The quality of the soil, in conjunction with temperature and moisture, determine the distribution and character of plant life. Limestone and phosphate rocks yield the richest soils. The cotton industry of the inner lowlands of Alabama is a response to its excellent soils from decomposing beds of limestone, while the soils of the barren Cuesta or "Chunnenugga," are from resistant sandstone, and, as a control, are negative. Population avoids this uninviting belt. Similar to the cotton belt is the blue grass region of Kentucky, with its meadows, pastures and high-bred stock.

Soil responses, either positive or negative, can be seen anywhere. Wheat responds admirably to the lacustral soils of old Lake Agassiz; "corn is king" in the drift soils of the prairie plains; and longleaf tobacco is the leading crop in the red sandstone valley of the Connecticut river.

Rock is a term that may be applied to all inorganic materials and is referred to here because mineral resources of many kinds are controls of industries, growth of cities, construction of roads, immigration, and are often subjects of national discussion and legislative contention.

4. Were the atmosphere static it would hardly deserve mention as a control, except from the
standpoint of its component gases. But the atmosphere is always moving, the winds sometimes attaining a great velocity and frequently shifting in direction, causing extreme changes in temperature and rainfall. Winds in themselves constitute important controls. Vegetation is often severely whipped and sometimes torn from its moorings by gales and hurricanes. It is readily observed in our northern states that trees, exposed to the winds, lean to the east, and that the longer branches point in the prevailing windward direction. In dry areas strong winds drive sand and dust before them, often covering vegetation. Forests are buried in encroaching sand dunes, as in Dune Park, Indiana. Sea water is sometimes driven inland by unusual winds, causing death and destruction. The tidal wave catastrophe at Galveston, Texas, illustrates the power of the wind in causing the sea to invade low coastal plains. Soils are sometimes completely removed from bedrock by wind action, thereby making life impossible.

5. Not only do the inorganic features and the forces which play upon them condition and determine life, but often life forms react constructively or destructively upon the organic world itself. It may often be that in this sense a response becomes, in turn, a control. There is a constant warfare in the realms of plant and animal life. "Though a summer field," says John Fiske, "seems at first to be a scene of unalloyed happiness, one has only to delve a little deeper to
Sorry, this page is unavailable to Free Members
You may continue reading on the following page

Upgrade your Forgotten Books Membership to view this page

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>10 Books per month</th>
<th>Purchase</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>$2.99 / month</td>
<td>Monthly payment</td>
<td>$0.30 per book</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>100 Books per month</th>
<th>Purchase</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>$4.99 / month</td>
<td>Monthly payment</td>
<td>$0.05 per book</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>10 Books per month</th>
<th>Purchase</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>$19.99 / year</td>
<td>Yearly payment</td>
<td>$0.17 per book</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>100 Books per month</th>
<th>Purchase</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>$35.99 / year</td>
<td>Yearly payment</td>
<td>$0.03 per book</td>
</tr>
</tbody>
</table>

Memberships can be cancelled at anytime
plateau, for which Tibet will serve as an example. For centuries its dry, cold surface has been swept by the prevailing westerlies until it has yielded, in the form of fine dust, the famous loess soils found in the lower valleys of China. Barriers in the form of inaccessible mountain ranges and large bodies of water are effective controls over distribution of life. Wallace has held that not only do natural barriers have much to do with the distribution of life, but that the origin of new species in general is due to changes in geographical environment.*

7. Human and Social Control. No special case need be made of human control, since man responds to organic environment and acts also as a control over it in exactly the same manner as do other forms of life. It is a matter more of degree and of perfection than of principle. The ability to reason gives man added advantages in his struggle for existence and supremacy. In pioneer days men sailed up streams until falls were reached; here portages were made and camps were formed, which in time became cities. It was discovered that the swiftly flowing water offered advantages for power, so in time mills were built. The great flour mills of Minneapolis are located at St. Anthony's Falls, conveniently near the wheat fields of the west and at a focal point of great commercial lines to the south and east. But even here man is responding rather than con-

trolling, though the psychic element must be considered.

Man often, however, modifies his inorganic environment in a way and to an end that might never be wrought by natural forces or physiographic processes. Instances of this kind are often seen in the construction of roads and waterways, well illustrated by the Panama project and the Drainage Canal of Chicago. But in such cases man is guided and controlled by nature to a large degree. Had not an old waterway been discovered, in the latter case, showing that Lake Michigan once really did discharge its waters southward into the Illinois river, man probably never would have undertaken the great engineering feat of constructing a drainage canal. Scholars have shown that not only physical attributes of all life are responses to organic and inorganic environment, but further that the social institutions of civilized races are determined, very largely, in the same manner.

From the foregoing the student should have reached the conclusion that—

1. A control is an element of environment that exerts a marked influence upon the development of a life form. It may prohibit, favor or determine the particular trend of life.

2. A response is a characteristic of life forms, effected through its yielding to the continued influence of a control or set of controls.

In its best sense, then, geography is a study of controls and responses. It is a study of life—
men included—as related to environment. Physiographic features and forces constitute the major controls, with organic controls as minors. Says W. M. Davis: "In its present modern phase, geography is essentially concerned with the rational correlation of the items that fall under its two parts: on the one hand, the items of inorganic conditions that constitute the physical environment of living forms; on the other hand, the items of organic response made by living forms to their environment."

The richest and most significant phase of geography, then, must terminate in this relationship, and teachers of the subject must comprehend the importance of treating the subject scientifically.

SUGGESTIONS AND QUESTIONS.

1. What is meant by environment? By inorganic environment?
   By organic environment? By social environment?
2. To what extent is the distribution of plant and animal life due to temperature? Why is there little life in polar regions?
3. What is the relative importance of moisture as a control?
   Are arid lands and deserts necessarily poor in plant foods?
4. What is the origin of soils? What formations yield rich soils?
   Poor soils?
6. Show how one form of life often controls other forms. Is this true of both the animal and plant kingdoms?
7. Name several instances in which topographic features have controlled the form and distribution of life.

FOR FURTHER STUDY.

1. What is the annual rainfall in your locality? Is it well distributed? What crops need the most moisture?
2. Write an essay describing the origin and character of the soils of your locality. King's *The Soil* will be very helpful.

3. Write an essay showing that "The Life of the Present is Determined by the Life of the Past." Shaler's *Nature and Man in America* will be an excellent reference.

4. Write a description of a desert? See VanDyke's *The Desert*.

5. Read the chapter in Brigham's *Geographical Influences in American History* entitled "The Appalachian Barrier" and prepare a brief summary. If available, Dr. J. F. Turner's *The Old West* will be very useful and interesting.

6. What are the dominant controls in your own locality, and how do they influence life? Develop this topic fully.

**BIBLIOGRAPHY.**

Shaler, Nathaniel—*Nature and Man in America.*

D'Alvilla, Albert Joseph—*Sahara and Lapland.*


Reclus, Elisee—*Earth and Its Inhabitants,* Vol. II.


Hubbard, George D.—"A Case of Geographic Influence on Human Affairs." Pamphlet.

Jefferson, Mark S. W.—"Wind Effects." *Jour. of Geog.,* Vol. III.

Platt, Mary J.—"Climatic Control in the Desert." *Jour. of Geog.,* Vol. IV.

Buckle, Henry Thomas—*History of Civilization.*


Russell, I. C.—*North America,* Chaps. III, IV, V.

CHAPTER III.

PHASES OF GEOGRAPHICAL STUDY.

TOPICS TO BE CONSIDERED.

The phases of geographical study.
Observational geography; its relation to nature study; the requirements of successful observational work; its value to the child.
Representative geography; explanation of; how and when this phase should be introduced; pupils should express their own ideas.
Descriptive geography; pupil’s new method of securing ideas; observational method limited to local environment; the idea of the world gained through descriptive geography.
Rational geography; the meaning of the term; the causal or rational element; why it should be emphasized.
The social phase; its importance; it evaluates the materials of geography and selects that which is of most worth in life.

Geographical study has been separated into several phases as a result of psychological adjustment.* These phases are clearly defined, not because there is any sudden change in the nature of mind activity, but because the subject is such that it demands study in several distinct fields, and the order of succession is based upon the mental development of the child. The phases, together with the order, as agreed upon by some educators, are:

1. Observational or Home Geography.
2. Representative Geography.
3. Descriptive Geography.
4. Rational Geography.
5. The Social Phase.

The writer adds the fifth or "Social Phase," which parallels each of the other phases, as far as they differentiate themselves, throughout the course. Unlike the phases based upon mental development, it involves the very function of education, the life relationships of the individual to his fellows as seen from the viewpoint of the three great systems, viz., "sustaining," "transporting" and "regulating"* which for our purpose may be called the industrial systems.

I. OBSERVATIONAL GEOGRAPHY.

Geographical study actually begins when the child enters school, though it is not dignified with the formal name of geography until the elementary book is begun in the fourth year. The introduction of the formal study is or should be made through the study of nature. The object of systematic nature study in the lower grades is to put the child into full sympathy with his immediate environment. Advancement to the study of geography proper is then in full accord with the accepted principles of pedagogy. The child's circle of information is extended, not in a formal way, but in a manner that appeals to the child's

* Small and Vincent: Introduction to Sociology.
understanding and establishes a permanent interest. The child should get his early instruction at first hand; later, he will be compelled to trust to the observations of others to describe countries and conditions too remote for him to visit. Now, it is evident that the large part of his information must come to him through the medium of books, which he must have the ability to interpret. The most important result of observational work in geography is the establishment of basal ideas, concrete and accurate, which are not only to be the foundation of his knowledge, but which are absolutely necessary to any reasonable conception of the earth through the medium of books. A cultivated imagination must enable the child to make the transition from the phenomena of the carefully observed roadside rill, to a conception of the same processes when supplied with the energy of a Mississippi. Observational geography and nature study furnish the rational extension of the child’s mental horizon; it furnishes that training in perception, imagination and memory which a further study of the subject demands; and it supplies the mind with typical basic ideas which are to aid in the interpretation of geographical literature.

The period of observational geography proper does not require the preparation of a set lesson, but it does require—

(a) On the part of the pupil, the activity of sense-perception and –
(b) On the part of the teacher, directive skill in
Sorry, this page is unavailable to Free Members
You may continue reading on the following page

Upgrade your Forgotten Books Membership to view this page

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>$2.99 / month</td>
<td>10 Books per month</td>
<td>Purchase</td>
</tr>
<tr>
<td></td>
<td>Monthly payment</td>
<td>$0.30 per book</td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>$4.99 / month</td>
<td>100 Books per month</td>
<td>Purchase</td>
</tr>
<tr>
<td></td>
<td>Monthly payment</td>
<td>$0.05 per book</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>$19.99 / year</td>
<td>10 Books per month</td>
<td>Purchase</td>
</tr>
<tr>
<td></td>
<td>Yearly payment</td>
<td>$0.17 per book</td>
<td><strong>Save</strong> $15.89</td>
</tr>
<tr>
<td>100</td>
<td>$35.99 / year</td>
<td>100 Books per month</td>
<td>Purchase</td>
</tr>
<tr>
<td></td>
<td>Yearly payment</td>
<td>$0.03 per book</td>
<td><strong>Save</strong> $23.89</td>
</tr>
</tbody>
</table>

Memberships can be cancelled at anytime
employed. This being true, teachers should then set about their tasks with courage and even boldness. Their own interests will deepen, and, if they are possessed of the teaching spirit, their use of books on both method and subject-matter can hardly fail to direct them into pedagogical paths. Latent interests may often be transformed and the possibilities of nature study and geographical topics be made clear through the reading of such literature as "The Story of a Salmon," "The Story of a Stone," "The Ascent of the Matterhorn," all by David Starr Jordan, and "The Desert," by VanDyke. Furthermore, the vast number of bulletins and pamphlets published by schools, by experiment stations, and by the Department of Agriculture, will be of great use to teachers generally.

II. REPRESENTATIVE GEOGRAPHY.

Representative geography is a form of expression through established symbols—of ideas already comprehended. But soon it comes to mean the interpretation of symbols for the purpose of securing ideas.

The observational work is oral. The pupil works only under immediate guidance of the teacher. The time soon comes when the process of education demands more expression from the child. So far, his geography has been learned directly from nature, but soon he must resort to books. It is necessary that he then understand the use of maps, and the logical procedure seems
to be that of mapping the home district or some part of it. Usually the pupil begins by mapping his school room. If seats do not face north, the pupil should occupy a chair facing the north, in this early study of maps. He now becomes active; he must invent for himself. After making the map of the school house, the pupil maps the school yard, the district or the ward, locating the school, his home, the postoffice, or other building or location that touches his interest. The mapping of these areas not only makes the child somewhat familiar with the idea of scale and the meaning of maps, but the accompanying descriptions worked out by the child himself react upon his observations previously made, making them sharper and clearer. By use of the sand table, the pupil learns to represent plains, slopes, divides, hills, and mountains; but this work should be a representation of observed phenomena in nature, and not a reproduction from books. Pupils, from the start, must be impressed with the fact that geography is a study of the earth and not of the book. The next step, that of reading a relief map, will not be difficult for the child who has comprehended the earlier work. Thus he gradually comes into the use of symbols; but they closely follow concrete ideas. Indeed, the picturing of an idea necessitates its disentanglement from a mass of information, often not fully organized and assimilated, making its lines more distinct, and adding to its significance. Frequently we do not realize how imperfect our notions are
until we attempt a written description or an illustrative diagram. Two important results should follow the activity of this phase of study. It should clarify and intensify the basal notions of his observation work; and it should introduce the child to the use of those symbols which are prerequisites to the next stage, descriptive geography.

III. DESCRIPTIVE GEOGRAPHY.

During the observational period the pupil is largely dependent. He has not yet learned the use of the symbols through which he can be independent. Neither does he at this time possess any considerable mass of related knowledge. Having come into possession of a reasonable body of facts closely related to his own life and interests, he proceeds in the second stage to adapt a set of symbols to this knowledge. His work is creative here, but still only partially independent. Much guidance is yet required by the teacher. The third stage places the pupil still more upon his own responsibility. He must now get his ideas from books of travel, from gazetteers, from maps, charts, etc., always under strict direction of the teacher, depending upon imagination and constructive conception to make these ideas strong and vivid. The tendency of geography in this period is to become abstract and to lack reality, a tendency which is obviated only by the pupil's exercise of his imagination, and by oral illustrations, pictures, lantern views and field excursions.
Practice in constructing accurate mental pictures which shall accord with the word paintings of oral or written description is invaluable. The exercise leads to the acquisition of rich and well-defined information, and incidentally secures mental discipline.

Since the average pupil has little opportunity to learn of the world at first hand, it soon becomes necessary to get ideas and information second hand, or through the medium of books. Since commercially related countries do much for one another, the pupil must learn of other homes than his own and of the dependence of his own home life upon the home life of far away people.

Descriptive geography, in general, covers the period of the intermediate grades. It is understood, of course, that there is no line of demarcation between these phases of geography, and that the descriptive phase, for example, will extend entirely through the succeeding work. Descriptive geography predominates at a time when memory and imagination are very active and before the time when relationships make the strongest appeals to the child-mind. During this phase the gathering of data, often of a detailed character, occupies much of the pupil's time. In courses based largely upon text-books, it constitutes the so-called "first round." Geographical readers, books of travel, and selected articles from current literature are highly in order, especially if well illustrated.

The various necessaries and luxuries of our
home life offer a natural approach to many topics widely enough distributed to lead inductively to a general view of the earth as a whole and to considerable detailed knowledge of it.

IV. RATIONAL GEOGRAPHY.

The observation of results and the acquirement of facts lead the child to look for reasons. Explanations of causal relations should be made at all times during the study, when they can be made to appeal. But the pupil must not be burdened with an explanation which he cannot comprehend. The study of rational geography is wisely deferred until the reason is active; when, as Dr. Harris says, the pupil forms the habit of looking upon one fact as the explanation of another. The child's whole life has been devoted to the acquirement of facts; he is now to discover how facts are related to one another. It is true that the untrained mind explains one fact by another having no relation to it, and therefore his notions of the world become distorted and superstitious. The rational element of geography is especially prominent in physiography. The pupil here compares and relates the facts of his earlier experience and from them deduces general principles. He learns to view all of the earth's materials and natural forces as inter-related and adjusted. Through industrial geography he learns how civilized men have controlled forces and modified materials to subserve their needs.

The introduction of the causal or rational prin-
ciple into geography is due to Carl Ritter. Later scholars have elaborated his notion, which assumes the form of relationship between environmental control and organic response. This is treated more fully in a succeeding chapter.

Prof. Dryer recognizes the rational element of geography when he defines its function as follows: "The business of geography is first to determine accurately the distribution of each and all of the factors of geography (land, water, air, plants, men) and, second, to discover the causes which have brought about the distribution of each; and, third, to explain the relation of each factor or group of factors to all of the rest."

Hence cause, relationship and consequence seem to merit special emphasis. Says Prof. Davis: "Another step of equal importance . . . is the change from the empirical to the explanatory or rational or genetic method of treating the elemental facts that enter into geographical relationships." Wm. T. Harris puts it this way:

"Above all, I should wish to call to mind again, as the central reason for its place in the curriculum, the general value of geography in giving the pupil an insight into natural causes. In early periods of the history of mankind, and among all savage peoples that are contemporary with us, the facts of nature are explained by animism, that is to say, by the interference of evil spirits. A vast network of superstition covers the face of nature from the gaze of the savage. But the child who begins to study geography begins to find one
fact behind another fact. He learns forces, and how forces make things, and how forces modify things. His knowledge constantly grows from the symbolic, which ignores the causal nexus, over to the scientific and prosaic view, which comprehends the rationale of phenomena.

V. THE SOCIAL PHASE.

This phase of geography has more often been styled "human" geography, but in the light of the recent movement in education it seems very appropriate to refer to it as the social phase.

As has already been said, this element pervades the whole course of elementary geography. In the nature study work, where a whole world of things confronts the teacher, his basis for selection must be, How will this particular thing, if taught the child, function in his life? How will this knowledge contribute to his social efficiency? In pointing out suitable nature study materials Otis W. Caldwell enumerates the following:

"Nature study materials should also make possible a large body of knowledge that is useful in the broadest sense of that term—knowledge of the domesticated animals, their ways of living, their use by man, their histories, the selection and care of the best breeds, the regions where different ones thrive best; knowledge of house pets; of wild animals, their relation to one another and to man; of helpful and injurious insects; knowledge of domesticated plants, house plants, vegetables and flowering plants and the gardens in which
### Upgrade your Forgotten Books Membership to view this page

<table>
<thead>
<tr>
<th>Membership Level</th>
<th>Price</th>
<th>Details</th>
<th>Save Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 Books per month</td>
<td>$2.99/month</td>
<td>Monthly payment $0.30 per book</td>
<td></td>
</tr>
<tr>
<td>100 Books per month</td>
<td>$4.99/month</td>
<td>Monthly payment $0.05 per book</td>
<td></td>
</tr>
<tr>
<td>10 Books per month (Yearly)</td>
<td>$19.99/year</td>
<td>Yearly payment $0.17 per book</td>
<td>Save $15.89</td>
</tr>
<tr>
<td>100 Books per month (Yearly)</td>
<td>$35.99/year</td>
<td>Yearly payment $0.03 per book</td>
<td>Save $23.89</td>
</tr>
</tbody>
</table>

Memberships can be cancelled at anytime
other in living. The sustaining system of the English weaver extends to the Dakota farmer who raises his wheat; the Minneapolis miller who grinds it; the transporting companies which carry the flour; and even to the British Parliament, the regulating power, which permits the flour to be landed duty free in Liverpool. How intimately associated, then, are the geographical and the social!

SUGGESTIONS AND QUESTIONS.

1. What is the chief function of observational geography? Psychologically considered, is the observational phase the proper approach to the study of geography?

2. What importance attaches to the idea of expression in education? How does expression react on the basic notions gained through observation?

3. Of what importance are detailed accounts in the study of geography? How are they gained? Should they assist in developing general notions?

4. What is the meaning of rational geography? With what is it chiefly concerned, facts or principles? With what grade of pupils should the causal idea be emphasized?

5. What idea is at the basis of the social phase of education? How does geography lend itself to this aim of education? Give an illustration of the social phase of geography.

FOR FURTHER STUDY.

1. Distorted ideas and faulty notions are all too general in the learning process. Through what methods can correct notions be gained?

2. Why may descriptive work in geography fail? Is there a period in childhood when such work appeals strongly?

3. To what extent do you think the causal element should enter into the teaching of geography in the elementary schools?

4. To what extent do you think geography contributes to social

**BIBLIOGRAPHY.**

Committee of Ten—*Report on Physical Geography.*


Bailey, L. H.—*The Nature Study Idea.*

CHAPTER IV.

THE RELATION OF GEOGRAPHY TO THE SCIENCES.

TOPICS TO BE CONSIDERED.

Geography a composite science; science necessary to explain relationships; specialized science to be avoided.

Geology the basis of geography; dynamical geology, a study of physiographic processes; soils intimately related to life.

Astronomy; how the sun's altitude determines temperature.

Influence of the atmosphere and its movements; how storms and sudden weather-changes affect the commercial world.

How physics and chemistry are involved in geography.

The biological sciences; the products of animal and plant worlds the materials of commerce and manufacture.

Much of agriculture in geography. Leading educators quoted.

Necessity of a knowledge of science in teaching geography.

The many-sidedness of geography relates it closely to various subjects of the curriculum. It is a nucleus at which the elements common to the three great groups of science, viz., the physical, biological and social, seem to meet. In this sense, geography is a field of simple applied science. To divorce geography from these science relationships robs it of its richest content. For these reasons physiography is conceded to be the best correlating subject in the secondary group. But only such elemental science should enter into general geography as is necessary to explain its relationships. If this principle is adhered to, the danger
of drifting into the field of specialized science will be avoided. The very nature of the subject demands a broad sweep of knowledge on the part of the teacher, and the chief source of failure in geographical instruction is due to a lack of breadth in general scholarship.

Geology, to which physiography belongs as its dynamical phase, is the very foundation of geography. It is inconceivable that good instruction can be given by one who has not grasped the full significance of the "physiographic processes," and the elaboration of these processes builds up physiography and dynamic geology. There are also many minor principles and facts in geology that no comprehensive treatment of geography can omit. The value of a knowledge of these principles is discussed in the chapter on "The Teacher's Preparation."

The whole subject of rock weathering and soils belongs both to geography and geology. Indeed, it must be understood that geography is a much broader and more significant term than is geology, physiography, meteorology, agriculture, etc. So closely related are life and soils that our most helpful writers on "home geography" include chapters on the formation of soils.

The change of seasons introduces the pupil to astronomical geography. The life zones of the earth are very largely dependent upon temperature. A study of the sun's altitude at various seasons of the year is legitimate geography when studied as a control over the distribution of life;
it is astronomy when studied as an end in itself.

Meteorology, as a department of geography, is of great importance. Storms, droughts, and sudden changes in temperature affect the whole commercial world. The daily weather map is the first thing to be considered by members of the Board of Trade. A continued strong south wind, by checking the outflow of water from Lake Huron, often delays the passage of the larger vessels through the straits at Detroit. The frequent destruction of crops in the Dakotas by midsummer hail storms has led to the organization of insurance companies to protect the producer of farm crops. Studied in this light, meteorology and geography are one and the same.

Physics and chemistry are so involved with the great fields of organic and inorganic nature that argument and illustration to show their relationships to geography seem quite unnecessary. "Were it not for the magician chlorophyll conjuring with the sunbeams," as John Fiske puts it, carbon-dioxide and water could not unite and make possible the major portion of the vegetable kingdom. Inertia and gravitation keep the earth swinging in its orbit, and the whole process of gradation and base-leveling is wrought through the force of gravity.

The biological sciences are involved in geography largely through the arts and industries, which employ animals and plants as the raw materials of commerce and manufacture. There are few things which civilized man has not utilized
for definite purposes. Much of school geography is found under the heads of agriculture, stock-raising, fishing, dairying, trucking, lumbering, etc., and the multitudes of products from this organic side of nature are biological in origin, but geographical when they direct the industries, distribution and welfare of mankind.

Applied science is today at a premium. The great interest in agriculture seems to be an illustration of this fact. A survey of the contents of texts on elementary agriculture reveals the fact that the subject matter is found largely in botany, zoology, and geography. There is certainly no innovation in the study of soils, roots, pollination, grafting, bee-culture, the cabbage worm, potato beetle, wheat, corn, moisture, and birds, simply because these topics are found in a book entitled "Agriculture for Beginners." The agricultural movement is in keeping with modern pedagogy, which maintains that culture and utility are in thorough harmony with each other. But it is a matter of application and degree rather than "newness" of the subject-matter. Reference is here made to agriculture simply to show that it bears a relationship, and a pretty close one, to geography. In discussing the correlations of geography, Dr. Charles McMurry makes the following statement:

"In some of the principal schemes for correlating studies, geography has been regarded as the mother study, the one that would naturally be the center in any plan of concentration. . . ."
The natural sciences are usually thought of, not only as having many intimate relations to geography, but as actually furnishing a large part of the warp and woof of geography. The minerals, vegetables, animals, and all the physical objects and phenomena of earth, air, and water which make up the peculiar realm of natural science supply also the subject-matter of geography. Geography deals with all these things from a peculiar standpoint which we call the geographical, but they are the same materials which the various natural sciences deal with, each from its own point of view." And James Bryce, in discussing the geographical relationships of geography and science, says in part:

"All branches of knowledge which have anything to tell us about the earth more or less hinge into or are connected with geography, or you may if you like, say they diverge from it as specialized departments of that general knowledge which it presents in its connection with the whole. For instance, geography takes account of the solid crust of the earth. The solid crust of the earth is the special subject of three sciences, geology, mineralogy and palaeontology, which therefore diverge from geography as being specialized branches of the science which it presents in a general way. Then you have a second divergent branch in meteorology and oceanography, dealing with the phenomena of the air and vapor and the closely cognate phenomena of the great masses of condensed vapor which exist on the surface of the
### Upgrade your Forgotten Books Membership to view this page

<table>
<thead>
<tr>
<th></th>
<th>Books per month</th>
<th>Monthly Payment</th>
<th>Yearly Payment</th>
<th>Annual Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>10 Books per month</td>
<td>$2.99/month</td>
<td>$0.30 per book</td>
<td>$15.89</td>
</tr>
<tr>
<td>100</td>
<td>100 Books per month</td>
<td>$4.99/month</td>
<td>$0.05 per book</td>
<td>$23.89</td>
</tr>
<tr>
<td>10</td>
<td>10 Books per month</td>
<td>$19.99/year</td>
<td>$0.17 per book</td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>100 Books per month</td>
<td>$35.99/year</td>
<td>$0.03 per book</td>
<td></td>
</tr>
</tbody>
</table>
ena which lie beyond the globe, and cannot be understood without a comprehension of astronomy.

"The whole of this great group of physical sciences, each of them redivided and specialized into numerous branches and departments, springs from geography as the center of the group."

The experienced teacher is well aware of the correlations of geography and science. Scarcely a lesson but what some necessity arises for the explanation of science facts. The most common observations occasion discussions, and "the fostering of a spirit of inquiry" makes explanations imperative. In the community is an artesian well. The water comes from a depth of 1,800 feet and has a temperature of about 70 degrees Fahr. It is highly charged with hydrogen-sulphide, and emits a disagreeable odor. Gas is seen to rise in bubbles and escape from the surface. Iron, too, is in solution, and "rusts" containing vessels. Here, then, is an opportunity, and a rare one, for nature study and geography lessons. Even young children will ask why the water gushes out of its own accord, why it is so warm, why there are bubbles in it, etc., etc.

Again, the local coal mine, which figures so much in the lives of people, can hardly fail to provoke questions which lead us back to historical geology for satisfactory explanations. Then, too, some coal is hard and some is soft. What is hard coal, and why does it sometimes burn with a pale blue flame and sometimes with a bright red flame? Why is soft coal so gassy and smoky as compared
RELATION TO THE SCIENCES

with the hard? etc., etc. A lime kiln may be in the vicinity, and an excursion may stimulate inquiry as to why the stone must "be burned," what change takes place, where the stone came from, etc. Certainly, on every hand science is involved with human life and welfare, and much of geography is meaningless unless accompanied with scientific explanations.

Much elementary science can be taught and of necessity must be taught in connection with geography. This science must not be considered irrelevant, for it is an integral part of geography. Care must always be taken not to go beyond the proper limits of geography, and the facts presented should explain earth relations, and so be of use to the individual in dealing with his physical environment.

To ignore the involved science in the study of geography tends to make the subject superficial, formal and empirical. If the teacher has a well-defined notion of geography, the danger of irrelevance will not be great. On the other hand, the added interest and significance which will come from an understanding of causal or scientific relationships seem to warrant the more thorough treatment which a scientific method requires.

If one pauses to consider how the facts and principles of science enter into the most common of life's experiences, especially those that seem to be earth-determined, he will readily admit its practical value. The production of a farm crop involves a whole round of science that is clearly
geographic. The enterprise first of all makes a consideration of climate fundamental. A crop must be selected that can mature during the growing season and which will thrive on the amount of moisture that may be expected. The whole problem of climate must at once be reckoned with, and any adequate understanding leads us to consider the facts of elementary science. Crop production, again, is largely dependent on soils, and the quality of soils, in turn, upon the character of underlying rocks. But rock-weathering is the result of many forces, some physical and some chemical, that cooperate in the process of soil-making. Next must be considered the drainage, which makes cultivation possible. Hence, topography plays its part. If the slope is insufficient to permit gravity to carry away accumulated water, then the farmer must resort to ditching or tiling. On the other hand, too great slopes may cause rapid dissection of the lands, which the ingenious cultivator must check. The soil must be sufficiently porous to absorb a goodly amount of moisture, and its capillarity must again bring it to the rootlets of the growing crop. By experiment the farmer must determine if his field is poor in phosphorus or nitrogen, and the lacking plant food must be restored. Careful study and experiment must determine the best time of planting (quite regardless of the moon’s phases), the depth at which the seed should be placed, together with the character and frequency of cultivation which the growing plants seem to demand.
And yet this is but the beginning of a homely illustration of how the earth and natural forces, or science, enter into the life of man. The new education attempts to explain such science as functions in life, and the new geography is one of the media through which education may bring much that is practical and vital into the lives of those who study its content and comprehend its teachings.

SUGGESTIONS AND QUESTIONS.

1. Name all of the sciences that enter into geography.
3. In Fig. 1, point out the knowledge that is common to geography and geology.
4. Select a topic from geography that is also important in meteorology. In which text is it more fully treated? Why? What is a specialized science?
5. Does the composite nature of geography prohibit its being a science? Formulate a satisfactory definition of geography.

FOR FURTHER STUDY.

1. Make an excursion to observe evidences of rock weathering. Write an essay to show that facts and laws of chemistry and physics are here legitimate factors in geography.
2. Explain fully "our summer season occurs during the sun's highest altitude." The heliog will help in this explanation. See Chapter on "Weather Study."
3. What do you think the term "earth-science" should include?
4. Write an essay to show how a knowledge of geography can be assistance to a farmer.

BIBLIOGRAPHY.

McMurry, G. as. A.—Special Method in Geography, Chap. VIII.
Keltie, J. S.—Applied Geography.
Bryce, James.—"The Importance of Geography in Education." Jour. of Geography, Vol. 1, No. 4.
Tarr, R. S.—New Physical Geography, Chaps. 17, 18, 19.
CHAPTER V.

THE RELATION OF GEOGRAPHY TO HISTORY.

TOPICS TO BE CONSIDERED.

How geography influences history; this influence ignored in the past; importance of geographical influence in history. The case of New England; brief geological history; glaciation and its effects; coast line; capes, bays and islands. Soils of New England; agriculture, the first industry; fitness of the industry. Ship-building in New England; the maritime epoch; influence of the Embargo Act. New England becomes a manufacturing country; the cotton industry; the wool industry. Present outlook for New England. Geographic influence in Illinois; glaciation and its effects; the Illinois river; the location of LaSalle; the anticlinal fracture. Influence of the anticline on the industries of LaSalle; coal; St. Peter's sandstone; the resulting industries. Scenery near LaSalle; pioneer history; Starved Rock. Galena and Platteville; lead and zinc; the smelters of LaSalle; geographic influence.

A field of study, profitable and fascinating, is that of geographic influence in history. "The unity of the science of geography is in geographic influence, i.e., in the relations borne by the physical conditions of man, products, and industries, to the distribution of wealth, culture, and the various types of life." Geography forms the basis of

* Pamphlet: "Geographic Influence, a Field for Investigation." George D. Hubbard.

63
history and often determines its trend. Mountains and rivers direct the line of march of invading armies, and influence, at least, the destiny of battles. Ocean currents and prevailing winds guide the courses of ships at sea. Mountain passes condition the settlement of distant plains. River valleys indicate the lines of least resistance for commercial highways. Industrial centers take advantage of falling water, and castle and fortress seek the eminence of hills.

Investigators in both history and geography have made marked progress in tracing the relationships of geography and history. Numerous magazine articles have been written, and genuine contributions have been made by Albert Perry Brigham and Ellen C. Semple.

The teacher of geography must pave the way for the teacher of history, by establishing a substantial geographic basis. The geography, too, must be made significant through the study of its influence on human affairs. The teacher in the grade or rural school who conducts the recitations in both of these subjects has a fine opportunity to develop the relationship, now from the side of history, and again from the side of geography. As a result of a wise correlation, both of these subjects can be much enriched.

On both large and small scales the influence of geography is seen. The writer remembers how, in the district school, the pupils were taught to associate industries with cities. "Lynn was noted for the manufacture of ladies' shoes;" "Bath, for
Sorry, this page is unavailable to Free Members
You may continue reading on the following page

Upgrade your Forgotten Books Membership to view this page

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>10 Books per month</th>
<th>Monthly Payment</th>
<th>$0.30 per book</th>
<th>Purchase</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>$2.99</td>
<td>$2.99 per month</td>
<td>$0.30 per book</td>
<td>Purchase</td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>$4.99</td>
<td>$4.99 per month</td>
<td>$0.05 per book</td>
<td>Purchase</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>$19.99</td>
<td>$19.99 per month</td>
<td>$0.17 per book</td>
<td>Purchase</td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>$35.99</td>
<td>$35.99 per month</td>
<td>$0.03 per book</td>
<td>Purchase</td>
<td></td>
</tr>
</tbody>
</table>

Memberships can be cancelled at any time
shire of Massachusetts. Having been lifted to a great altitude, the ever-active work of water began to make even Alpine heights bow to the sea. Erosion caused deep dissections in the mountain slopes, and swiftly flowing water, filled with material in suspension, deepened and widened the channels by corrosion. The valleys widened, the currents slackened, small tributaries backed up the divides, which, in turn, became narrower. The whole province had begun to show age, when the cycle of change was interrupted by a visitor from the icy north.

The Great Glacier having its origin in Labrador and Greenland came slowly sliding southward. It was a sea of ice, thousands of feet thick. Slowly its edge advanced; it cared little for the hills and mountains, its great thickness burying all. Like a great dull plane, it cut and pushed the soils and rocks ahead of it, or it ground the boulders beneath into rock-flour and clay. Sometimes it dipped into a depression, scooping it out still deeper, and again it ignored wide valleys or dropped its ponderous weight of rock, clay and sand into the old channels of streams. The glacier dipped into the sea, and, when it melted, deposited great moraines of sand and till. Cape Cod, with its beautiful beaches and cranberry marshes, is new land, formed by the rearranging of glacial sands by off-shore currents. Martha’s Vineyard, Nantucket, and Long Island are terminal moraines, and, when first formed, were great hills of drift on a narrow coastal plain. In many instances
the topography was completely changed; but, again, at no remote distance, some granite hill, "rock-ribbed and ancient as the sun," lifted its scratched and shaven head above the thick mantle of drift. The receding glacier lent its water to fill depressions, and so were formed beautiful lakes, which have ever since given constant head to the rivers. Their overflow followed ancient valleys, where not completely obliterated, and cut new channels in the drift. The erosion of new surface was rapid, especially as coastal margin began to sink, causing greater fall and more rapid currents. Thus were laid bare the rocks, torn, ground and crushed, which have ever characterized New England. Thus were born the glacial hills around Boston, Worcester and the lower Merrimac, and the beautiful drumlins of Massachusetts and New York. Frequently rivers found their way around these barriers of recent birth, and, tumbling down into old channels, formed beautiful falls, as at Lewiston, Lowell and Holyoke. Here currents were swiftest and water power best; here the Indians, ascending the streams in bark canoes, were compelled to stop; here their villages grew, and here, later, the English founded our modern cities.

The coast line of New England has vastly influenced her history. The gradual submergence allowed the sea to enter the lower, wider valleys, drowning them and converting the river mouths into broad estuaries. Much of the coastal plain became a narrow continental shelf. Higher portions fringing the old sea became isolated, form
ing numerous islands, of which Mt. Desert is a type. The intrusion of the sea into the valleys made the water deep and harbors good. The high portions between river mouths became capes and promontories. The enduring rocks of Cape Ann preserved the site of Gloucester and pointed its daring fishermen to the sea. Maine’s irregular coast, with its reentrant bays and spearhead promontories so numerous and intricate, has been increased tenfold.

The soils of New England when first explored were thin, consisting of sand, clay and till, all well mixed with glacial boulders. Much of the country was well forested. The pine thrives well in sandy soil, well watered, and in latitudes where there are extremes of heat and cold. These conditions prevailed in northern New England, and here "the murmuring pines and hemlocks" said their incantations to the sleek moose and the painted savage. So was New England when found by English Puritans. They were slow to adapt themselves to their geographic environment, and hence their prosperity was curtailed. Their industrial history is almost a direct result of physiographic processes. For a century they sought prosperity in vain, through the cultivation of thin, barren, rocky hillsides, and, says Redway—"'crops of glacial boulders alternated with crops of trouble.'"

All these years, geographic barriers—the interior mountains and roadless forests—had confined the pioneers to the coastal belt. They at last conceived the idea of ship building, and, as a result,
New England’s deep, protected harbors began to buoy up the stately pines of Maine.

The Revolutionary War abolished English restrictions, and this inaugurated New England’s first industrial revolution. A merchant marine sprang into existence, and New England canvas floated on every sea. Days of prosperity followed. Bank accounts grew; religious bickerings and persecutions ceased. But the era of maritime prosperity was soon over. The war of 1812, with America’s retaliatory measure, the Embargo Act, swept New England’s sails from the seas never to return; for, soon after the war was over, great vessels, driven by the expansive force of steam, were on hand ready to shriek defiance and derision at ships rigged with mast and sail.

During Napoleon’s invasion of Spain he confiscated many estates, and sold many flocks of famous Merino sheep to America. These found pasturage on the Berkshire hills and Green mountains. Importation being prevented by the War of 1812, New England’s idle capital began to build mills. Woolen goods were made in large quantities in Massachusetts, Rhode Island and Connecticut. The people had discovered another of New England’s chief resources — her water power. In the meantime the cotton industry had developed in the south. New England took advantage of this, and soon the cotton industry was paramount. Lowell, Lawrence, Manchester and Concord owe their rapid growth to water power and brains in the north, and cotton and slaves in the
south. Prosperity followed man's wise adjustment to physiographic conditions.

New England is still a manufacturing country. The hemlock bark is used to tan leather. Boots and shoes come from Lynn and Brockton. She has little coal, but this is imported in sufficient quantities to make light metal goods, as bicycles at Chicopee Falls and clocks at Waterbury. The pulp of the spruce is used in making paper at Berlin. Ships are still built at Bath, and the lumber of the Pine Tree State is shipped from Bangor. The ancient limestone of Vermont is now quarried as marble at Rutland. At Quincy they get the famous granite. New England has always taken advantage of good fishing. But this is possible only through nature's accident. The warm gulf current that circles Cape Cod meets a polar current, and the waters are tempered for cod, herring and mackerel. But many a cotton mill has ceased its noisy hum, and it is only a question of time when New England must abandon the industry which has made her famous for nearly a century. The rapid growth of cotton mills in the South tells us in silent language that some new industrial adjustment awaits the toilers of the bleak New England shores.

Truck-farming and gardening furnish employment near the centers of population. Farming, proper, is decadent. Many interior farms are entirely abandoned, especially in Maine and New Hampshire. Tobacco is grown in the Red Sandstone Valley of the Connecticut. The hills of
Vermont furnish pasturage, and St. Albans is a dairy center. But the population is drifting to city and village, to harbor and factory. Physiographic factors have here, as elsewhere, determined the distribution of population. The people have gone to river-valley and sea shore. Here are the best water power, excellent transportational facilities, easy access to fishing grounds, and here truck farmer and market gardener can ply their trades in more fertile valley or sandy beach and enjoy convenient markets, so essential to these industries. The inhabitants of Maine are well to the south; in New Hampshire they have settled on the Merrimac and the bit of coast; in Massachusetts, the shore line and the Connecticut valley support the densest population; while on the shores of Narragansett Bay dwell over nine-tenths of the people of Rhode Island.

The character of the soil has aided in determining the distribution of population. The thin soils were soon exhausted. The destruction of forests assisted in devastating the lower valleys. The winter snows melted rapidly, and the deluge of water swept debris of all kinds into the lower valleys, smothering the soil with heterogeneous material and driving the farmer away. The steeper slopes, once farmed, were so eroded by the same heavy rains and spring floods that all soils were carried away. The roots of struggling trees on such lands follow along the exposed rock strata, looking for places to fasten their tendrils in mother earth.
Everywhere the observing eye can discern an industrial adjustment to physiography. Men are often slow to make this adjustment, but the strong hand of nature whips them into line, or eventually drives them from a land where only half a tillage is possible.

II. A CASE OF GEOGRAPHIC INFLUENCE ON INDUSTRIAL HISTORY IN ILLINOIS.

The Illinois river follows the old, partially drift-filled channel of the pre-glacial Illinois. This last mentioned stream was of no mean size, being from one to two miles wide and carrying the overflow of the once enlarged Lake Michigan.

The Wisconsin Glacier, in its retreat, partially filled with drift the broad, deep channel of the pre-glacial Illinois, and, as if intent on obliterating the mighty river, it dropped the Valparaiso moraine in the form of a half moon, skirting the south end of Lake Michigan. It thus defied the lake waters to again reach the Gulf by this route.

But the rains fell and the run-off of northern Illinois and Indiana carved post-glacial channels, steep-sloping and narrow, in the soft drift. Of this character are the Fox, Des Plaines and Kankakee rivers, which now feed the Illinois.

The present Illinois, with its greatly decreased volume, has been unable to remove the drift from its ancestor's channel, and the river today flows rather lazily, swinging against the bluffs now on one side and then on the other. Streams are nature's highways of commerce, along which villages
Sorry, this page is unavailable to Free Members
You may continue reading on the following page

Upgrade your Forgotten Books Membership to view this page

<table>
<thead>
<tr>
<th>Books per month</th>
<th>Cost</th>
<th>Offer Details</th>
<th>Purchase</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 10 Books per month Monthly payment $0.30 per book</td>
<td>$2.99 / month</td>
<td></td>
<td>Purchase</td>
</tr>
<tr>
<td>100 100 Books per month Monthly payment $0.05 per book</td>
<td>$4.99 / month</td>
<td></td>
<td>Purchase</td>
</tr>
<tr>
<td>10 10 Books per month Yearly payment $0.17 per book <strong>Save $15.89</strong></td>
<td>$19.99 / year</td>
<td></td>
<td>Purchase</td>
</tr>
<tr>
<td>100 100 Books per month Yearly payment $0.03 per book <strong>Save $23.89</strong></td>
<td>$35.99 / year</td>
<td></td>
<td>Purchase</td>
</tr>
</tbody>
</table>

Memberships can be cancelled at anytime
was planed off almost level with the surrounding country, the broken strata dipping both to the east and west of the axial line of the anticline. The disturbance brought to the surface the coal measures, which were left exposed as outcrops, and, in an early day, attracted "drift" miners to make settlements at and near La Salle. Also the uplift, which increased the vertical distance between bluff altitude and water level in the river below, stimulated gradation, and, as a result, deep gulches and ravines in time communicated with the river, again exposing underlying seams of coal.

Forced to the surface, also, was the St. Peter's sandstone forming the historic cliff—Starved Rock. This sandstone is the raw material from which glass is made, and because (1) the coal was immediately at hand to melt the sand, and (2) because a great commercial city was developing to the northeast on Lake Michigan, men took advantage of the situation, and La Salle became a center for the manufacture of bottles. The glass industry extended also to Ottawa and Streator on the east slope of the anticline, practically repeating the conditions.

Underneath the strata of St. Peter's sandstone lies the calciferous Potsdam. It, too, was arched upward and exposed here where the Illinois river cuts the anticline. It is a notable fact, too, that this formation is not exposed elsewhere in Illinois.

* LeConte defines an anticline as a line on either side of which the strata repeat one another, dipping away from the axis. See Compend of Geology, p. 188.
From the calciferous Potsdam excellent Portland cement is made, and to one who is in possession of this bit of geology it is perfectly clear why The Chicago Portland Cement Works are located in La Salle. The geographic conditions are as follows:

1. Raw material, the Potsdam sandstone.
2. Abundance of coal.
3. Nearest to a great market, Chicago.
4. Ample shipping facilities, railroads and a canal.

The above conditions are favorable to the industry. To this may be added the fact that a wanton destruction of forests has made other building material necessary. The use of concrete is one way in which man has adjusted himself to the changed conditions. From the summit of Starved Rock a number of cement plants can be seen. Their existence is due to one of nature’s freaks, and in an industrial way it illustrates geographic (geologic) influence on human affairs, or history.

By another of nature’s accidents, the northwestern part of Illinois and the southwestern part of Wisconsin escaped the scouring and planing of glaciers. Eroding and denuding agencies, however, removed the later deposits and left exposed the Niagara limestone, Cincinnati shales and Galena limestone. Galena, or lead sulphide, is found in the crevices and pockets of this deposit. Even the early settlers on farms far to the south
used to find profitable employment in winter by "drifting into" the pockets exposed in the gulches of this deeply sculptured region. Galena, Illinois, was named for its mineral, and Platteville, Wisconsin, is always associated with zinc. But there was no coal in this region to be used in reducing the ore, and following the law that it is cheaper to take crude ore to the coal fields than to transport coal to the ore, the valuable ores of the southern part of the Driftless Area in an early day found their way to La Salle, where coal was plentiful and where communication by rail and water had been established with Chicago. Then, too, La Salle lay between Chicago and the productive zinc fields of Joplin, Missouri, and those of eastern Kansas. The coal fields soon attracted this ore, and La Salle's zinc-smelting and manufacturing industry grew as a result of geographic control. Nor was this all. The sulphur had to be removed from the zinc-sulphide, and this fact led to the establishment of large plants for the manufacture of commercial sulphuric acid as a by-product. The industries of La Salle are directly attributable to this diastrophic movement of the earth's crust, which lifted the coal measures several hundred feet and exposed the early Silurian deposits, making mining easier and more profitable, and furnishing abundant material for the manufacture of glass and cement. The abundance of coal attracted the zinc ore, and the smelting plants now in operation are among the largest in the United States. So important are natural resources that
several railroads and a canal at an early date competed for this traffic.

But geographic influence does not stop with industrial history. Political history is largely shaped by resources and industries. La Salle's industries attracted foreigners of varied nationalities. The question of municipal government even in a small city becomes an important social problem. There is, too, an aesthetic side to the La Salle problem. The deep dissection of the uplifted region across from La Salle has produced perhaps the most picturesque scenery in Illinois. It is of such marked beauty that it is now planned to purchase the region and set it apart for a state park. It abounds in hills, valleys, gulches, canons, waterfalls and caves, making Deer Park a rare region for the student of nature. But here again geographic influence is seen. The picturesque is a control over the economic. Railroads, trolleys, ferries, hotels and hacks are busy because an anticlinal fracture and sculptural gradation gave to La Salle this region of beauty.

The study of French exploration has firmly associated the heroic La Salle and his devoted Tonti with this region, though the busy little city that bears the name of the indomitable Frenchman may be unknown to many. Even in savage times geographic conditions played their role in history. So Starved Rock—the inaccessible citadel, attracted the weakened Illini, and here they perished from hunger or were mercilessly butchered by the Pottowattamies in their effort to escape.
The story of La Salle could be repeated, with necessary variations, for many another city. What better example of genuine educational work than that of teaching in the fulness of their relationships, local history and geography?

SUGGESTIONS AND QUESTIONS.

1. What physiographic conditions make New England a good manufacturing country?
2. What are the effects of glaciation in New England? Why is New England not well adapted to agriculture?
3. Why do good harbors abound in New England? What led to the maritime epoch? Why was it so successful?
4. What natural conditions led to the introduction of the textile industries?
5. What part have rapids and water-falls played in the industrial history of New England?
6. What natural conditions favored the introduction of smelters at LaSalle?
7. Account for the Portland cement and glass industries in the vicinity of LaSalle.
8. How was Starved Rock formed and how has it figured in history?

FOR FURTHER STUDY.

1. Account, if possible, for the first settlement in your locality. Was it determined by physiographic conditions?
2. Trace the course of some railroad through your county. Does it follow a stream or a divide? Why?
3. The early settlements in the prairie plains were usually made along the streams. Why? Does your local history verify this statement?
4. What part have mines played in determining the locations of settlements and cities?
5. Did the county in which you live suffer glaciation? If so, what evidences of glaciation can you cite?
6. What determines the present industries of your locality?


BIBLIOGRAPHY.

Worthen, Amos Henry—*Economic Geology of Illinois.*

Le Conte, Joseph—*Brief Course in Geology.*

Chamberlain and Salisbury—*Chicago and Its Environs.*

Parkman, Francis—*LaSalle and The Great West.*

Brigham, A. P.—*Geographic Influences in American History.*

Semple, Ellen C.—*American History and Its Geographic Conditions.*

Mather, I. F.—*The Making of Illinois.*

U. S. Geological Survey—"The Ottawa Sheet."

CHAPTER VI.

AIMS OF GEOGRAPHICAL STUDY.

TOPICS TO BE CONSIDERED.

Aims as stated by leading educators; aims fall in two categories; which is tenable?

Adjustment to environment as an aim in geography; place adjustment; economic adjustment; political or social adjustment. Introductory and correlative aims; geography holds a central position in science; it may be presented as an introduction to the natural sciences, or as a unifying or correlating principle following the other sciences.

How much practical value has geography; the broad meaning of practical.

Culture aim of geography; travel as a means of gaining culture; why geography can contribute to culture.

I. AS DEFINED BY LEADING EDUCATORS.

The very nature of the subject has led to the expression of many aims or ends to which an intelligent study should lead. To begin with, any subject must contribute to the general aim of education, whatever that may be, besides having specific values of its own. Geography, then, in its aims and purposes, must conform to a rational pedagogy; it must lend itself in large measure, in conjunction with the other studies of the curriculum, toward the fitting of the individual to cope suc-
Sorry, this page is unavailable to Free Members
You may continue reading on the following page

Upgrade your Forgotten Books Membership to view this page

<table>
<thead>
<tr>
<th>10 Books per month</th>
<th>10 Books per month</th>
<th>10 Books per month</th>
<th>10 Books per month</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monthly payment</td>
<td>Monthly payment</td>
<td>Yearly payment</td>
<td>Yearly payment</td>
</tr>
<tr>
<td>$0.30 per book</td>
<td>$0.05 per book</td>
<td>$0.17 per book</td>
<td>$0.03 per book</td>
</tr>
<tr>
<td>Purchase</td>
<td>Purchase</td>
<td>Purchase</td>
<td>Purchase</td>
</tr>
</tbody>
</table>

Memberships can be cancelled at anytime
4. Pleasure which knowledge of the subject adds to travel.

Richard Elwood Dodge, in "Teachers' College Record" for March, 1901, gives the following aims:

1. Knowledge — understanding geographical conditions.
2. Power — ability to think clearly and accurately.
3. Interdependence — study of inter-relations of peoples and individuals, and independence of all.
4. Citizenship — ability to combat successfully with social and physical environment.

In more general terms W. T. Harris states the aims of school subjects as follows: "The branches of study pursued in the elementary schools are chosen for the purpose of securing two useful and reasonable ends. In the first place, they are chosen to give the child an ability to understand his environment and to come into a mastery of it, so that he may make it useful to himself. He is taught arithmetic in order that he may divide and conquer; in order that he may measure the things and forces of his environment, and learn how to adapt one set of them to control and utilize another. He is taught geography in order that he may understand the causal relations existing between his habitat, or the place in which

* See "Forum," January, 1902.
he lives, and other places, as well as other systems of things and events on the earth.

On the other hand, a second reason for adopting a branch in the course of study is that it develops some faculty or power in the child, and gives him possession of himself in that respect: for one of the primary objects is to develop the intellect, the memory, the judgment, or the heart. By the expression heart I mean the aggregate of affections and inclinations of the soul. Some discipline in school, like writing, drawing, calisthenics, or manual training, finds its place in the curriculum because of its power to develop the will, the tenacity of purpose, the ability to pay long and continuous attention to one thing, and to form habits of industry, cleanliness, regularity, and punctuality, and thus acquire those virtues which make a man a better citizen than he could possibly be without them—which make his service of more value to his fellow-men, and give him the ability to get a larger share of service from them than he otherwise could."

Professor R. H. Whitbeck submits the following thesis: "The primary aim in teaching elementary geography is to give facts that are likely to be useful in practical life; to differentiate between things which are fundamental and those which are only incidental; and so to impress the fundamental that they shall become a permanent possession of the pupil."

The advocates of the "new geography" recog-
nize its practical value. That geography can be useful in the life of an individual or race is evidently accepted by the Paris Commercial Geography Society, the aim of which according to its report is:

1. "To place science at the disposal of commerce, and to put theory in practice;
2. "To aggrandize France by developing industry and commerce abroad;
3. "To receive and sift information from all parts of the world, and store up facts which may be freely drawn upon by all who can turn them to good account, whether for commerce or for theoretical study;
4. "To extend the study of everything which promotes agriculture, manufacture or trade, both at home and in the colonies;
5. "To show the mass of the people that they are interested in the products, export and import, of their own and other countries, and that knowledge leads to foresight, and foresight leads to power."

A consideration of the "aims" of geography teaching, as stated by educators, reveals the fact that they fall into two categories, viz: those who have for their object the disciplining of the mind, and, second, those whose purpose it is to acquaint the pupil with his environment and teach him its use. The aims which can be consistently included in the second category are rational and tenable; but those in the first, considered in the light of
modern psychology, are irrational and untenable. If training in one field of learning could carry over and explain problems in new fields of an entirely different character, then, perhaps, we might justify mental training as an aim of any department of education, as, for example, geography. This not being the case, we can indorse only those aims which are directly and vitally concerned in preparing the child for active life. Mental training must be incidental.

In James Bryce’s enumeration of aims, the value of geography as a foundation for history, literature, sociology and economics is at once apparent, as those subjects lead to an understanding of human institutions and human nature. We cannot subscribe to the training of the perceptive and reflective powers *per se* except in the sense above stated. The additional pleasure which a reader or traveler can obtain through a knowledge of the earth, its people and institutions, is sufficient reason for its study. If more of the aesthetic entered into the education of the poor, especially, their lives would not only be better but happier.

The aims as stated by Professor Dodge can be interpreted so as to make them the legitimate objects of geographical study. They are briefly but clearly set forth in the "Teachers’ College Record" of March, 1901.

Dr. Harris makes the understanding of environment an important aim of all studies, and especially of the study of geography. His second
statement, however, seems to suggest rather too strongly the doctrine of formal discipline. The idea of individual efficiency to the end that one may be of service to his fellows is fully in accord with the modern movement of “social efficiency” as the aim of education.

II. GEOGRAPHY IN THE LIGHT OF ADJUSTMENT TO ENVIRONMENT.

The educational principle which determines all values must be more clearly recognized. It is the principle of “adjustment,” which means that the individual must be adapted to his environment; must be able to make use of it for protection, sustenance, fuller development, and happiness. This is the view of Spencer, G. Stanley Hall, M. V. O'Shea, Frederick E. Bolton, Edward L. Thorndike and others. On this principle must be determined not only the value of geography but of every study in the school curriculum.

No one is educated who has not a fairly good fund of geographical facts and a reasonably clear notion of the science necessary to their understanding. The transactions of everyday life demand a knowledge of place. One must locate persons and places with a fair degree of accuracy, both with relation to himself and with relation to other fixed places, or his view of things will be much distorted. Every nation is dependent, and as such must know where other nations dwell, what of excess they produce, what they themselves cannot produce, what terms for exchange can be
effect, and what routes and modes of carriage can be resorted to. It is impossible to conceive of a civilized community without international relations, and hence an educated people must understand these relations and have clear conceptions of foreign countries and foreign peoples. James Bryce emphasizes strongly the additional pleasure that comes to travelers who have made a study of the country through which they are passing. Tourists invariably study the geography of the region they expect to visit, before starting on their journey. Indeed, it is often said that one can gain a liberal education through travel. The truth of this lies in the fact that travel places the individual in so many and in such complex situations that he learns to adjust himself to new conditions without great inconvenience or embarrassment.

A place adjustment is one of the first to be noted, and this fact, no doubt, has led to the overemphasis of locative geography. That physiography has much to do in determining the distribution of population can be instanced almost anywhere. Salubrious climates, rich soils and natural roadways have had much to do in determining density of population. Cities thrive on seaboards where sinking coasts permit the ocean waters to encroach upon the lower river valleys, affording deep and quiet waters for harbors. Lake cities develop rapidly where there are navigable waters from the lake to the sea, and where the topography, soils, temperature and rainfall favor
agricultural pursuits in the surrounding region, or where the lake shore rocks abound in valuable minerals. Chicago is an example of the first kind and Duluth of the second kind. Cities also find their location and owe their growth to breaks in transportation occurring at the head of navigation of rivers, or at the entrance of mountain passes. St. Paul is located at the head of navigation of the Mississippi river, and Denver is often called a "mountain gate" city. Thriving cities often find their location at river-falls, which offer excellent water power, and at the same time determine the head of navigation. In general, breaks in navigation determine the location and influence the development of cities.

As already stated, soils, temperature and moisture have much to do in determining the distribution of population. If all of these conditions are favorable, dense population may be expected. If, however, any one of these conditions is decidedly unfavorable, it may restrict very largely the density of population. Many parts of Arizona would be very productive if there were sufficient rainfall, but owing to a scarcity of moisture this condition outweighs all other conditions which in themselves may be favorable. The Prairie Plains support a dense population because the conditions individually seem to favor the life and activities of man. Soils, also, are very potent factors. The fine silt deposited in old Lake Agassiz now forms the rich soils and level surface of the Red River Valley and forms the highly productive soils now
Sorry, this page is unavailable to Free Members
You may continue reading on the following page

Upgrade your Forgotten Books Membership to view this page

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Books</th>
<th>Price</th>
<th>Books per month</th>
<th>Payment Type</th>
<th>Price per Unit</th>
<th>Discount</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>$2.99 / month</td>
<td>10 Books per month</td>
<td>Monthly payment</td>
<td>$0.30 per book</td>
<td>$15.89</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Books</th>
<th>Price</th>
<th>Books per month</th>
<th>Payment Type</th>
<th>Price per Unit</th>
<th>Discount</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>$4.99 / month</td>
<td>100 Books per month</td>
<td>Monthly payment</td>
<td>$0.05 per book</td>
<td>$23.89</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Books</th>
<th>Price</th>
<th>Books per month</th>
<th>Payment Type</th>
<th>Price per Unit</th>
<th>Discount</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>$19.99 / year</td>
<td>10 Books per month</td>
<td>Yearly payment</td>
<td>$0.17 per book</td>
<td>$15.89</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Books</th>
<th>Price</th>
<th>Books per month</th>
<th>Payment Type</th>
<th>Price per Unit</th>
<th>Discount</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>$35.99 / year</td>
<td>100 Books per month</td>
<td>Yearly payment</td>
<td>$0.03 per book</td>
<td>$23.89</td>
</tr>
</tbody>
</table>

Memberships can be cancelled at anytime
great distances, but since the operation of the principle can be seen more plainly at short range, our illustrations will be chosen accordingly. Rural communities adjacent to large cities usually devote themselves to supplying urban needs. Restricted areas demand intensified industries. In such cases the controlling principle is economic rather than physiographic. The region about Chicago, for instance, is given up largely to trucking and dairying. Elgin, Illinois, so noted as a dairy center, derived its original impulse from Chicago, though its product now is widely distributed. A trip from Chicago to Milwaukee convinces us of the importance of trucking. Hence, we see readily that the industries are sometimes dependent upon population centers, and are not, in such cases, largely determined by physiographic factors. Regions remote from important markets and equally well adapted for the production of grain or stock usually market a much larger ratio of stock than of grain. The reverse is often true of similar regions located near great markets.

Commercial geography concerns itself very largely with the operation of economic laws which are so important that valuable contributions to the subject are appearing under the caption of "Economic Geography."

Thus it may be seen that one of the aims of geography is to trace out certain of these economic relationships or adjustments.

In addition to the adjustments above men-
tioned, there seems to be a political or social adjustment which plays its part especially in commercial geography. The legal commercial relationships which exist between different countries have much to do in controlling the industries of the countries, and the tariff laws in any country have much to do with the manufacturing and transporting industries. To understand fully what people are doing in any country, and why they are so engaged, one must certainly take into consideration physiographic, economic, social and political conditions.

III. INTRODUCTORY AND CORRELATIVE AIMS.

Reference has been made under the definition of geography to its relation to other subjects. It occupies a central position; the other branches "diverge from it as specialized departments." Such being the relation, geography affords the only true basis for the study of natural science. For this reason it is urged that the rational element, the science phase, should receive due emphasis, inasmuch as the large majority of pupils will never have the advantage of secondary instruction in these specialized departments. In this case, geography will give the pupil a general view of the earth-phenomena with which elementary education so largely deals; and, if he enter the high school, it will serve as an introduction to the physical and biological sciences. Perhaps this view accounts for the appearance of the physical geography in the freshman program of
most high schools. Educators hold that it thus furnishes a radiating center from which the pupil may proceed understandably. Others advocate the teaching of physical geography in the senior year of the secondary school, on the ground that the study will serve the important function of tying together, unifying and organizing the information gained from other sources, thus making all more definite and significant.

IV. THE PRACTICAL VALUE OF GEOGRAPHY.

No one will challenge the practical value of geography. But if we accept the narrow meaning of "practical," geography is limited in its application quite largely to immediate environment. Home geography is very important. There are also many facts of geography that are of this practical value to individuals engaged in the commercial industry. If, however, we accept the broader meaning of practical, there can be no question concerning the value of geography. It has been pointed out repeatedly in this volume that the many points of contact between geography and life make this subject of distinct value in the educational process. Since practical value, in both senses, has been assumed, no further discussion will here be indulged in.

V. THE CULTURE AIM OF GEOGRAPHY.

Heretofore in our discussions we have dealt with the concrete and practical side of the subject. Geography, especially mature geography, has a
very high cultural value. If culture is to be held up as an aim of education, geography will then come in for an important place. Any subject that has so many phases and which enters into so many of the avenues of life cannot fail to contribute much that is cultural. This statement may not appeal to those who have made little or no study of geography; but those who believe that education is an adjustment to environment, physical and social, and who have pursued the study until the breadth and richness are apparent, readily concede its cultural value. Furthermore, geography includes so much of science and is so closely related to history, literature and economics, that its cultural value is very evident. Many students of geography assert that there is no subject that has done more to broaden their intellectual outlook and to deepen their appreciation of nature and life generally than has the study of geography.

SUGGESTIONS AND QUESTIONS.

1. What is the present day aim of education? Should geography contribute to this general aim?
2. What, then, is the chief purpose of teaching geography?
3. To what extent ought the practical aim to dominate in geography teaching? The cultural?
4. What seems to be the consensus of opinion of educators as to the aim of geography teaching? Quote several writers.
5. Illustrate the value of a knowledge of geography to a farmer living near a large city. To a merchant in the city. What sort of geographical knowledge do transportation companies
FOR FURTHER STUDY.

1. Waste in education is very largely the result of aimless teaching. Try for a time, at least, to justify each lesson that you teach. If you do this, you must have some basis for selection. Thus will the aim of education in general and of geography in particular, force themselves upon you.

2. Observe lessons in geography and compare the genuine thought-work with that of memorized statement. Which predominates? Why? Which is more valuable? Why?

3. What percent of the geography which you learned in school has been of use to you in your life experiences?

BIBLIOGRAPHY.


Harris, W. T.—"The Place of Geography in the Elementary School," The Forum, Jan., 1902.

McMurry, C. A.—Special Method in Geography, Chaps. I and VIII.

Dodge, R. E.—"Teachers' College Record," March, 1901.

O'Shea, M. V.—Education as Adjustment.

Keith, J. A. H.—Elementary Education, Chap. II.
CHAPTER VII.

HUMAN AND SOCIAL GEOGRAPHY.

TOPICS TO BE CONSIDERED.

The terms "human" and "social"; the real meaning of human geography; how primitive man adjusts himself to his geographic environment; how civilized man modifies his geographic environment to better serve his needs; the narrow view of human geography.

Geography in the light of social efficiency; how it contributes to social efficiency; usefulness of geographic knowledge.

Geography involves principles of economics; the self-sufficing versus the commercial economy; geography, rightly studied, reacts against formalism; geography and nature study tend to engender a humane spirit.

The terms human and social, as applied to geography, are often used synonymously. The writer believes, however, that there is some distinction. Human geography, generally speaking, refers to the activities of man, of human beings, and the various ways in which his activities and industries ultimately affect social environment. But human activities sometimes affect environment in such an indirect manner, or so slowly, that the influence is not very apparent. Social geography includes those activities and industries whose influence upon society is more direct and immediate. Under this head belong political and
commercial geography. Our regulating systems, such as interstate commerce laws, the tariff and other regulations which in their application greatly affect production and transportation, serve as effective controls over industries, and, as such, are elements of social geography.

I. HUMAN GEOGRAPHY.

That the so-called "human side" of geography is of prime importance and chief interest in the study of the subject is readily admitted. But that "geography is a study of the earth as the home of man," and nothing more, is neither comprehensive nor scientific. Geography is highly complex and the danger here, as in other fields of study, is that undue recognition and emphasis shall be given to some particular phase.

The conception of geography, elsewhere given,* does not limit the subject to "the earth as the home of man;" the oak tree, the pond-lily and the coral polyp; the antelope, horned toad and bird of paradise, are each and all inhabitants of the earth and, as such, each has its characteristics determined by geographic controls. So far as man is concerned he is simply one of the creatures of the earth; he battles with his environment, responds to its influence, and in the end survives or perishes the same as do the myriads of lower life forms about him. His advantage lies in the fact that intelligence, rather than mere instinct, enables him to conquer where his lower brothers

* See chapter on "Geographic Conditions and Effects."
<table>
<thead>
<tr>
<th>Books per month</th>
<th>Price</th>
<th>Details</th>
<th>Purchase</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 Books per month</td>
<td>$2.99 / month</td>
<td>Monthly payment $0.30 per book</td>
<td>Purchase</td>
</tr>
<tr>
<td>100 Books per month</td>
<td>$4.99 / month</td>
<td>Monthly payment $0.05 per book</td>
<td>Purchase</td>
</tr>
<tr>
<td>10 Books per year</td>
<td>$19.99 / year</td>
<td>Yearly payment $0.17 per book</td>
<td>Purchase</td>
</tr>
<tr>
<td>100 Books per year</td>
<td>$35.99 / year</td>
<td>Yearly payment $0.03 per book</td>
<td>Purchase</td>
</tr>
</tbody>
</table>

Memberships can be cancelled at anytime.
Slowly but surely men adjust themselves to physiographic conditions. The wisest adjustment and the highest success are coincident. These principles determine the growth and location of industries and the distribution of population. The pine woods and deep estuaries of Maine in an early day led to ship building. The people who lived on the capes and promontories (Gloucester, Massachusetts, is a good example) became fishermen because they were really out at sea even when their boats were at the dock. The oyster industry of Chesapeake bay owes its existence to a shallow sea, as otherwise, dredging for the crop would be difficult. The inner lowlands of Alabama, with their rich limestone soils, were selected as a superior region for the production of cotton. The arid west, with its plains and mountains, is a grazing region, not because its pasturage in any degree compares with that of the prairie plains, but because, under the existing conditions, herding yields the best returns and is, therefore, a wise adjustment to physiographic conditions. In every case of localized industry it has been man's function to discover what form of activity or what crop-system is best suited to a region and hence will yield the largest income.

The human side of geography shows itself in a more positive manner when man modifies, in some marked degree, his geographical surroundings. Instances of this kind are found in the construction of great commercial highways, in the reclamation of the vast arid regions, in the drainage
of swamps and in increasing the productive capacity of the soils. The discovery of an abandoned waterway westward across New York led some emigrant trains across the Appalachian barrier in an early day; but when man deepened the channel and transformed it into an artery of commerce connecting the Hudson with Lake Erie, the real significance of the physiographic factor, as modified by man, at once became apparent. The east and west alike responded to the new control, and no history of our country is complete that does not take cognizance of the opening of the Erie Canal. The building of trans-continental railroads and inter-oceanic canals, therefore, well illustrates the human factor in geography.

There are those who interpret human geography to mean only the industrial and commercial activities of man. This is not a broad or fundamental view of the subject. The study of industries may or may not be geographic. If mere technique is considered they certainly lose such significance. It is not so much "just how a thing is made," but its influence upon other industries, upon people and countries, when it is made, that makes it of geographic importance. The existence of waterfalls may lead to the erection of a factory; the consequent industry may require additional facilities; an influx of people follows and a city springs into existence; now, the adjacent country responds to a demand by the industrial center for more food and supplies. The country
people change their crop-systems to meet new demands, they are more prosperous, they live better, and eventually they improve and develop lands that, under the old regime, they could not afford to cultivate. In this sense, an industry is geographical in nature. It is only fair to say, however, that as more improved machinery and methods are employed and, therefore, the production of raw material is stimulated, and the output brought within the means of larger numbers of people, that the method of work assumes the nature of a geographical control. The invention and use of Whitney's cotton gin is an instance of this kind.

In its deepest and best sense, then, human geography is apparent in those activities of a people which finally assume the nature of geographic controls, and, therefore, have a far-reaching and often lasting influence upon the distribution of population, industrial life, social development, and geographic conditions. As stated above, this phase of geographical study may be reduced to two general principles, viz.: (1) man's intelligent adjustment to physiographic conditions and (2) the improvement of those conditions, whenever possible, for the purpose of making his life and the life of his fellows richer and more abundant.

II. SOCIAL GEOGRAPHY.

Effective citizenship includes (1) the individ-
ual's ability and inclination toward self-support, and (2) an intelligence which enables him to maintain himself and at the same time so to order his economic and social relations that his fellows may enjoy equal opportunity with him. It includes a will to place social well-being ahead of individual welfare.

An efficient citizen has productive capacity. He produces that which ministers directly to the material needs of society; he assists in securing social conditions—laws and regulations—which favor individual prosperity; and more indirectly, he helps in the production of a general intelligence and a public spirit which are always incentives to individual endeavor.

The very nature of geography makes its formal study valuable in securing the social attitude just referred to. One of the first advantages of geography as a formal study arises from the fact that it is concrete: that suitable data are everywhere available: and that an inductive procedure is possible. The true geography of the earth is the geography of today, and the most important geography for any individual is his local geography.

If social efficiency is a legitimate aim in education, material should be selected that will contribute to its development:—material, a knowledge of which may be made to function in every day life. The richness of the subject-matter of geography permits of great selection and makes possible the useful expression of the lessons
taught. The present educational reform is that of pulling the schools away from a traditional past and aligning them with the living present. Every social being lives through inter-relationships with his complete environment—earth and stone,—wood and iron,—air and water,—plants and animals,—his friends and business associates—and to these he relates himself and of these he makes legitimate use, in his struggle for improved existence. Geography, then, deals with elementary facts of agriculture, mining, manufacturing, economics and sociology, not as borrowed materials but as legitimate parts of its own content; and, because it deals with numerous actual life conditions, its subject-matter is rich, significant, and pertinent in every day life.

At the outset, geography teaches many facts concerning rural and urban life, directly useful to the individual in gaining a point of vantage in his struggle for a better existence. Agriculture and nature study will help in bringing useful information, but for a long time geography must continue to be the main source of knowledge and insight relating to community life. Some knowledge of the regular occurrence of cyclonic storms, and of the practical assistance of the weather bureau; elementary facts concerning the cultivation, fertility and means of maintaining productive capacity of soils; information concerning the reciprocal needs of city and country, suggesting advantageous industrial pursuits; authentic facts relating to regions somewhat remote and
serving in some measure to guide the course of emigration; such knowledge as this seems to be directly and practically useful, and is contributed very largely through the study of geography. Poverty is a great handicap to efficiency of life—and therefore, whatever tends towards prosperity brings opportunity for individual development. Hence practical instruction in geography contributes to effective citizenship.

Geography involves principles of practical economics. The practice of a true economy increases the productive capacity of the individual, which leads to increased prosperity, and makes possible greater social usefulness.

It is not meant that formal instruction in economics will be given, but that a full understanding of commercial geography, especially, will require some consideration of the laws that govern production, transportation and consumption.

A commercial economy dominates modern agricultural life, because such economy brings the largest long-time net profit. Obviously, the practice of the best farmers is the production of one or two commodities for the market, it having been previously determined what commodities will bring the largest profits, with a given outlay of labor and capital. With his proceeds the farmer buys many things which it is possible to produce on the farm. Most of the farmers in central Illinois buy their flour on the open market because they recognize the fact that the farmers of Minnesota and the Dakotas who are making a busi-
ness of raising wheat, and the millers of Minneapolis who are making a business of converting it into flour, can furnish the product at a less cost than the Illinois farmer (whose business is to raise corn and fatten stock) and the local miller can produce it. The principle applies to a score of things which the farmer could produce but does not, because he can buy them cheaper.

Boys and girls in the upper grades can be interested in comparing with this commercial economy the self-sufficing economy practiced by the early New England people, and the advantages of the modern system will readily be appreciated.

The study of production, transportation and consumption, as involved in geography, are related industrial and economic problems which will broaden the pupil’s outlook and define his relations to both his physical and social environment. As a response to environing conditions, the people of one region produce a certain useful product while the inhabitants of a remote region may produce something equally useful. Through transportation, the surplus of each is conveyed to the other, and as a result each will have its productive capacity enhanced. The pupil may come to see that no individual or community can, independently of other individuals or communities, live as well or produce as much, as is possible through the reciprocal helpfulness of exchange. Such an outlook, it would seem, will make the future citizen more rational in his industrial pursuits, and more democratic in the exercise of his civil rights.
<table>
<thead>
<tr>
<th>Books / month</th>
<th>Cost / month</th>
<th>Books per month</th>
<th>Payment Type</th>
<th>Price per book</th>
<th>Purchase</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>$2.99</td>
<td>10 Books</td>
<td>Monthly</td>
<td>$0.30</td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>$4.99</td>
<td>100 Books</td>
<td>Monthly</td>
<td>$0.05</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>$19.99</td>
<td>10 Books</td>
<td>Yearly</td>
<td>$0.17</td>
<td>$15.89</td>
</tr>
<tr>
<td>100</td>
<td>$35.99</td>
<td>100 Books</td>
<td>Yearly</td>
<td>$0.03</td>
<td>$23.89</td>
</tr>
</tbody>
</table>

Memberships can be cancelled at anytime.
lower forms of life. The effective citizen must be humane and altruistic. He must live and let live. In general, this spirit may be awakened and nourished through the observance of the universal struggle for existence. Children who have been well directed in nature study, do not wantonly trample upon wild flowers, mutilate the branches of trees, or destroy harmless life. They come to see, also, the use of much that is inanimate and inorganic, and finally they may arrive at a conception of life as manifold relationships and interactions with environment. Such an attitude toward nature is at once ethical and moral. Social efficiency depends very largely upon the ability to appreciate proper relationships and to estimate proper uses. The inventor calmly reflects upon the needs of society and then turns his attention to some material thing which he adjusts to human use, and so establishes a new relationship between man and nature. The effective citizen must have sufficient insight into geographical environment to discern adjustments and modifications that will benefit himself and the community; but such an understanding engenders an interest and sympathy which is quite akin to the humanitarian spirit of a purely social environment. Hence it may be said that any modification of physical or social environment that improves social conditions and enhances social welfare is a geographic control and belongs to the social phase of geography.
SUGGESTIONS AND QUESTIONS.

1. Does the scientific view of geography permit its limitation to a study of the earth as the home of man? Show why.
2. To what extent can man modify his geographic environment? Give several instances.
3. What are the qualities of an efficient citizen? What is there in the nature of geography that makes its study valuable in developing useful citizens?
4. How can a knowledge of geography enable a citizen to adapt his industry more advantageously?
5. How important is transportation to the nations of the earth? How does it enable nations to live better? Does it, then, satisfy social needs?
6. What department of geographical study especially emphasizes the social phase?

FOR FURTHER STUDY.

1. Read Chap. I, Book III, in Small and Vincent's *Introduction to the Study of Society* and write an essay to show why land is a social element. What, then, is the relationship of geography to sociology?
2. Study your home environment to find examples of human adjustment to physical conditions. Are houses built at the foot of hills? Do farmers drive herds to rivers or springs for water? Are streams forded? Select and describe as many instances as possible. Are these adjustments indicative of the greatest prosperity?
3. Select instances in your home environment to show reorganization of natural environment. Does the near-by railroad follow a river valley? Does it cut through or tunnel a hill? In either case, explain why.
4. What crop system prevails? Why?
5. Is the fresh meat slaughtered at home or shipped in? Why?
6. Do you believe that the proper study of geography can make better citizens? Did the instruction given you contribute to your efficiency?
7. What kind of economy is exemplified in Whittier's "Snow-Bound"? Does the same economy now prevail? What causes a change in economy?
BIBLIOGRAPHY.


Keltie, J. Scott—Applied Geography, Philip & Son.


Bagley, W. C.—The Educative Process, Chap. III.
CHAPTER VIII

Geography and Life.

Topics to be considered.

Life's struggle with environment; how animals and plants live, temperature, moisture and soil conditions.
The distribution of peoples; how man lives in the tropics; in the polar regions; in the temperate belts.
Life a process of establishing an equilibrium with environment; re-creation of environment a proof of enlightened civilization.
How industries are earth-determined; physiographic features restrict habitable areas; the life and character of peoples thus influenced.
How industries are determined in populous countries; in sparsely inhabited countries; how geography influences political history; England cited.
How geography is related to life; how it can help people to live better; dignity of the subject.

The leading consideration concerning all life is self-perpetuation. The inalienable right to live is the most impressive thought revealed in nature. Dearness of life is the sole cause of the universal conflict in the organic world. A superficial glance at nature reflects the harmony and tranquillity of a "daisied field in June," but a more careful scrutiny convinces us that the realm of nature is the scene of a warfare "utterly shameless and utterly cruel." "Long life and length of days" come only to the creature whose environment is
favorable to its needs. Organisms either find desirable homes and congenial company, or vanish from the earth altogether. The security of life is contingent upon environment. The interesting adaptations of plants to secure sunlight, water, and food; and of animals to secure food, and for rivalry and defense, establish the fact that dependence characterizes every organism by determining its nature.

Animals derive food either directly or indirectly from plants, for they alone possess the important function of organizing inorganic materials. Since the two kingdoms must occupy the same domain, the struggle for existence is made more intense. But plants, in turn, are dependent upon proper conditions of temperature, moisture and soils. The temperature of any region leads to a consideration of the sun and its effect upon earth and atmosphere; moisture takes into account the aqueous envelope as affected by heat and winds; and soils result from the combined action of all these factors and forces upon the rock crust of the earth. Plants do not thrive in regions where the temperature remains long at or below 32°, as water is necessary to dissolve and transport nourishment. A meager precipitation of moisture, for a similar reason, stunts plant growth; but with sufficient moisture and a sufficiently high temperature there is scarce a region in the world that would not "blossom as the rose."

A consideration of man's distribution and development reveals positive evidence of his re-
response to physiographic conditions. Temperature and moisture are chief among these, not only because they affect man directly, but because they determine the productiveness of habitable areas. A study of the progress of civilization leads to the conclusions (1) that range and variation in climatic conditions are favorable to civilization and culture, and (2) that extreme and uniform conditions are unfavorable to the advancement of civilization.

Tropical regions support a luxuriant vegetation in response to high temperature, liberal rainfall and alluvial soils. The food supply is generous and were it not for other less favorable conditions a dense population might flourish. The range of temperature is scarcely more than ten degrees, and, in addition to the enervating influence upon human beings, it permits an uninterrupted plant growth, insuring abundant food with but little expense of human energy. The rank vegetation becomes a barrier which man declines to penetrate, partly because intertwining plants and vines obstruct his path, and partly because this tropical verdure harbors a dreaded animal and insect life. Resistance to life, so far as food and shelter are concerned, is reduced to the minimum; the palm alone may furnish all that human life demands for mere subsistence. Excessive heat causes man to languish in the shade; excessive moisture breeds disease and makes cultivation difficult. The uniform climate and unlimited varieties in vegetation become monotonous
and oppressive. Plant life holds the scepter! Man is over-awed with the fierceness and regularity of environing conditions. Long subjection has brought with it resignation and mental decadence. What wonder, then, that the primitive mind should reverence forces so irresistible as scorching suns, angry skies, gigantic trees and ferocious beasts! What wonder that man should abandon a struggle for supremacy in which the odds are so against him!

Civilization is also in a low stage in the Arctic regions. The Eskimo's struggle for existence is so intense that all human effort is expended in extorting from nature a meager support. If we reflect on the conditions of his environment, we shall discover the most depressing monotony in the long silent night with only lurid gleams of light, in the illimitable expanse of glacial ice, in the absence of vegetation, in the desolate climate, and in the few species of animal life; surely his is a "universe of sky and snow." Here, again, nature outbalances man, and ambition is weighed down by conditions so monotonous that no excitations appeal to him except those for food and shelter. Even the food that he eats so lacks variety that the building up of a sensitive and susceptible organism is impossible. He is as stolid as the world in which he dwells. Being driven for long periods to his home by the rigors of the clime, his emotional nature responds to enforced retirement and hence he manifests a strong love for home and family. Surely his is a
Sorry, this page is unavailable to Free Members
You may continue reading on the following page

Upgrade your Forgotten Books Membership to view this page

<table>
<thead>
<tr>
<th>10 Books per month</th>
<th>Monthly payment</th>
<th>Purchase</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 Books per month</td>
<td>$2.99/month</td>
<td></td>
</tr>
<tr>
<td>Monthly payment</td>
<td>$0.30 per book</td>
<td></td>
</tr>
<tr>
<td>100 Books per month</td>
<td>$4.99/month</td>
<td></td>
</tr>
<tr>
<td>Monthly payment</td>
<td>$0.05 per book</td>
<td></td>
</tr>
<tr>
<td>10 Books per month</td>
<td>$19.99/year</td>
<td></td>
</tr>
<tr>
<td>Yearly payment</td>
<td>$0.17 per book</td>
<td><strong>Save</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>$15.89</strong></td>
</tr>
<tr>
<td>100 Books per month</td>
<td>$35.99/year</td>
<td></td>
</tr>
<tr>
<td>Yearly payment</td>
<td>$0.03 per book</td>
<td><strong>Save</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>$23.89</strong></td>
</tr>
</tbody>
</table>

Memberships can be cancelled at anytime
According to Herbert Spencer life is the process of establishing an equilibrium with environment. The more intricate and complex the equilibrilal processes become, the higher the degree of life and the higher the scale of civilization. In low forms of life the adjustments to environment are simple, and the accommodations are largely effected by the organisms themselves. Every animal must either respond to the demands for food and protection from enemies, or become extinct. The tropical inhabitant adjusts himself to his surroundings almost completely; he lives in caves or in the shelter of trees, wears little clothing and subsists on fruits, roots and insects. He is a direct response to an equable climate and a highly productive soil abounding with indigenous food-plants. Provision for the future is unnecessary, hence irresponsive and indolent habits are consequent reactions. Inactivity and stupidity are direct responses to conditions that make life easy. So nature, here violent and monotonous, outbalances a manhood that places little value upon an existence that is so generously bestowed.

Re-creation of environment is the test of enlightened civilization. In the lower stages of civilization, man stooped to adjust himself to nature and so became enslaved; but in highly civilized races, men have developed tastes and needs which nature, alone, cannot satisfy. So human ingenuity and discovery are summoned to transform material resources, and the work of nature is consummated with an artificial touch, which
makes it serve more perfectly a fastidious people. All arts and industries, all crafts and trades, have, in the end, a single function to perform, viz., the promotion of natural resources to greater usefulness. But all modifications of material resources demand an intellectual alertness which marks progress in civilization.

It is interesting to trace out the history of localized industries, and one is soon convinced that favorable productive conditions, coupled with advantageous means of distribution, are the determining factors. To one who has studied geography aright, it is unnecessary to explain why cranberries are grown on Cape Cod, tobacco in the Red Sandstone Valley of the Connecticut, rice in South Carolina, or wheat in Minnesota; or why locomotives are made in Philadelphia, plate glass in Pittsburg, furniture in Grand Rapids, cotton goods in Birmingham, or pottery in Trenton. Suffice it to say, that industries slowly but surely spring up in the regions well suited to their development. Frequently, where conditions are adverse, men triumph over nature’s barriers to civilization, as when they tunnel mountains, connect oceans with watery threads, turn the course of rivers and moisten arid lands. Nature deals out her wealth with moderation in temperate zones and to them only who would "subdue and have dominion" over her. Life is dear because it has been purchased by incessant toil, and it is versatile and abundant because in the struggle it
acquired knowledge, sympathy, judgment and mercy.

The trend of industrial history is determined by physiographic conditions. Man can modify his environment but he cannot annihilate it. In general, prosperity is coincident with a wise adjustment to geographic conditions. Chief among these are climate and soils, of which much has been said. But land forms, themselves, exert important controls over industrial life. A general distribution of mountain ranges parallel to seas makes narrow coastal plains; close parallel ranges enclose inter-montane valleys; in the midst of the sea volcanic disturbances project habitable lands; the subsidence of continental margins is responsible for numerous head-lands and adjacent islands; and great rivers build and moisten far-reaching food plains. Hence it is that these earth processes fashion restricted habitable areas, while unrestricted areas result from the evaporation of large water bodies, or from the diastrophic tilting or lifting of extensive seafloors. Broadly speaking, habitable lands are restricted or unrestricted and a review of industrial life makes the following inductions possible: (1) Restricted habitable areas determine industries in which a maximum of labor is expended in the production of a minimum of material. (2) Conversely, unrestricted habitable areas determine industries in which a minimum of labor is expended in the production of a maximum of material.

The operation of this principle is reflected in
the character of the people. The Norwegians, hemmed in between the mountains and the ocean, were long dependent upon the fishing industry, and years at sea developed them into the boldest and most famous of seamen.

When a yard of Belgian hand-made point lace is sold, ninety-five per cent. of the purchase price is for labor; the value of the raw material used is insignificant. In order that nearly five hundred people may live on a square mile, the highest possible utility must be given every production, by the expenditure of much labor upon little material. In Switzerland, where metals and woods are scarce, hand-made watches and ingeniously carved toys illustrate how limited quantities of raw material may be transformed into great value through the application of much industry. Unusual skill, strict economy and extreme perseverance are the characteristic responses in the people. Restricted tillable areas near Boston and New York stimulate truck-farming, because an acre so employed furnishes a maximum of labor, the compensation for which comes when a limited quantity of choice seasonable vegetables finds a ready market.

Not only to industrial life does the principle relating to restricted areas apply; it extends also to political history with most decisive results. As England’s tillable lands are much restricted, her own soils have long been unable to support her rapidly increasing population. In 1815 the Corn Law was passed to protect the English land-
ford. Under this obnoxious measure, the price of wheat in 1817 reached $3.25 a bushel, and the same year the weekly wage of a weaver was $1.02. The struggle for free trade soon followed. The exorbitant price of wheat added to the misery of the under-fed laborer, and the tariff interfered with commerce. Manufacturers demanded free trade because they saw clearly that a more abundant food supply would increase the spirit and efficiency of the workmen, and would also tend to keep labor cheap. Had England's territory been sufficient to furnish food for her millions, the great political struggle that wrenched the very life of England might have been averted. The misery, suffering, and abject poverty of the people enlisted the sympathy of noble hearts, who condemned the evil condition where "wealth accumulates and men decay." Poets, reformers, and statesmen championed the cause of suffering humanity, and finally, in 1846, Robert Peel, through motives altruistic or otherwise, deserted the Tories and introduced the bill which sealed the doom of the Corn Law and marked the beginning of free trade in England. So in America, geography is peculiarly interwoven with history. The coastal plains, with their rich soils and warm, moist climate, must answer for the Civil War, says Prof. Davis, for these conditions made slavery profitable. Ultimately, the economic resources of the South were responsible for the direful industrial situation there following the war. In areas where the resources are less restricted,
the industrial problem is very different. In contrast to the Swiss, who makes a few ounces of metal into a watch worth ten dollars, or the Belgian, who converts a handful of flax into a yard of point lace worth its weight in gold, the Pennsylvanian makes from his almost unrestricted resources, iron and coal, locomotives and steel rails. The problem of the Illinois farmer is the production of a maximum yield with the minimum investment of labor. A load of corn which brings $25 shows at least a return of $20 for material and the balance for labor. Dealing, as he does, with produce in great bulk, he becomes wasteful and extravagant. If, instead of Illinois’ eighty people to the square mile, it had Belgium’s four hundred and ninety, no longer could “half a tillage stint” our prairie plains. No half-tilled farms, no weedy fence corners, no peaty swamps or alkaline tracts could then exist. Agriculture in the past has been easy. Owing to its great possibilities “man has had only to tickle the soil with the plow and it has laughed with a harvest.” But in his greed to get bountiful returns with little outlay of labor and capital, man is fast reaching a point of diminishing returns. Because of reduced fertility, a point is reached at which a given outlay of labor and capital fails to produce a proportionate yield. Here the study of geography touches life most directly. It is only through an understanding of soils, and a knowledge of the treatment by which their fertility can be maintained, that this point of diminishing returns can
be pushed farther into the future. So the agricultural college becomes a necessity, and the calling of the scientist is dignified by his reduction of farming to scientific agriculture.

Has too much been said concerning the influence of geography upon life, and too little concerning the value of the study of geography as presented in our schools? The educational tendency is emphatically toward a training that touches life in practical, rational, and vital ways; hence the value of any study must be measured by its contribution to fullness of life. That man is best educated who best understands his environment, who most clearly recognizes his relationships and responsibilities to all other life, and who best uses his resources to promote the common weal. Every science deals with some phase of man's environment, and geography, which is a department of science, deals in a general way with the same subject-matter. Any study which aids in giving man the correct view of his place in nature is of great value either from the practical or the cultural point of view: for, indeed, culture, to be worthy the name, must manifest itself in the every day life of a people.

The revelation of truth is one of the chief functions of all education. Superstition and tradition have ever blocked progress. Geography has assumed its share in the task of disseminating knowledge. A Genoese visionary, starting out to prove the rotundity of the earth, discovered a new world; Magellan consummated the unfinished task
# Upgrade your Forgotten Books Membership to view this page

<table>
<thead>
<tr>
<th>Level</th>
<th>Price</th>
<th>Books</th>
<th>Payment Type</th>
<th>Cost per Book</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>$2.99</td>
<td>10</td>
<td>Monthly</td>
<td>$0.30</td>
<td>Purchase</td>
</tr>
<tr>
<td>100</td>
<td>$4.99</td>
<td>100</td>
<td>Monthly</td>
<td>$0.05</td>
<td>Purchase</td>
</tr>
<tr>
<td>10</td>
<td>$19.99</td>
<td>10</td>
<td>Yearly</td>
<td>$0.17</td>
<td>Save $15.89 Purchase</td>
</tr>
<tr>
<td>100</td>
<td>$35.99</td>
<td>100</td>
<td>Yearly</td>
<td>$0.03</td>
<td>Save $23.89 Purchase</td>
</tr>
</tbody>
</table>

Memberships can be cancelled at anytime.
tonly devastated, serves man directly in a score of ways, and indirectly enriches and protects the soils, prevents disastrous floods, secures constant heads to our streams, breaks the biting blasts of winter, and makes beautiful, landscapes that otherwise would be barren and monotonous.

Even above the value of practical knowledge, the student of nature may discover the steadfastness and immutability of God's law. He may be convinced that retribution follows its transgression, in the physical as in the spiritual world, with unfailing certainty; and finally, that to him who is in harmony with nature, and therefore most likely to be "in tune with the Infinite," shall come "length of days, riches, and honor."

SUGGESTIONS AND QUESTIONS.

1. Why are the temperate zones the home of the highest civilization?
2. What is there in common in the lives of polar and equatorial inhabitants? What is the effect?
3. Why are the industries of Belgium so intensified?
4. Why did England become a free trade country? Did geography have much to do with the change in policy? How?
5. What principle predominates in the industry of a western farmer?
6. Summarize the relations of geography and life.

FOR FURTHER STUDY.

1. *The Ocean Atmosphere and Life*, by Elisee Reclus, is unusually strong and inspiring. It is an excellent reference to the student who desires to comprehend the relations of earth-forces and factors on the development of life. Read, for
instance, Chapter XV, "Influence of Climate," in the volume named above, and prepare an argument to show why highly civilized races occupy temperate regions.

2. The life of the pioneer was self-sufficing; the economy of today is commercial. Compare.

3. To illustrate that the life of the earth engages in a universal conflict, read *A Summer Field and What It Tells Us*, by John Fiske.

4. Shaler's *Nature and Man in America* is an excellent volume to study in connection with the foregoing chapter. Select a pertinent chapter and write a brief review of it.

**BIBLIOGRAPHY.**

Reclus, Elisee—"The Earth and Its Inhabitants," Vol. entitled *Ocean Atmosphere and Life.*

Mill, H. R.—*International Geography.*

Shaler, N. S.—*Nature and Man in North America.*

Webster, W. C.—*History of Commerce.*


Taylor, H. C.—*Agricultural Economics.*

Walker, Francis—*Political Economy.*

Trotter, Spencer—*Geography of Commerce.*

Fiske, John—*Cosmic Philosophy.*

Wallace, Alfred Russell—*Studies Scientific and Social.*

Wallace, Alfred Russell—*Island Life.*
PART II.

CHAPTER IX.

THE TEACHER'S PREPARATION.

TOPICS TO BE CONSIDERED.

Why geography demands broad scholarship on the part of the teacher; teacher must know limits of the subject; a knowledge of principles, of first consideration.

Importance of an understanding of physiographic processes; brief discussion of diastrophism, vulcanism and gradation; the cycle, teacher's scholastic equipment commensurate with the number of generalizations made.

A knowledge of local environment important; illustrations.

Knowledge of books, maps and apparatus necessary to success; teaching ability presupposed.

In discussing the teacher's preparation in geography, only the subject-matter side and a few pedagogical points peculiar to this subject, will be considered. The appreciation of general pedagogical principles is presupposed.

Because of the diversified relationships of geography, which overlap on its physical side, the fields of geology, astronomy, zoology, botany, meteorology, physics and their allied specialized
departments; and on its social side, history, civics, economics and sociology, it is evident that a liberal education will aid greatly in presenting the subject of geography. The same argument, however, may be advanced for many other subjects, though of all elementary-school subjects, geography requires the greatest range of insight and information. It should be clearly kept in mind that the marginal subject-matter which articulates geography with these various subjects, is as truly geographical as it is physical or sociological, and therefore geography "borrows" no more from these subjects than they "borrow" from it. (See Fig. 1, p. 57.) The tests which determine whether material is geographic are:

(a) Does it contribute in any way to the correlation of life with physical environment or, as Professor W. M. Davis puts it, of the physiographic and ontographic factors of the subject?

(b) Is it necessary to an understanding of controls and responses?

(c) Is the material in question directly or indirectly "earth-determined?"

Such tests are necessary to keep the teacher from unconsciously drifting into a discussion of irrelevant matter, a dangerous tendency which even very earnest teachers sometimes find difficult to avoid. It is a matter of extreme importance, however, for the teacher to be constantly on his guard against this common weakness.

One of the first requisites, then, is that the
teacher shall recognize the limits of the geographical field, and thereby always direct his teaching to purposeful ends.

If we look now to the subject-matter within the proper limits of geography, we shall find it made up of countless facts and details from which scholars have induced laws and principles. It is with this material that the teacher must deal, using the facts not alone as ends in themselves, but as the raw material or data from which general principles are to be derived.

I. A knowledge of the great physiographic processes is fundamental to the teacher's equipment. Without their comprehension he sees only "as through a glass darkly." It is often observed in normal-school classes and in institutes, that many teachers are wholly ignorant of these processes, and since this is true, no comprehension of the life history of continents is possible. For the benefit of those whose opportunities have been somewhat limited, a short exposition of these processes is given. Experienced teachers should always keep them within the field of conscious knowledge and use them as directive and correlative factors. The physiographic processes are (a) diastrophism, (b) vulcanism, and (c) gradation.

In addition to these and as a result of their interaction, we have the unit of terrestrial life-history, the cycle.

* For fuller discussion of the comparative values of facts and principles see Chapter XIV.
(a) Diastrophism is the uplift or subsidence of any portion of the earth’s crust, or lithosphere. The earth’s crust under the influence of gravity, tends to invest the contracting centrosphere, or central core. This tendency causes the crust to subside slowly in various regions, and the subsidence is often accompanied by arching or folding in other regions. Either movement is diastrophic. If a sheet of paper be laid on the table top and held at both ends with some “fulness,” any attempt to smooth out the fulness, will cause it to appear in a different place. So when subsidence occurs in one region, uplift may appear in another.

It is through this process of diastrophism that sea-bottoms are lifted and large land masses born. All parts of the earth have at some time been under water, and many portions have oscillated from land to sea many times, as is attested by the rocks and sediments exposed at the surface. Plateaus and mountains are often the result of the arching, folding, and faulting of the earth’s crust.

But this process is not a matter of history only; it is a dynamic force now operating slowly in many portions of the earth. Time was when our own continent was an elongated island reaching from Labrador to Georgia. The Rocky mountains were then lifted; and by slow upward movement and numerous subsidences, the bed of the Paleozoic sea finally came to the surface, causing its waters to recede respectively toward the Arctic
Sorry, this page is unavailable to Free Members
You may continue reading on the following page

Upgrade your Forgotten Books Membership to view this page

<table>
<thead>
<tr>
<th>Books per month</th>
<th>Cost</th>
<th>Purchase</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>$2.99/month</td>
<td>$2.99/month</td>
</tr>
<tr>
<td>100</td>
<td>$4.99/month</td>
<td>$4.99/month</td>
</tr>
<tr>
<td>10</td>
<td>$19.99/year</td>
<td>$19.99/year</td>
</tr>
<tr>
<td>100</td>
<td>$35.99/year</td>
<td>$35.99/year</td>
</tr>
</tbody>
</table>

Memberships can be cancelled at anytime
rising and sinking, of which the sections pointed out will serve as examples. Also, in a general way, a ragged contour with deep inlets, suggests subsidence, and even shore lines, like the east coast of South America, suggest uplift. But ragged and indented coasts may now be rising, and even coasts may be sinking, the reverse movement in each case having preceded. Pupils can infer from maps the great movements that have occurred. Thus the lands in general, with their mountains, plateaus, lake basins and typical shore lines, are often determined by diastrophism alone; sometimes by this process working in conjunction with the others mentioned.

(b) Vulcanism is the ejection of the interior materials of the earth upon the surface. The causes of this action are not very clearly understood. The process assists diastrophism in building land masses. The inner materials are ejected either through craters or through fissures in the earth's crust. When through craters, volcanic cones are formed; when through fissures, dykes or vulcanic plateaus. Mt. Shasta is an example of the former, Columbia Plateau of the latter. Vulcanic action often occurs in the sea, when islands are formed. The Philippines, the islands of the Japan Empire, and the Hawaiian Islands are of vulcanic origin. Hence vulcanism also tends to make lands and increase altitudes above the level of the sea. The general elevation of large regions of the west has been increased in this manner. Successive lava flows in Washington and Oregon have produced
vulcanic rock of great thickness, as is shown in the canon of the Snake River in southeastern Washington.

Diastrophic uplift and vulcanism tend to make lands and increase their altitudes. Subsidence tends to submerge the lower lands.

(c) Gradation is that process by which winds, water, and glaciers, assisted by other physical and chemical forces, tend to restore the lands to sea level. Gradation, then, works against diastrophic uplift and vulcanism, and establishes, on a magnificent scale, a universal conflict. Slowly mountains and hills yield to the action of weather, the loose materials are carried by gravity, winds, glaciers or water, toward and into the sea, thus reducing the altitude and sculpturing the land surface with valleys, gorges and canons. The moisture that falls on mountain crests is always planing away the slopes and ultimately only a gentle divide will mark the location of the old range. This degrading process ends when the rivers cut their channels to sea-level and so lose their ability to do the work of transportation.

The cycle is a term inclusive of all of the changes wrought by the physiographic processes in uplifting a region and subsequently reducing it to sea level. Its conception is the most significant in the whole physiographic side of geography, and no teacher has made a beginning until the idea is grasped in its entirety.

The teacher's intellectual equipment, then, will...
vary directly according to the number of inductions or generalizations made, and in saying this, we incidentally give the detailed fact-side of subject matter its rating. For further illustration, several inductions are here given. If the teacher can elaborate fully, and apply these and many similar ones, it will speak well for his geographical equipment.

1. Cyclonic storms are of economic value to the Upper Mississippi Valley.
2. Rivers are enemies of lakes.
3. Increased population necessitates intensified industry.
4. Rotation of crops does not increase fertility of soil.
5. In our latitude, west coasts are warmer.
6. Glaciated areas abound in lakes.
7. The temperature varies with the altitude of the sun.
8. Cities are located at breaks in transportation.
9. The driftless area has a perfect drainage system.
10. Industries are earth determined.
11. Forests preserve soils, and prevent floods.
12. Illinois and Iowa are rivals in corn production. Illinois markets much more corn.

II. A good preparation must include the ability to interpret geographical features in one's own environment. How often people are wholly oblivious to the interesting features and processes of the
neighborhood. This is sometimes true of teachers whose "book knowledge" is fairly adequate. But of what value is any science unless it be applied? Geography and nature study should never deteriorate into mere formalism. Their content is concrete and their worth depends upon their application. The wise teacher has an opportunity to socialize the materials of geography. Lessons on soils may be carried home and the parents taught by the children. The farmer may learn of the value of legumes in restoring nitrogen to his fields, and in this and other ways, the school may become a true social center. Should a rural teacher, on his way to school, observe that the corn in a certain field is of light green or yellowish color, he might interpret it to mean insufficient nitrogen in the soil, and so advise with the farmer. Should he examine the clover roots and find no tubercles he could suggest inoculation.

The teacher who has no love for the stories which "Mother Nature" tells and who cannot "read as he runs," at least some of the more common ones, is not prepared to interest children in outdoor geography. On board of train, as one passes the dunes in Indiana, cuts through the moraines of Illinois or Wisconsin, rounds lakes and drumlins, and finally enters a valley walled in by the terraced slopes of the Driftless Area, what chapters of earth lore should pass through his mind and make travel truly a pleasure!

Suppose again that one passes a stream in Iowa and notes that the banks are nearly on a level with
the water as shown in Fig. 2; or crosses the Illinois and observes its bluffs and banks as in Fig. 3; and finally crossing the Fox observes the features of Fig. 4, what interpretations will he make explanatory of these varying characteristics? And these are familiar and typical aspects of the Upper Mississippi valley.

III. The teacher's preparation must include a knowledge of books, maps, helps and simple apparatus, useful in his daily work. In order that this volume may be helpful, short bibliographies are given at the close of each chapter, and occasional references in the context itself. The teacher
must not only know the sources of information—but must know how to use them, as well. The chapters on Maps and Models, and Weather Study, it is hoped, will be suggestive.

"One of the most valuable parts of the geography training is the ability to use reference books accurately, easily and effectively. This training can readily be given through the use of reference books accessible in the school library. Only a few reference volumes should be used, and the best should be selected not merely because they are interesting, but primarily because they are geographically sound, information giving, and really supplementary to the class-room lessons."

Without referring especially to teaching ability as a part of a teacher’s necessary equipment, this being quite fully treated elsewhere, two other phases must be noted. These are the life side, and the social and economic side. The first could be best summed up by saying that the prepared teacher should know something of the theory of evolution to serve as a guide in dealing with organic responses; and from the social side of geography, which includes commercial geography, it seems that some knowledge, at least, of political economy is absolutely necessary. Production, transportation and consumption involve principles of economics, an understanding of which adds much to the teacher’s efficiency. Both of these phases of geography are treated at some length in other chapters.
THE TEACHING OF GEOGRAPHY

SUGGESTIONS AND QUESTIONS.

1. What characteristic of geography makes broad scholarship of the teacher necessary?
2. Why should the teacher clearly recognize the limits of geography?
3. What are the tests that determine whether facts and materials are geographic?
4. What knowledge is fundamental in the teacher's preparation? Why?
5. How best test the teacher's scholastic equipment?
6. Why is the teacher's ability to interpret local environment an important acquisition?
7. What knowledge of books ought a competent teacher to possess?

BIBLIOGRAPHY.

Redway, J. W.—"The Teacher's Preparation, New Basis of Geography," Chap. XII.
Frye, A. E.—How to Teach Primary Geography, Ginn & Co.
Parker, F. W.—How to Teach Geography, D. Appleton Co.
<table>
<thead>
<tr>
<th>Books per month</th>
<th>Monthly Payment</th>
<th>Purchase</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 Books / month</td>
<td>$0.30 per book</td>
<td><a href="#">Purchase</a></td>
</tr>
<tr>
<td>100 Books / month</td>
<td>$0.05 per book</td>
<td><a href="#">Purchase</a></td>
</tr>
<tr>
<td>10 Books / year</td>
<td>$0.17 per book</td>
<td>Save $15.89 <a href="#">Purchase</a></td>
</tr>
<tr>
<td>100 Books / year</td>
<td>$0.03 per book</td>
<td>Save $23.89 <a href="#">Purchase</a></td>
</tr>
</tbody>
</table>

Memberships can be cancelled at anytime.
General method in geography, then, is a resultant of three components, viz.,

1. The intrinsic nature of the subject.
2. The needs of the individual in his life relationships.
3. The educative process through which the pupil comes into possession of these relationships.

Granting the above theses, reform in general method must be wrought through instruction whose guiding principles require that—

1. Formal fact teaching be replaced by concrete and significant principles.
2. The rational or causal element be more generally recognized.
3. Materials be more fully evaluated and useful types selected.
4. The social phase receive more emphasis.
5. Subject matter be presented in form of pertinent problems which pupils are to solve.

Only the last point will be discussed since the first four deal with the selection and emphasis of materials rather than presentation of matter.

That the teaching of geography suffers much as a result of unscientific method is readily admitted by all thoughtful students of the subject. A more general use of geographical readers and magazines, of well selected illustrative materials, together with the vividness and concreteness resulting from well conducted excursions, are of great
value in giving new life and interest to the work. The old and established method of telling the facts of the science in the laconic statements of the brief text-book, is at best but a mild way of stimulating mental activity. This latter method pours a great profusion of generalized statements into the mental hopper, but furnishes little motive for their screening, milling and sifting. To receive and to retain are the assumed aims of this un-scientific or empirical method.

To make the above clear, one or two parallels are drawn. What interest would the study of arithmetic excite, should the author solve all of the problems and present the written solutions for pupils to study? What demands would such procedure make upon the mind of the pupil? The best teachers of mathematics condemn the time-honored custom of authors of geometry because too much of the work is done for the student.

What of the method of teaching geography? Even with the recent awakening to the possibilities of the subject and the somewhat improved methods of presentation, the results are not commensurate with the expense of time and effort. Ought not the same general method to apply to geography as applies to mathematics and science? Cannot the essentials be brought to the pupils in the form of pertinent problems which they are to solve?

In their life experience, all are interested in geography. Problems of production, transportation and consumption—one or all—affect every
individual. Problems of agriculture, forestry, irrigation and road-building command universal interest and attention, yet, withal, the study of geography is generally formal and empirical. The difficulty lies in the fact that the presentation is unpedagogical; surely the subject matter is interesting. If pertinent problems could be so presented to pupils, that their solutions would necessitate the interpretation of good maps, charts and graphs; the reading and sifting of selected articles in newspapers and periodicals; the comparison of statements in texts and reference books and the selection of a "consensus of opinion"; and the expression of results by means of maps, models, graphs and written essays, it seems that the whole situation might be changed for the better. Instead of being mere recipients, pupils would then be forced to read carefully; to reason, interpret, infer and to express. The true spirit of a student might be engendered by a procedure that rejects brief and unqualified statements and requires pupils to compare authorities, to examine "the planes of cleavage" and, therefore, to modify first impressions.

A suggestive problem suitable for the higher grades is here given. It is the outgrowth of actual experience in teaching.

Problem: What water body furnishes much of the moisture of the corn and wheat states?

A sixth grade class worked this problem with fairly satisfactory results, reaching the conclusion through the steps indicated by the questions. No
teaching was done except that necessary to lead to an understanding of the particular problem in hand. The only materials used in this case were the Natural Advanced Geography and the daily Weather Maps. The small maps in the geography were very helpful.

1. What transports moisture from seas to the land? Why does it often rain on the windward sides of the mountains? What causes precipitation? How, then, does the upward movement of the air affect its temperature?

2. What is the general direction of the wind in the regions of the corn and wheat states? (Children are referred to the wind charts in the geographies, and to proper sections of the text. A motive has been furnished for the understanding of each.)

3. Can the prevailing westerlies transport moisture from the Pacific Ocean to the corn and wheat states? Why? (Verbatim written answer of pupil: “The prevailing westerlies do not carry moisture to the wheat and corn growing states because as they cross the Rocky Mountains they get chilled and drop their moisture before they get to the wheat and corn growing states.”)

4. If the winds blow in their normal direction, can the Atlantic Ocean furnish moisture to these states? Why? The Arctic Ocean? The Gulf of Mexico? Why?

5. Determine from the rainfall chart the annual rainfall in the Great Plains. The Prairie Plains.
6. Consult the map that shows the movement of cyclonic storms. How does the storm affect the surrounding air currents? In what direction does the wind blow to the north of the storm-center? West? East? South? (Teacher here developed few salient points concerning the cyclonic storms, but only facts here needed.) In what direction does the air move in small whirl-winds? When air rises how is its temperature affected? What would occur if large volumes of warm moist air should rise?

7. What change in temperature will occur in the winds that reach the storm center from the north? Will these winds absorb or deposit moisture? (Pupil's answer: The winds from the Hudson Bay are cold and as they go farther south they get warmer and keep their moisture.)

8. Can the winds that reach the storm center from the east bring much moisture? Why? (Imagine storm center to be in central Iowa.) Compare with winds from west.

9. The winds that reach the storm center from the south cross what water body? Consult temperature chart and compare the temperature of the Gulf Coast with Iowa. (Motive for learning isotherms.) What change will occur in temperature of winds that reach storm center from the south? Will these winds deposit or absorb moisture? (Weather maps showing storm centers in Iowa given to children. Used to verify inference that cloud and rain areas are to south and east of storm center.) Cyclonic storms cross Iowa and
Illinois with great regularity, especially in winter months. Real conditions should be observed.

10. What indicates approach of storm from west? Observe temperature. Condition of sky, rainfall (if any) that accompany a southeast wind. Observe same conditions as winds shift to west. Repeat observations. What winds bring most rain? What water body does this wind cross?

11. What water body, then, is of the greatest value in furnishing moisture to the wheat and corn states? How did the cyclone help in bringing the moisture?

The introduction of problems in geography serves to focalize the attention for some time upon an important question. It furnishes definite motives which guide the pupil in his study. The solution of problems assists much in the organization of geographical facts, reduces formal work to a minimum, emphasizes the value of ideas, substitutes active investigation for passive reception, and, in a general way, trains the pupil in genuine habits of study.

SUGGESTIONS AND QUESTIONS.

1. Of what importance is the selection of material in geography? What is the true basis for selection?

2. What is the empirical method as applied to geography? Can you justify such a method?

3. What must any good method take into consideration?

4. Of what advantage is the solution of well selected problems in teaching geography?

5. Why has the teaching of geography often been inefficient?
BIBLIOGRAPHY.

Hinsdale, B. A.—*The Art of Study.*

Salisbury, Rollin D.—"The Teaching of Geography—a Criticism and a Suggestion." Educational Bi-Monthly, June, 1909.

Chamberlain, J. F.—"Geography and Life." Elementary Teacher, October, 1897.


<table>
<thead>
<tr>
<th>Books per month</th>
<th>Rate per month/Yearly</th>
<th>Cost per book</th>
<th>Purchase Link</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 Books per month</td>
<td>$2.99/month</td>
<td>$0.30</td>
<td><a href="#">Purchase</a></td>
</tr>
<tr>
<td>100 Books per month</td>
<td>$4.99/month</td>
<td>$0.05</td>
<td><a href="#">Purchase</a></td>
</tr>
<tr>
<td>10 Books per month</td>
<td>$19.99/year</td>
<td>$0.17</td>
<td>Save $15.89</td>
</tr>
<tr>
<td>100 Books per month</td>
<td>$35.99/year</td>
<td>$0.03</td>
<td>Save $23.89</td>
</tr>
</tbody>
</table>

Memberships can be cancelled at anytime.
The Teaching of Geography

Descriptive work has for its motive the collection of data, the assemblage of facts, the recollection and comparison of last month's or even last year's materials, for the express purpose of establishing general principles. Otherwise the work is purposeless and empirical, that is, it is done on the assumption that somehow, somewhere, sometime, it will fit into the child's experience in a helpful way. And, indeed, it may, but it will be by mere accident in some particular case. It is safe to say that, unless it be the conscious purpose of the teacher to use this material to a wise end, a great waste in education will result.

Although the chief movement in lower grade geography is inductive, there are not many lessons that can be consummated by the more direct inductive process. For instance, the notion of the world as a whole is reached inductively, but only after a whole year of reconnoitering journeys to different parts of the globe. These journeys are suggested by home needs, and the industries and materials by which the needs are satisfied, furnish motives for an introductory study of Brazil as a coffee-producing country; of France as a silk-producing country; of the Philippine Islands as a manila hemp and sugar-producing region; and of South Africa as a diamond-producing country. Thus, little by little, the pupil comes into possession of a series of conceptions, the last of which is the "world as a whole."

Induction, then, seems to be the natural procedure in the early work of geography. But this
process of learning is no end in itself. Neither can it be separated from deduction, which may be termed the inverse inductive procedure. The writer conceives these educative processes to be reciprocally related; that is, the inductive method narrows down to the general, while the deductive spreads out to cover the particular.

It is not thought that special effort will be made by teachers to make the lessons in geography show the ear-marks of method, but it is believed that skillful teaching will naturally follow these methods of procedure. Indeed, the teacher's method will become an unconscious guide, if the principles of teaching have been fully assimilated.

Deduction, then, is the fruit of the inductive process. It can hardly be called a process by itself, but is rather the application of the general principle to which induction led. Without deduction the process of learning might become very slow and tedious. Its application is a more direct method of securing results, and is, therefore, an economical procedure in the learning process. It seems to be a natural mental movement.
In any development lesson the art of questioning is of fundamental importance, for through the questions the whole method-movement is determined. The questions not only point the way, but they must be put in a manner that will relate new and old data, suggest likenesses and differences and weld together all statements pertinent to the problem in hand.

Again the movement of either inductive or deductive lessons must be such as to call for some original thinking. All apt questions in development lessons will call for initiative on the part of pupils. The central problem for the teacher is "how best to stimulate the constructive thinking of the pupils of the class; how to induce in them the most educative self-activity."

This getting together of data for the discovery of a principle, or later, the application of the principle to new cases, involves the comprehension of relationships, which are the essential elements of problems.

The following lesson illustrative of the inductive lesson is not given as a "model." It was planned and taught, at the suggestion of the author, by Professor Thomas H. Gentle, for the sole purpose of testing the inductive method. The condition and the class were average only. The observation of the lesson illustrated one thing clearly, viz., that a well planned lesson in the hands of a good teacher can stimulate a large amount of original
thought; involve a large amount of significant subject-matter; and direct the minds of pupils to the understanding of an important generalization.

A short synopsis of the plan is here given.

**AN ILLUSTRATIVE INDUCTIVE LESSON.**

(Planned for a Seventh Grade.)

Geographical principle to be induced: "The location of cities is often caused by breaks in transportation."

**1. PREPARATION.**

What is the chief product of our home region? To what place is it shipped? How? Southwestern Wisconsin once produced much lead. Where was it taken? Why taken to Galena? How? What did the people of Galena do with the lead? Where is Galena? Show it on the map. On what river is it located? Why not located at the mouth of La Fevre river? Why not at its source? What determined how far up the river Galena should be located? Then what determined the location of Galena?

What supplies were needed in the region of Platteville in early days? Where did the supplies come from? By what route? Trace the route. What was done with the supplies when they had been taken as far by boat as possible? What might this transferring point become?

A few days ago we learned that New York is the richest city in America. Where is New York City located? Point to it on the map.
Pupils' problem No. 1. Let us find out how New York City came to be located at the mouth of the Hudson river.

PRESENTATION.

From what place did the first settlers of New York come? How did they come? Were their ships large? Could they easily sail up the river? Why not? Who inhabited this region when the white men came? How did the Indian get his living? Did he have any products which the white men might want? What? Where could the white man sell the furs? What could he give the Indian in exchange for them? Where were the "trinkets" secured? How could the Indians get their furs to the white men? Could the white men reach the Indians in the ocean ship? Could the Indians reach the ocean ships in their canoes? Where, then, could the white men and Indians best meet to trade? What might you call such a point? What do we find there today? Then what determined the location of New York City?

II. PREPARATION.

How many have ever been to the Mississippi river? What did you see while there? (Steamboat.) Where was it going? Is St. Paul a large city? With what was the boat loaded? Did you notice any railroads near the river? How many? Did they have anything to do with the decrease
of river traffic? How so? Where is St. Paul located? Point to it on the map.

Pupils’ problem No. 2. Let us find out why St. Paul is located where it is.

PRESENTATION.

Who formerly lived in the region about St. Paul? Why? What attracted white people? From what direction did the white fur traders come? Did the white traders and the Indians have definite meeting places? Point out one on the map. Why there? What might we call this point? How did the traders procure the furs? What did they give the Indians in return? Show on the map how the traders returned from the region.

Later, lumbermen and settlers came into the country about St. Paul. What did these people need to carry on their work? How could the supplies reach them? Trace the route on the map. What might you call the transferring point? How, then, was this point located?

III. PREPARATION.

How many have ever visited Chicago? Name interesting things you saw there. Here is a large map of Illinois. Find the Chicago river. Locate the city.

Pupils’ problem No. 3. Let us find out why Chicago was located at this place.
A long time ago a missionary visited the Mississippi valley. He died where Chicago now stands. You learned about him in the fourth grade. Who was he? Tell about his journey to the Mississippi river. Some years after, a French trader came to the mouth of the Chicago river and bought a cabin which he found there. Was it an excellent place for fur trade? Why? From what region could he collect furs? How could the Indians bring them to him? Where could he dispose of them? How could he send them away? What did this make of the point where the trader lived? What made the post grow larger?

From what regions do railroads now enter Chicago? Why are they needed? What do they carry to the city? What do they take away? Does this trade make the city grow? Why?

IV. COMPARISON AND GENERALIZATION.

Let us now compare these three places which we have studied, to see if we can find one thing true of all of them.

In the case of New York what were the white men forced to do with the supplies and trinkets they brought to the region for the settlers and the Indians? (Land them.) What did the Indian have to do with his furs? Could he carry them further than the mouth of the Hudson river? In this regard examine both St. Paul and Chicago. What do we find true of all?
Sorry, this page is unavailable to Free Members

You may continue reading on the following page

Upgrade your Forgotten Books Membership to view this page

<table>
<thead>
<tr>
<th>Books per month</th>
<th>Monthly Payment</th>
<th>Purchase</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 Books per month</td>
<td>Monthly payment $0.30 per book</td>
<td></td>
</tr>
<tr>
<td>$2.99 / month</td>
<td></td>
<td>Purchase</td>
</tr>
<tr>
<td>100 Books per month</td>
<td>Monthly payment $0.05 per book</td>
<td></td>
</tr>
<tr>
<td>$4.99 / month</td>
<td></td>
<td>Purchase</td>
</tr>
<tr>
<td>10 Books per month</td>
<td>Yearly payment $0.17 per book</td>
<td></td>
</tr>
<tr>
<td>$19.99 / year</td>
<td>Save $15.89</td>
<td>Purchase</td>
</tr>
<tr>
<td>100 Books per month</td>
<td>Yearly payment $0.03 per book</td>
<td></td>
</tr>
<tr>
<td>$35.99 / year</td>
<td>Save $23.89</td>
<td>Purchase</td>
</tr>
</tbody>
</table>

Memberships can be cancelled at anytime
BIBLIOGRAPHY.

Bagley, W. C.—*The Educative Process*, Chapter XIX.

Roark, R. N.—*Method in Education*, p. 32.

McMurry, C. A.—*The Method of the Recitation*, Chapter Xi.
CHAPTER XII.

A Deductive Development Lesson.

Topics to be Considered.

The deductive development lesson; steps: (a) the securing of data, (b) the recalling of principles, (c) the making of inferences, and (d) the verifying of inferences.

A deductive lesson presupposes the possession of general notions or principles, for without their use a deductive procedure is impossible. Hence deductive lessons follow the inductive and form the application of the induced principle. The general notion plays an important role in geographical study since it is a sort of "try square" by which we take the measure, as it were, of the new material. If the "fit" seems fairly satisfactory, we make an inference which is quite likely to be correct. Verification can be made by reference to text or reference books. The deductive lesson is a short cut and therefore rapid and economical. It incidentally affords drill on already comprehended principles.

A careful study of the following lesson will show clearly the movement of a deductive lesson.

Problem: Why is the winter temperature on the coast of Washington and Oregon so warm?
I. EXERCISE TO SECURE DATA.

1. Locate these states on a good political map. What is the latitude of Portland, Oregon? Compare with latitude of Portland, Maine. Compare the latitude of Seattle with the latitude of Duluth, Minnesota. With Moscow, Russia.

2. From an isothermic chart (if not found in the geography, Longman’s New School Atlas will furnish the data) find the January isotherm for Portland, Oregon? For Portland, Maine? Which is warmer? How many degrees? In like manner compare Seattle, Washington, with Duluth, Minnesota. Compare the January temperatures of Seattle and Quebec. Of Seattle and Moscow, Russia. Of Duluth and Moscow.

3. From a good relief map of United States, determine the altitude of Seattle. Compare with the altitude of Duluth. Compare with the altitude of Portland, Oregon, and Portland, Maine. In either case is there much difference? What is the altitude of Moscow?

4. From a good temperature chart find the annual range in temperature for Seattle, for Portland, Oregon, for Duluth, and for Portland, Maine. Compare the July temperatures of Seattle and Duluth. Of the two Portlands, which has the greater differences between January and July temperatures?

5. From a rain chart determine the annual precipitation in each of the above cities. What is the annual rainfall in Seattle? In Duluth? In Que-
The text is not clearly legible due to the quality of the image. However, it appears to be a deductive lesson in geography, discussing topics such as rainfall distribution, prevailing winds, and the effect of water bodies on temperature. The text also includes questions about the location of cities relative to water bodies and the influence of latitude, altitude, and water bodies on temperature.
gon and Washington including the region of the Cascade Mountains. Show by arrows the direction of the winter winds that blow from the Pacific Ocean over this region. Are the conditions favorable for making the winter climate warmer? Make small sketch maps of Duluth and Portland, Maine, and insert the arrows to show wind directions. In the case of Duluth do the conditions favor a higher winter temperature? In the case of Portland, Maine? For a comparatively high winter temperature in the latitude of Seattle should a region be on the east or west side of a water body?

4. How does condensing steam affect adjacent bodies? Where does the heat come from? How do freezing water bodies affect adjacent lands? When the moisture of clouds condenses, is heat set free? What effect, then, will daily rains have on the temperature of a region?

III. MAKE THE INFERENCES.

The comparatively high winter temperature on the coast of Washington and Oregon is due:

1. To the warm winds from the Pacific Ocean that bathe the region during the winter months.

2. To the heat that comes from the rapid condensation of moisture, rain falling almost daily.

IV. VERIFY THE INFERENCES.

Consult your text books and select as many statements as possible that seem to verify your inferences. Refer to a text book on meteorology, if possible.
(The ordinary geography, especially the older editions, are still teaching the almost preposterous theory that the Japan current is responsible for the high temperature of the Pacific Coast winters. This theory is untenable as is also its application to the Gulf stream's influence on the western coast of Europe. Prof. Henry Gannett of the U. S. Geological Survey denies that the Japan current even touches North America, and states that such a current, even if it did bathe the continent, would not be warm after a journey of 6,000 miles in polar seas. See "Journal of Geography," vol. I, p. 157.)

SUGGESTIONS AND QUESTIONS.

1. What does a deductive lesson presuppose?
2. For what purpose is data secured?
3. How is the inference made?
4. Through what means can the inferences be verified?
5. To what extent can deductive procedure be employed?

BIBLIOGRAPHY.

Emerson, Philip—"Training of Teachers for Study of Home Geography," Jour. of Geography, Nov., 1902.
McMurry, C. A.—Special Method in Geography.
Tarr, Whitbeck, Jefferson, Profs.—"Results to Be Expected from a School Course in Geography," Jour. of Geography, Apr., 1905.
King, Chas. F.—Methods and Aids in Geography.
Bagley, W. C.—The Educative Process, Chap. XX.
Dodge and Kirchwey—"Geography in the Horace Mann Schools," Teachers' College Record, March, 1901.
Rooper, T. G.—"On Methods of Teaching Geography," Jour. of Geography, Feb., 1902.
Geographical facts must be systematized; in studying countries a unit must be selected; the physiographic region recommended. The advantages of the regional unit; how it helps in organizing the materials of geography; its economy over a political unit; summary of argument.

The selection of material and its elaboration are two very important questions which confront every teacher of geography. In the matter of selection that which is fundamental should guide. There is such an unlimited amount of geographical material that, unless the teacher deals with general principles, he is in danger of being lost in the maze of detail. The notion that one must know all of the individual facts relating to location is not the true test of geographical knowledge. Geographical information must, in the end, be systematized—thrown into general categories and linked together by some general principle which shall be the basis of organization. If the student understands the principle and can give concrete illustrations, his knowledge of geography may be quite comprehensive, even though there may be very many items and facts quite interest-
### Upgrade your Forgotten Books Membership to view this page

<table>
<thead>
<tr>
<th>Books per month</th>
<th>Price</th>
<th>Details</th>
<th>Purchase</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 Books</td>
<td>$2.99 / month</td>
<td>Monthly payment $0.30 per book</td>
<td>Purchase</td>
</tr>
<tr>
<td>100 Books</td>
<td>$4.99 / month</td>
<td>Monthly payment $0.05 per book</td>
<td>Purchase</td>
</tr>
<tr>
<td>10 Books</td>
<td>$19.99 / year</td>
<td>Yearly payment $0.17 per book, Save $15.89</td>
<td>Purchase</td>
</tr>
<tr>
<td>100 Books</td>
<td>$35.99 / year</td>
<td>Yearly payment $0.03 per book, Save $23.89</td>
<td>Purchase</td>
</tr>
</tbody>
</table>

Memberships can be cancelled at anytime.
which comes to teacher and student alike, by use of an areal unit in simplifying geographical information, is great. The study of the United States, for instance, might be centered about eight or ten regional studies and by this means much more time be given to elaboration than would otherwise be possible. Facts for their own sake cannot always be justified. Elaboration is useful and essential in tying together and relating the various factors which have had to do in making the earth and its people what they are. Only when the teacher or student has discovered these factors and has traced each one of them carefully to see how it has influenced earth or man, and has discovered, also, how it has worked with or against other forces either natural or human, has he carried elaboration as far as it is profitable. Principles are not a burden to the mind, but are helpful in explaining observed phenomena, and are a source of power and of pleasure to the student. Elaborations, if properly made, bring out the principle and give it a distinct central setting. Details may cluster about this center and be valuable as illustrations, but any one is not indispensable. Indeed, there are so many facts that it is quite impossible for the student to know all, and frequently there is but little choice from the standpoint of utility which one of several the student should learn. The selection of the larger unit of study avoids needless repetition, assists in better organization of material, enables a more complete elaboration, and permits of a more scie-
entific treatment, since a regional study brings the physiographic and ontographic factors into the most systematic relationships. R. E. Dodge, in speaking of geography for secondary schools,* uses these words:

"The regional geography of the future will be a course taught scientifically and causally, and will include a special consideration of the commercial geography of areas and nations. Thus the essential elements of physical geography will be taught as a basis for studying the man-and-life side of the subject, and physical geography will by no means be entirely overthrown. The point of view will be different from the point of view in reference to that subject held at present. Physical geography will not be taught as an end in itself, but as a means to an end. Selected parts of the whole field will be studied as fully as needs warrant and as scientifically as now, but always in order that the application of the selected facts and principles may be given in a careful study of the larger geography of given areas and regions. This study will involve the use of texts, maps and atlases, will be strong in laboratory work, will include the elements of political and commercial geography, and will be well knit into a united whole. Such a course, or one on closely similar lines, will have all the strength of the present work in physical geography, but will be more valuable as a part of a secondary course than any specialized phase of the subject of geography can

* "Educational Bi-Monthly, June, 1909."
be. Regional geography for secondary schools will not be a thing of 'shreds and patches'; it will not be feebly related facts and semi-useful statistics, easy to learn and equally easy to forget. It will be a disciplinary subject of great worth in the education of any person of secondary age.’’ And is not this equally true of the regional treatments in the seventh and eighth grades?

The argument for a regional treatment in the higher grades, as seen by the author, are these:

1. The units are larger and ‘'scrappiness’’ is avoided.
2. There is economy of time. Often the geographical facts relating to a small political unit are equally true of a large physiographic region.
3. The treatment is more scientific, the two great phases of geography, the physical and ontological, being ideally correlated.
4. Because of the above, the organization is close and strong, the organizing principles being the causal or rational idea or element.*
5. The physiographic region is the natural and logical unit for study.

SUGGESTIONS AND QUESTIONS.

1. What has been recommended as an organizing principle of geography?
2. How can a regional unit help in the process of organization?

* See Chapter III.
3. What is a physiographic region?
4. What advantages does the physiographic region offer over the political unit?
5. Does the regional unit provide a special opportunity for associating cause and effect?

BIBLIOGRAPHY.

Trotter, Spencer—Geography of Commerce, Chap. V.
CHAPTER XIV.

GENERALIZATION AND ORGANIZATION OF GEOGRAPHICAL MATERIALS. THE CAUSAL ELEMENTS.

TOPICS TO BE CONSIDERED.

Why organization is important; lack of organization in the old geography; the causal element emphasized in the new geography; the organizing principle of geography.

The reaction against formalism in education; how the facts and items of geography function in generalizations; the value of generalizations.

It is the conviction of the writer that there is no failure in teaching more serious than the failure to generalize. The character of certain subjects, and the method of instruction, make them especially subject to such omission. Geography is exceedingly liable to suffer from the teacher's neglect to organize and generalize. The climax of all good teaching is reached in these processes, and any instruction that stops short of them fails accordingly.

In a deductive study, like geometry, every conclusion is a general truth, not only applicable to but necessary in any further development of the subject. Each conclusion is a premise in a succeeding theorem; the subject tends to unify itself. Inductive studies place more responsibility upon
the teacher. Because the content of geography is so broad and varied, and because its nature, phase, and values have been so poorly understood, it has doubtless suffered more from a lack of organization than any of the common school subjects.

The old geography devoted itself almost wholly to fact study. Vast numbers of items were learned empirically, as ends in themselves. There was so little sequence, aim and reason in the subject that it fell far short of a science. It was composed of cross-sections of geology, astronomy, zoology, botany, etc., but the subject-matter was not articulated for a purpose. The old question of "what and where are the following" is suggestive. Isolated and unrelated facts, interesting in themselves but often valueless, because they did not bear upon any generalization, engaged the attention of the student.

The New Geography involves a strong rational element. The study of any region necessitates the consideration of three sets of factors or processes. These may be designated as inorganic, dynamic and organic. The inorganic phase considers the earth's envelopes in static conditions—as the crust, its topography, rocks, soils, minerals, the atmospheric and aqueous envelopes as related to rock-weathering and oxidation, and to plant and animal life. The dynamic deals with the interaction of these envelopes as influenced by heat, gravity and planetary motion. This phase includes the subject usually treated in dynamic geol-
ogy. The organic deals with life as fostered by particular combinations of local influences.

It may be said by some that these limits are too broad, but any adequate study of a man’s environment leads to all of these investigations. If mere fact is the goal of geographical study, then the "why," the rational side of geography, may be lopped off, and we shall then return to the old basis of teaching the subject. If, however, an understanding of the earth as a habitat is the object of geographical study, then certainly much value must be placed upon reason and relationship.

Without taking cognizance of the causal idea, it would be quite impossible to organize the subject-matter of geography. Careful selection and arrangement of data must precede induction, inference, conclusion. The rational element is the thread upon which the facts are strung. The empirical facts of the old geography were lost as readily as beads from a broken string, but perhaps the loss was not great because facts learned after such manner are insignificant. Significance comes when order is established, when, as Dr. Harris says, one fact is made to explain another to which it is related. An arrangement of facts to show logical sequence is organization. It assists the memory, clarifies and intensifies the meaning, and leads toward a classification of geographic material.

Men succeed best in industrial life when they best adjust themselves to their environment. To
Sorry, this page is unavailable to Free Members
You may continue reading on the following page

Upgrade your Forgotten Books Membership to view this page

<table>
<thead>
<tr>
<th>Books</th>
<th>Price</th>
<th>Books per month</th>
<th>Payment Method</th>
<th>Price per Book</th>
<th>Save</th>
<th>Purchase</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>$2.99</td>
<td>10 Books per month</td>
<td>Monthly</td>
<td>$0.30</td>
<td></td>
<td><a href="#">Purchase</a></td>
</tr>
<tr>
<td>100</td>
<td>$4.99</td>
<td>100 Books per month</td>
<td>Monthly</td>
<td>$0.05</td>
<td></td>
<td><a href="#">Purchase</a></td>
</tr>
<tr>
<td>10</td>
<td>$19.99</td>
<td>10 Books per month</td>
<td>Yearly</td>
<td>$0.17</td>
<td>$15.89</td>
<td><a href="#">Purchase</a></td>
</tr>
<tr>
<td>100</td>
<td>$35.99</td>
<td>100 Books per month</td>
<td>Yearly</td>
<td>$0.03</td>
<td>$23.89</td>
<td><a href="#">Purchase</a></td>
</tr>
</tbody>
</table>

Memberships can be cancelled at anytime
cessfully approached from the thought side. Why should facts in geography be taught arbitrarily? The whole subject of physiography has to do with cause, and the responses of the organic world are results or effects of certain local sets of conditions. Thus, the causal, or the rational, is prominent throughout the subject of geography. Is not, then, this element the logical basis for organization? The value of types is manifest here as in other departments of science. But a type is only a concrete illustration of a general principle which obtains, in slightly modified form, in a multitude of instances. Its value lies in the fact that the student, through cursory examination and hasty comparison of the new example, recognizes the principle and classifies his information.

Unorganized geographical material has but little value and significance. The educational value of geography increases as the rational element is recognized. The work of the earlier geography is, indeed, to observe, to learn facts, and to gather material; though to some extent, even in this phase, the causal idea may be recognized. When, however, considerable information along various lines has been gained, it seems to be the true function of geography to induce from this information as data definite principles. The student may still continue to gather and learn facts, but the time has come when he should have a place to put these facts in orderly arrangement. This comparing and relating of data to strengthen and clarify meaning and to establish general principles which
shall serve as categories for the reception of new material constitute organization as applied to geography. A student who has mastered a few general principles may then proceed to some extent in a deductive way. Knowing a few general truths relating to a region, he should be able to deduce with considerable accuracy the details of life conditions that prevail, and, looking backward, he should be able to read in outline its geological history. Is it not obvious, then, that the rational element, viz., reason and relationship, should be the major organizing principle of geography and that with the recognition of this principle will increase the educational value of the subject?

SUGGESTIONS AND QUESTIONS.

1. Why is the process of generalizing important in education?
2. What has been the chief cause of failure in geography teaching?
3. Why is organization especially important in geography?
4. How can formalism be avoided in teaching geography?
5. What is the organizing principle in geography?
6. How can generalizations once made be used in succeeding lessons? Illustrate.

BIBLIOGRAPHY.

Davis, W. M.—"The Rational Element in Geography," Nat. Geog. Mag., Vol. X.
CHAPTER XV.

THE USE OF TEXT BOOKS.

TOPICS TO BE CONSIDERED.

What constitutes a wise use of text books; a bad use; the character of text books; the importance of good assignments; danger of committing meaningless statements; effect on pupils. Illustrative assignments; the value of problems; how to secure initiative on the part of pupils; objections offered by teachers. Text book method or special plans, which? Plans necessary for results; subject-matter and method not to be condemned simply because found in text books; the text book a background of geography teaching.

It has been pointed out in another chapter that the introduction of problems in the teaching of geography would do much to bring about a wiser use of the text book. Perhaps the greatest improvement in geographical teaching would follow of necessity the reforms of vicious text-book habits. What constitutes a wise and reasonable use of the text?

First let the question be answered negatively: A very bad though very common practice, it is feared, is the assignment of a definite portion of the text-book material, without any definite idea in mind as to what there is in that portion of the text that is valuable, reliable and pertinent for
the particular class in hand. This statement no doubt seems to be an innocent platitude; but it is so important that it would bear underscoring several times. Let us analyze the case.

To begin with, teachers must appreciate the fact that text books are compendiums of very brief statements and condensed treatments. This is no criticism of the texts, however. The great wonder is that so vast a subject as the earth and its life can be so interestingly treated in such meagre volumes. Poor teachers usually find fault with the text books. Do not forget that every text presupposes a teacher. Probably no author of geographies was ever satisfied with his books. The very nature of the case has compelled a "hop, skip and jump" treatment. *The Earth and Its Inhabitants*, by Elisee Reclus, requires eighteen encyclopedic volumes, and even this excellent work gives no extended account of very many of the topics treated. The author of the school text confronts the difficult task of making his subject interesting without being permitted to develop his topics to any reasonable degree.

The first failure in the use of the text is detected in unpurposeful assignments. Pupils are directed to study "so much," but no hint is given as to why they should study the lesson. Their attention is not centered on any particular facts that should be considered, and the reading of the lesson sometimes is quite akin to reading the dictionary—"the subject changes too often." No adequate interest is aroused.
The second failure grows out of the one just stated. Without purpose there is no discrimination of the laconic statements. Each statement is equally important to the pupil. There is no central theme, hence no focalization of consciousness on any text statement. What concentration can follow such procedure?

Again, such irrational study results in committing meaningless statements. They have no meaning because they are unrelated in the pupil's mind. And it has already been pointed out and emphasized that the element of relationship, the causal element, constitutes the basis for organizing, or tying together geographical materials. Therefore such an unpedagogical method cannot lead to the organization of subject matter.

All of this being true, what of the interest in the study? Will the lessons not "simmer down" very soon into a monotonous, lifeless grind? As already shown, such method, or lack of method, tends to passivity on the part of the pupils. They are recipients merely of text statements. There are no demands for real thinking or for initiative in study. Hence it may be stated, positively, that a wise use of the text must secure quite the opposite results of those mentioned, viz.:

(a) The assignment must be characterized by definite purpose.
(b) Definiteness of purpose leads pupils to discriminate, to evaluate statements and to choose the pertinent.
(c) A definite aim or purpose serves as a nucleus or center about which related ideas are to be grouped. This relating of ideas is fundamental to organization.

(d) Definite aims or purposes secure variety in daily lessons.

(e) The adaptation of the book to the purpose of the pupil awakens genuine thought-activity and stimulates some degree of initiative.

So far as the mass of teachers is concerned, there is no inclination on the part of the author to make it appear that a vast amount of planning and skirmishing is necessary to secure at least fairly good results. In the following illustration the practical rather than the ideal will be suggested. Let us suppose that the North Central States are to be studied, and that the text treats the states separately, by political rather than by regional units. Instead of saying, "You may study Illinois, Iowa and Missouri for tomorrow," the teacher assigns as follows:

1. Pupils, the Corn Belt extends from Ohio through Indiana, Illinois, Iowa and Missouri into Kansas and Nebraska. For your lesson, select all of the statements from your book that seem to tell why corn thrives well in these states. Write a paragraph in your own language that will tell these facts.

2. Select all of the statements that tell of the production of corn in these states. In your own
language write a paragraph that will tell these facts.

3. Make a sketch map of these states and write across it, "The Corn Belt States."

This is no ideal assignment. It is one, however, that the rural teacher, who has a long program, will find practicable. However much this assignment may be open to criticism, it is purposeful, and it necessitates the discrimination of text-book statements. It must be an improvement on the assignment that calls only for an aimless reading of the same text-matter. In making the suggestion the writer has in mind a sixth grade class, using the advanced geography of a two-book series.

Please understand the position here taken. The assignment has to do with the pupil's use of the text book. It is not thought that the assignment will in any sense do justice to the topic "Corn and the Corn Belt." The second lesson might be of this character:

1. Ascertain from your text the boundaries of the Corn Belt. On your sketch of yesterday draw a dotted line around the region and color it light yellow with water color.

2. Study your text to learn if there are corn markets in these states. If so, indicate the location of these markets or cities on your map.

3. Review your text to learn of the uses made of corn. In your own language write a paragraph which tells these text-book facts.

4. Review your text to learn if corn is shipped
Sorry, this page is unavailable to Free Members
You may continue reading on the following page

Upgrade your Forgotten Books Membership to view this page

<table>
<thead>
<tr>
<th></th>
<th>$2.99 / month</th>
<th>10 Books per month</th>
<th>Monthly payment</th>
<th>$0.30 per book</th>
<th>Purchase</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>$4.99 / month</th>
<th>100 Books per month</th>
<th>Monthly payment</th>
<th>$0.05 per book</th>
<th>Purchase</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>$19.99 / year</th>
<th>10 Books per month</th>
<th>Yearly payment</th>
<th>$0.17 per book</th>
<th>Save $15.89</th>
<th>Purchase</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>$35.99 / year</th>
<th>100 Books per month</th>
<th>Yearly payment</th>
<th>$0.03 per book</th>
<th>Save $23.89</th>
<th>Purchase</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Memberships can be cancelled at anytime
facture of implements? The growth of cities?

(f) How does corn compare with other cereals as a food? What countries make large use of corn products? Why?

(g) Compare the United States with other countries in corn production.

The development of topics of this kind is quite dependent upon the teacher. But the significance and general richness of the study is contingent upon the development of topics beyond the point of exposition in the ordinary text. The use of geographical readers in this connection is of much value. In making even a brief study of corn, children will be delighted to read the section on corn in Carpenter’s Industrial Reader, Foods, or to read some chapter from The Book of Corn.

Learning by rote has little place in geography, and probably the chief error is that of committing condensed statements which, without elaboration and assimilation, cannot possibly be of much value either as knowledge or as educative material. Prof. C. H. Leete, who has prepared a small volume of Exercises in Geography, says: Through proper exercises “pupils are led to collate facts for themselves and to write their own descriptions. They learn as they work: their interest arises from the processes of acquisition and expression; the result is the power of perceiving essential facts and of recording what is seen.” To
this the writer would add that the interest will grow out of the self-activity of the pupils.

In the above discussion it has been assumed that the text is about all the teacher has to use. This attitude is assumed and suggestions made accordingly, to the end that no teacher can say, as he might if an elaborate plan were suggested, "I haven't the books and maps and time to teach that way." But every teacher can refrain from the senseless rote work and can substitute simple problems for the meaningless empirical teaching. If, however, the teacher in graded schools has more facilities and reasonable time, more elaborate plans can be executed with profit. In this event more exercises based on atlases and maps should be introduced, and the text used largely to verify inductions and inferences. An illustration of the use of the text in this case is given in another chapter under the caption, "An Illustrative Exercise Based upon Longman's New School Atlas."

In a recent article* Prof. Salisbury contends that better results would accrue from a closer following of text books, as few teachers are competent to make better plans than are found in the books, and further that the teacher's energy is often spent in making plans rather than in realizing them. This may be true; but we must not fail to recognize that a text book is a sort of balance struck between the requirements of widely differing regions and interests; that classes of pupils

vary greatly, even within the limits of a medium-sized city, and that teaching facilities and general conditions often make this “struck balance” plan inadequate and uninteresting.

The idea often held that pupils must never look into their books while in class is old-fashioned and traditional. Quite often the recitation period may very profitably be spent with books open and pupils intent on answering questions from maps, interpreting pictures, verifying inferences, or getting correct meaning from difficult sentences. Every teacher who secures good results must find such “study-recitations” necessary. Too often pupils are put to tasks without preparation; waste of time, mental confusion and discouragement are quite sure to follow.

The author is in no sense condemning the use of text books. He is, however, making a strong plea for a wiser use of them. But a wiser use cannot be accomplished without a consideration of (a) the needs of pupils together with their already acquired knowledge; (b) the subject-matter as presented in the text book, and whether it is pertinent, capable of satisfying the pupils’ needs and within their grasp; and (c) the best method of bringing the pupil and the subject-matter into the most harmonious relations. And what is this best plan? Anything short of this at once reduces geography teaching to the old formal and empirical method. The successful teacher must plan; but it does not follow that because the text book has selected and arranged certain subject-matter
that such material must of course be condemned, and new matter selected and arranged to show the "finger marks" of the teacher. And yet good schools can be pointed out in which a sentiment has been created that anything found in text books of geography, at least the adopted texts, is of little consequence, either from the standpoint of subject-matter or method.

Text books are wisely handled when—

(a) assignments from them take the form of problems,
(b) the solution of problems furnishes a motive to consider and discriminate between text-book statements,
(c) subject-matter satisfies the pupils' needs,
(d) only generalizations satisfy the demands of the problem,
(e) independent work is necessitated by the problem, and
(f) much use is made of maps and graphs.

The teacher should recognize the text book as the background of the work. Where other courses of study are not provided, it serves as an elaborated course of study. But it is not to be swallowed whole. For many reasons the order of lessons may need to be changed. Some lessons may profitably be studied pretty thoroughly; some only carefully read; and some may need to be omitted. That text books are abused does not condemn them; it rather reflects upon the intelligence of the teacher.
THE TEACHING OF GEOGRAPHY

SUGGESTIONS AND QUESTIONS.

1. What is the teacher's first problem in the use of a text book?
2. How can assignments be made to prevent formal rote work in the preparation of lessons?
3. What are the requisites of good assignments?
4. How can expression enter into the preparation of lessons?
5. What value should be attached to maps and graphs?
6. Should the teacher make formal plans? When? Can a lesson be well taught without a plan?
7. How ought the teacher of geography to regard his text book?

BIBLIOGRAPHY.

Hinsdale, B. A.—The Art of Study.
Chamberlain, J. F.—‘Geography and Life,’ Elementary Teacher, October, 1897.
Part III.

Chapter XVI.

The Value of Magazines and Government Publications in Teaching Geography.

Topics to be considered.

The value of magazine articles in teaching geography; text books necessarily brief; magazines are unconventional; they appeal strongly.

Subject-matter of standard periodicals and government reports reliable.

Magazines well illustrated; place emphasis on social side of subject; illustration of the richness of current publications in geographical information.

Sources from which helpful material can be secured.

Educative material of high grade often appears in magazines, and since magazines are now so widely circulated there seems to be no serious obstacle in the way of bringing them into the school. As to government publications, it is their function to educate, and as goodly numbers of the government issues are free, there certainly is no valid reason why they should not be drawn upon, together with the popular and technical magazines, to serve often as helps and sometimes as bases of school-room lessons.
The materials drawn from these sources are of distinct value in teaching geography because:

1. They serve as valuable supplements to brief school texts.
2. The subject-matter is authentic and up-to-date; it gives a living touch to the instruction.
3. The articles are usually well illustrated.
4. They afford the best media for emphasizing the social phase of the subject.

1. Textbooks are laconic in their styles. This is necessarily the case, since they deal mainly with the principles of the subject. They are mere outlines at the best. Hence the imperative need of supplementary material. This we have in generous quantity, in the form of geographical readers, but many schools are not provided with such reference books. The magazine article is usually of much greater length than articles in geographical readers, a fact that offers an advantage in type study exercises where the elaboration should be rather comprehensive. Still another advantage lies in the fact that the magazine article is not the conventional source from which to supplement the lesson. Like the occasional school visitor, it causes the pupils "to sit up and take notice." The few supplementary and reference books that the average school has (if it has any) are often worn, torn, dilapidated and emit the ancient odor of dusty school rooms. How welcome the fresh, clean, beautifully illustrated magazine! Unlike the school book, it was not invented especially for
Sorry, this page is unavailable to Free Members
You may continue reading on the following page

Upgrade your Forgotten Books Membership to view this page

<table>
<thead>
<tr>
<th>Tier</th>
<th>Price</th>
<th>Books</th>
<th>Payment</th>
<th>Book Cost</th>
<th>Purchase</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>$2.99</td>
<td>10</td>
<td>Monthly</td>
<td>$0.30</td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>$4.99</td>
<td>100</td>
<td>Monthly</td>
<td>$0.05</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>$19.99</td>
<td>10</td>
<td>Yearly</td>
<td>$0.17</td>
<td>Save $15.89</td>
</tr>
<tr>
<td>100</td>
<td>$35.99</td>
<td>100</td>
<td>Yearly</td>
<td>$0.03</td>
<td>Save $23.89</td>
</tr>
</tbody>
</table>

Memberships can be cancelled at anytime
side of geography. Information gleaned from its source makes more impression. The school suffers from isolation. The magazine brings into the school a little of the big, teeming world. Its paragraphs have no set-to-school-order arrangement, and the content no suggestions that it was produced for the school alone. The magazine is a cosmopolitan book, not a school book, and in this lies its particular power. Through such media the school materials can best be socialized. The more our schools can draw upon the actual world for its educative materials, the more will be the progress toward uniting school and life interests.

Can there be any doubt as to the wisdom of using magazine articles in the teaching of geography? The practical question of securing the magazines still confronts the teacher. Perhaps the children can be interested sufficiently to contribute a few cents each in order to secure the "National Geographic Magazine," the "World's Work," or the "World Today," for their school room. But this question of expediency is one not to be argued here.

Should the teacher happen himself to be a subscriber to the "Journal of Geography," he will find many articles quite readable by the upper grade pupils. Then, too, the monthly summary of "Current Articles on Commerce and Industry" which this excellent magazine gives will be of help to the teacher in locating useful geographic

material. Other magazines compile similar summaries.

In order to impress young teachers with the idea that there is really much material applicable to the school room to be gleaned from magazine sources, a part of a compilation for one year, made by Prof. H. S. DeVelde,* is here given.

"The Pacific : Most Explored and Least Known."
National Geog. Magazine; Aug., '08—L. G. Blackman.

"Buenos Aires (City of Good Airs)." Scribner's; May, '08—A. Ruehl.


"Quebec—Britain's French Empire in America." Review of Reviews; Dec., '08—L. V. Norman.


"In Quaint, Curious Croatia." National Geog. Magazine; Dec., '08—F. J. Koch.

"Buried Cities of Asia Minor." National Geog. Magazine; Feb., '09—E. L. Harris.

"Kaleidoscopic La Paz (City of the Clouds)." National Geog. Magazine; Feb., '09—H. C. Adams.


"Alaska and Its Wealth."’ World Today; June, '08—Dr. W. W. Atwood.
"Real Venezuela."’ World Today; Jan., '09.
"Changing Conditions in the Caribbean."’ World Today; Feb., '09—R. A. Wilson.
"My Discoveries in Thibet."’ Harper’s Monthly; Aug., '08—Sven Hedin.
"The French Peasant in His Fields."’ Outing; Aug., '08—V. Thompson.
"A Trip Through Africa."’ World’s Work; Oct., '08—S. P. Verner.
"Across Africa by Boat."’ World’s Work; April, '08—E. A. Forbes.
"Where East Meets West (Dalmatia).”’ National Geog. Magazine; May, '08.
"Persia—The Awakening East."’ National Geog. Magazine; May, '08.

So far the discussion has referred to magazines only. Since education and enlightenment is the function of government publications, and since they are largely for free distribution, little argument is necessary to commend them to school use. These publications are highly authentic, a quality of much importance. Careful selection and adaptation are of course necessary. Some of the circulars, bulletins and monographs are too technical for public school use; others are readable even by the pupils of higher grades. As in the case of
magazines, they are usually illustrated and deal with great diversity of subjects.

For use in geography, the publications of the United States Geological Survey; of the Department of Commerce and Labor; of the Treasury Department, and the Department of Agriculture, are most useful. In addition to the publications of the general government, there are many valuable state publications, notably those of the state geological surveys, the experiment stations, and agricultural colleges.

The United States Geological Survey has a long list of publications. Teachers should address the Director U. S. Geological Survey, Washington, D. C., for the "List of Publications of the U. S. Geological Survey." Reports and bulletins, some free and others at nominal cost, are available.

The various state geological surveys issue annual reports, many of which are very useful to teachers. The following recent publications of the Illinois State Geological Survey will serve as an illustration:

Bulletin No. 3—"Composition and Uses of Coal," by S. W. Parr.
Educational Bulletins Nos. 1, 2, 3 and 4
No. 1 treats of the region along Lake Michigan.
No. 2 treats of the valley of the Des Plaines river.
No. 3 treats of the Illinois Valley from Hennepin to Pekin.
No. 4 treats of the region about East St. Louis.

A Monthly Summary of Commerce and Labor is published by the Bureau of Statistics, Treasury Department, and often contains monographs of value in commercial geography, especially: e. g.

Grain Trade in the United States.
Cotton Trade in the United States.
Coal Trade in the United States.
Lumber Trade in the United States.
Production and Consumption of Sugar.
Commercial Porto Rico.
Commercial Philippines.
Great Canals of the World.
Steamship Lines Between U. S. and Foreign Countries, etc.

These may be obtained by addressing The Department of Commerce and Labor, Washington, D. C.

The Consular Reports may be mentioned in this connection. They are free daily or monthly, and a trial will convince teachers of their practical use in the geography lesson. Address Bureau of Foreign Commerce, Washington, D. C.

Census Reports. Volumes on Manufactures, Agriculture and the Statistical Atlas are of special value. Address, Bureau of Census, Washington, D. C.

The publications of the Department of Agriculture are numerous, useful and pertinent at this time, when agriculture is of so much interest.
Duplicate copies of selected papers might well be studied in class and then given to the pupils for home use.

The "Year Book" of this department is of special value. Topics of the following nature are treated:

"Rice Culture in the United States."
"Life Zones and Crop Zones of the United States."
"The Fruit Industry."
"Agricultural Resources of Hawaii."
"Milk Supply of Boston and Other Cities."
"Forest Conditions of Wisconsin," etc., etc.

The reports of Experiment Stations, and the Annual Reports of Farmers’ Institutes, are of interest to teachers, who should apply to the directors of these institutions for information. The State Railway and Warehouse Commissions often distribute useful maps of their respective states.

SUGGESTIONS AND QUESTIONS.

1. Why should geographical text books especially need supplementing?
2. Why should current magazine articles appeal strongly to pupils?
3. What advantage has the unconventional source of information over the conventional?
4. What features of text books are most likely to become obsolete?
5. What phase of geography is emphasized in current magazines?

BIBLIOGRAPHY.

Jones, Edward D.—"Sources of Literature for Commercial Geography," Jour. of Geog., April, 1902.
CHAPTER XVII.

THE VALUE OF PICTURES IN TEACHING GEOGRAPHY.

TOPICS TO BE CONSIDERED.

Why pictures are valuable in teaching geography; excellent medium to convey ideas; pictures quickly and easily read. Pictures give unity of impression; printed statements more likely to confuse. Pictures are accurate and attractive.

Suggestions as to use of pictures; text book pictures not to be neglected; how to read a picture; illustrations.

Collections of pictures; how to use stereographs; value of stere-opticon.

Good pictures constitute one of the most valuable helps in teaching geography. Fortunately in these later years the popularity of the camera has wrought wonders in making good pictures cheap. The public's taste has improved. More and better pictures are demanded. Many of our magazines have come to be veritable picture books. The advertiser resorts more and more to the efficacy of pictures to herald his wares. And is it not psychologically sound to do so? Let us examine the case.

1. A picture is particularly valuable, first of all, because it is a highly economical medium through which ideas can be conveyed. It economizes both time and effort. Through the picture
Sorry, this page is unavailable to Free Members

You may continue reading on the following page

---

Upgrade your Forgotten Books Membership to view this page

<table>
<thead>
<tr>
<th>10 Books per month</th>
<th>10 Books per month</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 Books per month</td>
<td>Monthly payment $0.30 per book</td>
</tr>
<tr>
<td>10 Books per month</td>
<td>Monthly payment $0.05 per book</td>
</tr>
<tr>
<td>10 Books per month</td>
<td>Monthly payment $0.17 per book</td>
</tr>
<tr>
<td>10 Books per month</td>
<td>Monthly payment $0.03 per book</td>
</tr>
</tbody>
</table>

**$2.99 / month**

**$4.99 / month**

**$19.99 / year (Save $15.89)**

**$35.99 / year (Save $23.89)**

Memberships can be cancelled at anytime.
process is reversed; the picture, if a good one, presents a unity at first sight, and in a further study of the picture we analyze, and eliminate details, if necessary.

2. The second value of the picture has, then, been pointed out, viz., unity of impression. If descriptive composition be somewhat complex in order to be exact, it often happens that the mental pictures do not differentiate themselves clearly. This can be tested as follows: Ask a class of seventh or eighth grade pupils to read a page of description and select the important pictures. It is likely that there will be considerable variation as to the number of pictures formed by different pupils, and this is probably due to the fact that the printed symbols, in yielding to this translation, failed to call, in all cases, the same ideas into focal consciousness.

3. Pictures are accurate. But little need be said on this point, except again by way of comparison with the printed page. A strange word may be a stumbling block in constructive conception, whereas in the picture we see the unity in familiar words of our own vocabulary. However, it is no doubt true that in reading a picture, that is, in reducing it to language, visual perceptions are made clearer and more significant through a correlation with language.

4. Pictures are attractive, even beautiful, in our best text books. Recall the illustrations in Harold W. Fairbanks' *Home Geography*. The well-selected and clearly printed pictures make
this little volume truly artistic. Indeed, it is through the attractiveness of pictures very largely that beginners are taught the printed symbols. It would seem that there is little need of arguing the use of pictures in teaching.

5. The first suggestion offered is that you make good use of the pictures in the text book. Do not trust the pupils to read the pictures for themselves. True, they will get much from them without the teacher’s help, and they will enjoy them; but they cannot be expected to get the best lessons without guidance. At any rate, it is the teacher’s business to know, and the knowledge is secured by testing the pupils on picture reading as you would test them on context reading.

The writer has before him a picture of a whaleback steamer passing through the “Soo” locks. As a class exercise the pupils may be directed to open their books at this picture. They are given a little time for silent reading. Each pupil is then required to read something from the picture. If the points are not all brought out, questions from the teacher will lead the class to see the additional significance in the illustration.

1. Why is the ship called a “whaleback”? What sort of cargo is it built to carry? Show why. What are its advantages?

2. Examine the lock. Why is it necessary? Which of the lakes has a higher water level? Can you determine from the picture something of the manner of operating the lock?
3. With what kind of cargo is the whaleback loaded? Where is it probable that it loaded? What sort of country, then, is accessible to Duluth? What of the soils? The topography? The rainfall? If this region exports wheat, what do you think it imports? Why?

4. Where is the "whaleback" going? Why?

Lake Transportation. A Whaleback Freighter Passing Through the "Soo" Locks Between Lake Superior and Lake Huron.

Do you think Buffalo has flour mills? Why should Buffalo manufacture flour? Where will the flour go from Buffalo? How? Why will it go to New York?

A further illustration, suggesting a practical method of using pictures, and incidentally emphasizing the value of government publications, else-
where discussed as sources of information, is taken from a valuable paper by Marian Weller.*

"The picture lesson should be one to secure the activity of the child, and not one merely to hold his attention. This point may be illustrated by a couple of lessons with a class which was studying the Philippine Islands.

"Some extra copies of two or three of the illustrated volumes of the Report of the Philippine Commission were gotten by the teacher, and the pictures and printed matter bearing upon certain selected topics were cut out and arranged for the use of individual pupils in the class. Such topics as the cultivation of rice, the hemp industry, the water buffalo, native methods of transportation, the construction of a native house, were found well illustrated, and each topic was assigned to some pupil to be presented before the class. In connection with some of the topics museum material was brought in to supplement the pictures, such as a bundle of hemp fiber prepared by the natives, and a protective covering made from dry palm leaves, illustrating the manner in which the roofs of the houses are thatched to shed the rain.

"The way in which the 'rice' topic was presented will serve as illustration. The topic was assigned a day or two before it was to be reported on, and the pupil prepared his exercise from the printed references and pictures which had been

collected. In the presentation of the topic it was explained with the pictures, using a picture with each step, how the ground was prepared with the help of the native plow and harrow and the water buffalo; how the fields were surrounded with levees and flooded; how the rice was planted by hand and later harvested with a small hand sickle, and then threshed, by being trampled on, either by the natives themselves or by the water buffalo. Then with pictures it was explained what is being done on a government farm with more modern methods. Each picture was shown to the class, and in it a definite thing was called attention to, which was to be seen by the class. After the discussion of the topic some stalks of rice in the head, threshed rice, rice with hull removed, rice polished, and rice flour and bran were shown."

Collect pictures to supplement the text book. Many fine booklets profusely illustrated are distributed by transportation companies. Often whole page photographic reprints are given. Watch the announcements of these companies in daily papers. Send for free booklets. The larger views can be mounted on cardboard for convenience in class use. Label each picture and put in its proper class. An active teacher can soon collect several hundred pictures on geography, history and art; such a collection, properly used, is of great value."

Railroad companies often give away fine views—sometimes mounted or framed—

*Certain publishers furnish, at reasonable cost, pictures singly or in sets, illustrating travel, commerce and industrial arts. See Bibliography.
which are not only useful for geographical illustration but ornamental as well.

As above suggested, the value of pictures depends much on their classification and arrangement for immediate use. If no better system is possible, large manila envelopes may be used to good advantage. An index of the enclosed pictures should be written on the face of the envelope.

**STEREOGRAPHS.**

The stereoscopic views (stereographs) are very convenient for use in geography. Certain companies are making specialties of educational views. The photographs are taken by experts, and by use of the stereoscope are made to stand out in bold relief. These views are excelled only by the stereopticon views, which, of course, are beyond the reach of most schools.

The stereographs are selected and arranged in sets, each treating of some particular subject. These sets can be used to excellent advantage in type studies. Almost every subject is treated. Some important industries are illustrated in all of their phases by as many as twenty-five to fifty views. Taken in order, they represent every phase of great industries.

Some companies have employed educational experts to write descriptions to accompany the views. Usually the descriptions are on the backs of the pictures, and make the views doubly valuable. They can be used in two ways:
1. The views and stereoscope may be placed upon a table and each pupil in the class required to go in turn, look at the views, and read the descriptions, as a preparation for the recitation.

2. The stereoscope with an appropriate view may be started through the class during a recitation, it being understood that each pupil shall have a half minute to look at the view. The recitation, in this case, does not stop. When all selected views have gone around, each pupil may be handed a particular view and given a minute or two to prepare the gist of the description, which he then recites to his classmates.

Everything considered, the stereographic pictures are the most practical, since they are comparatively inexpensive and always ready for instant use.

The stereopticon is of great value as an educational help. In the past it has been too expensive for many schools. Now, however, good lanterns are much cheaper and better. The electric lantern is the most practical where a current is available. Gasoline lanterns that work well may be purchased for a comparatively small amount, and village schools can easily afford one. Slides are somewhat expensive, but this difficulty may largely be overcome by renting them. For full information concerning lanterns, lantern slides, stereographs and stereographic views, apply to any of the companies whose addresses are given in the bibliography, Chapter XXII.
<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
</table>
| 10 | $2.99 / month | 10 Books per month  
Monthly payment  
$0.30 per book |
| 100 | $4.99 / month | 100 Books per month  
Monthly payment  
$0.05 per book |
| 10 | $19.99 / year | 10 Books per month  
Yearly payment  
$0.17 per book  
**Save $15.89** |
| 100 | $35.99 / year | 100 Books per month  
Yearly payment  
$0.03 per book  
**Save $23.89** |

Memberships can be cancelled at anytime
CHAPTER XVIII.

THE VALUE OF ILLUSTRATIVE MATERIALS AND FIELD WORK.

TOPICS TO BE CONSIDERED.

The school museum; directions for making; its value in teaching; useful materials it should contain; the museum not an end in itself.

The industrial excursion; the phase of geography it emphasizes; what excursions to make; preparation for excursions; subsequent review of observations.

Physiographic field work; the value of the field trip; suggestive field studies.

I. SCHOOL MUSEUM.

The text books on reading, language and geography constantly refer to objects and phenomena that, as yet, are outside the children's experiences. A large part of the process of education consists in familiarizing the child with new things. In order that pupils shall know things and not merely names of things, other means than text books must be employed. The teacher can bring the pupils face to face with the new material or phenomena.

1. By means of the School Museum.

2. Through the School Excursion.

By a school museum, no pretentious "collection of monstrosities," but rather a modest collection...
of significant things, is meant. Geography especially refers to many articles of commerce which in their raw condition many people have never seen, and the ideas of which are vague and incorrect.

There will be needed for the exhibit:

1. A case or cabinet. This will furnish work for manual training. The pupils will bring needed tools and lumber.

2. Bottles in which to preserve grains, seeds, berries, sands, soils, etc. The pupils will bring many bottles from home. These can be classified, and answer the purpose. Wide mouthed bottles are best.

3. Labels. These can be bought, or white paper slips will answer, if a bottle of library paste is in the room.

4. Boxes. Small pasteboard, wood and cigar boxes will serve as specimen trays for rocks, minerals, etc. Boxes, bottles, etc., can be picked up as needed.

All materials should be neatly labeled, as:

1. Macaroni Wheat.
   Commissioner of Immigration,
   Winnipeg, Canada.

2. Fossil Fern.
   Collected by Edward Roberts,
   Cape Girardeau, Missouri.

Illustrative materials to be useful must be conveniently arranged, so that no time need be lost in presenting them to the class. A piece of granite
from some monument works; a specimen of iron pyrites—"fool's gold"; a piece of obsidian from the Rockies, or a sample of red hematite from the Superior region, passed about the class at just the proper moment, will add reality to the teaching.

There are numerous manufacturing companies that furnish gratis, or at small cost, fine exhibits, showing processes through which raw materials pass in becoming finished products. Some of these are not only very attractive but possess much educative value. Not infrequently companies have published pamphlets descriptive of their manufacturing processes, and these, of course, are correct, and are the very best sources of information. Through the alertness and activity of wide-awake teachers, some schools have fine museums of illustrative materials. Almost every day a teacher can draw on the museum for an article to illustrate some point in reading, language, literature, history or geography. In just so far as such materials can be used to illustrate new ideas will school work be redeemed from the formal and meaningless grind.

SUGGESTIVE MATERIALS.


Rocks: Gneiss, Obsidian, Breccia, Coquina, Quartzite, Anthracite Coal, Bituminous Coal,
Coke, Marble, Granite, Limestone, Shale, Rock-phosphate.

*Grains:* Corn, Oats, Rye, Wheat, Flax, Barley, Peas, Kaffir Corn, Broom Corn (brush with seeds), Rice on Straw, Buckwheat.

*Seeds:* Timothy, Clover, Millet, Turnip, Radish, Lettuce, Beet, Beans, Coffee, Berries, Cocoa Beans.

*Vegetable Fibers:* Manila Hemp, Sisal, Flax, Raphia, Hemp, Jute, Cotton, Rattan, Bamboo, Pineapple Fiber, Bast Fiber.

*Spices:* Pepper, Allspice, Caraway, Cloves, Ginger, Cinnamon, Nutmegs.

*Woods:* Pine, White and Yellow, Cedar, Cypress, Birch, Oak, Maple, Ash, Walnut, Rosewood, Mahogany, Hickory, Elm, Basswood, Whitewood, Cherry, Corkwood.

**MISCELLANEOUS EXHIBITS.**

<table>
<thead>
<tr>
<th>Petroleum Products</th>
<th>Portland Cement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silk</td>
<td>Furs</td>
</tr>
<tr>
<td>Wool</td>
<td>Leathers</td>
</tr>
<tr>
<td>Cotton</td>
<td>Nuts</td>
</tr>
<tr>
<td>Cocoa</td>
<td>Corundum</td>
</tr>
<tr>
<td>Wheat and Flour</td>
<td>Sands</td>
</tr>
<tr>
<td>Corn Products</td>
<td>Shells</td>
</tr>
<tr>
<td>Coffee</td>
<td>Pebbles</td>
</tr>
<tr>
<td>Spice</td>
<td>Feathers</td>
</tr>
<tr>
<td>Grasses</td>
<td>Etc.</td>
</tr>
</tbody>
</table>

The collection of materials for school museum furnishes a motive to become familiar with many
strange materials, and to discriminate and select for a purpose. Through a movement of this kind pupils are frequently awakened, and the formal hum-drum of school may for a time give way to genuine interest. But, after all, a movement of this kind is secondary to the real work of the school. It should not be spasmodic; any interest enlisted should be made permanent and applied to the substantial work of the school. Recently, in a certain school known to the writer, the collection of woods led to the learning of every tree that grew in the district, an accomplishment of no little moment. This spirit might extend to other fields of observation.

The teacher who undertakes the building of a museum will find considerable assistance in "Commercial Raw Materials"* an inexpensive volume "descriptive of the origin, processes of preparation and uses of the most important commercial materials."

In discussing geographical museums Willis E. Johnson writes as follows:

"The cabinet may not only contain materials of every conceivable kind illustrating products and industries, but may contain pictures and slides illustrating people and natural and artificial scenery. The central museum should be equipped with apparatus, an auditorium for optical projection, and in proper grades the magnifying glass and microscope should find a place. The loan and exchange idea should pervade every cabinet col-

* See Bibliography.
lection, and every child and home should be glad to assist and contribute. Exchanges may be made not only among schools of the same city, but ex-
changes and loans may extend to different cities and may be national or even international in character.”

Certain companies furnish geographical mu-
seums or cabinets ready for use. They are valu-
able helps in teaching commercial geography. However, the writer feels that the adoption of the “ready made” cabinet sacrifices the opportunity to stimulate interest and to teach lessons in geog-
raphy by building a museum through the activi-
ties of the school itself. A poorer collection thus made stands for more educationally than a better one secured by direct purchase. On two occasions the writer has had members of his classes do the planning, conduct the correspondence, and make personal visits and excursions to secure mate-
rials; and, having secured contributions, the pupils wrote descriptions of the objects, products, industries, etc., with such care that they became reliable sources of information. Such initiative, guided by definite motives, is indicative of an interest that brings results.

II. INDUSTRIAL EXCURSIONS.

Through the school excursion, teachers should take advantage of every opportunity to study the physical phenomena and industrial activities in the vicinity of the schools. Unless actual obser-
vations be made and concrete materials used,
<table>
<thead>
<tr>
<th>Level</th>
<th>Price</th>
<th>Books per Month</th>
<th>Payment Details</th>
<th>Purchase</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>$2.99/mo</td>
<td>10 Books</td>
<td>Monthly $0.30/book</td>
<td>Purchase</td>
</tr>
<tr>
<td>100</td>
<td>$4.99/mo</td>
<td>100 Books</td>
<td>Monthly $0.05/book</td>
<td>Purchase</td>
</tr>
<tr>
<td>10</td>
<td>$19.99/yr</td>
<td>10 Books</td>
<td>Yearly $0.17/book</td>
<td>Purchase</td>
</tr>
<tr>
<td>100</td>
<td>$35.99/yr</td>
<td>100 Books</td>
<td>Yearly $0.03/book</td>
<td>Purchase</td>
</tr>
</tbody>
</table>

Memberships can be cancelled at anytime.
A Bakery  Pickling Works
Meat Packing Plant  Cereal Mills, etc.
Corn Products Co.

**NEED OF A CLOTHING SUPPLY.**

Shoe Factory  Woolen Mills
Cotton Mills  Glove Factory
Lace Factory  Hat Factory

**NEED OF BUILDING MATERIALS.**

Saw Mills  Nail Factory
Planing Mills  Concrete Works
Stone Quarry  Brick and Tile Works
Paper Mills  Sheet Metal Works

**NEED OF FARM IMPLEMENTS.**

Wagon Works  Plow Factory
Machine Shop  Foundry
Harvester Works  Thresher Works

**NEED OF TRANSPORTATION FACILITIES.**

Locomotive Works  Rolling Mills
Steel Plate Industry  Canal Projects
Subways  Elevated Roads
Tunnels  Terminal Stations
Ship Building  Dry Docks, etc.

In making an excursion the teacher should always have clearly in mind exactly what he wishes the pupils to observe. Pupils may pass by interesting and educative phenomena daily, but without the guidance of the teacher may fail to see the
essential features. So a well-formulated plan of procedure is essential to good results. Illustration of this is seen in the precise and systematic way that the guides of certain large concerns show visitors through their plants.

Not a little of the value of an excursion depends upon the reviews, explanations and discussions which should always follow in the class room. Here imperfect observations may be supplemented and misunderstood processes explained.

The reduction to writing should be the final step in this work, the summaries being valuable in unifying and associating such materials as possess true educative value.

III. PHYSIOGRAPHIC FIELD WORK.

Much has been said about field work in geography, but as yet little is done in the public schools. Excuses are made by grade teachers on the ground that there is not sufficient time, that it cuts into other work, and that they have two classes in the room, and therefore cannot take one class on an excursion. This is probably all true, but underneath the argument there is an assumption that some other work is of greater importance than the field work in geography. We shall not argue relative importance, but simply state that if geography is worth doing at all, it is worth doing right. And let us repeat that geography in the past has been a formal study because teachers have kept away from earth and life and have clung tenaciously to the text book. Schools
of the best type do not assume to teach chemistry or physics, unless they have some sort of laboratory and a workable amount of apparatus. This equipment costs considerable, but it is supplied. Then, too, double periods must be arranged for laboratory practice, but again the program yields to the pressure. When grade teachers become convinced that field work is highly profitable, and when they become resourceful enough to interest boys and girls out of doors, then we may expect better things. Superintendents recognize the value of this phase of geography. The writer has often experienced the recoil of otherwise willing teachers when they were asked to do some field work. It is also said that the discipline is difficult, but the teacher who lacks in resources finds it equally difficult to keep order inside. The school garden, agriculture, nature study, geography—these all make new demands upon the teacher; he must be equal to the occasion—must arise to the opportunity.

It may be said of nature study that it has not been systematic, but the difficulty lies not in nature. It may be some time before the great body of teachers become proficient in the study of science at first hand, but the only alternative is to walk in the light we already have and pray for more.

Would one become proficient in physiography, then what can take the place of a well-directed trip to Dune Park, Indiana; to Blue Mounds in the Driftless Area of Wisconsin; to the Baraboo
Ranges and Devils Lake; to Fort Snelling, at the
junction of the Minnesota and Mississippi rivers,
St. Paul, Minnesota; to Minnehaha Falls in Min-
neapolis; or to Starved Rock on the Illinois river?
These are a few of the places of much physio-
graphic interest in the Upper Mississippi Valley.
A score of others almost as inviting could be
named. And if the teacher is more ambitious, the
National Park, Grand Canon, the Park and the
Selkirk Mountains are yet his to explore.

But field work is not beyond the possibility of
any city, village or country school. The outlook
may be less inspiring and the proportions com-
paratively mean, but it is quite safe to assert that
within a single mile of most schools, nature dis-
plays phenomena as truly valuable and equally
as illustrative as are those more picturesque and
stupendous works of nature. "Despise not, then,
the little things." Here are some of the physio-
graphic features common to most rural schools.
Visit any that are near.

1. River, creek, or brook. The excursion
should be made for the purpose of studying one
or two definite features, and just at a time when
the concrete material is needed. The purpose of
the trip might be to study one or more of the fol-
lowing: flood plains; deltas; terraces; corrasion;
meanders, etc.

2. Hills and valleys, as results of erosion.

3. Gullies and ditches—along country high-
ways. Methods of checking.

4. Hills, showing effects of erosion when un-
der cultivation. Compare cultivated hillside with meadow or pastures of similar slope.

5. Soils. Collect specimens of soils from different fields. Compare. Preserve samples of sandy soils, clay soils, loam, vegetable mold, etc.


8. Stone quarry. Collect specimens. Study stratification, faulting, etc.


10. Lake shore. Study shore features, wave action, etc., etc.

All schools will not have the same or equal advantages for field work, but each should make the most of its opportunities. The rural teacher who can take his whole school to the roadside to study wild flowers, insects, birds, the action of frost or the work of running water, has an advantage over a city teacher, who with a larger school must make a longer journey to come in contact with nature at first hand. But all cities and many towns offer good advantages for the study of manufacturing industries and commerce. The superintendent should assist his teachers in selecting for study those things which can be made interesting and profitable, and every earnest teacher who will try repeatedly will grow and in the end will succeed.
VALUE OF ILLUSTRATIVE MATERIALS

SUGGESTIONS AND QUESTIONS.

1. Why are museums and excursions necessary to the best geography teaching? Without them what would probably be the character of the instruction?

2. What effect on the pupil’s interest would the formation of a museum have? Is it possible for any school to secure a museum?

3. What are the opportunities for industrial excursions in your vicinity?

4. How would you plan and conduct an excursion?

5. Enumerate the field trips conveniently near your school that would be of value to your pupils.

6. Characterize the knowledge gained through excursions with that gained from books alone.

FOR FURTHER STUDY.

1. Select some field or plot of ground that is conveniently located for study.

2. Study the soils during their preparation for planting. Are they clay, loam or sand? Do they permit of easy cultivation?

3. Observe the growing crops. Do all parts of the field equally favor the growth of plants?

4. Do the soils maintain moisture well? Is the cultivation conducive to preservation of moisture?

5. Is the plot subject to "wash"? How does this affect the fertility of its parts? Examine soils in different places.

6. Are there different crops on the plot? Which seems to thrive best?

7. Does the season’s temperature seem to be right for the growing crops?

8. Is the rainfall just adequate?

9. Do the winds affect the growing crops? In what way?

10. Have the growing crops animal or plant enemies?

11. Observe the crop until maturity. Is the crop consumed by the producer or is it marketed? If sold, at what market? How transported? Was the product ready for use, or did it have to undergo manufacture? If it required manufacture, where and how was it accomplished?

12. Write an essay discussing the factors that enter into crop production in your locality.
BIBLIOGRAPHY.

Carpenter, F. G.—*An Industrial Reader, Foods.*
Chase and Clow—*Stories of Industry.*
McMurry, C. A.—*Type Studies from United States Geography.*
Rocheleau, W. F.—*Great American Industries,* Vols. I, II and III.
Lane, M. A. L.—*Industries of Today.*
Lyde—*Man and His Work: Man and His Markets.* 2 Vols.
King, C. F.—*Geographical Readers.*
Carpenter, F. G.—*Geographical Readers.*
Redway, J. W.—*Commercial Geography.*
Trotter, Spencer—*Geography of Commerce.*
King, C. F.—"Methods and Aids in Geography," Sources of Geographical Pictures, pp. 251-3.
Fairbanks, H. W.—*Home Geography.*
McMurry, C. A.—"Home Geography Excursions," Special Method in Geography, Chap. III.
Sorry, this page is unavailable to Free Members
You may continue reading on the following page

Upgrade your Forgotten Books Membership to view this page

<table>
<thead>
<tr>
<th>Books</th>
<th>Price</th>
<th>Books per month</th>
<th>Payment Details</th>
<th>Save</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>$2.99</td>
<td>10 Books per month</td>
<td>Monthly payment $0.30 per book</td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>$4.99</td>
<td>100 Books per month</td>
<td>Monthly payment $0.05 per book</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>$19.99</td>
<td>10 Books per month</td>
<td>Yearly payment $0.17 per book</td>
<td>$15.89</td>
</tr>
<tr>
<td>100</td>
<td>$35.99</td>
<td>100 Books per month</td>
<td>Yearly payment $0.03 per book</td>
<td>$23.89</td>
</tr>
</tbody>
</table>

Memberships can be cancelled at anytime
livery route. Send a request to the nearest Weather Bureau, stating that you are a teacher. A file for holding the maps can be had on application.

2. Cloud Chart. Frame if possible. Keep it before the pupils.


Where other addresses are not given, apply to "The Weather Bureau," U. S. Department of Agriculture, Washington, D. C.

Some simple apparatus will also be very helpful and some of it, at least, can be made in the school.

1. A Thermometer. Every school should have a thermometer for the purpose of regulating the school room temperature. A chemical thermometer will answer a double purpose.

2. A Mercurial Barometer. This instrument costs several dollars, but a fairly good one can be made for 75 cents. Its construction will furnish a motive for manual training work.

A home-made barometer would be a valuable contribution to a school. Study Circular F.
Directions for making. Close one end of a glass tube 42 inches long and \( \frac{1}{4} \) inch in diameter, using a gas or alcohol flame to soften the glass. About 34 inches from the closed end make a "U" shaped bend. Slowly pour in mercury (about 2 pounds will be required) until both arms of the tube are filled.* A piece of rubber tubing, one end of which is fitted to the open arm of the glass tube and the other attached to a funnel, affords a convenient method for introducing the mercury. Incline the glass tube toward a horizontal position while pouring in the mercury. When both arms are filled, place the tube in a vertical position and mount on a smooth board on which is a scale in inches and centimeters.

The true reading of the barometer will be the difference between the heights of the two mercurial columns. Hang the instrument in a safe place. Read it daily.

3. A Helior or Sun Board. This little instrument can be made by the teacher or older pupils of the class. It is a good piece of work for manual training, and can be used to excellent advantage in establishing basal ideas of temperature. Directions: From \( \frac{1}{2} \)" wood make a square tube 3"x3" inside measurement and 10" long. Prepare a base-board

* If advantages permit, the mercury in the tube may be boiled to drive out any bubbles of air.
36"x4", using 1" material. To its edges attach a 1½" vertical strip 36"x3½". By means of light hinges attached to one end of the tube, fasten it to the middle of the base-board. The tube should be so adjusted that when moved its side will just touch the vertical strip.

Secure a cheap protractor, or make one from light card-board, and fasten it to the side of the helior tube as shown in Fig. 7. A short plumb line properly attached to the protractor will, as it crosses the arc, indicate the inclination of the tube. A light metal strip, one end of which is fastened to the tube and the other to the sliding block [see cut], will hold the tube at any desired angle.

4. A Hygrometer, or Wet and Dry Bulb Thermometer. Two cheap thermometer tubes attached side by side to a small board will answer if a better form cannot be had. Around the bulb of one thermometer wrap one end of a lamp-wick, immersing the other end of the wick in water held in a small bottle, also attached to the board. The other bulb will be exposed to the moisture of the
atmosphere only. A table from which the relative and absolute humidities can be obtained may be found in a book on meteorology.

5. A Rain Gauge. A can with perpendicular sides set “in the open” will answer the purpose of a rain gauge in approximating the rainfall. Circular No. 250, “Instructions for Voluntary Observers,” gives full information. (See p. 218.)

**SIMPLE EXERCISES WITH THE HELIOR.**

1. Set the helior in the sun at noon in a level, north-south position, and so adjust the tube that all sides are lighted directly by the sun. This position is secured when shadows are absent. If the tube is too high, a shadow will appear on its upper surface; if too low, on its lower surface, etc. Now the angle shown between the lower edge of the tube and the base-board will represent the noon altitude of the sun. If the middle point of the protractor arc be designated zero, the marginal number at the intersection of the plumb-line and arc will indicate the numerical value of the sun’s altitude.

2. With the helior tube in the position indicated in 1, note the lighted rectangular area within the shaded boundary lines. Determine the length and width of this area. The beam of sunlight that enters the tube will be projected upon a surface as wide as the tube, and will vary in length with the altitude of the sun.

Now if the sun’s rays were vertical, a surface
of 9 square inches would receive all of the light and heat entering the mouth of the helior tube. The altitude of the sun would in this case be 90°. As the sun never reaches this altitude north of the Tropic of Cancer, the light and heat entering the tube will be distributed over a rectangular surface somewhat larger than 9 square inches. Thus on September 23—the autumnal equinox—the noon altitude of the sun at Platteville, Wisconsin, is approximately 47°. At noon on this date the helior, with dimensions as given above, will show a lighted area of $13\frac{1}{2}$ square inches. It is evident that the intensity of light and heat will then be two-thirds as great at 43° north latitude as at the equator.*

From the above exercise, pupils will understand why the more nearly vertical rays between the tropics make that region hotter than other regions, and why it is called the Torrid Zone.

3. Properly adjust the helior tube to show the area heated and lighted at nine o'clock. Compare with area heated and lighted at twelve o'clock, and again at four p.m. At what hour do we receive the more nearly vertical rays? The earth is receiving the maximum of heat at this hour, but the thermometer will register higher at two or three p.m., as more heat at that time will be radiated by the earth into the atmosphere.

* $13\frac{1}{2}$ : 9 : : : of \( \text{of} \); since at an altitude of 47° a beam of light and heat is distributed over \( \frac{3}{2} \) the area that it would be were the altitude 90°, it follows that the intensity will be only \( \frac{2}{3} \) as great.
These generalizations will be very useful in understanding the temperature of different parts of the earth’s surface.

**SAMPLE HELIOPHORE RECORD**

<table>
<thead>
<tr>
<th>Date</th>
<th>Altitude of Sun</th>
<th>Cross Section of Light Beam</th>
<th>Ratio of Area of Beam Distribution</th>
<th>Ratio of Areas</th>
<th>Ratio of Intensities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sept 23</td>
<td>17</td>
<td>9</td>
<td>12</td>
<td>9:12</td>
<td>4:3</td>
</tr>
</tbody>
</table>

**SIMPLE EXERCISES TO SHOW ATMOSPHERIC PRESSURE.**

1. Fill a basin with water. Press a bottle, mouth downward, into the water. Why does not the bottle fill? Does this show air pressure?

2. Fill a bottle with water. Hold the hand over the mouth and invert. Lower the mouth of the bottle into water and remove the hand. Why does the water remain in the bottle? Does this show air pressure? If so, in what direction?

3. Fill a bottle (level full) with water. Press with the palm of the hand a piece of heavy writing paper evenly over its mouth. Holding the hand in this position invert the bottle and carefully remove the hand. Why does not the water run? Does this show air pressure? In what direction?

**EXERCISES TO SHOW CONVECTION CURRENTS.**

1. Heat a beaker of water in which a little sawdust has been placed, by applying a flame to
the bottom of the glass near one side. In what direction does the water directly over the flame move? In what direction is it moving on the other side of the glass? Why? Is a circuit established? How will all of the water become heated?

2. School rooms heated by stoves illustrate convection currents. Show by experiment that the air above the stove rises; that the air on the floor flows toward the stove. With the school thermometer, take the temperatures on the floor and near the ceiling. Trace some of the circuits of the air in the school room.

CONVECTION CURRENTS IN THE ATMOSPHERE; CYCLONES.

The great storms that pass over the country with considerable regularity are cyclones. Correct the current notion that the violent destructive storms are cyclones; they are tornadoes. Cyclones, or cyclonic storms, are shown on all weather maps of the United States. But in order to teach the use of the Daily Weather Map, one rather difficult notion must be developed, viz., the idea of atmospheric or barometric pressure. The teacher even without the mercurial barometer will be able, little by little, to establish the idea.

Air surrounds the earth to a depth of two hundred miles or more, but almost half of it is within three miles of the earth's surface. Now when the air is considerably heated over a large area, it rises in the same manner that it does over
Sorry, this page is unavailable to Free Members
You may continue reading on the following page

Upgrade your Forgotten Books Membership to view this page

<table>
<thead>
<tr>
<th>Books per month</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>10 Books per month</td>
<td>Monthly payment $0.30 per book</td>
<td>Purchase</td>
<td></td>
</tr>
<tr>
<td>100 Books per month</td>
<td>Monthly payment $0.05 per book</td>
<td>Purchase</td>
<td></td>
</tr>
<tr>
<td>10 Books per month</td>
<td>Yearly payment $0.17 per book</td>
<td>Save $15.89</td>
<td>Purchase</td>
</tr>
<tr>
<td>100 Books per month</td>
<td>Yearly payment $0.03 per book</td>
<td>Save $23.89</td>
<td>Purchase</td>
</tr>
</tbody>
</table>

Memberships can be cancelled at anytime
in the northern hemisphere. Upward currents of air always expand and cool, hence it usually rains in low pressure areas. A falling barometer signifies low pressure and therefore a storm.

Downward currents of air are always being warmed as a result (1) of their approach to land or water which is warmer than the upper air, and (2) of the increased air pressure at lower levels. The increased pressure condenses the air and as it is condensed, heat is set free. A large area of slowly settling air is called a high. As the temperature of such air rises, its capacity for moisture increases. Precipitation is not likely to occur and, in general, highs indicate fair weather.

Older students can be taught the meaning of isobars and isotherms from the weather map.

Our prevailing winds are westerlies. A sudden shift of the wind to the east indicates the approach of a storm from the west. The shift will be accompanied also by a falling barometer, and it can easily be noted that the temperature is rising. Correct the prevalent notion that a humid, cloudy, or foggy atmosphere is heavy. Moisture settles when the air is unable to buoy it up.

No more practical lesson can be learned than that of forecasting the weather a day or two ahead. Pupils in the upper grades can do this by observing direction of winds, state of sky, temperature, and pressure. Teach children that the long-range forecasts seen so often in the local newspapers are unreliable.

Teach the children how to tell whether the
storm centers pass north or south of their locality. Since winds blow toward the low or storm, if the wind is east, the storm is west. If the wind is south, the storm is north. If the wind is south-west, the storm is northeast. If the wind is west, the storm is east. Hence, in this instance, the storm center passed north of the observer. Hence—

1. If the wind shifts from the east to the west by way of the south, the storm center passes north of the observer.

2. If the wind shifts from the east to the west by way of the north, the storm center passes south of the observer.

Teacher and pupils should observe the shifting winds and make inferences relative to the paths of cyclonic storms.

Since winds flow in spirally to the storm center it follows that—

East winds start in the south.
South winds start in the west.
West winds start in the north.
North winds start in the east.

**Simple Suggestive Exercises for Study of Cyclonic Storms.**

1. Cut a 2" square from transparent paper. Lay the square directly over the word "Low" on a weather map. Trace the word "Low" and the arrows about it that indicate wind directions. Transfer the square to another "Low" and make
the two words coincide. Trace in the arrows again. Repeat for four or five lows. What do you conclude as to wind directions near lows?

2. On an outline map of the United States show by an isobar the location of a low on successive days as it crosses the continent. Make a heavy dotted line to show the storm track. Measure, by means of the scale, the distance traveled each 24 hours. Average a dozen measurements to secure the approximate velocity of cyclones.

3. Trace several isotherms through lows found in the Mississippi basin. Note the bends which the isotherms make. In what direction do they bend in front of the low? In the rear? [See Fig. 9.] Remembering what has been said about wind directions, account for these bends. Why are our west winds cool in summer and cold in winter?
4. Observe the cloud and rain areas as lows cross the country. In which direction from the cyclonic center is the largest cloud and rain area? Which wind brings the most moisture? Why? From what source does most of our moisture come?

5. Note the clouds frequently. Learn the different classes by reference to the Cloud Chart.

6. Take the whole school on an excursion. Observe the general direction toward which the trees lean. What is this direction? On which side of trees are the branches usually longer? Why?

7. Watch the direction of the little whirlwinds so often seen in spring and summer. Account for their general direction.

**SIMPLE EXERCISES TO SHOW THAT AIR DEPOSITS AND ABSORBS MOISTURE.**

1. Fill a cup or glass pitcher with ice water. Note the moisture that collects on the outer surface. Where did the moisture come from? Why did it collect?

2. Into similar shallow dishes place equal quantities of water. Set the dishes near each other—one in the sunshine and the other in the shade. Compare the times required for evaporation. Explain. What causes water to evaporate?

3. Place equal volumes of water in two dishes, one broad and shallow, the other narrow and deep. Compare the times required for evaporation.
SIMPLE EXERCISES TO SHOW FORMS OF HEAT ENERGY.

1. Set an open dish of cold water on the stove or place it over an alcohol flame. Introduce the bulb of a thermometer and take the reading. Have pupils note the rise of mercury as the water heats. Take the reading when the water boils. Continue to apply heat. Does the mercury continue to rise after the water boils? Can water be heated beyond the boiling point in open vessels? Is evaporation rapid at this temperature? Hold a piece of cold glass above the vessel and note the collection of vapor on it. What becomes of heat energy after the water boils. Is there much heat, then, in vapor? If the vapor be condensed, can this heat (latent) be set free? Which burns more severely, boiling water or steam? Why? When vapor condenses into clouds, is heat set free? Is it usually warm when it rains?

2. Set a dish of water containing ice over a flame. Introduce the thermometer bulb. Note the reading. Watch the mercury as the melting advances. Does it rise? What is the heat energy doing? Why does not the water heat? Is there heat in the water that comes from melting ice? Note the mercury at the moment the ice is all melted. Does it rise from that time, on? What is the heat energy now doing? Is there heat (latent) in all water? When water freezes is heat set free? What effect have freezing water-bodies on adjacent lands?

3. Pour a few drops of ether, alcohol, or am-
monia in the open palm of each pupil. What becomes of it? Why does the hand feel cold?

For the convenience of teachers who have no references at hand some information concerning wind velocities, state of sky, and precipitation is given below.

**WIND VELOCITIES (ACCORDING TO H. A. HAZEN, UNITED STATES WEATHER BUREAU).**

0. Calm.
1. Light breeze; just moving leaves of trees.
2. Moderate wind; moving branches.
3. Brisk wind; swaying branches; blowing up dust.
4. High wind; blowing up twigs from ground; swaying whole trees.
5. Gale; breaking small branches; loosening bricks on chimneys.
6. Hurricane or tornado; destroying everything in its path.

**STATE OF SKY (ACCORDING TO WARD).**

A Sky 3-10 or less cloudy is marked on weather map *Clear*.
A Sky 3-10 to 7-10 cloudy is marked *Fair*.
A Sky over 7-10 cloudy is marked *Cloudy*.

If the teacher follows the suggestions concerning the securing of a cloud-chart, the pupils will soon learn the principal kinds of clouds, and a column can be added to the weather record under the heading, “Kinds of Clouds.”
RAINFALL.

Under this term are included rain, hail, sleet, and snow. *Precipitation* is the term usually employed. Rainfall is measured in inches. About ten inches of snow give one inch of water, but there is much variation in the density of snow.

THE WEATHER RECORD.

Rule a large sheet of paper, as suggested below, for a "Weather Record." Fill in daily with observed data. Each pupil in the upper grades should "rule off" pages in his geography notebook, and keep an individual weather record.

**SAMPLE WEATHER RECORD.** NON-INSTRUMENTAL OBSERVATIONS.

<table>
<thead>
<tr>
<th>Date</th>
<th>Hour</th>
<th>Temperature</th>
<th>Wind Direction</th>
<th>Wind Velocity</th>
<th>State of Sky</th>
<th>Precipitation</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dec. 18</td>
<td>9 a.m.</td>
<td>Very Cold</td>
<td>N.W.</td>
<td>Brisk</td>
<td>Clear</td>
<td>None</td>
<td>Frozen</td>
</tr>
<tr>
<td>Dec. 18</td>
<td>4 p.m.</td>
<td>Very Cold</td>
<td>N.W.</td>
<td>Brisk</td>
<td>Clear</td>
<td>None</td>
<td>Same Condition</td>
</tr>
</tbody>
</table>

A column headed "Barometric Pressure" may well be added to the weather record. Schools that teach ninth and tenth grade work would do well to make the barometer, and also a hygrometer. If the latter be made, a column headed "Humidity" may appear in the weather record."

In order that pupils, especially in rural districts, may apply the knowledge gained in weather study, such phenomena may well be associated with social

*Ward's Practical *E in Meteorology* is very helpful along the lines mentioned.*
## Upgrade your Forgotten Books Membership to view this page

<table>
<thead>
<tr>
<th>Books per month</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 Books per month</td>
<td>$2.99/month (Monthly payment $0.30 per book)</td>
</tr>
<tr>
<td>100 Books per month</td>
<td>$4.99/month (Monthly payment $0.05 per book)</td>
</tr>
<tr>
<td>10 Books per month</td>
<td>$19.99/year (Yearly payment $0.17 per book, Save $15.89)</td>
</tr>
<tr>
<td>100 Books per month</td>
<td>$35.99/year (Yearly payment $0.03 per book, Save $23.89)</td>
</tr>
</tbody>
</table>

Memberships can be cancelled at anytime.
8. Of what value to the pupil is the keeping of a daily weather record?

9. To what extent can a knowledge of weather conditions function in daily life?

FOR FURTHER STUDY.

1. The sunshine which exactly covers one acre on the equator at noon, March 21, would cover what area at 40° north latitude? 40° south latitude?

2. Demonstrate: The intensity of heat and light varies with the altitude of the sun.

3. At noon on June 21, the sun's altitude is observed to be 49°. What is the observer's latitude if in the Northern Hemisphere? If in the Southern Hemisphere?

4. At noon September 22 an observer at St. Petersburg will see the sun at what altitude?

5. Knowing the day of the month, if given the observer's latitude, can you find the sun's altitude? If given the sun's altitude, can you find the observer's latitude? Make problems to illustrate.

6. Draw a 1" square to represent the distribution of sunshine at noon on the equator at equinoctial time. Using the same scale, draw figures to show the distribution of sunshine at latitudes 20°, 40°, 60°, and 80° north or south latitude. Vary the exercises.

BIBLIOGRAPHY.


Jackman, Wilbur S., Nature Study for Grammar Grades, Chap. III.


Harrington, M. W.—About the Weather, D. Appleton Co.

Waldo, Frank—Elementary Meteorology, American Book Co.

Davis, W. M.—Elementary Meteorology, Ginn & Co.


CHAPTER XX.

MAPS AND MODELS AND THEIR USES.

TOPICS TO BE CONSIDERED.

Maps; what are the characteristics of good maps? classification of maps.

Map drawing; requirements of good map drawing exercises; illustrations.

The use of government maps; value of; illustrative exercise.

The value of good school atlases; the use of; an illustrative exercise.

Outline maps and graphs.

Models; how to make paper pulp models; salt and flour models; sand models; plasticine models; chalk and pencil models.

The school that is wholly without maps cannot secure the best results in geography and history. Teachers should acquire a better understanding of maps; a keener appreciation of their value and use will follow. Then, too, with maps as with other necessaries of school equipment, if the teacher appreciates and makes use of the materials and apparatus at hand, he is at the same time making it easier to secure additions.

Maps are symbolical representations of geographical truth. They show distribution of features upon a flat surface. There is great economy in their use, since the desired truth can be immediately pointed out without any reference or recog-
dition of the other features shown. They are therefore time savers and some one has termed them "shorthand records."

The study of cartography becomes a science in itself, so that only the elemental facts concerning map-projection is likely to be mastered by teachers not specializing in geography. But all teachers need the help of maps, and, like their watches, should make good use of them even if the technique of map-making is not perfectly understood. For the benefit of beginners, especially, the essentials of a good map may be enumerated. A good map should—

1. Be truthful. That is, it should first of all be recognized as the work of a skilled cartographer. This insure a proper projection and as much accuracy in details and distribution of features as is possible when a large area is reduced to so small a scale. It should be revised and up to date. The exaggerations should be minimized.

2. Be distinct. Distinctness insure easy interpretation or reading. By comparing a few maps of different make, one will soon discover great differences in this respect. In teaching it is necessary for the entire class to study a map at once, and hence at some little distance, a thing quite impossible and perhaps injurious to the eyes, if the map is lacking in clearness. Poor systems of lettering and coloring, together with the
representation of too much on a single map, lead to confusion and indistinctness. In selecting maps, teachers and school officers should keep the above points in mind.

3. Employ conventionalized symbols, viz., those in common use. The spelling, especially, should be that approved by geographical societies.

**CLASSIFICATION OF MAPS.**

(a) Political Map, which shows on a flat surface the horizontal forms and distribution of features with particular attention to artificial boundaries.

(b) Outline Map, which is a political map with nomenclature omitted.

(c) Relief Map, which shows on a flat surface both horizontal and vertical irregularities of land masses. There are three kinds in common use, the difference being in the symbols employed in showing vertical variations. Elevations are shown by (1) Contours (2) Colors, (3) Light and Shade. Each plan has its particular advantages.

(d) Model, which is an actual miniature reproduction of some land form. It is very useful but cannot be very correct. Horizontal irregularities are much simplified through great reduction in scale, and vertical irregularities greatly exaggerated to make them appeal to the eye—to be distinct.
MAP DRAWING.

It would be a platitude to expatiate on the value of map drawing. Its value is conceded by all. The map is a diagrammatic or graphic way of expressing ideas.

But what exercises in map drawing are most valuable? The suggestions here given are the outgrowth of years of experience in teaching and observing children of all ages. At the outset the mechanical exercise of copying maps is of the least value. That it impresses form and relative location and magnitude is true, but these ends can be reached through exercises involving more thought. The best map exercise is one that requires (1) the interpretation of one map and (2) the expression of the mental picture in an entirely new set of map symbols. This exercise is very practical and permits of much variation. To illustrate:

(a) Interpret a United States Geological Survey (contour) map and express the mental picture by the use of light and shade. In this manner reproduce the region shown in the Ottawa sheet, or a portion of the Kaibab sheet.

(b) Carefully study the surface of France. Sketch the outline and color as follows:

1. All surface having an elevation of 500 feet or less, light green. (Use water colors.)
2. All surface having an elevation of 500-1,000 feet, light yellow.
3. All surface having an elevation of 1,000-2,000 feet, deep yellow.
4. All surface having an elevation of 2,000-5,000 feet, light brown.
5. All elevations above 5,000 feet, dark brown.

(c) Study the text and examine the political map of some region. Having gained a good mental picture, express it in contours, in colors or in light and shade.

Map drawing in which geometrical figures or "nets" are employed to fix definitely certain points are highly recommended by many teachers. To the writer it seems that the attention of the pupil must necessarily be drawn from the idea he would express to the machinery of expression, and that the so-called "nets" simply add to the formal element of map drawing. Since the plan emphasizes the use of meridians and parallels, "the real ground work of maps," it certainly would tend to keep the pupil oriented, and so far as the practical value of location is concerned would be commendable.

UNITED STATES GEOLOGICAL SURVEY MAPS.

The most scientific map is the topographic map published by the United States Geological Survey. The atlas sheets are accurate and cheap, and should be more generally used. Below is given a map of this character on a much reduced scale. It represents a portion of the campus of the Western
Illinois State Normal School and was prepared by a pupil as a part of the field work.*

It is to be regretted that teachers generally know so little of the educational value of the topographic map. Ultimately the entire United States will be surveyed and mapped. The national government, co-operating with various state governments, is prosecuting the work as fast as possible.

The topographic map can be used to good advantage in the eighth, ninth, tenth and higher grades. Topographic Folios 1 and 2, treating of "Physiographic Types," can be used to excellent advantage by any class attempting the study of physical geography.†

*No illustration in this chapter was especially prepared; each was selected from a large number handed in as regular class exercises.
†Apply to the Director of U. S. Geol. Survey, Washington, D. C.
Sorry, this page is unavailable to Free Members
You may continue reading on the following page

Upgrade your Forgotten Books Membership to view this page

<table>
<thead>
<tr>
<th>Books per month</th>
<th>10 Books per month</th>
<th>100 Books per month</th>
<th>Purchase</th>
</tr>
</thead>
<tbody>
<tr>
<td>$2.99 / month</td>
<td>Monthly payment</td>
<td>$0.30 per book</td>
<td></td>
</tr>
<tr>
<td>$4.99 / month</td>
<td>Monthly payment</td>
<td>$0.05 per book</td>
<td></td>
</tr>
<tr>
<td>$19.99 / year</td>
<td>Yearly payment</td>
<td>$0.17 per book</td>
<td>Save $15.89</td>
</tr>
<tr>
<td>$35.99 / year</td>
<td>Yearly payment</td>
<td>$0.03 per book</td>
<td>Save $23.89</td>
</tr>
</tbody>
</table>

Memberships can be cancelled at anytime
the shore? Examine contours at several places.
5. How high are the highest points of Linekin Neck? Of Rutherford Island? Of Squirrel Island?
6. If the land should sink 20 feet, what landform would Linekin Neck become?
7. Draw Fisherman Island. Draw it as it would appear if the island sank 20 feet.
8. Why are there so many islands off the coast in this region? Were these islands ever parts of the main land? How could they become attached to the main land?
9. Do you think the water in the bays is deep? Why do you think so? Do you think the coast abounds in good harbors? Examine the contours.
10. Describe the land surface. Do you think it is good for cultivation?
11. In what direction do the long axes of the hills extend? Could this be the result of glaciation?
12. Where are settlements thickest? Why? What do the people in this region do?
13. What physiographic process is responsible for the contour and topography of this coast?
14. Examine a good picture of a fiord coast.
15. Sketch a small part of this region in light and shade.

You will note that the answers to the above questions are all obtained from the map by ex-
amination or inference. This is a typical coast found in many parts of the earth. A careful study of such a type makes all similar coasts very significant.

Donaldsonville Sheet. Flood Plains.

1. Locate the area on a large map.
2. Find maximum height of land above river-level. Where is the highest land? Account for proximity of contours to each other, near the river. Draw a profile of the region on the parallel 30 degrees, 5 minutes.
3. The margin of the swamps seems to follow the direction of the river. What does this suggest? How were the banks made?
4. Note direction of country roads. Why do roads run at right angles to the river? Why parallel to the river? What need for railroads?
5. What is a bayou? Does the definition seem to apply to Bayou Conway?
6. Where are the settlements? Why?
7. Of what economic value is this region? Characterize the soils.
8. What do you infer concerning its healthfulness?
10. In time, what will be true of the region? What was the condition of the region ages past?
11. Write a clear description of the physiographic processes here exemplified.

ILLUSTRATIVE EXERCISE.

Based Upon Longman's New School Atlas.

The use of maps should not be restricted to mere location. Every school should have a copy of *Longman’s New School Atlas*. So far as possible, originate problems requiring map-interpretation and inference. Such exercises necessitate genuine thought-work and insure correct generalizations. The better geographies have maps showing rainfall, vegetation, distribution of products, density of population, commercial maps, etc. Suppose the teacher state the problem:

What Relationship exists between the Annual Rainfall and the Distribution of Forests in the United States?

In order to reach a conclusion certain data must be secured, and this can be done quickly and conveniently by reference to the maps.

1. Find the 100th meridian on Map 15. What is the annual rainfall along this meridian? How does rainfall vary as you go east? As you go west? In general, what part of the United States is best watered?

2. Name the states and parts of states that have an annual rainfall of 50 inches or over. How many such regions are there?

3. What region has an annual rainfall of 60-100 inches?
4. What is the annual rainfall in New England? In the Lake region? In central Illinois?
5. Name the states and parts of states (and territories) that receive less than 10 inches annual rainfall.
6. In what states do you find forests chiefly of conifers? What is the annual rainfall in this region?
7. In what states do you find forests containing some tropical trees? What is the annual rainfall?
8. Where are there forests chiefly of trees that shed their leaves? What is the annual rainfall in this region?
9. Where are there prairies intermixed with forests? State the annual rainfall of the region.
10. What is the rainfall of the steppes supporting isolated trees and shrubs?
11. Where is the heaviest rainfall in the United States? Where are the heaviest forests?
12. Where is the region of least rainfall? The treeless country? How nearly do these regions coincide?
13. What do you infer concerning the relationship between rainfall and the development of forests? Verify your inference by data secured from South America, Eurasia, Africa and Australia. What is your final conclusion?
14. For your language lesson write a compo-
sition on "The Relation of Rainfall to the Forests of United States." Additional subject for composition: "Why Are Mountain Slopes Usually Forested?"

OUTLINE MAPS.

Teachers should make free use of "outline" maps of the various continents. Such maps can be purchased reasonably in quantities (address of publishers elsewhere given), or they can be made by teacher and pupils by means of a mimeograph, simplex, or other duplicator. Now let the problem be "The Distribution of Wheat in the United States." The pupil reviews his text, and other reference books at hand and then shades rather deeply with green water color the areas of largest production. Again referring to his text to ascertain the facts, he shades lightly with green the areas of medium or light production.

In similar manner the outline maps can be used to show the distribution of other products and resources. Our best geographies now contain distribution maps in limited numbers; the teacher should select problems in such a way that the exercises will not deteriorate into the mere copying of maps. To illustrate: Assume that the text contains separate maps showing distribution of coal and corn in United States. The problem may be: What part of the Corn Belt is underlaid with coal?

On an outline map draw a light line entirely around the corn belt. With water color shade
lightly. Allow the map to dry thoroughly. Now with pen and ink parallel-line very neatly those areas which abound with coal. The advantage of this map is that it presents graphically the coincident areas that produce both corn and coal. The impression made is stronger than when the eye is compelled to carry one graphic impression over to the second map for comparison. By selecting varieties of symbols a map may become cumulative, that is, a number of resources, all or in part coincident in their distribution, may be shown on one map. Such a map emphasizes the great wealth of certain areas, and, incidentally, explains the distribution of population.

ILLUSTRATIVE EXERCISES.

1. Show on one map the distribution of rice and sugar in the United States.

2. Show by dotted lines the commercial routes of iron ore from Duluth and Superior.

3. Shade on an outline map the areas of United States engaged in truck-farming. Show how these areas are related to thickly populated areas.

4. On an outline map show with different colors of ink three trunk railroads that reach Chicago from the east. Show two lines that extend from Chicago to the Pacific Ocean.

5. Shade with rather dark color that part of North America that was covered by the Great Glacier.
6. Color with rather deep green those regions of North America where the altitude is 500 feet or less. Color with light green the areas that are 500 feet to 1,000 feet in altitude. Color with light yellow the areas that are 1,000 feet to 2,000 feet high; with deeper yellow areas 2,000 feet to 5,000 feet high; and with deep brown all areas over 5,000 feet in height.

Nothing will deaden the interest and reduce the geography to mere memory work more surely and quickly than exclusive daily study and oral rehearsal of text-book statements. Such work reduces the pupil to a state of passivity. All statements look equally important on the printed page. The material of a text on geography is to be read, weighed and sifted for the ultimate purpose of reaching and applying the broad general principles of the subject. The text should never be learned merely for the sake of reciting it literally.

**Statistics.**

Large numbers never bring clear ideas. The teaching of statistics is time poorly spent. Teach areas of states approximately. Illinois, for example, may be learned exactly. With a map of United States before the class, require pupils to refer to tables of statistics to find area of Illinois. Now look at the map. Find other states about the same size as Illinois. Name these states. The pupils can be led to pick Wisconsin, Iowa, New York, Alabama, etc.
<table>
<thead>
<tr>
<th>Level</th>
<th>Membership Fee</th>
<th>Books per month</th>
<th>Payment Type</th>
<th>Price per Book</th>
<th>Save Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>$2.99/month</td>
<td>10 Books</td>
<td>monthly</td>
<td>$0.30</td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>$4.99/month</td>
<td>100 Books</td>
<td>monthly</td>
<td>$0.05</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>$19.99/year</td>
<td>10 Books</td>
<td>yearly</td>
<td>$0.17</td>
<td>$15.89</td>
</tr>
<tr>
<td>100</td>
<td>$35.99/year</td>
<td>100 Books</td>
<td>yearly</td>
<td>$0.03</td>
<td>$23.89</td>
</tr>
</tbody>
</table>
Production of Pig Iron in 1901.

<table>
<thead>
<tr>
<th></th>
<th>United States</th>
<th>Great Britain</th>
<th>Germany</th>
</tr>
</thead>
</table>

By the use of cross-section paper (ordinary paper can be ruled into centimeter squares) very significant graphs can be made, which will show not only productions, etc., for a given year, but the relative increase or decrease of several countries through a series of years. For illustrations of such graphs teachers should consult one of the standard commercial geographies.

Drill on pertinent statistics can be secured by making problems for the arithmetic lesson, which involve the selected values. Illustration:

1. What per cent of the world’s output of pig-iron is supplied by the United States?
2. Germany’s output of pig-iron is what per cent of United States’? Of the World’s? etc.

Outline maps are not expensive and can be filled in and used to excellent advantage by schools destitute of map equipment.

The “Standard Atlas” of the last census has valuable double page maps showing distribution of products, density of population, etc., etc. These maps can be removed, mounted on card board and be ready for instant use. The Atlas is valuable and can be had free.
MAP EXERCISES.

A little study on the part of the teacher will suggest numerous problems which the pupils can answer by reference to maps. Such exercises are recommended strongly since it is the conviction of the writer that pupils make too little use of maps generally. The following exercises suggested by Prof. A. W. Andrews will be found helpful:

"From a map without names showing elevation by shades of color, such as the Diagram Hand Map of the London District, to find the position of the chief towns at the gaps of the North Downs.

From a similar map of France to find the possible lines of march of Caesar.

From a similar map of India to show the regions of excessive rainfall.

From a similar map of South America to show the direction of the rain-bearing winds in the Amazon valley.

From maps of the Atlantic and Indian Oceans showing prevailing winds in January and July, to work out the winds likely to reach the land with an excess or deficiency of moisture, or to show the route of Columbus.

From maps of Africa showing rainfall in January and July to show the regions of permanent tropical forest, of savanna with an area extended or diminished according to rainfall, and of permanent desert.

* Journal of Geography, March, 1902.
From a series of maps showing climate and elevation to find the regions likely to produce rice.

From maps showing the density of population of Wales to find the coal mining districts.

From a map of Australia showing rail and telegraphs to show the area of densest population.

From a contour map of the North Sea or the Banks near Newfoundland, to find the main fishing centres.

From a map showing the amount of Africa explored in 1788, consisting of a rim round the coast, to work out the special difficulties presented by the configuration of the land.

But we would go further; carefully selected series of typical views lend themselves to the problem method quite as readily as maps. It would be easy to multiply instances.

From two views of the northern and southern slopes of the Alps, to find the points of the compass from a consideration of the presence and absence of snow."

MODELS.

The making of models is an excellent means of securing better notions of surface features. Printed descriptions lose force with children. Even if geographies contain good relief maps, the construction of a model will necessitate a more careful study of the relief map, and the mechanical work will deepen the impression. Better still, all such work makes the pupils doers rather than passive receivers.
PAPIER MACHÉ MODELS.

Excellent models can be made from papier mache. Secure a good bundle of old newspapers. Have the children tear them into small bits. Place in a jar or pail and cover with water and allow to
stand for two or three days. Drain off excess water. Then thoroughly work with a sharpened wood paddle until mixture becomes a thick, pliable mass. If thoroughly worked it is now ready for modeling. The outline of the map should previously have been made. Paper pulp models will keep well. Blue water-colors may represent bodies of water. Varnish or shellac will enable the model to resist moisture.

**SALT AND FLOUR MODELS.**

Good models can be made from a mixture of two parts of common salt and one of flour. Mix well (dry) between thumb and fingers. Add water very slowly, mixing all of the time. Continue until mixture has the consistency of wet sand. It is now ready for use.

The outline of the country should previously have been prepared. An easy way is to trace the outline from a text-book map, using transparent paper. This can be done quickly. Now lay this copy on a piece of cardboard (pasteboard boxes in every home can be had), and trace again with hard pencil or stylus. This imprints the outline on the cardboard, upon which the model is to be made. Apply the salt and flour mixture, spreading very thin, and covering completely over the area to be modeled. Now add more of the mixture to build plateaus and mountains. A flexible case knife is convenient to spread mixture. The thumb and fingers are good tools for mountain building. Relief maps from which to model are
found in all of the better geographies. Shiny cardboard may be brushed over with library paste before applying the mixture. This insures adhesion.

Before children make models, the teacher should discuss the surface with them. Mountains, plateaus, and lowlands should be pointed out.

Rivers can be scratched in with a pencil point while mixture is moist. Do not use too much of the mixture. The cardboard will absorb the moisture and become so weakened that model may
crack in handling. Light pine board may be used for the base. Water bodies adjacent to continent may be shown with blue water colors.

After the first time, children can prepare models at home. South America is a good continent with which to begin. Keep the models dry. A coating of shellac will help preserve them.

This exercise is very practical and highly commended.

Observe the model of North America made from the salt and flour mixture.

SAND MODELS.

There is no excuse for not modeling land forms. A modeling board 2 feet x 3 feet or 3 feet x 4 feet, with a rim 2 inches or 3 inches high, and two or three pails of sand, completes the requirements. Sand models can be made quickly and, as the material costs nothing, larger models can be made than was practicable with other material.

PLASTICINE MODELS.

Plasticine is a commercial modeling material. Circulars describing it and giving directions as to its use can be had on application.* Plasticine can be used over and over again. It can be used in geographical, historical and manual training work.

Procedure: "Flatten pieces of gray plasticine between finger and thumb, and press upon the pa-

* For addresses of companies that furnish modeling materials, see Chapter XXII.
Sorry, this page is unavailable to Free Members
You may continue reading on the following page

Upgrade your Forgotten Books Membership to view this page

<table>
<thead>
<tr>
<th>10</th>
<th>$2.99 / month</th>
<th>10 Books per month</th>
<th>Monthly payment</th>
<th>$0.30 per book</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>$4.99 / month</td>
<td>100 Books per month</td>
<td>Monthly payment</td>
<td>$0.05 per book</td>
</tr>
<tr>
<td>10</td>
<td>$19.99 / year</td>
<td>10 Books per month</td>
<td>Yearly payment</td>
<td>$0.17 per book</td>
</tr>
<tr>
<td>100</td>
<td>$35.99 / year</td>
<td>100 Books per month</td>
<td>Yearly payment</td>
<td>$0.03 per book</td>
</tr>
</tbody>
</table>

Memberships can be cancelled at anytime
Chalk and pencil models are relief maps. They are readily made with crayon on blackboard, or on paper with soft pencil. This method of showing relief is one of the most practical, as the pupil's equipment is so simple. Children love to work with the hands and very soon acquire the ability to make excellent light and shade maps.

In performing the work the crayon or pencil is held in an almost horizontal position between
the thumb and forefingers. When the pencil is used it should be very soft, with long “lead” exposed. Rub the pencil back and forth on rough paper until it is somewhat flattened. Ordinary drawing paper is a good surface upon which to make the pencil model, though scratch paper or light brown wrapping paper does well. No detailed directions for executing the work can here be given. A few suggestions may help the beginner:

Avoid lines with point of pencil; the strokes should be with the side of the lead.
Successive strokes should blend.
Horizontal strokes will represent level surfaces; oblique strokes, sloping surfaces, and vertical strokes, vertical surfaces.
Successively higher altitudes are shown by relatively deeper and deeper shadings.
Mountain ridges are usually represented with rather heavy strokes on one slope and light strokes on the other slope.
The height of mountain chains is represented by the length of the oblique strokes. Relatively longer and shorter strokes will represent relatively higher and lower mountain ridges.
Land at or near sea-level is very lightly shaded.
Note the illustrative pencil model of South America.
"Chalk Modeling," by Ida C. Heffron, is a

* See Bibliography.
most helpful volume, containing numerous illustrations and clear directions for modeling the various types of topography and land forms.

SUGGESTIONS AND QUESTIONS.

1. What is a map? A model? A relief map? An outline map?
2. How many ways of showing relief on a flat map? Of these ways which is the most practical for public school pupils?
3. What constitutes a good map drawing exercise?
4. Why are U. S. Geological Survey maps of special value? In what phase of geography are they most useful?
5. How can school atlases be used to advantage?
6. To what extent can graphic representation be employed in geography? By what method?
7. What use can be made of outline maps?
8. What advantage have models over relief maps? What caution is necessary in the use of models?
9. What is the educational value of modeling as a school exercise?

BIBLIOGRAPHY.

Dryer, Chas. R.—"Surveying and Mapping," Inland Educator, June, 1898.


Davis, King and Collie—The Use of Government Maps in Schools, Henry Holt & Co.


CHAPTER XXI.

SUGGESTIONS ON THE STUDY OF SOILS.

TOPICS TO BE CONSIDERED.

The study of soils; the origin of soils; character of soils dependent largely on aqueous bed-rock; law of deposition; the case of the Blue Grass region.

Transported soils; alluvial, glacial drift, loess; short descriptions of each; the Mississippi delta; the prairie plains; the loess of lower Mississippi valley.

Importance of maintaining the productive capacity of soils; elements of soil fertility; the new interest in agriculture.

The teacher of elementary geography should have some knowledge of soils. Any technical study of soils belongs, of course, to agriculture; but there are considerations wholly within the province of geography, a knowledge of which is quite essential to one who essays to teach grammar school geography.

Many text books of geography make formal statements concerning the soils of a state or region, but the necessity for brevity forbids any explanation of why the soils of said state or region are good or poor. It rests with the teacher to supplement and make significant the brief denotative statements of the text.

Teachers should know that soil is rock waste mixed with more or less organic matter. This
being true, no adequate understanding of soils is possible without some consideration of the rocks whose decomposition yields the soils. By far the larger portion of soils is the product of sedimentary rocks. If, perchance, we know the conditions under which the rocks were deposited, we shall have a key to the character of the soils which the rocks will yield.

Sedimentary rocks are aqueous rocks; that is, they were formed from materials deposited in a body of water. But a body of water, be it lake or sea, will be either shallow or deep; or, the same body of water may be shallow in one part and deep in another. In general, water is shallow near shore lines and deep some distance out. The waste of the adjacent lands is carried by streams into the water body. Now it is evident that heavy materials will settle quickly to the sea bottom and therefore such deposition will be along the shores. As finer waste of the lands settle more slowly sea-currents carry such materials farther out from shore before deposition occurs. When an old sea-bed is lifted and drained we should therefore expect to find the fine grained rocks at some distance from the old shores, and the coarse textured rocks near them.

It appears therefore that there is a sorting of the sediments, the order of deposition beginning with the coarsest and ending with the finest. These aqueous deposits will in time become rock through the agencies of pressure and cementation. But should the sea-bed be lifted, the rocks in time will
decompose and the resulting soils will be characterized by them. We should hardly expect good soils from the rocks and gravels which come from the conglomerate rocks along the shore. Neither would the coarse sandstone farther out yield rich soils, for sand crystals are not easily dissolved and the rootlets of plants cannot feed upon undissolved materials. The soils resulting from the finer sandstone will be somewhat better. The mud deposits will, of course, yield fine soils; and since muds contain much organic material, these soils will be rich.

Deep sea ooze hardens into limestone. Soils resulting from the decomposition of deep-water deposits are rich, for the ooze contains the calcareous remains of marine life forms, diatoms, globigerina, etc., which are rich in phosphates and lime. The disintegration of such solidified deposits produces fine rich soils. In general it may be said that

(a) Shallow sea-deposits yield sandy and gravelly soils of low fertility.
(b) Deep-sea deposits yield fine soils rich in organic substances and therefore of high fertility.

The application of the law of aqueous deposits explains the character of soils in many regions. The soils of the Blue Grass region of Kentucky, for instance, are very rich. The teacher should be able to explain such an empirical statement. There is a chain of associations which carries one in thought from the fields of hemp, tobacco and
blue grass, to the Paleozoic sea that once occupied the Mississippi valley; to its marine life with microscopic limy shells; to the deep-sea ooze somewhat west of the old Appalachian shore; to the beds of limestone which the ooze helped to form; to the diastrophic uplift which caused the sea water to retreat southward; and finally to the rock-weathering which converted the limestone into rich soil. This fertile Blue Grass region enticed Finley and Boone through Cumberland Gap into a land of "wonderful fertility and beauty. In its rivers, its plains, its forests, its gentle eminences, its bright skies and salubrious clime, it presented then, as now, as attractive a residence for man as this globe can furnish."

And all of these things are associated, in the mind of one who has made an intelligent study of the region in question.

What has been said refers to local soils. There are, however, large regions of transported soils and these will need to be understood by the teacher. Transported soils include alluvial, glacial drift and loess soils.

I. ALLUVIAL SOILS.

Alluvial soils are fine and of high fertility. They abound in river valleys and delta formations. The Mississippi delta affords a good illustration. The great wedge-shaped area with its base southward and its apex extending northward.

* Abbott's "Daniel Boone."
Sorry, this page is unavailable to Free Members
You may continue reading on the following page

Upgrade your Forgotten Books Membership to view this page

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Book Icon" /></td>
<td><strong>$2.99</strong> / month</td>
<td><strong>10 Books per month</strong>&lt;br&gt;Monthly payment $0.30 per book</td>
<td>Purchase</td>
</tr>
<tr>
<td><img src="image" alt="Book Icon" /></td>
<td><strong>$4.99</strong> / month</td>
<td><strong>100 Books per month</strong>&lt;br&gt;Monthly payment $0.05 per book</td>
<td>Purchase</td>
</tr>
<tr>
<td><img src="image" alt="Book Icon" /></td>
<td><strong>$19.99</strong> / year</td>
<td><strong>10 Books per month</strong>&lt;br&gt;Yearly payment $0.17 per book</td>
<td>Purchase</td>
</tr>
<tr>
<td><img src="image" alt="Book Icon" /></td>
<td><strong>$35.99</strong> / year</td>
<td><strong>100 Books per month</strong>&lt;br&gt;Yearly payment $0.03 per book</td>
<td>Purchase</td>
</tr>
</tbody>
</table>

Memberships can be cancelled at anytime.
fundamental facts of glaciation. The topography and soils of northern United States have received their character largely through the work of glaciers. As many good books have been written on glaciers and glaciation interesting science sketches await the perusal of teacher and pupil. Not alone have surfaces and soils been determined by glaciation; but commercial highways, industries and population have responded in turn to surface and soil condition.

Long, long after the great changes that made our country first land, then sea, came the great glacier from the north, grinding the shales and rocks to powder, scattering and spreading the rock-flour smoothly over the undisturbed rocks, leveling the hills, and "wiping out rivers as easily as a schoolboy wipes out chalk marks." This great glacier was hundreds—perhaps thousands—of feet in thickness, and it pushed and dragged the fine muds, sands, and clays, rich in lime and phosphorus, from the north and finally spread them evenly over our upper Mississippi valley, forming soils so productive that they have only "to be tickled with the plough to bring forth a harvest." We call them glacial drift soils, and every schoolboy should realize how much we owe the glacier for making and bringing in our soils. Indeed the finest fields of corn often feed on limy foods scraped from the Niagara limestone or Cincinnati shales of northern Illinois and southern Wisconsin, and laid down in the corn belt of the prairie plains. Who is not proud of this prairie
country with its great fields of corn, oats and grass; with its orchards and gardens; and with its luxuriant pastures where graze white-faced Herefords and dappled Percherons? This prairie country is level. There are no hills, just here and there miniature valleys and ravines, carved by waters of frequent storms. An occasional boulder lies sleeping by the roadside, but to him who is in tune with nature it whispers the interesting story of the Great Ice Age. No mountains and scarce a lake or waterfall break the monotony of its level expanse; but there is a rare beauty in the country road lined with elms and maples, in the cultivated fields of dark rich mold, and in the peaceful homes of plenty that dot a landscape whose surface and soils are products of glaciation.

III. LOESS SOILS.

The loess and loam in the Mississippi valley are flood-plain deposits of glacial debris. The melting of the Great Glacier, the southern margin of which corresponded roughly to the courses of the Ohio and Mississippi rivers, furnished floods which carried the finer morainic materials southward into Mississippi and Louisiana. The loess is of great thickness, which shows that it could not be a disintegration of the underlying rocks. Its vertical extent sometimes reaches one thousand feet. It does not show stratification, a fact which distinguishes it from the underlying rocks on which it lies. The absence of lime distin-
guishes it from the bluff formation along the Mississippi river.

The loess is often deeper as rivers are approached, a fact which shows that such channels were preexistent. Increased thickness is observed near the Mississippi, the Black and the Tombigbee rivers. The erosion of these loess surfaces now assists in the transfiguration of the country.

Loess and loam are continuous in Mississippi, though the latter is absent in the bluffs. They pass each other by insensible gradations.* The so-called loess-loam was deposited while the region was at sea-level and its position shows that no submergence has since occurred. As the great gulf into which the fine materials were deposited was not deep, the heavily loaded streams carried the fine sediments far outward. The later recession of water permitted winds to modify the position of the materials, hence both wind and water as agencies have assisted in their formations. The yellow loam is unstratified as a result of sluggish, overloaded streams, or of consequent modifications. No old shore lines are visible in these formations. The yellow loam is the latest deposit in northern Mississippi, extending fifty miles east of the Yazoo bluffs, and is described by Hilgard as the non-calcareous division of the loess. The loess proper is a fine calcareous clay, containing a great variety of land and fresh-water shells.

Loess soils the world over are very rich. The

*The geologist characterizes them as "homotaxial" and "synchronous."
loess deposits of eastern China are of great thickness and of rare fertility. Among the regions of the United States covered with loess, either wind-blown dust deposits or water-sorted glacial materials, are Nebraska, Kansas, and Oklahoma. The modified drift (the siftings of glacial drift redeposited from water) is found in considerable quantities along the Mississippi river, in parts of Iowa, Wisconsin, Illinois, and elsewhere.

Lava soils are the result of the decomposition of trap rock. Great fissures have been formed in the newer portion of our country, and from them much molten rock has been ejected; this volcanic material has flowed into the valleys and over the plains, sometimes for considerable distances. On cooling it solidified; but the resulting rock in time yielded to the processes of weathering and soils were formed from it. These soils are fertile, but lack of moisture often renders them unproductive.

The study of the origin of soils is interesting and profitable and the methods of maintaining their productive capacity is of immediate importance. Simple facts and principles, relating to the home neighborhood, are typical and may be taught in connection with geography.

It is not difficult to classify the soils and to associate the various types with physiographic regions. Their origin may then be recalled.

The general types of soil in the following regions may prove suggestive:

Atlantic Coastal Plains, sandy soils.
Gulf Coastal Plains, sandy, alluvial and loess soils.
Lake Plains, lacustral* soils.
Prairie Plains, drift soils.
Northern Appalachian valleys, limestone soils.
Columbia Plateau, lava soils.
Basin Region, lacustral soils.
Etc.

There are seven elements in the soils that are necessary to the growth of plants. These are: calcium, iron, magnesium, sulphur, phosphorus, potassium and nitrogen. Of these, the soils contain in large amounts, all except the last three.

Nitrogen is a gas and constitutes about four-fifths of the atmosphere. Teachers should make themselves familiar with the interesting science story that explains how bacteria live upon the roots of leguminous plants and how they gather nitrogen from the air and store it up as nitrates in the nodules of rootlets. If clover be pulled up by the roots and carefully washed, these nodules, if present, can be easily seen. Agricultural colleges furnish free bulletins relating to this practical department of science. Now that so much attention is given to agriculture such knowledge should be familiar to all elementary teachers.

Phosphorus is of great value to soils. It is removed through the sale of nearly all products of the farm. Much phosphorus is needed to produce the seeds of grains. It also goes into the bone structure of animals, hence any farm product is

* Fine deposits of ancient lakes.
likely to make a drain upon this important element of the soil. Soils deficient in phosphorus can be replenished through the application of rock-phosphate flour or bone meal. Beds of phosphate rock are found in Tennessee and Florida. These rock deposits are of high commercial value, the rock being quarried, ground and shipped even to foreign countries.

If soils are lacking in potassium it, too, should be added. Crude potash mineral can be purchased on the market under the name "kainit." Teachers would do well to secure bulletins from agricultural colleges, and to study selected portions of them with the children. Through the children the parents may become interested and, in this manner, the school will perform its highest service.

**ILLUSTRATIVE EXERCISES.**

Through outdoor study pupils can learn,

(a) To distinguish the various types of soil as clay, loam, sand, loess, etc.

(b) The depth of loam by actual measurement.

(c) The relative fertility of soils by observing growing crops.

(d) The porosity of soils by observing their ability to hold water upon their surfaces.

(e) The comparative depth of soils on hillsides and level tracts.

(f) The rapidity of erosion and the laws that govern the same.

(g) The soils that best maintain moisture.
(h) The soils that are poor in nitrogen from the color of growing plants.
(i) The influence of different kinds of fertilizers through the observation of growing crops.
(j) The bad effects of cultivating soils when too wet.
(k) The spread of roots in different crops, and the kind of cultivation required.
(l) The adaptation of crops to soils, etc.

Teachers will find Hunt's *How to Choose a Farm* helpful as a reference in the study of soils in any part of the United States.

With the ever increasing demands of the teacher he should still be optimistic. A little accomplished may be of great value, and an honest endeavor will surely bring its reward.

---

**SUGGESTIONS AND QUESTIONS.**

1. What is soil? How is soil formed?
2. What are aqueous rocks? How are they formed? Name the various classes.
3. Why are the soils that result from the weathering of limestone rich? Explain fully. Illustrate by reference to the Blue Grass region.
4. Why are sandy soils less fertile than limestone soils?
5. What is loess? What do you understand by "modified drift?"
7. Discuss the formation of lava soils.
8. What elements of the soil are most likely to be exhausted?
9. How can nitrogen be restored to the soil?
10. How can phosphorous be replaced?
11. Characterize the soils of the different regions of the United States.
Sorry, this page is unavailable to Free Members
You may continue reading on the following page

Upgrade your Forgotten Books Membership to view this page

<table>
<thead>
<tr>
<th>Books per month</th>
<th>10 Books per month</th>
<th>100 Books per month</th>
<th>Purchase</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>$2.99 / month</td>
<td>Monthly payment $0.30 per book</td>
<td>Purchase</td>
</tr>
<tr>
<td>100</td>
<td>$4.99 / month</td>
<td>Monthly payment $0.05 per book</td>
<td>Purchase</td>
</tr>
<tr>
<td>10</td>
<td>$19.99 / year</td>
<td>Yearly payment $0.17 per book</td>
<td>Purchase</td>
</tr>
<tr>
<td>100</td>
<td>$35.99 / year</td>
<td>Yearly payment $0.03 per book</td>
<td>Purchase</td>
</tr>
</tbody>
</table>

Memberships can be cancelled at anytime
CHAPTER XXII.

Suggestions Relative to Placing Emphasis in Teaching Geography.

Topics to be Considered.

Pronunciation of geographical names. Drill on spelling of names.

The significance of geographical names. Illustrations.

Definitions. Some statements should be definite and should be learned. Latitude and longitude as illustrations.

Facts of location and direction should receive some drill. Illustrations. Locational facts of little value; of much value.

Statements of principles and laws should be accurate. Not many should be taught.

The value of some facts has been overestimated. Examples.

Summaries to illustrate what pupils should know.

Relational or rational geography needs little drill.

In order to secure satisfactory results from the study of any subject, definite aims must be in the mind of the teacher. So far as geography is concerned, no educator or group of educators has, as yet, clearly set forth definite standards of attainment, generally accepted by the elementary school. In a way, courses of study set up such standards, but usually they are so comprehensive and inclusive that, so far as pointing out the absolutely essential is concerned, they are of little worth. To take seriously everything found in the ordinary course of study, means no emphasis of essentials. It is a case where "too many intensives fail to intensify."
Still there is a general feeling among educators that the results of geographical teaching are not commensurate with the time and effort expended. In the light of this fact, it would seem that indeterminateness of aim and method is a vulnerable point of attack. Geography is essentially a content study—a fact that complicates the problem. In the more formal subjects there is an element of definiteness that springs from their very nature. The question of organization and ends concerns the teacher of foreign language but little. In general, geography as a school subject is informational, explanatory, significant, relational. Desired results, however, fall into two categories: (1) acquisitions requiring concise expression to be valuable, and (2) acquisitions of connotative or significant character, and not requiring equal exactness in expression. All ideas of whatever kind should be clear and definite; but the truths in the first category should be clearly and concisely stated, while those in the second category need not be reduced to equal accuracy of form to be valuable.

In the first category belong all statements of fact or principle that are directly useful in determining empirical results or in reaching logical conclusions. Definiteness of thought and statement should attend—

a. Pronunciation and spelling of geographical names.
b. Definitions, as in mathematical geography.
c. General directions and locations.
d. Statements of physiographic and economic principles, facts, and laws.
e. Statistical units to serve as keys.

While it is not to be inferred that large numbers of geographical names are to be memorized, it is very desirable that accuracy in spelling and pronunciation of important names be secured. Altogether too much careless work is permitted in this regard. Accuracy is not urged as an end in itself, but for its usefulness and value generally. Many geographical names have historical significance, and whatever of mastery is gained in geographical drill will function immediately in history, literature, etc.

Drill should be given on those names only that have become "settled" and are in common usage. Try pronouncing the names of the states of the Union. Look up the correct pronunciation of any about which you are in doubt. How many pronunciations of "Illinois," "Arkansas," and "Missouri," can be heard in our school-rooms! Is it not worth while to have correct pronunciation become a habit early in school life? The stirring song, "Not without thy wondrous story, Illinois, Illinois," will be more beautiful if the name is pronounced Ill-i-noi'; and the song itself may offer good opportunity for drill.*

* See International Geography, Mill, p. 33.
Test yourself and your pupils on the pronunciation of:

Alabama
Louisiana
Colorado
Hawaii
Missouri
Asia
Persia
Roumania

Spokane
Seattle
New Orleans
Sierra Nevada
Vienna
Los Angeles
Nagasaki
equator, etc.

If the teacher is alert, no great amount of time need be taken to have a reasonable number of important geographical names well fixed as to spelling and pronunciation. Short, lively drills are usually enjoyed by pupils, and they should be given frequently. In rural schools the exercise may be general, as it may also in graded schools where two or more classes occupy one room. Equal attention should be given to the spelling of selected names. Try these:

Delaware
Philippine
Cincinnati
Manila

Gibraltar
Alleghany
Mediterranean
Arctic, etc.

In this connection, also, the meaning of geographical names should receive some attention. As there is really no limit of what could be accom-
plished in this direction, it is wise to select a few of special significance. Illustration:

Spanish—
San Salvador—Holy Savior.
Rio Negro—Black River.
Buena Vista—Good View.

German—
Schwarzwald—Black Forest.
Konigsberg—King’s Hill.
Rotterdam—Dam (or dike) of Rotter River.

English—
Gloucester—Bright fortress.
Edinburgh—Edwin’s town.
Norwich—Northern town.
Suffolk—South folk.

French—
Eau Claire—Clear water.
La Havre—The Harbor.
Detroit—The Strait.

Swedish—
Bergen—Mountains.
Stockholm—City on stakes.

Indian—
Minneapolis—City of Minnehaha.
Pueblo—Village.
Wisconsin—Rushing channel.
Asiatic—
Hindoostan—District of the Indus.
Yang-tse—Son of the Sea.
Fusiyama—Great mountain.
Mesopotamia—Middle of the rivers.

By constant reference to maps, some cardinal points may be well fixed in the mind through this drill. And frequently helpful associations with history can be effected through the significance of names. In the study of Washington and Oregon, for example, the local names are full of historical suggestion. Vancouver Island named for the English explorer; Puget Sound for Peter Puget, who accompanied Vancouver; Columbia River after Captain Gray’s ship; Astoria after John Jacob Astor, who established a fur-trading station there; Cape Disappointment, because the Spanish explorer Meares was outstripped by Captain Gray in rounding the bar to enter the Columbia River; Gray’s Harbor after Captain Gray; Strait of Juan de Fuca after the Greek navigator sailing in Spanish service under the sobriquet, “Juan de Fuca,” etc.*

Definitions, to be of the highest value, must be very accurate and concise. However, definitions should not be taught dogmatically, but should be developed inductively. The idea or conception is always of first consideration. Neither are many definitions essential or desirable. But there are

some that are so fundamental that to learn them well is a matter of convenience and economy. Definitions of latitude and longitude are of this kind. A large percentage of pupils define latitude as the "distance north and south of the equator." Such a definition indicates inaccuracy of thought, and surely reflects upon someone's teaching. Correct the fallacy of the definition by changing and to or, and then strengthen it by adding the phrase, "measured on a meridian." When pupils see the full meaning of the definition, "Latitude is distance north or south of the equator measured on a meridian," it is good pedagogy and surely good economy to have it learned once for all. Similarly, longitude is "distance east or west of a prime meridian measured on a parallel."

The examination of normal students reveals a poor conception of "equator." The old notion of "an imaginary line around the earth" is prevalent. This definition is both worthless and dangerous as contrasted with the terse and strong statement, "The equator is a great circle of the earth perpendicular to its axis." But this definition must follow the true conception of great circle, together with the conception that there can be only one such circle perpendicular to the earth's axis.

Such old and faulty definitions as "A volcano is a mountain that sends forth fire, smoke, and lava" should be abandoned. A volcano is an opening in the earth's crust through which internal materials are ejected; whenever a mountain
Sorry, this page is unavailable to Free Members
You may continue reading on the following page

Upgrade your Forgotten Books Membership to view this page

<table>
<thead>
<tr>
<th>Level</th>
<th>Monthly Price</th>
<th>Books Per Month</th>
<th>Payment Details</th>
<th>Purchase</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>$2.99 / month</td>
<td>10 Books</td>
<td>Monthly $0.30</td>
<td>Purchase</td>
</tr>
<tr>
<td>100</td>
<td>$4.99 / month</td>
<td>100 Books</td>
<td>Monthly $0.05</td>
<td>Purchase</td>
</tr>
<tr>
<td>10</td>
<td>$19.99 / year</td>
<td>10 Books</td>
<td>Yearly $0.17</td>
<td>Save $15.89 Purchase</td>
</tr>
<tr>
<td>100</td>
<td>$35.99 / year</td>
<td>100 Books</td>
<td>Yearly $0.03</td>
<td>Save $23.89 Purchase</td>
</tr>
</tbody>
</table>

Memberships can be cancelled at anytime
5. The Hundredth Meridian West from Greenwich.
6. The Hundredth Meridian East.
7. The Twentieth Meridian East.
8. The Sixtieth Meridian West.

With a few locations and directions thus well established, pupils will be able to approximate distances and locations for practical needs. To insist on the exact location of all countries by latitude and longitude would be to place emphasis upon the unessential and unfruitful.

Principles, inductively developed and therefore understood, can well be memorized. The number of such principles will not be large, and their statement should be terse and exact. However, such statements are generalizations the value of which has already been discussed in Chapter IX, p. 132. Principles are quite as likely to be economic as physiographic. Reference to the importance of economic principles has been made on pp. 89-90. Indeed, it is with them that commercial geography is ultimately concerned, and all representative texts on the subject devote considerable space to the exposition of these laws and principles.

Definiteness also should attend the teaching of statistical units which should serve as keys in the interpretation of text materials and in comparisons. So far as notions of distant lands are concerned, they will be of necessity only approximately correct. If our standards of interpretation and comparison are quite wrong to begin with, we
shall be far from the truth in our final conceptions. In saying that standards should be correct, it is meant that they should be correct within reasonable limits; e. g., mountains should be measured in miles, certainly not more accurately than in even thousands of feet; areas of countries in round numbers of thousands, etc. Thus, Pike's Peak is three miles high and Mt. Washington one mile high; Illinois has an area of 50,000 square miles, and Texas an area of 250,000 square miles; the distance in a straight line from Chicago to Boston is approximately equal to the distance from Chicago to Denver; from Chicago to New Orleans; from Chicago to Jacksonville, Florida. The population of Cincinnati is approximately equal to that of Milwaukee; of Antwerp, Belgium; and of Alexandria, Egypt.

In like manner, statistics of production should be reasonably accurate. A limited number only should be learned to serve as standards of comparison, but these should be learned thoroughly. (Reference to the use of statistics has been made on p. 248.) The somewhat questionable results now attained in geography are the result of the educational sentiment that has underestimated the knowledge of facts. Some facts, some laws, must be learned in the study of geography, or the whole intellectual structure will be without substantial framework. So the completion of the course should presuppose the knowledge of a limited number of generalized facts of current interest and general usefulness. It matters little
to just what these facts relate, so long as the above requisites be satisfied. For example, sugar is a staple food product and figures in every tariff schedule of the United States. A well-trained grammar school pupil should have some idea of the rank of the United States as a sugar producing country, if later as a citizen he shall be entitled to an opinion on the justice of a tariff on this commodity. Hence the pupil should have learned something of the leading sugar producing regions of the world and should know how his own country compares with them in its production. In like manner, rather definite notions should be gained relative to the production of iron, coal, copper, gold, corn, wheat, cotton, tobacco, live stock, etc.

In a negative way it may be well to point out some phases that have, in the past, been overemphasized. There is little value, in the long run, in "bounding" countries, and as soon as the regional unit is generally recognized, there will be less occasion for spending energy in this direction. So, too, the description of rivers is not very fruitful. Knowledge of this sort should be learned incidentally through the sketching of maps and in that study of maps in which mere form is not the object of attainment.

Too much effort should not be given to the learning and locating of cities. A limited number of commercial, manufacturing, and historical places should be carefully located and thoroughly fixed in mind. Liverpool, San Francisco, Rio
Janeiro, and New Orleans; Cleveland, Grand Rapids, Lyons, Manchester, and Birmingham; Manila, Bennington, Waterloo, Gettysburg, Lucknow, and Richmond are examples of cities that for obvious reasons should be well fixed and properly associated in the mind.

In general, also, there is little reason for learning capes, bays, straits, etc., for any intrinsic value that these names possess.

But whenever such features function as economic or strategic points, they should be learned. Gibraltar, because it controls the entrance to the Mediterranean; Hong-Kong, because it is an important British coaling and trading station; the Hawaiian Islands, because of their location in the midst of the Pacific Ocean, and their consequent economic and strategic value to the United States; and the Suez Canal, because of its commercial importance, all illustrate true locational values in geography, and so point to facts that should be emphasized and well known by pupils on their completion of the elementary school.

In a larger way, also, pupils should be able to image the continents in their relative positions on the globe, and should be able to make rapid free-hand sketches of them, showing the major features of their outlines. They should have clear mental pictures of the salient relief features and appreciate their influence upon climate, upon distribution of population, commerce, etc. For example, pupils, at the completion of the elementary school,
should be able to sketch South America from memory; to show the Orinoco, Amazon, and La Plata rivers; to show the location or trend of the Guiana and Brazilian Highlands and the Andes Mountains; to locate a half dozen important cities—e.g., Rio Janeiro, Buenos Aires, Valparaiso, etc.; to be able to explain the effects of the mountain ranges on climate and rainfall, e.g., the causes for heavy precipitation in western Brazil and for the aridity of northern Chile; to associate with the larger regions of the country their sources of wealth, industries, etc. It is not desirable or reasonable to expect pupils to be able to indicate the exact boundaries of political divisions, or even locate their capitals, though the gross outlines of the countries should be acquired. That Chile, e.g., is a long, narrow country west of the Andes and bordering the Pacific Ocean; that the precipitation is heavy in the south and very light in the north; that its leading exports are wool, hides, wheat, sodium-nitrate, and guano; that its trade is chiefly with Great Britain and Germany; and that Valparaiso is its leading port; these facts, if understood, would indicate good results from the teaching of this particular country. Taking South America as a whole, a resume like the following, taken from Dodge’s *Advanced Geography*, would seem adequate, if the individual statements can be explained and made meaningful by the pupils:

“South America is, on the whole, unprogressive, except in the countries of the temperate belt and
in Brazil. The governments are unstable, revolutions are frequent, and business cannot therefore be carried on successfully. The continent is deficient in railroads and highways, and hence the native riches are not developed. The exports are mostly mineral and cattle products, except in the few scattered agricultural regions. The imports are chiefly foodstuffs and manufactured goods, especially textiles and steel. It is anticipated that when the Panama Canal is completed, so that commerce can be readily carried on between the western coast and the large commercial centers of the United States, the continent will develop rapidly.’’

II.

Ultimately, the richest phase of geography is that which is explanatory and significant, i.e., the rational. It is this phase which leads to an appreciation of physical environment. No instruction in geography that stops short of this acquirement can be considered fruitful. Often large numbers of formal facts are learned by pupils, but no genuine appreciation awakened; no permanent interest aroused; no oneness with Nature ever felt. Geography, broadly considered, is humanitarian. The real test of its worth lies in the inclination and power to interpret. A ramble through the meadows, a walk by the brook, a quiet hour by

*See Generalization and Organization of Geographical Materials, Chap. XIV.
the lake-shore or sea-side, is delightful—yes, fascinating to him whose eyes are fully open and ‘to him who in the love of Nature holds communion with her visible forms.’

Pupils in the grammar grades can catch something of this deeper meaning, if rightly taught. And the most fruitful method is that which brings pupils and earth phenomena into direct contact. Often, very often, cold formal statements are the only agencies employed by teachers, and the results obtained are fragmentary and unvitalized. But excursion, experiment, and museum are agencies through which a genuine awakening can be effected. It would be very difficult to designate the exact number or kind of ‘earth friendships’ that any class of pupils should make. Indeed, it matters little just what they are, if only a reasonable number are established. The kind should be determined very largely by the immediate environment of the particular pupils in question. Since all of the relationships of geography point to a relatively small number of laws for their explanation, it is often immaterial what relationships are considered, so long as the basal conception is gained. Thus, for example, the slow uplift of the continental margin in South Carolina, Georgia, and Florida, has caused a retreat of the sea-water and a consequent shallowing of the embayments, which otherwise might have afforded good natural harbors. Occasionally a downward oscillation in some locality, as at Mobile, Alabama, has preserved an advantageous
<table>
<thead>
<tr>
<th>Books Per Month</th>
<th>Membership Type</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>10 Books per month</td>
<td>$2.99 / month</td>
</tr>
<tr>
<td>100</td>
<td>100 Books per month</td>
<td>$4.99 / month</td>
</tr>
<tr>
<td>10</td>
<td>10 Books per month, Yearly payment</td>
<td>$19.99 / year</td>
</tr>
<tr>
<td>100</td>
<td>100 Books per month, Yearly payment</td>
<td>$35.99 / year</td>
</tr>
</tbody>
</table>

Memberships can be cancelled at anytime.
SUGGESTIONS AND QUESTIONS.

1. History has a geographical basis. Literature, also, may involve the geographical.

2. In connection with the study of Gloucester, Massachusetts, as a fishing station, read "'Skipper Ireson’s Ride’"; in connection with Mobile, read "'The Bay Fight’"; in connection with Sebastopol, Crimea, read "'The Charge of the Light Brigade,’" etc.

3. Suggest several good drill-exercises for geography.

4. To emphasize everything, means no emphasis at all. Discriminate sharply between the important and essential, and that which is interesting only.

5. How often in your daily experience do you find it advantageous to know that Mt. Kilimanjaro is 19,000 ft. high? What value would you assign to this fact?

BIBLIOGRAPHY.

Tarr, Whitbeck, Genthe, and Jefferson—‘Results to be Expected from a School Course in Geography,’ Journal of Geog., April, 1905.


Emerson, Philip—‘Results of an Elementary Course in Geography,’ Journal of Geog., Dec., 1904.

APPENDIX.

BIBLIOGRAPHY OF THE PEDAGOGY OF GEOGRAPHY.

Davis, W. M., Progress of Geography in the Schools, First Year Book, Herbart Society.
Frye, A. E., How to Teach Primary Geography, Ginn & Co.
King, Chas. F., *Methods and Aids in Geography*, Lee & Shepard.


Mill, H. R., Geography in European Universities.


Trotter, Spencer. "The Social Function of Geog-

BIBLIOGRAPHY OF SUBJECT-MATTER.
Adams, C. C., Commercial Geography, D. Appleton Co.
Ball, R., The Cause of an Ice Age, D. Appleton Co.
Ball, R., The Earth's Beginnings, D. Appleton Co.
Bonney, T. G., Ice Work, Past and Present, D. Appleton Co.
Bonney, T. G., Volcanoes, G. P. Putnam's Sons.
Brigham, A. P., Geographic Influences in American History, Ginn & Co.
Carpenter, F. G., Geographical Readers, American Book Co.
Chamberlain, J. F., How We Are Clothed, The Macmillan Co.
Chamberlain, J. F., How We Are Sheltered, The Macmillan Co.
Chamberlin & Salisbury, Geology, Henry Holt & Co.
Chisholm, C. G., Commercial Geography, Longmans, Green & Co.
Coe, Fannie E., Our American Neighbors, Silver, Burdette & Co.
Cook, Joel, America, Picturesque and Descriptive, John C. Winston Co.
Darwin, Charles, Corals and Coral Islands, Dodd, Mead & Co.
Davis, W. M., Elementary Meteorology, Ginn & Co.
Davis, W. M., Elementary Physical Geography, Ginn & Co.
Dexter & Garlick, Object Lessons in Geography, Longmans, Green & Co.
De Windt, H., Through Savage Europe, J. B. Lippincott.
Dodge, R. E., A Reader in Physical Geography, Longmans, Green & Co.
Dryer, C. R., Physical Geography, American Book Co.
Dutton, C. E., Earthquakes, G. P. Putnam’s Sons.


Freeman, E. A., *Historical Geography of Europe*, Longmans, Green & Co.


Gifford, J. C., *Practical Forestry*. 
Sorry, this page is unavailable to Free Members

You may continue reading on the following page

Upgrade your Forgotten Books Membership to view this page

<table>
<thead>
<tr>
<th></th>
<th>$2.99 / month</th>
<th>10 Books per month</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td></td>
<td>Monthly payment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$0.30 per book</td>
</tr>
<tr>
<td></td>
<td>Purchase</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>$4.99 / month</th>
<th>100 Books per month</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td></td>
<td>Monthly payment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$0.05 per book</td>
</tr>
<tr>
<td></td>
<td>Purchase</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>$19.99 / year</th>
<th>10 Books per month</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td></td>
<td>Yearly payment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$0.17 per book</td>
</tr>
<tr>
<td></td>
<td>Save $15.89</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Purchase</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>$35.99 / year</th>
<th>100 Books per month</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td></td>
<td>Yearly payment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$0.03 per book</td>
</tr>
<tr>
<td></td>
<td>Save $23.89</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Purchase</td>
<td></td>
</tr>
</tbody>
</table>

Memberships can be cancelled at anytime
Le Conte, Jos., *Compend of Geography*, American Book Co.
Perry, Mason & Co.—The Companion Series:

Our Country: East.
Our Country: West.
By Land and Sea.
Talks About Animals.
Northern Europe.
Under Sunny Skies.
Toward the Rising Sun.

Pinchot, Gifford, Primer of Forestry, Department of Agriculture.


Powell, J. W., and Others, Physiography of the United States, American Book Co.


Redway, J. W., Commercial Geography, Charles Scribner's Sons.

Redway, J. W., Physical Geography, Chas. Scribner's Sons.

Redway, J. W., Physical Geography of the Mississippi River, D. C. Heath & Co.


Ritter, Carl, Comparative Geography, American Book Co.

Shaler, N. S., *Outlines of the Earth's History*, Chas. Scribner's Sons.
Taylor, Bayard, *Boys of Other Countries*, G. P. Putnam’s Sons.
Vincent, F., *Actual Africa, or the Coming Continent*, D. Appleton Co.

A SMALL BUT VALUABLE GEOGRAPHICAL LIBRARY
FOR RURAL SCHOOLS.

2. *Commercial Raw Materials*, Toothaker, Ginn & Co 1.25
3. *A New School Atlas*, Longman, Longmans, Green & Co... 1.50
4. *Geographical Influences in American History*, Brigham, Ginn & Co ................. .... 1.25
5. *Starland*, Ball, The Cassell Co.......................... 1.60
6. *A Reader of Physical Geography*, Dodge, Longmans, Green & Co ... ....... .... 70
7. One Standard Commercial Geography selected from the following list:
   (a) *Commercial Geography*, Adams, D. Appleton. ... 1.10
   (b) *Geography of Commerce*, Trotter, Macmillan Co.... 1.10
   (c) *Commercial Geography*, Redway, Charles Scribners.. 1.25
   (d) *Handbook of Commercial Geography*, Chisholm, Longmans, Green & Co. ....... 4.80
   (e) *Geography of Commerce and Industry*, Rocheleau, Educational Publishing Co .... 1.00

8. One set of Geographical Readers chosen from the following:
(a) Carpenter, American Book Co.:
North America ............... .60
South America .................. .60
Europe .......................... .70
Asia ................................ .60
Australia, Our Colonies and Other Islands of the Sea .......... .60
Africa ................................ .60
Industrial Reader, Foods .......... .60

(b) The World and Its People, Silver, Burdette & Co.:
Our Own Country, ............... 50
Our American Neighbors ............ 60
Modern Europe .................. .60
Life in Asia ....................... .60
Views in Africa ................... .60
Australia and the Islands of the Sea ........... .68
Hawaii and Its People ............. .68
South American Republics .......... .60

(c) Picturesque Geographical Readers—Charles F. King, Lee & Shepard:
Home and School .................... 58
This Continent of Ours .............. 83
The Land We Live In, Part I ......... 64
The Land We Live In, Part II ........ 64
The Land We Live In, Part III ...... 64

9. How We Are Clothed, How We Are Sheltered, and How
We Are Fed, Chamberlain, 3 Vols., Macmillan Co., each. .40
10. Home Geography, Fairbanks, Educational Publishing Co. .60
11. About the Weather, Harrington, D. Appleton Co. .65

A MAP EQUIPMENT FOR A RURAL SCHOOL.

No school, however small, should have less than the following equipment of maps:
1. World Mercator's Projection.
2. Eastern and Western Hemispheres.
3. United States, Canada and Mexico.
4. Eurasia.
Sorry, this page is unavailable to Free Members
You may continue reading on the following page

Upgrade your Forgotten Books Membership to view this page

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
</table>
| ![Book Icon](image) 10 | **$2.99** / month | 10 Books per month
Monthly payment $0.30 per book | Purchase |
| ![Book Icon](image) 100 | **$4.99** / month | 100 Books per month
Monthly payment $0.05 per book | Purchase |
| ![Book Icon](image) 10 | **$19.99** / year | 10 Books per month
Yearly payment $0.17 per book | Purchase |
| ![Book Icon](image) 100 | **$35.99** / year | 100 Books per month
Yearly payment $0.03 per book | Purchase |

Memberships can be cancelled at anytime.
W. M. Welch & Co., 179 Illinois St., Chicago, Ill... . . . . . . . . . . . . . 11.00

Any of the above maps may be purchased singly as follows:

A. C. McClurg & Co., Wabash Ave. and Adams St., Chicago . . . . . . . . . . . . . . $1.70
W. M. Welch & Co., 179 Illinois St., Chicago 2.00
M. A. Donahue & Co., 407 Dearborn St., Chicago . . . . . . . . . . . . . . . . . 2.25
Atlas School Supply Co., 315 Wabash Ave., Chicago . . . . . . . . . . . . . . . . . . . 2.00
A. Flanagan & Co., 268 Wabash Ave., Chicago . . . . . . . . . . . . . . . . . . . . . 2.00
J. L. Hammett Co., 250 Devonshire St., Boston, Mass . . . . . . . . . . . . . . . . . . . 2.33
Rand, McNally & Co., Chicago, Ill. (Kiepert's Imported) . . . . . . . . . . . . . . . . . . . . . . . 6.00
Hall & McCready, 261 Wabash Ave., Chicago 2.00

Excellent state maps may be secured from almost any of the above companies at about $2.00 each.

IDEAL MAP EQUIPMENT FOR A RURAL SCHOOL.

1. One set of eight up-to-date authentic political maps showing latest geographic discoveries and political changes.
   See list and prices given in "Minimum Equipment for Rural Schools."

2. A blackboard outline map of United States.
   A. H. Andrews & Co., 178 Wabash Ave., Chicago. $2.00
A. Flanagan & Co. ........................ 1.50
A. C. McClurg & Co. (in Diamond  roller case) . . . . . . . . . 4.50
J. L. Hammett & Co. (in roller case) 3.75

3. One physical wall map of North America and one of Europe.
   Rand, McNally & Co. (imported),
   Kiepert's ............. ........ $ 9.00
   Rand, McNally & Co. (imported),
   Sydow-Habenicht . . . . . . . . . . 15.00

4. One suspension globe. Necessary, as hemisphere maps distort directions, divide oceans and sever ocean cables, ocean currents, isothersms, etc.
   The Sturgis Co., 1030 Warren Ave.,
   Chicago, Ill.
   18 1/2 in. globe $16.75
   Rand, McNally & Co.
   18 1/2 in. globe . . . . . 18.00
   12 in. globe . . . . . . 6.25
   A. Flanagan & Co.
   12 in. globe . . . . . . . . 8.00
   Hall & McCreary.
   18 in. globe . . . . . . 16.00
   A. C. McClurg & Co.
   18 in. globe . . . . . . . 12.50

5. One large scale indexed state map.
   Rand, McNally & Co. (in Diamond case) $4.80

6. Reversible map, U. S. on one side, the World on the other. Shows railroads, large cities, steamship and cable lines and ocean currents.
   A. C. McClurg & Co  $1.80
THE

308

One

7.

OF

outline

blackboard
A.

"

Flanagan

GEOGRAPHY

of the

map

state.

Co

Politico-Relief

One

8.

TEACHING

$1.50
of

Map

United

States

(a model).
Atlas

EXCELLENT

that

rural

EOE

is included

school

A

in

Co

$17.00

VILLAGE

an

GRADED

ideal

SCHOOL.

equipment

for

the

with

following additions:
A
of each
of the continents,
physical map
either Kiepert's or Sydow-IIabenicht's.
One
complete set of Politico-Relief
maps
(models), [is follows:

1.

2.

Atlas

America.

1.

North

2.

South

3.

Europe.

4.

Asia.

5.

Africa.

G.

United

States.

7.

World

Mercator's

America.

Projection.

'.
Supply Co
School
Supply House, Chicago.

$100.00

School

Central
Should

Howell

the very

Bausch

best be desired,

Series, Washington,
LANTERNS

" Lomb

The

Buckeye

The

Mackintosh

Chicago,
T.

Supply

EQUIPMENT

All
a

School

.

.

the E. E,

I). C.

LANTERN

SLTDES.

Optical Company, Rochester, N.Y.
Co., Cleveland, Ohio.
Stereoptieon Co., Randolph St.,
111.

IT. McAllister
N. Y.

AXD

secure

100.00
.

Co., 40

Nassau

St., New

York,


The Badger Stereopticon Co., Platteville, Wis.
Moore, Bond & Co., 106 Franklin St., Chicago, Ill.

PICTURES.
The Nature Study Publishing Co., 521 Wabash Ave., Chicago, Ill.

MODELING MATERIALS.
J. L. Hammett, 116 West 14th St., New York.

STEREOSCOPIC VIEWS.
Underwood & Underwood, New York City.
The H. C. White Co., 770 Monon Bldg., Chicago.
Adjustment to environment, 21; 28.
Adjustments, in geography, place, 87-9; economic, 89-90; political or social, 91.
Agassiz, old lake of, 31; 88.
Agriculture, 55.
Aims of geography, 80-93; as defined by educators, 80-86; as adjustment to environment, 86-91; correlative aims, 91-92; practical aims, 92; culture aim, 92-93.
Alabama, soils of, 31.
Alluvial soils, 264-265.
Altitude as control, 29.
Arguments in favor of a regional treatment, 163-164.
Assignments, unpurposeful, 173; purposeful, 174-175; illustrative, 176-177; text assignments, 181.
Astronomy, as related to geography, 57.
Atmosphere as a control, 32.
Barometer, how to make, 218-219.
Biology, as related to geography, 51-55.
Blue Grass Region, 21.
Bryce, James, quoted, 56; on aims of geography, 81-82.
Caldwell, Otis W., quoted on nature study values, 18-19.
Causal element in organization, 165-169.
Cause and effect in geography, 23.
Civilization, its test, 114.
Climatic provinces, 29.
Controls, defined, 35; temperature as, 29; barriers as, 53; moisture as, 39; soil as, 31.
Coin law of England, 117-118.
Correlative aims of geography, 91.
Cotton industry of Alabama, 31.
Culture aim of geography, 92-93.
Cycle, The, 131.
Davis, W. M., quoted, 21; 36; 136; on aims of geography, 81.
Deductive lesson, 156-159.
Descriptive geography, 44-46.
De Velde, H. S., quoted on value of magazine articles, 187.
Diatrophism discussed, 128-130.
Dodge, R. E., quoted on aims in Geography, 82; on regional geography, 163.
Drainage canal an illustration of human control, 35.
Driftless area, 74-76.
Economics adjustment, 89-90.
Economics involved in geography, 102-105.
Emphasis, necessity of, 274-289; on pronunciation and spelling, 275-277; on meaning of names, 277-279; on geographical definitions, 279-281; on locational facts and statistics, 281-284; danger of over-emphasis, 281-287; emphasis on rational phase, 287-289.
Excursions, school, 208-211; why valuable, 209; suggestive industrial excursions, 210; field excursions, 211-214; 288.
Field work, 211; preparation for, 212; suggestive field studies, 213-214.
Fiske, John, reference to, 32; 109.
Formalism in education, reaction against, 169-170; how avoided, 186; 205.
Fox river, sub-glacial channel, 131.
Galveston catastrophe, 32.
Generalization, importance of to teacher, 131-132; 166-171.
Geography, as a science, 19; a study of relationships, 19-21; its inherent interest, 20; its breadth of scope, 21; its richness, 21; comprehensive treatment includes, 22; a science, 23; concerned with controls, 36; with nature study, 41; its manifoldness, 52; as applied
science, 55; central position in group of sciences, 58; cannot ignore science, 59-60; relation to history, 67-78; as a preparation for citizenship, 101.

Geographic materials, the test of, 126.

Geographic influence in history, 63-66; case of New England, 65-68; case of La Salle, 72-78.

Geological survey maps, 2-9; how to use them 241-244; illustrative exercises: Boothbay sheet, 241; Donaldsonville quadrangle, 213.

Geology, its relation to geography, 30.

Government publications, 180-190.

Gradation, the process discussed, 131-142.

Harris, W. T., on nature of geography, 21; on aims of geography teaching, 82-83.

Helior, instructions for making, 219; exercises with, 221-223.

History, as related to geography, 63-78; 117-119.

Hubbard, G. D., quoted on geographic influence on human affairs, 64.

Human control of geographic factors, 31.

Human development in tropical regions, 111-112; in Arctic regions, 112-113; in temperate regions, 113-114.

Human geography, 95-106; defined, 96; illustrations of, 97.

Illinois farmer, 119.

Illinois river, 12.

Indiana, 9.

Inductive lesson in geography, 10.

Industrial excursions, 208-209; preparation for, 210; subsequent use of, 211.


Industries, how determined, 74-78; 115; how localized, 115; influence of climate on people, 29; influence of geography, in history, 61-64.

Johnson, Willis E., quoted on school cabinets, 207.

Kentucky, 24.

Knowledge of environment important to teacher, 132-133.

La Salle, city of, 73.

Lesson, inductive, 119-153; deductive, 155-159; on moisture of corn and wheat states, 140-143; on use of pictures, 195-196.

Life as a response to environing conditions, 24.

Loess soils, 257-259.

Magazines, use of in geography, 184-191; why valuable, 184-185; illustrative magazine articles, 187-188.

Man's struggle with environment, 25.

Maps, 235-252; characteristics of a good map, 236; kinds of, 237; drawing of, 238; U. S. G. S., 239; bibliography of, 304-309.

McMurry, C. A., geography the mother study, 53.

Merriam, C. Hart, quoted, 29.

Meteorology, its relation to geography, 54.

Method in geography, a better, 137-143; basis of, 138; improvement of, 138; empirical, 139-140; inductive, 145-153; deductive, 155-159.

Minneapolis, how located, 34.

Models, 252-260; paper pulp, 255; salt and flour, 254-255; sand, 256; plasticine, 256-257; chalk and penell, 258-259.

Moisture adaptations in plants, 30; nomadic habits of people, a moisture response, 31.

Moisture of corn and wheat states, 140-143.

Mountains as barriers, 31.

Nature study, teachers' attitude toward, 41-44.

New educational situation, 18.


Observational geography ended, 30-42.

Old geography, 27.

Organic controls, 32.

Organization of geographic materials, 160-171.

Organizing principle of geography, 16.

Outline maps, 245.

Panama canal as illustration of man's control over environment, 35.

Passive work by pupils, 171.

Pedology of geography, bibliography, 204-204.

Phases of geographic study, 28-30.

Organizational, 39; representative, 42; descriptive, 41; reciprocal, 16; social, 18.

Physics, its relation to geography, 34.

Physiography, 18... 127-132.
INDEX

Pictures, value, 192-195; how to use, 195; stereographs, 199; stereopticon, 200.
Place adjustment in geography, 87-89.
Plant life, the distribution of, 29.
Plateau, as a control, 35.
Platteville, Wisconsin, 76.
Portland cement works of La Salle, 75.
Plant life, the distribution of, 29.
Principles, value of, 132.
Problem, The, value of in teaching, 140; solution of type, 140-143.
Rain gauge, 221.
Rainfall, 232; as a control, 30.
Re-creation of environment, 28.
Regional geography, 160-164; advantages of, 163-164.
Relations of animals and plants, 119.
Relation of geography to sciences, 52-61; 125-126; shown by diagram, 57; of geography to history, 63-78.
Representative geography, 42-44.
Response defined, 35.
Rocks, sedimentary, 262; resulting soils, 263-264.
Russell, I. C., reference to, 29.
Salisbury, R. D., quoted on use of text, 179.
School atlas, how to use, 244-246.
School museum, 202-208; how make, 294; suggestive materials, 205-206; value of, 207; Johnson quoted on, 207.
Sky state of, 231.
Social control over environment, 270-271; illustrative exercises, 271-272.
Spencer, Herbert, quoted on life, 114.
Starved Rock, 74; 75; 77.
Statistics, graphic representation, 248-250.
St. Paul, how located, 150-151.
Teacher's opportunity in geography, 121-122; separation, 125-135; knowledge, 127-135.
Temperature controls, 20.
Temperature, influence of, range of, 111.
Tendancy, modern education, 17.
Text books, use of, 172-181; bad use of, 173; what constitutes good use of, 174-175; illustration of good use, 177-178; summary, 181.
Topographic controls, 33.
Unit of geography study, 160.
Use of books in the recitation, 180.
Use of maps and models, 235-260.
Use of text books, 172-181.
Value, of magazine articles in teaching geography, 182-191; of pictures in teaching geography, 192-200.
Value of observational geography, 40.
Vulcanism discussed, 130-131.
Wallace, Alfred Russell, quoted, 34.
Washington, rainfall in 30.
Weather record 232.
Weather study, 217-233; suggested helps, 217-218; apparatus suggested, 219-220; illustrative exercises on atmospheric pressure, 223; on convection currents, 223; on cyclonic storms, 227-228; on heat energy 230.
Whitbeck, R. H., quoted on aims in geography, 83.
Wind directions near lows, 227.
Wind, effects on vegetation, 32; winds on plateaus 34.
Wind velocities, 251.
Winds, westerlies, 141.
Zinc mines, 76.

R.P.H.
<table>
<thead>
<tr>
<th>Books per month</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 Books per month</td>
<td>$2.99 / month</td>
</tr>
<tr>
<td>Monthly payment</td>
<td>$0.30 per book</td>
</tr>
<tr>
<td>100 Books per month</td>
<td>$4.99 / month</td>
</tr>
<tr>
<td>Monthly payment</td>
<td>$0.05 per book</td>
</tr>
<tr>
<td>10 Books per month</td>
<td>$19.99 / year</td>
</tr>
<tr>
<td>Yearly payment</td>
<td>$0.17 per book</td>
</tr>
<tr>
<td>Save $15.89</td>
<td></td>
</tr>
<tr>
<td>100 Books per month</td>
<td>$35.99 / year</td>
</tr>
<tr>
<td>Yearly payment</td>
<td>$0.03 per book</td>
</tr>
<tr>
<td>Save $23.89</td>
<td></td>
</tr>
</tbody>
</table>

Memberships can be cancelled at anytime.