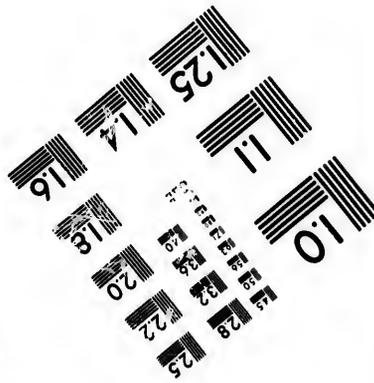
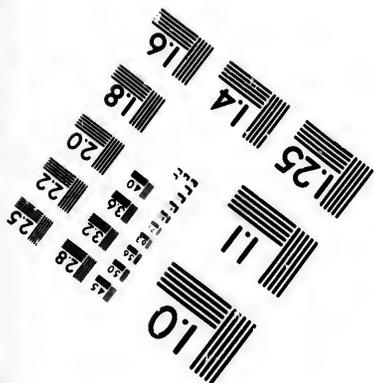
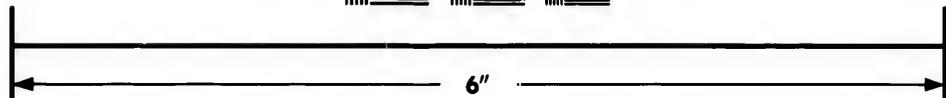
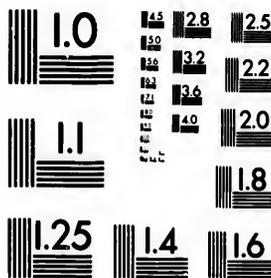


**IMAGE EVALUATION  
TEST TARGET (MT-3)**



Photographic  
Sciences  
Corporation

23 WEST MAIN STREET  
WEBSTER, N.Y. 14580  
(716) 872-4503



**CIHM/ICMH  
Microfiche  
Series.**

**CIHM/ICMH  
Collection de  
microfiches.**



**Canadian Institute for Historical Microreproductions / Institut canadien de microreproductions historiques**



**© 1987**



The copy filmed here has been reproduced thanks to the generosity of:

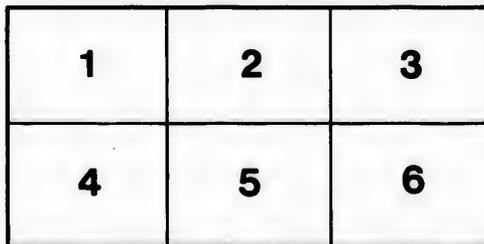
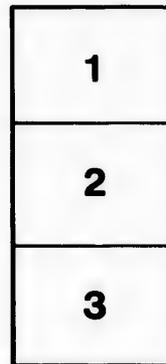
National Library of Canada

The images appearing here are the best quality possible considering the condition and legibility of the original copy and in keeping with the filming contract specifications.

Original copies in printed paper covers are filmed beginning with the front cover and ending on the last page with a printed or illustrated impression, or the back cover when appropriate. All other original copies are filmed beginning on the first page with a printed or illustrated impression, and ending on the last page with a printed or illustrated impression.

The last recorded frame on each microfiche shall contain the symbol  $\rightarrow$  (meaning "CONTINUED"), or the symbol  $\nabla$  (meaning "END"), whichever applies.

Maps, plates, charts, etc., may be filmed at different reduction ratios. Those too large to be entirely included in one exposure are filmed beginning in the upper left hand corner, left to right and top to bottom, as many frames as required. The following diagrams illustrate the method:



L'exemplaire filmé fut reproduit grâce à la générosité de:

Bibliothèque nationale du Canada

Les images suivantes ont été reproduites avec le plus grand soin, compte tenu de la condition et de la netteté de l'exemplaire filmé, et en conformité avec les conditions du contrat de filmage.

Les exemplaires originaux dont la couverture en papier est imprimée sont filmés en commençant par le premier plat et en terminant soit par la dernière page qui comporte une empreinte d'impression ou d'illustration, soit par le second plat, selon le cas. Tous les autres exemplaires originaux sont filmés en commençant par la première page qui comporte une empreinte d'impression ou d'illustration et en terminant par la dernière page qui comporte une telle empreinte.

Un des symboles suivants apparaîtra sur la dernière image de chaque microfiche, selon le cas: le symbole  $\rightarrow$  signifie "A SUIVRE", le symbole  $\nabla$  signifie "FIN".

Les cartes, planches, tableaux, etc., peuvent être filmés à des taux de réduction différents. Lorsque le document est trop grand pour être reproduit en un seul cliché, il est filmé à partir de l'angle supérieur gauche, de gauche à droite, et de haut en bas, en prenant le nombre d'images nécessaire. Les diagrammes suivants illustrent la méthode.

Index for Maps

North America	36 page
Canada	40-41 pages
Ontario	48-49 pages
Quebec	50-59 pages
New Brunswick	page
Nova Scotia	page
Manitoba	
Alberta	page
Saskatchewan	
British Columbia	page
United States	pages
West Indies	9 102 page
Central America	
South America	108 page
Europe	116 page
England and Wales	122 page
Scotland	1 24 page



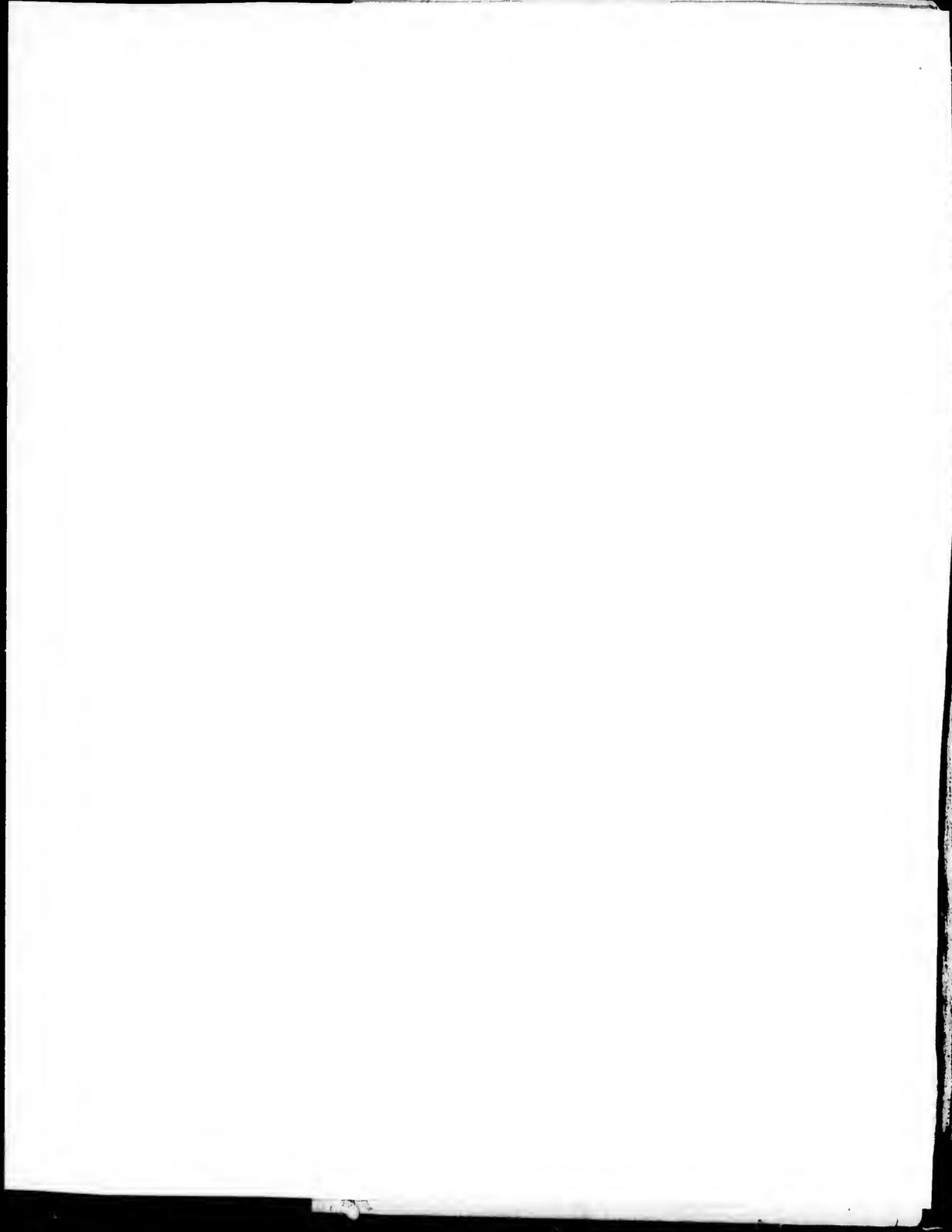
National Library  
of Canada

Bibliothèque nationale  
du Canada

THE  
PUBLIC SCHOOL  
GEOGRAPHY.

AUTHORIZED FOR USE IN THE  
PUBLIC SCHOOLS, HIGH SCHOOLS, AND COLLEGIATE INSTITUTES OF ONTARIO,  
BY THE DEPARTMENT OF EDUCATION.

TORONTO:  
CANADA PUBLISHING COMPANY,  
(LIMITED).



F  
C  
L  
t  
F  
F  
is  
m  
s  
d  
m  
C  
p  
tr  
b  
d

## PREFACE.

---

The subject of Geography is, in many respects, one of the most important of all Public School studies. There is certainly no other subject of the course which includes so many branches of study or which has such a direct bearing on the general development of the pupils' knowledge. Much of the teaching in History, Literature, Elementary Science, and in object and general information lessons, comes properly under the head of Geography, or leads up to the more formal study of the subject.

The general plan of the book is directly based on the recommendations of the "Committee of Fifteen," bearing on the teaching of Geography; and the central idea of treatment throughout this work is *man*, in his relations to physical environment—his history, customs, industries and commercial relations as modified by the forces of nature. The pupil is led to observe the peculiarities of nature about his own home, and from this starting point he is gradually brought to the conception of the world as a whole. The various races of mankind, and their more important characteristics and distribution, have been presented in such a manner as to interest those for whom this work has been prepared.

Special attention has been given to the varied productions—animal, vegetable, and mineral, of the different countries. An intelligent study of a country's natural resources must be based on knowledge of its physical features. The commercial relations of any country is largely dependent upon its productions. Commercial geography has been given prominence, because commerce, domestic and foreign, is the dominant interest in the affairs of the leading nations of the world. It involves a systematic presentation of the resources and industries of the different countries, as dependent upon climate, soil, mineral deposits and other physical conditions. Commercial geography also includes the most important information concerning manufacturing, distributing, and mining centres. Attention must also be given to the main systems of transportation, both domestic and international.

All the recent political changes which have taken place throughout the world have been carefully noted. The partition of Africa among the powers of Europe has been treated with special care. It is confidently expected that the work will be found up to date.

The relief and colored maps have been prepared by the most expert map makers on the continent. They will be found valuable both for direct reference and for progressive map study. No pains have been spared to make them accurate, attractive, and helpful to the student. The relief maps contain the names of the more important physical features; they will, therefore, not require "keys" to adapt them to the needs of practical use in the class-room.

The portions dealing with the British Empire will be found of special interest, in view of the present relations between Great Britain and her various dependencies. While special prominence has been given to Canada, all the other parts of the empire have received due consideration. No attempt has been made to prophesy political changes; at the same time, the matter has been so presented as to prepare the way for the consideration of changes which seem inevitable.

In view of the limited time given to geography in our schools, this treatise has been made as concise as possible, without limiting its usefulness as a work of reference. This is not only desirable but necessary on account of the large type used in the text and the space given to pictorial illustrations.

The pictures, many of which have been reproduced from original photographs by Wm. Notman & Son, Montreal, have been so arranged on the pages as to serve a really useful purpose, by way of illustrating the text. They have been selected and disposed with this object mainly in view.

The purely statistical matter has been placed at the end of the book. This arrangement will, it is believed, be found more convenient for ready reference, than to have the information distributed throughout the text.

G 127

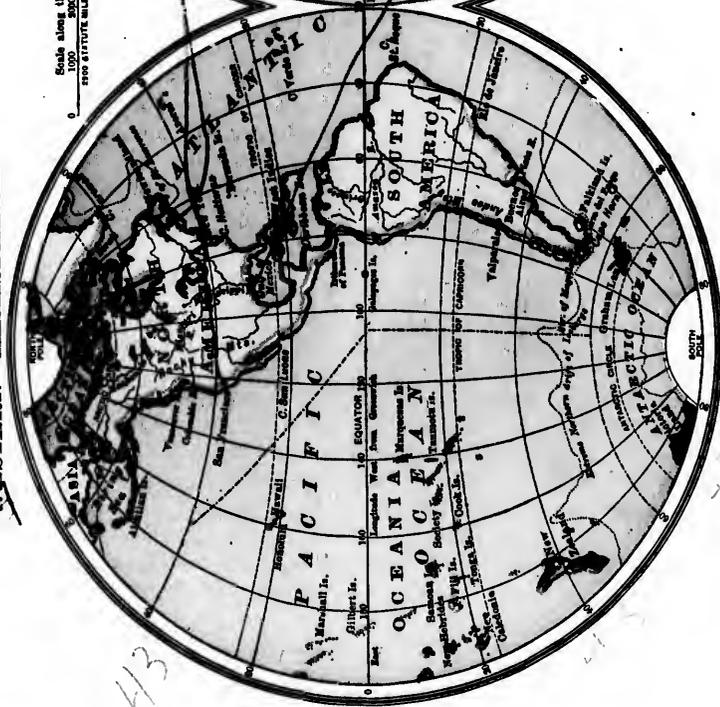
PS

1900

fol.

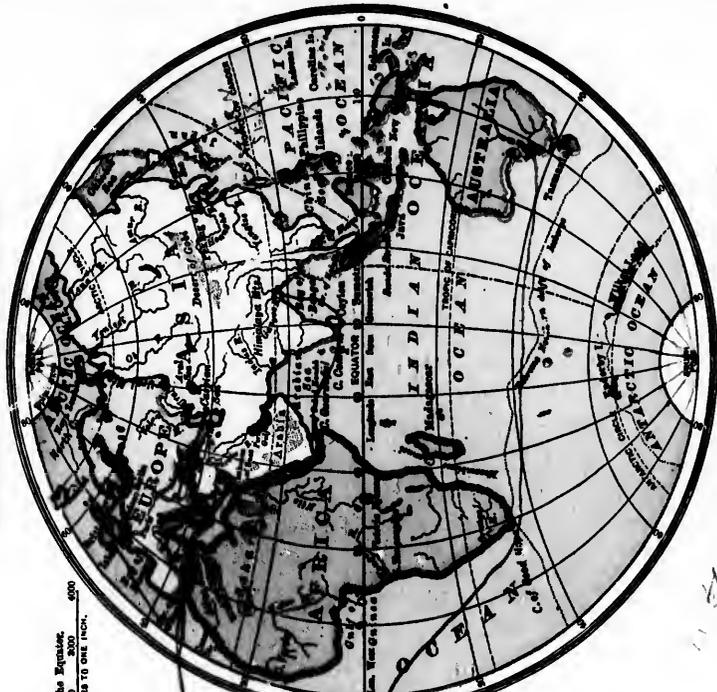
02

WESTERN HEMISPHERE.



Scale along the Equator  
 0 1000 2000 3000 4000  
 FEET ALTITUDE RELATIVE TO ONE INCH.

EASTERN HEMISPHERE.



43

41

43

117  
112

117  
112

43



## INTRODUCTORY.

### 1. Direction.

Here is a picture meant to teach us something. The sun is coming up over those hills and tipping them with the morning light. The *rising sun* is the centre of our interest, for without it we should see nothing at all. Can you tell why this picture is printed here? Well, perhaps this little story about the rising sun may help you. Once a man was riding a good horse over the great level plain in the middle of Canada, when night overtook him far away from any house. On he wandered in the dark till he lost his way and could not tell the *direction* of his journey. He went to sleep on the grass, till the morning sunshine woke him. Up he sprang to his saddle and said, "O, there is the *east*; now I know the way!"

Watch the sun come up in the east to-morrow. Do you know that it always rises on the same side of your home? Now tell what the picture means. Quite true; it shows us the rising sun and the east, and it makes us think of direction. Every morning a little girl walks to school with the sun shining full in her face. In what direction does she go? After you have watched the sun come up several times, then watch carefully to know where the sun

sets, for that is the *west* side of the sky. Next watch the moon as soon as you can and you will find that it rises on the eastern side, and sets on the western side of the sky.



Here is a picture of a school room. Look at the clock and tell the time. Look at that stream of sunshine coming through the window. Now point out the east side of the picture. On which side of the room does the clock hang? How shall we name the other two sides of the room? Well, the farther end is the *north*, and the teacher stands at the *south*. In what direction are the pupils looking? On which

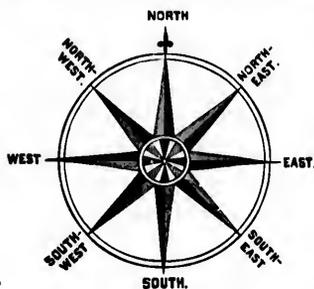
side of the teacher's desk does the basket stand? The chair? Now mark well where the sun shines at noon to-day. You will find it directly south, and we shall all go out and draw a line on the ground north and south. Here is a long string. Two pupils may stretch it tight across the room from east to west. Now move your position so that the direction of the string is north and south. Now point east and west, north and south.

On the ships that sail over our great lakes and over the sea, of which you have often heard, the sailors carry a very odd kind of clock with them. It has only one pointer, and that always stops at the north, no matter how much the motion of the vessel shakes it about. Underneath this wonderful pointer they have

a card to name the directions we have been studying.

Here is a picture of the card. They call this queer clock a *compass*, and with it before him the steersman guides the ship on her course even in the darkest night. A

surveyor with a compass can go through a dark forest, or over a wide plain, in whatever direction he pleases. There are no wheels, but only a fine steel pointer hung on a pivot. Have you seen a compass? Look at the picture. There are the north and the south, the east and the west. Read the other names half way between the *cardinal points* and learn them by heart. Some birds seem to know how to fly north or south without any compass, and some pigeons can fly straight home from long distances.



We use the compass or the sun to find direction, but sometimes Indians and hunters know the north by the moss that grows on the shaded side of forest trees. By and by you will hear of the stars that point out the north in the night. You now see that there are several ways of knowing direction, and that we can hardly get lost if we can see the sun, or if we have a compass with us. The lost traveller forgot to take a compass, and did not know the stars overhead.

*Answer these questions in complete sentences.*

Which way does your own shadow point in the morning? At noon? At night? Why does your shadow never fall towards the south? What are the cardinal points of the compass? Where does the moon rise in the sky? Draw a picture of the compass card.

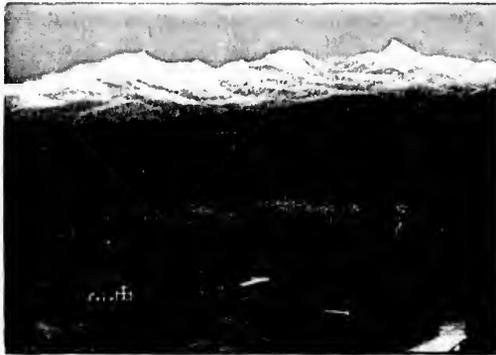
## 2. The End of the Land.

Please examine the picture below. If you have never seen the real sea, nor any great lake, take a long look at this picture of the wide, wide *ocean*. Do you ask which way the sea lies from where we live? Well, it lies every way you can go, for the *ground*, or *land*, on which we walk ends on all sides at the sea. Look at the water in the picture; look at the sky. Do you see the where they seem to meet? That is the sky-line we call the *horizon*. Go up to the top of a high hill and you will see this sky-ring around where the sky seems to bend down to the land on all sides. You can see that the land ends at the edge of the sea in the picture. Let us set off towards the east and try to find the end of the real land. We shall walk to a railway station and take an east-bound train. The sky-ring, or horizon, keeps ahead of us all the way on the land, but at last we see it stretching over the dark-blue water of the wide sea, which seems to grow broader as we come close to it. Our train has to stop because we are at the



The Wide, Wide Ocean.

end of the land, towards the east. You can see as we stand at the end of the land, which people call the *shore*, that the water is heaving up and down in long waves, and far out where the water is very deep you can see some ships with white sails that catch the wind to drive them along over the vast ocean. Stoop down and taste the water of the sea. It is salt and bitter, and not at all like the sweet, fresh water of our own Canadian lakes. You cannot drink it. Now if we turn back home and travel to the west we shall find the ocean on that side too. We go on and on towards the setting sun till the land stretches away on all sides in great level *plains*. These are the *prairies* that lie in the very middle of our beloved Canada.



Hills and Mountains.

As our train sweeps on, the land before us grows rough and hilly, and the hills get so very high and steep that they are called *mountains*. You see that



Waves dash against a Rocky Shore.

the bare and rocky tops seem to reach the clouds. It is hard work to make a railroad over these great mountains; it is hard for our train to climb the steep grades; but by and by we reach the top and afterwards on our long journey we cross more mountains and catch sight of others in the distance. At last our train has to stop and we behold again the deep-blue water of the ocean before us and the sky-ring, or horizon, out on the water. Near by, the great waves come rolling in against a high and rocky shore and dash into white foam. The water is again salt and bitter; we have reached the end of the land towards the west, as we did before towards the east. Canada is many, many miles wide from east to west; it takes our train six days and six nights to cross from sea to sea, but at last we find before us the wide ocean on this side also.

If we travel from our home north to the sea the journey will be harder and longer because none of the railroads go very far that way. It will take many weeks to go to the northern sea, and we must carry tents and plenty of food. Our way lies through a great, lonely land, where no towns are, no farms and very few people. We shall go in winter so that we can cross the rivers on the ice, for there are no bridges; we shall take dogs to pull our sledges over the snow; and we shall make big fires at night to keep our camp warm, and we shall sleep in warm furs. The way is very long, but at last we again reach the end of the land and the wide, salt sea is before us once more.



Icefields and Icebergs.

Do you see those floating *fields of ice* before us, and the great *icebergs* farther off towards the horizon which has followed us here also? Here the winters are very long and very cold, and the ice grows very thick indeed; some of it is always floating about in the sea. The land ends this way, and the sea is found at the north as well as at the east and the west.

If we start from home and go on and on towards the south we see at last the wide blue sea before us, just as we have seen it east and west and north of our home. The sky again seems to meet the water. In all our journeys the sun rises every morning in the east, goes round at noon to the south, and sets in the west. But away in the south we find the sun hotter, the winters shorter, and so warm that snow and ice are seldom seen there.

#### ORAL AND WRITTEN EXERCISES.

(Answer in sentences.)

How do you know the east side of the school room? Point towards the east. Point to the west. Tell in a sentence how you know the west. Stand with your face to the north. Tell quickly how you know which is north. What direction is behind you? Which way does the shadow of a tree stretch at noon? Give the reason. Name the line where the sky and the land, or the sky and the water seem to meet. Give a name to the end of the land and the beginning of the water. What is the color of the sea? How does the water taste? When the hills grow very high what do we call them? Where are the great plains of Canada? Where are the lofty mountains? How long does an express train take to cross Canada? Why is the journey to the northern sea so long? Which is the best time for the journey? Tell why. Write a sentence about an iceberg. Learn these lines by heart:—

The sea it is deep, the sea  
It is wide,

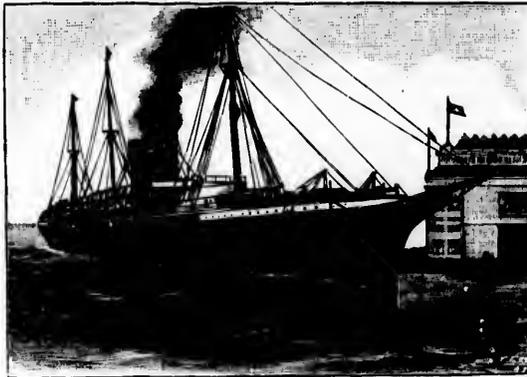
It girds the earth on every side.

How many hands has a clock? How many, a compass? Which way does the compass point? Which way do the wild geese and the wild ducks fly in the spring time? Which way do they fly in the fall of the year? How can a hunter tell the north in the middle of a dark forest and in cloudy weather? What is the hour of the day when your own shadow is shortest? Which way does the shadow point then? Name the direction half-way between north and east. Name the opposite direction. In what direction does the road or street run in front of the school? At what time of day is the sun highest in the sky? At what time lowest? When does the moon rise; when does it set? Where does it rise; where does it set? Do the stars rise and set? Where?

### 3. The Continent of America.

Name all the directions in which we travelled in studying the two previous lessons. Now, point towards the sea in four different directions. Yes, the sea *bounds* the land on all sides, and if a man at

the seashore followed the edge of the water all round the land he would be sure to come back to the starting-point again. In this way he would find out the *shape of the land* we live in. But we can do that much better by going aboard a large steamer such as the picture below shows us, just starting from the harbor. This journey by sea will take our fine vessel many months, because the distance round the land is many thousands of miles, and, besides, we can only sail round the frozen north in the summer. We shall see many different kinds of people, many different kinds of trees and fruits and houses, and we shall pass by many places that will interest us. Some of the places at which we stop will be hotter and others colder than our home, and we shall take with us quite a lot of clothes to suit the weather. The charming flowers, the pleasant



Ocean Steamer leaving Harbor.

fruits and the steady heat of the south will strike our attention so that we shall never forget them. We shall see the oranges, the bananas and the lemons hanging on the trees of the south, and the pineapple, the sugar-cane, the cotton plant and the broad-leaved tobacco growing in the fields. Many things will be new and strange to Canadians. In the north we shall see again the ice-

fields, through which our fine ship has to go very carefully to avoid harm, and we shall keep as far as possible away from the icebergs, that would sink our ship if we struck one of them. In the end we are glad to get back to our own beloved Canada. Let us draw out on paper the shape of the land we have sailed around. On the next page you see the picture of it as men have found it out little by little after years of hard work. No picture is as big as the thing itself; the picture of a tree or of a house is much smaller than the real thing; but this picture of the land is many thousands of times smaller than the real land; yet it shows the shape of the land truly. The land is shaded and the water is white. Notice the east, south, west and north sides of the picture marked on the edges of the *map*. Learn the name of the ocean on the east, of the

ocean on the west, and remember how long our train took to travel across from east to west, flying, flying, night and day. What is the name of the great sea to the north? Pronounce Atlantic, Pacific, Arctic over again, so that you can read them correctly and spell them easily.

You see that the land is pretty nearly all in one large mass, called a *continent*, with a few smaller pieces lying out near by in the sea. But in the middle of the mass, or the *continent of America*, on which we live, there is a mere strip, or neck of land, called an *isthmus*. Find the isthmus on the map and read the name. Learn to pronounce and spell Panama, so that you will know it well. It divides the continent about the middle into two smaller parts or *grand divisions*. Read the names on the map. Where is each grand division widest? Where narrowest? Which has the more regular outline? We live in North America, near the place where "North" appears on the map. The smaller pieces of land, with water around them on all sides, are called *islands*. You see a good many at the north of North America, and in the middle, where the land tapers down to the isthmus; but there are only a few to the south.

#### ORAL AND WRITTEN EXERCISES.

(Answer in sentences.)

Name the very, very large island, or continent, on which we live. Name the two grand divisions of it. Name the three seas marked on the map. Tell what an isthmus is like, and name one that you know. What fruits grow in the hot parts of America? Why are there no oranges, no bananas, in the far north? Which grand division is the wider, North America or South America? How do you know? Tell which way your own shadow falls at noon on a bright day. How can you find the north

early in the morning or late in the afternoon? Do you remember how the sea-water tastes? How does lake-water taste? Draw a picture, or map, showing the shapes of the two Americas. Why do the boys and the girls in Canada wear warmer clothes than the boys and the girls who live at Panama? At what hour of the day, and in what month of the year, is the sun hottest in Canada? Which way does the needle of a compass point?

#### 4. Across the Ocean.

Let us recall for a moment some of the things learned in our previous lessons. The trip to the end of the land at the east—do you remember that? And the long ride over the fertile prairies, those vast plains in the middle of Canada? Can you recollect how our train climbed over the great mountains and at last came down to the sea on the west? What ocean lies to the east of America? What ocean to the west? And in our long, long journey with dogs and tents we came at last to the ocean at the north filled with icebergs and great floating fields of ice? What is the name of that frozen ocean? Southward, also, we found hot weather, strange fruits, and the deep blue sea. What lies beyond the great world of waters that

girds America on every side? We shall find out. We shall travel eastward as before and board the same fine steamship that carried us all round the vast continent of America and brought us safely back to our starting point.

This time we shall steer away to the east and leave our own dear land of the maple leaf. As our good ship ploughs ahead through the salt water, America dips below the horizon behind us and our native land fades out of sight. We are alone on the wide, wide sea; water, water everywhere; the blue sky overhead; our good staunch



ship under our feet; the deep, dark-blue, pathless sea all around us. Now we need to look often at the compass to keep our ship straight to the east. The sky and the water seem to meet on all sides; the horizon makes a complete ring about us, as we steam swiftly along night and day, farther and farther from Canada. Every morning the sun appears to come up out of the water in front of

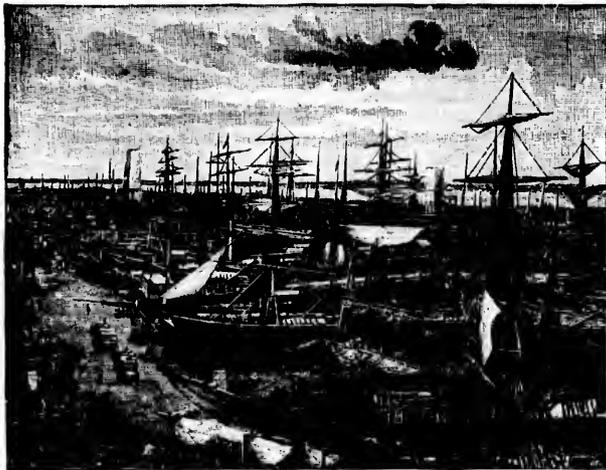


Out on the Wide Ocean.

us, at noon it is high up in the sky on our right, and every evening it slopes down to the sky ring and sinks slowly down into the water.

Out here on the wide ocean we can see nothing but the waves of the tossing sea. Even on fine bright days the waves are large enough to make our huge ship roll from side to side and heave and plunge as we go swiftly over them, so that it takes us several days to learn to walk the deck without falling when the vessel rolls or lurches forward.

But sometimes the wind rises and blows up a storm; the waves then ran so high and grow so large and terrible that they are called *billows*. Their tops or crests rise many feet high and are lashed



A Harbor.

into white foam. Often they dash themselves against the strong sides of our good ship and toss it about like a bit of cork floating in a swollen creek.

Now and then a bigger wave, twenty or thirty feet high, dashes up against our ship with a great thud that makes her shiver from stem to stern, and a part of the wave at the top breaks over the side of our vessel. At such times we must

stay below in the cabin; on deck, we may be drenched to the skin, or swept overboard and drowned. But the sight of the storm-tossed ocean is grand; we can never forget those huge mountains of water on all sides. By-and-by the wind dies away, the waves sink down to less than half their former size, and it is once more safe for us to walk the deck of our ship and survey the wide ocean around us.

All this time our engines are throbbing down below, and driving our ship eastward both night and day for a

*msa* <sup>The Great West</sup> whole week, until at last, far ahead, the land begins to rise dimly out of the sea.

Soon we come closer, and can see it stretching away to the right and the left; our captain slows down the speed of our ship, and then we go carefully on; at last we are across the Atlantic, and have reached the shores of the largest land-mass in the world. Here is a fine harbor ahead of us, and we can see hundreds and hundreds of vessels that have found their way from all parts of the world across pathless seas by means of the wonderful compass

*A Constellation is a group of fixed stars.*

that every ship carries. Do you see the ships on both sides of the *piers*, or landing-places? And the forest of masts? Here is a pier where our steamship can stay and take on board more coal and supplies; Here we step ashore upon the *Eastern Continent*.

**ORAL AND WRITTEN EXERCISES.**

*(Tell what you know in complete sentences.)*

In what direction from your home are the great ice-fields? If we travel a long way south, what sorts of fruit shall we find growing there? What part of Canada contains those vast grassy plains called prairies? How long did our steamer take to cross the Atlantic? How long does an express train take to cross Canada from ocean to ocean? How did our captain know which way was east in the darkness of midnight? When the stars rise at sea, on what part of the sky-ring do they first appear? When they sink out of sight, in what part of the horizon do they disappear? Are all the stars of the same size and brightness when they shine out overhead? On the first starlight night look out towards the east, and watch a star rise. Keep close watch on some bright star, and watch it set in the west. Look carefully at the stars that shine in the northern part of the sky, for we need to know them best of all. On the previous page there is a picture of the stars as they often look at the north side of the sky. Copy the picture for yourself. It is called a star-map. Note all the large bright stars, and look for them in the sky. There is one star in the map that we must know very well. Notice the seven bright stars on the left of the picture. They are sometimes called the Dipper. The two on the right are called the Pointers. The first bright star above them in their line is the North Star or Pole Star.

**5. The Eastern Continent.**

Do you see the zig-zag shape of the Atlantic Ocean in the picture? The dotted line shows the track of our ship. You see that we crossed at one of the narrow places, and yet it took our ship a week at high speed. Point out another narrow place in the Atlantic. Find the Isthmus of Panama, and notice that the ocean is widest opposite the central part of America. Look at the outline of the Atlantic again, so that you may be able to draw it from memory.

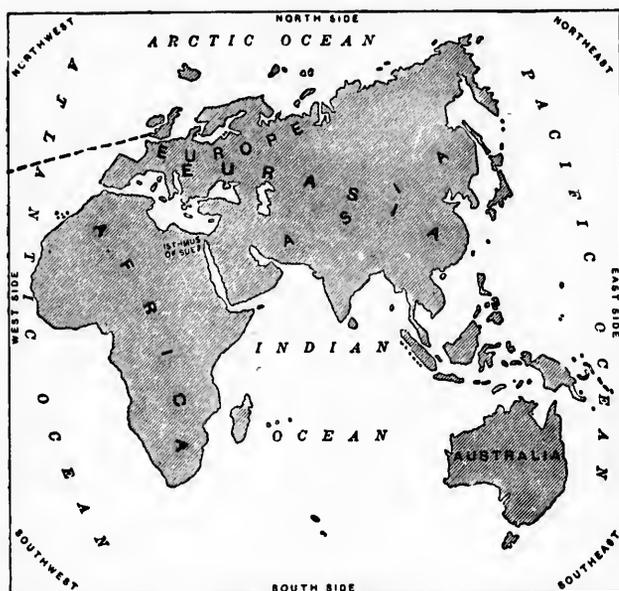
You see this picture is made round, and when you hold it far off it looks like a ball, with the great continents and the ocean on the outside. Remember this, because the picture means more than this book has told you so far. See how very long the Atlantic is from north to south. This picture does not show all the southern end of it, but the picture on page 9 shows the full length, which is more than nine thousand miles, and would require a whole month for our steamer to traverse even in fine weather. Can you imagine now what a vast world of waters this great ocean really is? See how very much larger this great Atlantic is than the whole of North and South America. Yes, there is far more water than land, and by-and-



The Atlantic Ocean.

by we shall cross a mightier ocean that will make the Atlantic look quite small. You must learn to expect more water than land in our travels, because only about one part in four of this beautiful world is land; the other three parts are covered by the restless waters of the wide, pathless ocean.

Now we must set to work to find out what the Eastern Continent is like. It is the greatest mass of land on the face of the earth, and years and years of hard work had to be spent before men found out its shape. The picture on the next page shows how it came out at last. It would take us years and cost us thousands of dollars to find it all out for ourselves, because the distances are very, very great; but the picture tells us at once what thousands of people slowly found out. Look at the cardinal points of the compass, marked on the map, and also at the other points printed at the corners of the map. Do you know them again? The dotted line at the north-west show the track of our good steamer and the island where we landed. Look very closely at that island. It is the most famous in the whole world. That island is Great Britain, our



own mother country, the very centre of the great British Empire to which we belong, the greatest empire that has ever existed on the earth, and which now governs one-fifth part of the land in the world, and is able to rule the whole of the sea. Never forget that you were born under the flag of this great empire. Look again very closely at that island. The northern and smaller part is Scotland, the southern part is England, and the other island to the west is Ireland. From these two islands have gone forth the British race of people, speaking the English language, and planting free governments round the world—in Canada, the United States of America, South Africa, and Australia. You will learn all about this by-and-by. The people of these islands are our nearest relations; to them we owe the happiness and prosperity of Canada, and it sounds homelike to hear them talking in our own language; but after we leave these islands we shall hear strange talk that we cannot understand.

Glance at the picture again. Look for the other islands of this continent. Opposite Great Britain, near the south-east corner of the map, you will notice a large island, Australia. It is so very large that it is often called a continent, for the continents are, in fact, immense islands. Later on we shall visit Australia and find English spoken on all sides; for we shall find Australia peopled chiefly

by the British race. The Australians are our near relatives and very good friends, but we cannot visit them on this trip.

Many other large islands lie along the east and south-east coasts of the Eastern Continent, and towards the north a few small ones.

Turn back to the picture of America, and compare the sizes of the continents. This one is nearly twice as large as America, and very many times as large as Australia. Write down the names of these three continents in the order of their sizes. They all have oceans around them. What ocean is north of the Eastern Continent? Name the ocean at the south. What do people call the ocean at the east? Over what ocean did we come to reach this Eastern Continent? Look how the water almost cuts the Eastern Continent in two. There again is a very narrow strip of

land like the one at the central part of America. What is the name of that one? This neck of land is also an isthmus and the name is printed on the map as you see. Tell from the map the name of the great mass of land south-west of the Isthmus of Suez and study its shape carefully. The other part north-east of the isthmus is so vast that it gets two names. Read the name of the part nearest to Great Britain, and the name of the part nearest to Australia.

These three portions of the Eastern Continent are so immense that they are generally spoken of as three continents; so also are North and South America. Europe and Asia are least separated; but on the whole we find in the world three huge islands which divide into six grand divisions. Look at the map again; write the names of these six grand divisions in the order of their sizes, and place Australia last on the list.

#### ORAL AND WRITTEN EXERCISES.

(Make all statements in complete sentences.)

How many bright stars do you count in the star-map on page 10? Look for these same stars in the sky. Tell the cardinal points of the compass. How can you find the north in a dark forest on a cloudy day, or even at night? At what hour does your shadow fall north-west? Tell the time of day when your shadow stretches north-east. Tell in a sentence which way the great mountains of Canada lie from your home. How does a mountain differ from a large hill?

Island means "water-land." Write a sentence about an island. A piece of water is ringed round with land; give it a name. How does a lake differ from a pond? How does the water of the sea differ from the water of the lakes? Write a sentence about an iceberg, and another about fields of ice. What is the length of the Atlantic from north to south? At what times of the day is your shadow longest? Where do the singing birds of Canada go in the autumn? When they return in the spring, which way do they fly? What is a harbor? Draw out on paper the shape of North and South America? Draw the picture of the Atlantic without looking at the map. Which continent reaches farther south, Africa or South America? Which is the larger, the Atlantic or the continent of America? Where is the Atlantic widest? Write a sentence about the narrowest places. Name the empire to which we belong. What is its centre? What language is used in Australia? In what direction is that island from Great Britain? Which is the largest, which is the smallest—Europe, Asia, or Africa? Answer in one sentence. Which reaches farthest north, which farthest south—Europe, Asia or Africa? Answer in one sentence. Draw two maps as large as your paper will allow, one of South America, one of Africa. On each of these maps draw two straight lines: first, the longest that can be drawn from north to south; second, the longest from east to west. What is the direction of the longest straight line that can be drawn on the western continent? Of the longest straight line on the eastern continent?

### 6. Our Interest in the Eastern Continent.

We are now on the Eastern Continent with the wide Atlantic behind us and our native land far beyond the sea. There are very many interesting things for Canadians to learn about this greater continent. Our Canadian merchants do a large amount of business on this side of the ocean; and every year many of them take ship and cross over to Europe and Asia, and some to Africa, to buy the things they want for their customers, such as currants, raisins, silk and fine woollen cloth. From Asia they get rice, fine coffee, pepper, cinnamon, cloves and other spices, besides a good deal of the tin we use in making all kinds of tinware. From the eastern part of Asia come our best tea, rice paper, and many articles made of bamboo cane. From Africa we receive cotton, ivory, diamonds for our mining drills, ostrich feathers, and many other useful things that are not found in Canada. Have you any idea how we manage to pay for all these expensive articles that we buy from the peoples or nations of the eastern part of the world? This is how it is done. We send them in return many ship loads of valuable lumber, immense quantities of wheat, oats, flour, oatmeal, beef, cheese, butter and dried fish, and some silver, gold, copper and nickel, so that we can easily pay for all we get

But by far the most interesting thing about the Eastern Continent is the fact that it is the home of the white race, also called Caucasian, to which we belong. It was the scene of most of the events in the history of the people from whom we are descended. Our parents, grandparents, or great grandparents—all our ancestors—came from the western parts of Europe and that is the old home of all the white people in America. You will read in your Canadian history that our people have been in America only a little over 300 years; and that all the British, French, German and Spanish people that have by hard work turned the vast forests and the great fertile plains of America into happy homes, and have built all the cities, canals, railways, mills, factories, churches and schools, came from the west side of this continent on which we have landed. In North America the British race, and a few people of French, German and Spanish origin, govern the continent. In South America most of the white people are of Spanish origin.



The Landing of Columbus.

Before the year 1492, all the white people in the world lived on this eastern side of the Atlantic, chiefly in Europe, with some in Asia and a few in the north of Africa. But in that year Columbus sailed from Spain and discovered North America. Soon after, the English, French and Spanish sent out ships and gradually occupied the whole of North America. Read all about this in your Canadian history and observe how the white race has slowly come into possession of all America, which Columbus found inhabited by tribes of Indians, most of whom were savages and only a few of whom had any knowledge of the arts of civilized life. Find out all

about the life of Columbus and afterwards write a composition about his adventures and misfortunes.

You now understand that we have landed in the home of our forefathers and that the white people over here are our blood relations. You now know also where the white people of America came from, and how they crossed the sea to establish new homes and plant the seeds of religion, education, and civilization in our own land.

#### Topics for Oral and Written Work.

If a ship goes east from any part of South America, what continent will it reach? A ship leaves a port or harbor on the east side of North America, what continent will it reach by sailing east? Where do ostrich feathers come from? Why do so many Canadian merchants cross the Atlantic? Tell where our tea and best coffee come from and also what goods we send back to pay for them. From what countries did most of the white people come? Where do ivory and pepper come from? What peoples of the Caucasian family rule North and South America? How is it that Spanish is spoken in South America, and English in the greater part of North America? Have you ever seen people who were not white? Tell what you know about Indians, Negroes, and Chinese. Do you know the name of any missionary who has gone from Canada to Asia or Africa? Why did he go? Sketch again the outline of America. Sketch once more the map of the Atlantic. Do it quickly this time.



Negroes.

#### 7. Homes of the Races of Mankind.

You easily remember that this Eastern Continent upon which we have landed is the home of the white

or Caucasian race to which we ourselves belong. Have you ever seen any other people who are not white? Do you know that the *Negro* race of men have a black, shining skin, very dark, curly hair, and also much thicker lips and broader and flatter noses than most white people? You see in the picture the features of the *Negro* race. Well, Africa is the home of this black or *Negro* race, and most of these people still live in Africa. But long ago, people of the white race, our own people, went in ships to Africa and stole many of these black people and took them to America for slaves, and made them work for nothing. A few of these slaves were brought to Canada; but most of them were lauded far south. However, in the year 1793, under Governor Simeoe, a good law was passed that abolished slavery: it forbade the bringing of any more slaves into this province and also set free all the slave born negroes at the age of twenty-five. Ten years later, in 1803, Chief Justice Osgoode declared that slavery was contrary to the laws of Canada, and 300 of these black people received their freedom in the province of Quebec, which lies north and east of Ontario. These two facts concern us deeply, because Canada was the first country to set free negro slaves. Later on Great Britain freed all her slaves, and still later, the United States, our nearest neighbors to the south, after a dreadful war that lasted five years, liberated millions of slaves, who still live there. Now, you know that the negroes of America all came from Africa, which still contains the chief part of the black race. Those whom we have seen have become civilized and have received some education and know something of civilized life. But most of those who live in Africa are ignorant savages who live in rude huts made of mud and grass like the one in the lower part of the picture. They wear little or no clothing and know little or nothing of education or religion. Some black people also live in Australia, and these are still more degraded.

From this Eastern Continent has also come to America another kind of people that we sometimes see in the cities of Canada. They have yellowish skin, and slanting, almond-shaped eyes, and they wear their hair in a long braid. The men and the women dress very much alike. They wear loose jackets and queer shoes, and many of them work at the laundry business. Have you seen any Chinese laundry-men? Well, they belong to the great yellow or *Mongolian* race, quite different from the Caucasian, and entirely distinct from the *Negro* race. Their



A Chinese Laundry.

own home is in the eastern and north-eastern parts of Asia, all along the eastern shores of the vast continent we are now studying. Only a few have crossed over to America, but in the world there are about as many yellow people as there are of the white race, and more than all the black race of Africa. These are the three greatest races of the human family.

Now learn about a fourth kind of people who live on the Eastern Continent, which you easily see is

the greatest hive of the human race. In the extreme south-east of Asia and in those groups of islands off its south-east coasts,

north and west of

Australia, is found

the brown, or

Malay race. Their skin is

of a brownish

color and

their eyes do

not slant like

those of the

yellow race. Like the Negroes and the Mongolians they are very ignorant and



Malay—Girl and Boy.

half savage. Their life is very different from ours and they know very little of education, civilization, or religion.

There is a fifth race of people who make another great branch of the human family. They are found only in America; but we will speak of them to complete the list of the five great races of mankind.

When Columbus and the voyagers who followed him landed on the east side of America, they found a new kind of people that are now called *Indians*. The story is told in your Canadian history. Have you ever seen any Indians in Canada? They have long, straight hair, coarse and black, and their skin is a bright olive or reddish-yellow.



Indians and their Wigwag.

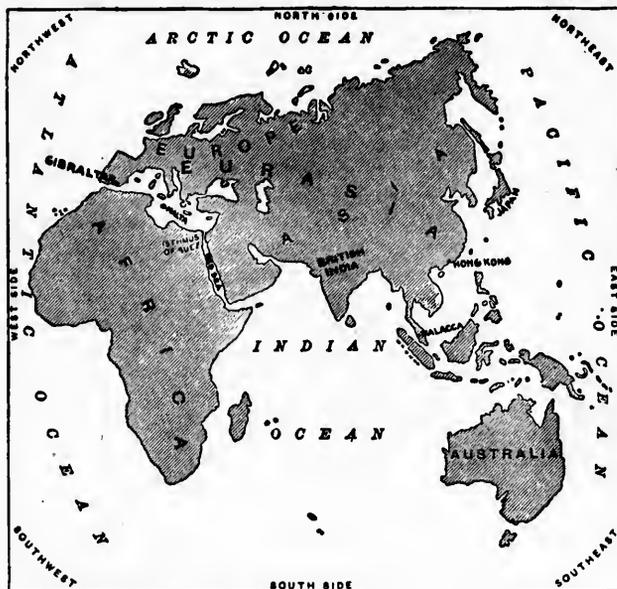
Most of them lived in huts or wigwams made of skins or bark. They spent their lives in hunting or fighting with bows and arrows. But some of them were of a higher class, and built houses, raised crops of corn and had settled homes. At the present time many Indians live like white people, and there are only a few tribes left who live by hunting and fishing. The schools and the missionaries have taught them something of the arts of life, and in Canada they live together in numerous reservations. However, America is the home of the red, or *Indian* race, which is not found on any other continent.

#### ORAL OR WRITTEN EXERCISES.

(Use complete sentences in all answers.)

Give the names of the five great races of mankind. Where is the home of the black race? Tell how the negroes of America came there. Which was the first country in the world to set free Negro slaves? Which continent was the home of the white race? How many centuries have the Caucasian people been in America? What people lived in America before the whites came over? Mention some people that have a yellowish skin, and tell where they chiefly live. To which great family do the natives of Australia belong? What people live on the islands north of Australia? Where is the home of the red race of men? How did the native Indians make a living?

Where are the Indians of Canada mostly found at present? Describe a Mongolian as correctly as you can. Name the races of mankind whose homes are on the Eastern Continent.



we should see many odd ways of dressing, observe strange customs, and hear a great variety of foreign tongues we could not understand. But our ship will take us much sooner, and we shall see many countries with perfect safety.

Here we are at the famous *Strait of Gibraltar*, and we find a British fortress with 5,000 soldiers to guard the entrance to the inner sea. This one that stretches eastward between Europe and Africa is called the *Mediterranean Sea*. The name means "in the midst of the land," and a single look at the map explains the name. As we sail along eastward we have Europe on the left and Africa on our right. The sky is bright and clear and the weather decidedly warm. On both sides are countries through which we mean to travel by and by. This Mediterranean Sea is nearly as long as half the width of the Atlantic. Near the middle we find another British naval station to guard the sea. It is on a little island called *Malta*, on which the Apostle Paul was shipwrecked when he sailed over this sea long ago. Our

### 8. Our Journey Eastward Completed.

We are ready to travel onward and explore the great Eastern Continent. Glance over the map again. Point out Great Britain where we landed. Follow the coast southward and find the narrow passage that separates Europe from Africa. A narrow passage of water that opens out into a broad body of water beyond is called a *channel* or *strait*. What name is given to a narrow neck of land? Let us go aboard our ship and head away to the south till we reach this strait which will be a gateway to our eastern trip.

Perhaps you think we might traverse this enormous continent by train. We could in certain directions, but the only railway route from sea to sea lies far north. Travel in Europe would be easy by a central route, but in the middle of Asia there are no good roads, and we should need camels, horses, and a well-armed guard to protect us on our way over wild plains, through dangerous passes, over lofty mountains, across sandy deserts full of rocks, and among wild and half-savage tribes of people. True,



Gibraltar.

captain is steering for the *Isthmus of Suez* which joins Asia and Africa. Name another isthmus that joins two great continents. Find this one on the map. Do you think we shall be able to sail across this isthmus?

On all sides of the Isthmus of Suez are countries and places mentioned in the Bible and in the early history of our race. On the west side is *Egypt*, where Joseph lived long ago, and a little to the north is the country where Christ was born. On all sides of the Mediterranean are countries famous in the story of the nations and full of interest to educated people. They contain many ruins and monuments that tell us much about the people who lived there thousands of years ago. In this picture



Pyramids and Sphinx, Egypt.

you see in the foreground an immense stone sphinx, represented with a human head, built in Egypt ages ago by a powerful king. There is also farther off on the plain a colossal stone pyramid still in good preservation although over 3,000 years old.

Well, here is the isthmus, and now you see that our ship can sail straight across it; for we find that men have dug out the sand and rock for nearly one hundred miles to make an immense ditch from sea to sea, and the water is deep enough to float our steamer along. A passage of this kind is called a *canal*, and we have quite a number at home in Canada. This is called the *Suez Canal*, and it partly belongs to Britain. We see that British soldiers also guard this canal under our own flag. Slowly and carefully we steam through and at the southern end we come to a narrow sea also famous in Bible history. On our right we still have Africa; but the continent of Asia is on our left, for we have left Europe far behind us. Notice the reddish tinge of the water in this shallow sea. This is the *Red Sea*, and at the southern end is the small island of Perim where another British naval station guards the strait at the south which opens into the *Indian Ocean*.

Now we leave Africa behind us and turn again eastward along the southern shores of Asia. Glance

at the map and observe our course. Notice also how the Mediterranean and the Red Sea divide Africa from the rest of the land in the Eastern Continent. The Suez Canal makes it really an island; but Europe and Asia are not thus separated. The two together form one great mass of land sometimes called *Eurasia*. Find the name on the map.

A few days' sail takes us half across the Indian Ocean, and brings us to *India*, which, like Canada, is under British rule. It contains a vast population, mostly dark skinned people, in fact, more than twice as many people as live in both the Americas. Notwithstanding their color they are considered to belong to the white race. At our port we see the British flag over hundreds of ships and notice many soldiers wearing the Queen's uniform. We also hear our own speech on all sides and see many British officers and merchants amid crowds of swarthy natives. By and by we shall return to India and visit its great cities and find out more about its vast wealth and resources. It has a long history indeed which we shall learn some day.

But now we continue our journey, and after a few days come to another strait. Look at the map and find that long finger of land that reaches to the very south of Asia. A long narrow strip of land like that stretching cut into the sea is called a *Peninsula*. The name means "almost an island," and this one is the peninsula of *Malacca*. At the *Strait of Malacca* we find another island (Singapore), owned by the British, which serves to guard the passage. We have reached the end of Asia in this direction. Now we turn north and leave Australia a good way to the south, where we shall afterwards go and see the homes of many more subjects of our Queen, who, like ourselves, belong to the white race and speak the English tongue.

In a few days more we reach *Hong Kong*, another British naval station which guards these eastern seas. On the mainland close by we find many large towns and cities surrounded by rich and fertile plains and valleys. The very narrow streets are crowded with people. Their yellow skin, slanting almond-shaped eyes, queer shoes, and braided hair strike our attention at once. They are exactly like the laundrymen of our own Canadian cities. Yes, this is China, the chief home of the Mongolian race, and their level country is fairly alive with yellow people. They are busy, industrious workers, but most of them are wretchedly poor. Wages are very low indeed and men do the work performed by



Street in China.

horses and steam engines in Canada. Their houses in the numerous towns and cities are only one or two stories high, and their food is chiefly rice.

You see we have reached the end of the land towards the east of Asia. A few more days' sail to the north brings us to a group of pretty large islands. In what ocean do these islands lie? You see that they are almost opposite to Great Britain. These are the *Japan Islands*; the Japanese look a good deal like the Chinamen; to whom they are closely related by blood. They are, however, a superior race, much better off, and have lately made very great progress. They are the most intelligent of the yellow race. We shall come back and study their country.

But at present we must push out eastward over the immense Pacific Ocean, which is far wider than the Atlantic, and try to get home to Canada. The wide, blue ocean once more extends on all sides. Water, water everywhere. China and Japan are far behind, we are alone on the wide, wide sea. Do you think our

ship will ever reach land eastward? It takes us more than twice as long as it took to cross the Atlantic. But at last, after a sail of between twenty-five and thirty days, we see land ahead, and soon we are in the harbor of Victoria, and when we go ashore we stand once more on the soil of Canada. Close by we find another of those British naval stations and see some fine war-ships ready to guard these seas. We now cross to the mainland, take a palace car, and are soon back at our own home.

#### ORAL AND WRITTEN EXERCISES.

(Give all answers in complete sentences.)

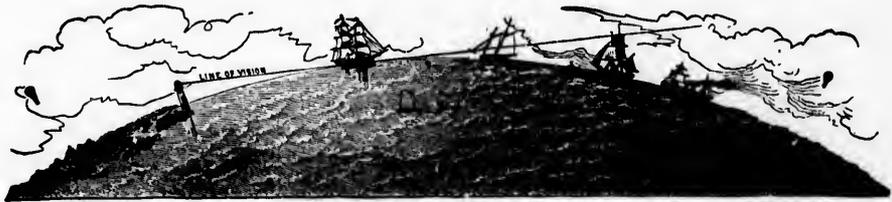
What strait divides Europe from Africa? What nation commands the entrance to the Mediterranean? Describe a channel. How long is the great sea between Europe and Africa? Where do Maltese cats come from? Is there any railway across Eurasia? What difficulties meet the traveler in Central Asia? Name all the British naval stations you can. What is an isthmus like? Name one or two. How do ships get over the Isthmus of Suez? What seas are connected by the Suez Canal? What do geographers mean by the word Eurasia? Tell something about the people of India, and also state how that country is governed. What is a peninsula? Mention those you know. What country lies west of Hong Kong? What ocean east? Describe Japan and China as far as you can. Which way does the city of Victoria lie from Japan? Why does Great Britain maintain so many naval stations and keep so many warships and soldiers? Find out the name of the naval station near Victoria.

Mongolian.  
Ethiopian.

TYPES OF MEN.

Caucasian.

Malay.  
Indian.

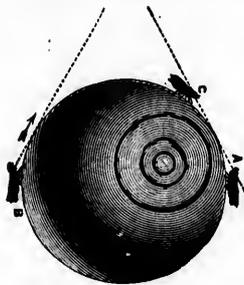


The Shape of the Earth.

### 9. The Shape of the Earth and its Size.

Do you remember about the sky-ring, also called the horizon? In all our travels that wonderful ring followed us. Sometimes it was sky and land at our own home; sometimes sky and water out on the mighty deep; but it was always a *ring* or *circle* when we could see it clearly. When we climbed those lofty mountains on the western side of America the ring grew very large and seemed far away.

Watch two flies walk about on the top of a level table. It is plain that each of them can see the whole of the other fly no matter where he goes on the top of the table. This would be true if the table were hundreds of times as big as it really is. The only difference would be that each fly would look smaller when farther away. You have noticed that trees in the distance look very small, and a large ship far out on the water looks as small as a boat. But as long as the flies are on the flat top of the table they cannot hide from each other.



Now let us lay an orange on the table and watch two flies alight on opposite sides; one at A and the other at B. The lines in the picture show which way they can look. In that position they cannot see each other, for the whole orange is between them. But let A stand still while B creeps round to the point C in the line along which A looks. A can now see the other fly's head, but not his body, which is still hidden from A by the curve of the orange. When you look at the orange you can only see one-half of it. It is quite impossible to see the whole surface of the orange at once. If you hold it close to your eye, you will see much less than half the surface. Why can we never see the whole of the land and water in the world?

Yes, the whole world of land and water has the shape of a ball, or orange. The Continent of America on which we live, the Eastern Continent, and all the vast oceans are curved round and round like an orange. It took a long time to find out the shape of the earth. But our journey eastward, our long journey ever eastward from Canada back to Canada, proves that we can travel round the world just as the flies can walk round the orange. The earth *seems* flat only because it is so very large. When you hold an apple, or a ball, or an orange close to the eye it looks flat also. If we could go up far enough we should be able to see one-half of the round world, just as we can see one-half of the round orange. Do you recognize this picture?



Do you know America again? More than three hundred years ago Magellan sailed quite round the world and found out that it is round like a ball.

When we watch a ship coming across the lake on a clear day, or a steamer coming into port from the ocean, we do not see the whole ship at first. The top-mast appears like a tiny speck; this speck grows larger as the sails and smoke-stacks come into sight,

and at last the whole ship comes into full view. The curved part of the earth hid the largest part of the huge ship at first, just as the orange hid the body of the fly. In every part of the world this is observed, and it proves that the earth is not round like a fifty-cent piece, nor round like a large roller; but round in every way like an orange, or an apple.



Turn your globe round till you see the very picture shown here. You know the Eastern Continent shown on the round which you have seen before on the flat. Geographers call this the *Eastern Hemisphere*, because it shows the eastern half of the world. They call the other half the *Western Hemisphere*, which shows America, or the Western Continent.



Look at this picture of the immense Pacific Ocean. The dotted line shows the course we took when we

sailed across the narrow part. At the south-west lies Australia and to the east of that lie the islands of New Zealand. Over all these the British flag floats, and they are parts of the British Empire, to which we belong. Turn your globe round and look closely at the vast ocean called the Pacific; notice its great length and its width. See how much larger it is than the Atlantic or the Indian Ocean. Turn your globe round and round and study the land and the water.

Is most of the earth's surface land or water? About three-fourths is water, and only about one-fourth of the round world is solid land.

What ocean lies away south of the Indian Ocean and the Pacific?

#### ORAL AND WRITTEN EXERCISES.

(Express all answers in complete sentences.)

Draw a large picture of the files and the orange on the blackboard. Then take a pointer and explain the picture. How would you proceed to increase the size of your horizon? If the earth is really round like a ball, why does it appear to us like a flat surface? Cut a piece an inch long out of a common barrel hoop. Lay this section on the table, and explain why it seems flat. Why does the little flag at the top of the mast come into sight before the hull of the ship, which is thousands of times larger? Why does the tail of a kite go out of sight before the kite itself when it is carried up very high? It is said that a train running at 25 miles an hour would take 1000 hours to make a circuit of the middle part of the earth. What must be the distance round the world? What is meant by the Eastern and the Western Hemisphere? Which hemisphere contains most land? In which hemisphere do we live? Cut an apple in two to represent hemispheres. Draw a picture of the Pacific. Mark Australia and New Zealand. Name the ocean north of America and Eurasia. What ocean lies far away to the south of the continents? Name all the five great oceans. Which is largest? Which is smallest? Which is larger, Asia or Africa? Who was Magellan?

#### 10. The Turning of the Earth.

From the last lesson you know that the world is round like a ball, or an apple, or an orange. Your school globe represents the earth on a very small scale, and helps us to understand many things quickly. Let us make some use of it now. We shall place it in the window where the sun shines brightly, and take notice. You see that the bright light shines on only one half of the globe at once. Let us make a chalk dot on the globe and then turn it round in the sunshine. You see that the white dot goes regularly through the light, enters the shade and comes back into the light in turn.

The great globe on which we live is always turning round in this way before the sun. On which side does the sun rise? Well, the earth turns

toward the east and the sun's light passes along over to the west. This motion of the earth makes the sun appear to rise in the east, move westward across the sky all day, and sink below the horizon in the evening. Turn the globe yourself and watch the white dot come into the light. That is its sunrise. Notice it go out of the sunshine again. That is its sunset.

It is the turning of the earth once around in every twenty-four hours that makes day and night. It took men a long time to find this out; but we can easily see how it is, now that the truth is known. The earth is turning round before the sun, making daylight over half the world. The other half is in the dark which we call night.



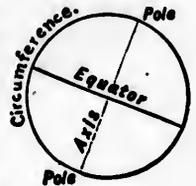
Now we shall thrust a knitting-needle or a hat-pin through a large apple, or ball. Now light a lamp and close the blinds. Let us hold the apple, or ball in the light and make it turn round on the wire. We shall stick a postage stamp or a bit of colored paper on the spot we wish to watch. There it goes; now it is in the light. The stamp is at sunrise. Now it is directly in front of the light. Now the stamp has its noontide. Now it is passing out of the light into the shadow. The sunset of the stamp has come, and its night also follows.

The wire passing through the centre of the apple or the ball may be called the *axis*. Now the earth turns round on an axis in the same way that your apple or ball does. But there is no rod of iron or of anything thrust through it. It floats free like a balloon, or a large soap-bubble such as boys and girls love to blow. All the time, however, it keeps turning on its axis before the sun. Put another larger stamp on your ball opposite the first stamp. Call the little one America and the big one Asia. See, now, as we turn, when it is day in America, it is night in Asia. Asia again emerges into light, and our pretended sun no longer shines on America, which is now passing through the shades of night. So it happens that, when we have daylight, the people on the other side of the earth have night and dark-

ness. We can turn our little ball on its axis in a few seconds; but it takes the huge world twenty-four hours to turn round, or *rotate*, on its axis, making for us just one day and one night.

The ends of the earth's axis are two points on the surface. The one at the north is called the *north pole*, and straight over it we see the North Star which you must learn to find in the sky. The other end of the axis is, of course, exactly opposite at the south. It is called the *south pole*. This word pole means "turning point." If you spin a top very fast you can see a pole on the upper part of the top.

Now draw a white line round our apple or ball, exactly midway between these two poles. It is a ring or circle and may be called the *equator*. If we cut the apple or ball through and through along this line we shall make the northern and the southern *hemisphere*. You may notice that the equator runs exactly east and west. Certainly, nobody can draw a line all the way round the earth; but we can easily think or imagine such a line. Such lines are therefore called *imaginary lines*, and there are several more to be learned by and by. The picture shows clearly the meaning of *pole*, *axis* and *equator*. The circle round the earth is called its *circumference*.



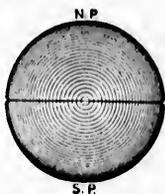
#### ORAL AND WRITTEN EXERCISES.

(Use complete sentences in the answers.)

What does the bright hemisphere of the globe or the apple represent on the earth? What does the dark hemisphere of the ball represent? What line does the wire or the hat-pin represent? With respect to the sun and the earth, what does the lamp represent? Which way does the earth turn on its axis? Turn your ball or globe so as to make the sun (lamp) rise in the west. If the earth rotated twice as fast, how would the days and nights be altered in length? What kind of day and night should we have if the earth stood still for a month? How often would the sun rise? Draw a figure and explain the meaning of *circumference*, *axis* and *equator*. Make your figure very large. When you are on a fast train, which way do the trees and telegraph poles seem to move? When the earth turns to the east, which way do the sun and the stars seem to move? When the children of Canada are eating their noon meal, what time of night will it be on the opposite side of the world? Which is larger, the northern or the southern hemisphere? Give reasons for your answer. Why are there no moonlight nights when the sun and the moon happen to be on the same side of the earth? What are imaginary lines? Mention some. Draw an imaginary line in a picture of the school room. What is the direction of the equator?

## 11. Latitude and Longitude.

Here is the picture of a ball meant to represent the earth. Name the line drawn round the middle part. Can you tell the meaning of the letters N.P. and S.P.? At play some day take a big lump of soft, tough clay and make an earthen globe to stand for the world. Get it rolled into a perfect sphere, sprinkle a little sand all over it, and put it in a dry place till it hardens. After that mark the equator with an even scratch around your sphere. Drill a small hole to stand for the north pole and another for the south pole.



In going from the equator to the north pole what part of the whole distance round the world do you pass over? Is it one-half or one-quarter? Well, when we want to tell how far a place is from the equator, we divide this distance from the equator to the pole into ninety equal parts called *degrees of latitude*, so that the equator is just ninety degrees of latitude from each pole. How many degrees of latitude measure the distance from pole to pole? How many degrees must there be in the whole circumference of the earth? Yes, for convenience every circle is divided into 360 equal parts and each part is called a degree. As we measure latitude on a quarter of the whole circle, we can see that the latitude of any place must lie between  $0^\circ$  and  $90^\circ$ . The latitude of Toronto is about  $44^\circ$  north; the latitude of Dunedin, New Zealand, is about  $46^\circ$  south; of New Westminster, British Columbia, a little over  $49^\circ$  north. Turn up the maps and find these places. Now you know that latitude means the distance of a place north of the equator, or south of the equator, as the case may be. On maps it is usual to mark the latitude by lines drawn across the map from east to west.

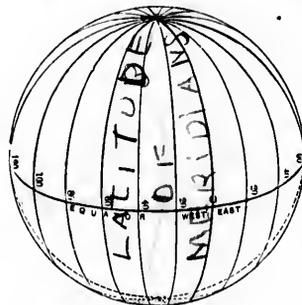
Here is a picture that shows the *parallels of latitude*  $10^\circ$  apart. On the maps the degrees of latitude are marked at the sides. You can count them in the northern hemisphere up



Parallels of Latitude.

to  $90^\circ$  at the north pole. Look over the maps and notice the parallels of latitude with the figures marked on the sides to tell how far these lines are north or south of the equator. Now mark some parallels of latitude on your clay globe at even distances.

Do you see the line marked on this ball, that goes through London, England? It reaches from pole to pole and is called a *meridian*. Take your clay globe and scratch a meridian evenly from pole to pole. Put a small dot to stand for London, which lies between  $51^\circ$  and  $52^\circ$  north of the equator. This meridian is very important and is called the *first meridian*, or *prime meridian*. Very often it is called the *meridian of Greenwich*, because in one part of London, called Greenwich, there is a celebrated observatory through which this first meridian passes. Take your clay globe again and scratch your meridian line from pole to pole on the other side also. It now makes a complete circle and cuts the equator in two places exactly opposite each other. How many degrees are there in a circle? How many in half a circle? Yes, these two points on the equator are  $180^\circ$  apart, and the distance of any place east or west of the first meridian is measured in degrees which are called *degrees of longitude*. You can see that the longitude of any place must lie between  $0^\circ$  and  $180^\circ$ . You can also see that  $180^\circ$  east longitude brings us to the same meridian as  $180^\circ$  west longitude, because we measure longitude on half of the whole circumference of the world. The longitude of Toronto is a little over  $79^\circ$  west from Greenwich; the town of Dunedin, New Zealand, is in  $170^\circ$  east longitude; and New Westminster, B.C., is in  $123^\circ$

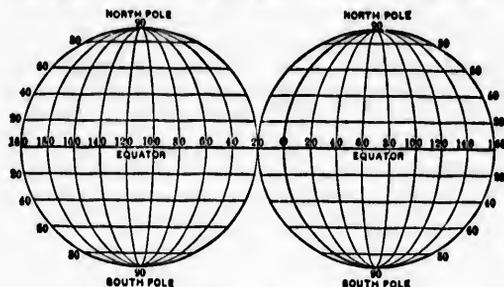


Meridians of Longitude.

west longitude. Turn up the maps and find the places again. The longitude is marked along the top and along the bottom of the maps; none of the numbers is greater than  $180^\circ$ .

Here is a picture that shows the *meridians of longitude* drawn  $20^\circ$

apart. You can count them up to  $120^\circ$  west and  $60^\circ$  east, or  $180^\circ$  altogether. Now mark some meridians of longitude on your clay globe at even distances.



In another picture we see all the imaginary lines represented at once on the two sides of the globe. The parallels of latitude and the meridians of longitude are all drawn this time  $20^\circ$  apart. You will find some maps in this book in which they are drawn only  $5^\circ$  apart, and a few in which they are only  $1^\circ$  apart. Turn up a number of these maps and see for yourself how very convenient these lines are to tell the exact position of any place. Let us draw a meridian line on the playground at the next recess, and also a parallel of latitude quite across the ground. At present we shall make two lines across the floor, one north and south, the other east and west. The point where they cross shows our latitude and our longitude. Find out the correct figures. How many degrees do we live west of Greenwich? How many degrees north of the equator?

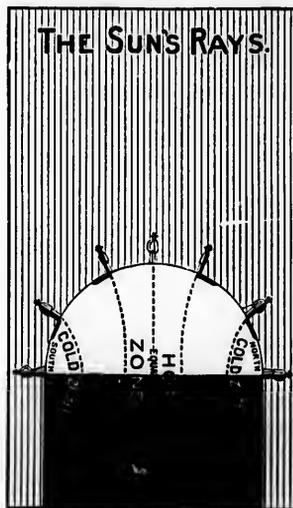
#### ORAL AND WRITTEN EXERCISES.

Rule your slate or a large sheet of paper into squares like a checker-board. Number the lines at the sides and along the top and the bottom. Here and there, at the places where the lines cross, mark in the 26 letters with capitals. Call the top north, the right side east, the bottom south, the left side west. Suppose these lines are meridians and parallels. Now read from your drawing the position of each letter thus: the point A is in latitude  $10^\circ$  north and in longitude  $8^\circ$  west. Place the point of a pencil on the school globe and then read the latitude and longitude of that place. Take a pointer and indicate any place on one of the wall maps. Tell the latitude and the longitude of the place you touch. Give the latitude and the longitude of the place where the first meridian cuts the equator. Point out the place on the map. What is the latitude of the south pole? What is the longitude of the north pole? Two ships are sailing along the equator out in the Pacific Ocean. The first ship is going east and the second west. Tell the latitude of each ship. When the first ship is in  $180^\circ$  east longitude and the second in  $180^\circ$  west longitude, how far will the ships be apart? Parry Sound, Ontario, is in  $80^\circ$  west longitude, and St. John, New Brunswick, is in  $66^\circ$  west

longitude. Both places lie in  $46^\circ$  north latitude. How many degrees is the first town west of the other? If the whole circumference of the earth is divided into 360, and if the earth turns round in 24 hours, tell how many degrees of longitude rotate before the sun in one hour. If  $15'$  of the equator turn round under the sun in 60 minutes, how long does it take for one degree to rotate? If two places have their meridians  $75'$  apart, what is the difference of time for sunrise at these places? Charlottetown, Prince Edward, is about  $63'$  west longitude, and Winnipeg is about  $97'$  west of Greenwich. How many degrees are they apart? How many minutes will the sun shine at Winnipeg after it has set at Charlottetown? Find the places on the globe that lie as follows:— $45^\circ$  N. lat. and  $45^\circ$  W. long.;  $45^\circ$  S. lat. and  $45^\circ$  E. long.;  $36^\circ$  S. lat. and  $20^\circ$  E. long.;  $30^\circ$  N. lat. and  $32^\circ$  E. long. At Windsor, Ontario, the sun sets about 5 hours and 32 minutes later than it does at Greenwich. Find the longitude of Windsor. If a number of people in different parts of the world all set off from their different homes and travelled straight northward could they possibly meet? In what latitude? What star would be directly overhead? The meridians of longitude are all equal, but the parallels of latitude grow smaller and smaller all the way from the equator to the poles. Explain this. A degree of latitude is everywhere the same, namely, about 69 miles; but a degree of longitude varies all the way from 69 miles at the equator to zero at the poles. Explain this by means of a ball or globe, or by drawing circles on the blackboard.

#### 12. The Zones.

The earth turns before the sun, and its daily rotation on the axis causes day and night in regular succession. But all the days are not alike. Everybody knows that the middle of the day is hottest, and that summer is much warmer than winter. Nearly all our light and heat come from the sun;



and where there is most sunshine there we have the strongest light and the greatest heat. At noon the sun pours down his heat and light with the most direct rays, and in summer his rays slant less than in winter. We find that these are the periods of greatest heat. In some parts of the world the sun shines straight overhead at noon, and these are the hottest parts of the earth. In the

morning and in the evening the sun's rays slant most during the day, and in the winter they slant more than in summer. Look at the sun's rays in the picture and notice how they strike the curve of the earth. At the equator they fall straight overhead. Look at the man standing on the equator. At the equator and on both sides of it the sun shines straight down with little or no slant. There it makes most heat; and the *hot zone* or belt lies there. Count the number of rays that strike the earth within the hot zone, also within the cold zone. This *torrid zone*, as we call it, is over 3000 miles wide and has very warm weather every day in the year. The days have about twelve hours of vertical sunshine, and the plants, flowers and fruits grow all the year round. The ground is always hot. "Torrid" means "hot and dry." The people wear very light clothing.

Near the poles the sun never goes very high up in the sky even in summer, and in winter it does not rise at all for several weeks at a time. There is not much heat there. At mid-summer the sun never sets for several weeks at a time, but it is low down in the sky and its rays slope so much that they produce very little heat. The winter lasts nine or ten months and the summer only two or three months. The slanting rays can hardly melt the ice in summer, and a little way down from the surface the ground is always frozen. Only a few plants can



grow there in the very short summer, and the winters are the coldest in the world. These two cold zones, or regions, are called the *north frigid zone* and the *south frigid zone*. "Frigid" means "frozen." The days and nights are sometimes very long and sometimes very short, and the people wear warm fur clothing. The frigid zones are very small. You will notice on the map on next page two other belts that divide these frigid zones on each side from the torrid zone. Each of them is almost as



wide as the torrid zone itself; one is called the *north temperate zone*, while the other is named the *south temperate zone*. They make up together the largest part of the world and contain the homes of the ruling races of mankind. In these zones the length of the day varies a good deal; the sun is never directly overhead and the weather is moderate both in summer and in winter. There are *four distinct seasons* following in regular order. Can you name them? We live in the north temperate zone, but New Zealand is in the south temperate. When we have summer here it is winter there; and when we have snow and skating, it is midsummer in the south temperate zone. Learn from the map on next page the names of the four lines that mark off the five zones of the world.

Now, if the earth simply turned before the sun exactly in the same way day by day throughout the year, every day would be of the same length, and there would be no change of season in any zone. But nearly every day the sun rises and sets a little earlier or a little later than it did the day before. The slant of the sun's rays is also different from day to day. These changes make the seasons come round in their order. The main cause of this variation is the motion of daily rotation working with another movement of the earth that goes on at the same time. This is the *annual revolution* of the earth round the sun; for, while the earth never stops turning eastward on its axis, it is all the time swinging regularly round the sun once in a year. This combined motion of the earth, together with a *certain fixed direction of its axis*, serves to produce all the changes of the seasons. You can make the whole matter clear with a globe suspended by a long twisted cord.

At play time pretend you are the earth and your comrade the sun. While your playmate slowly rotates on his heels you may revolve much faster on your own heels and at the same time circle round in a wide ring. You can thus imitate the earth's motion. If you will carry a revolving ball, like that in lesson 10, completely round the table where the lamp is, taking care to make the upper wire always point *north*, you will understand the distribution of the sun's light and heat more perfectly.

#### ORAL AND WRITTEN EXERCISES.

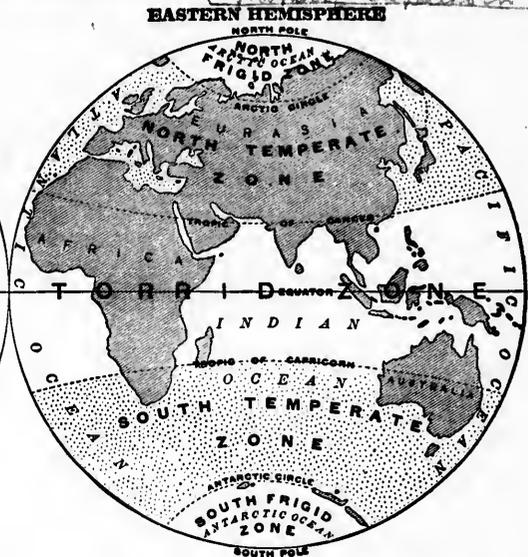
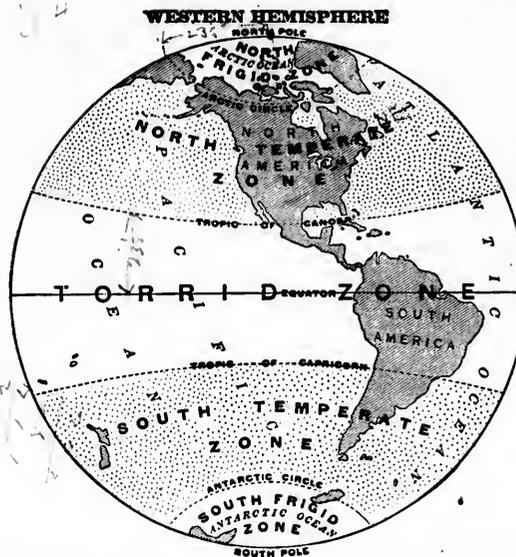
(Give all answers in complete sentences.)

Notice the exact time of sunset on Monday and also again on Friday. State how many minutes' difference. At what times of the year does the sun set exactly at six o'clock?

417  
 44  
 280  
 43

FRIGIDA =  $23\frac{1}{2}^{\circ}$  from pole.  
 Torrid =  $23\frac{1}{2}^{\circ}$  from equator  
 Temperate =  $43^{\circ}$  from antarctic circle and 25 from arctic circle

MAP-DRAWING AND MAP-READING



Tell the hour of each day and the month of each year when we see the sun highest up in the sky. Why do we get most heat when the sun's rays slant the least? Make a drawing to explain. In what regions of the world do the sun's rays slant most, in what region least? What zone is the largest, which are the smallest? Draw a very large circle and mark off the zones. Next give the boundaries of each zone. What is the shape of the frigid zones? Cut out two pieces of paper to represent the frigid zones and mark two dots to locate the poles. In the frigid zones they have the longest days in the world and also the coldest weather. Make a statement to account for this low temperature or heat. Why are few woollen and fur garments used in the torrid zone? As there are few trees in the frigid zones, what do the people use for building houses? How do they make fires? Wheat, apples and turnips grow in the temperate zones. Mention some of the food products of the torrid zone, and tell what people live on in the regions near the poles. How long are the nights in the torrid zone? Which is the zone you have seen most yourself? Which zone contains most land, which most water? Which continents lie chiefly in the torrid zone? Is the northern or the southern part of Australia the hotter? How do you know? Is the northern or the southern part of Asia the hotter? How can you tell? Name in order the continents and the oceans that are crossed by the Tropic of Capricorn. Name in regular order the continents and the oceans that are crossed by the Tropic of Cancer. In what zone does the Mediterranean Sea lie? Name the largest ocean, continent, and zone. If the earth should cease to rotate on its axis, but should still revolve round the sun as usual, one day would make a year. Prove this with a globe. In what zone is North America? South America? Africa? Europe? Which is warmer, the south of Africa or the south of South America? Why? Which is warmer, South Africa or Canada?

### 13. Map-Drawing and Map-Reading.

Before Columbus found his way across to America he earned his living for some time by making maps and charts.

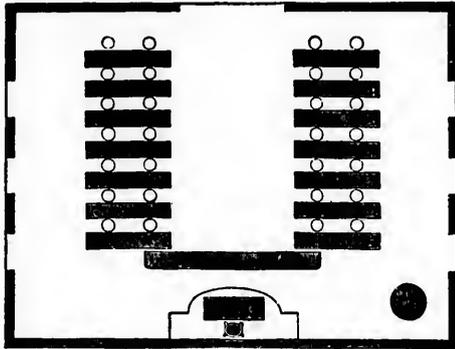


Picture of Schoolroom.

We must learn what a map is, for without maps we could know very little about geography.

The drawing shows us the inside, or interior, of a schoolroom. We see the floor, ceiling, walls, windows, desks and seats. The different objects in the schoolroom are shown as in the various positions in which we should see them if we stood at the door, and looked in. It is a picture.

Now, if we could lift off the roof and look down, we should see the floor, and all the objects on it. And, if a drawing of the schoolroom were made as we should then see it, we should have what is called a *ground-plan*, or a *plan* of the schoolroom, as here shown.



Plan of Schoolroom.

Suppose we draw a plan of a schoolroom. First, we must measure it. Let us say it is forty feet long and thirty feet wide. Of course we cannot draw on a slate or on a blackboard a line forty feet long; so let us make one inch stand for ten feet, then the lines for the longer sides of the room will be four inches, and those for the shorter sides three inches. This is making the drawing on what is called a *scale*—a scale of one inch to ten feet. We have all seen a photograph of a man six feet tall; but was the figure in the photograph six feet in length? No; perhaps it was only three inches. Now if the man was six feet (seventy-two inches) high, and the picture only three inches long, we should say that the picture was on a scale of three inches to seventy-two, or one inch to two feet.

As we have measured the schoolroom, and made a plan of it, so we may measure the school-grounds and make a *map* of them. We speak of a "plan" of a building, and of a "map" of the school-grounds, or the school section, or our province, or the Dominion of Canada, or the world. A map is a plan of the whole or any part of the earth's surface.

When we draw a plan of a schoolroom we do not make *pictures* of the objects on the floor; we *represent* the objects by lines and marks. So we may draw a map of the school-grounds by using signs that stand for the different objects in them.

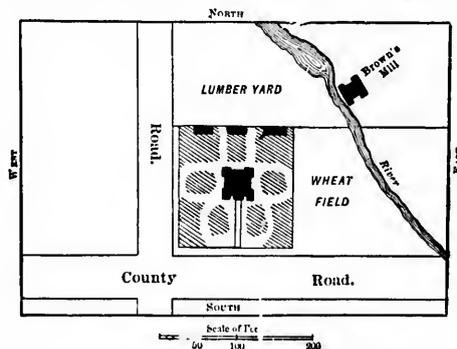
Draw another plan of a schoolroom on the same

scale, five inches by four inches. What is the size of the room this plan represents? Measure your own schoolroom and make an accurate plan of it. Get the dimensions and directions with great care. Next measure your school-grounds and map them out on a fixed scale.

We cannot succeed in learning about the different parts of the earth without maps. No matter how many pictures of any part of the world you may have seen, you cannot tell where it is, nor of what shape it is, nor how large it is, unless you have a map of it. One thing must be kept in mind all the time in looking at a map,—its *scale*. We may make a map of a country on a small scale or on a large scale. Sometimes we make quite a large map to show a small country. We need to do this when the country has many rivers and mountains and places that we wish to show clearly. And sometimes we make quite a small map to show a large country in a general way.

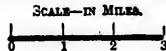
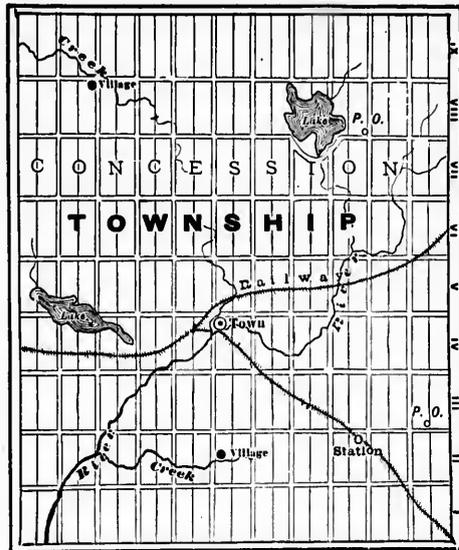
Maps are usually made with the top for the north, the right side for the east, the bottom for the south, and the left side for the west.

Here is the map of a schoolhouse and grounds,



Map of a Schoolhouse and Grounds.

and the places near by, that will serve as a model. Look at the line which you see marked at the bottom, and tell what its scale is. Two hundred feet to the inch is right. Rule a line at the foot of your map, and mark upon it the scale you have used. If your home is in a village or town, draw a map of the village or a map of that part of the town near your school. If you live in a township, make a map of it. On the next page is a map of a township in Ontario, which shows how to mark lakes, rivers, roads, towns, railways, post offices, and so on. The scale is given in miles.



Now find out how many townships there are in your own county, the directions of the hills and of the rivers, the size of the lakes, and the position of the towns. Make a small map of your own county, but do not mark too many places. Ridges of hills may be shown by a series of crosses: **xxxxxxx** Mountains are generally marked with a dotted line:  which is afterwards fringed thus:  The lettering should be neatly done, and you should write the names upon clear space, as far as you can. Turn up the map of your own province in this book. Look at the scale of miles. Observe the cardinal directions. Find your own county, or town, or city, or township. Put a small pencil dot on the place where you live. Look at the scale, follow the railways and see how a small map can show the directions and the distances of a large country. With your ruler and the scale find out the distances shown on the map between ten other places and your own home. By and by you will be able to understand how Columbus and many other geographers since his time have made maps of the great continents and the wide oceans, in which thousands of miles are represented by a few inches

on the map or chart. A map of a large country is the result of a great deal of careful measuring and much travelling by many people. Understand the meaning of every mark you find on the maps in this book. To read everything on the maps *intelligently* is very important indeed. Copy every map you study.

**ORAL AND WRITTEN EXERCISES.**

(Take care to use complete sentences.)

Name the county or district in which you live. How many townships does it contain? Give their names in proper order. Explain the difference between a picture and a map. What is meant by a ground-plan? If a map is hung up on the wall, what direction does the top of the map represent? If a fly is creeping up towards the top of the map, is the fly going northward? If a map is laid on the floor, which side of it should face the east? If a fly should run across the map from left to right, would the fly be going eastward? What is the direction of the nearest post office, from your school? If you live in a township, describe the position of your home. If you live in a town or city, describe the position of your home. Name the railways and the rivers nearest your home and tell which way they go. Make two maps: one of a garden, the other of an orchard. The Pacific Ocean is about 9,000 miles long from north to south; draw a line to represent its length. Use a scale of one inch for 1,000 miles. The Mediterranean Sea is 2,300 miles long; draw a line to represent the length. Use a scale of one inch for 100 miles. From Toronto to Montreal is 333 miles. Draw a straight line to represent this distance, using a reduced scale. Find out from the maps in this book the largest scale and also the smallest scale that has been used in the maps of the countries. Tell the scales in inches as nearly as you can. A map of Canada is drawn on a scale of 60 miles to an inch and a half. The distance between two places on the map is six inches. How many miles are these places apart? Measure the maps and the scale, and tell the lengths of Lake Ontario, Lake Erie, Lake Huron, and Lake Superior. Find the map of North America and measure its greatest breadth from east to west according to the scale that is given.



Lachine Rapids.

## RELIEF MAP OF NORTH AMERICA.



## RELIEF MAPS.

On page 9 and on page 25 we show outline maps of North America and other grand divisions. On this page we have a map of North America, which shows not only the shape of its outline, but also the high and low parts of its surface. Such a map is called a *Relief Map*. On the relief maps in this book the low land is shown dark, and the high lands, light. In the highlands, however, the mountain ranges are shown by darker shading. You can easily see from this map that the surface of the western part of North America is very uneven. What long range of mountains is found there? The broken, moun-

tainous country extends very close to the shore of the Pacific Ocean. What shorter range is near the Atlantic coast? Between these mountains and the Atlantic stretches a tract of smooth country of moderate width. Find Hudson Bay. Notice the broad highland surrounding this bay. This is the Laurentian plateau described later. See the great area of lowland between the Rocky and Appalachian Mountains, stretching from the Arctic Ocean on the north to the Gulf of Mexico on the south. Notice the rivers shown by the dark lines. Write out the names of six. Notice the lakes shown in white on the map. Find the Great Lakes, and three other lakes.

## NORTH AMERICA.

### 14. Position and Shape.

On page 28 is a map of North America, the grand division on which we live.

What tropic crosses the southern part of North America? In what zone is that part of North America, south of this tropic? What circle crosses the northern part of North America? In what zone is that part of North America, north of the Arctic Circle? In what zone is all North America between that circle and the Tropic of Cancer?

What oceans wash the shores of North America? What land is near North America in the North-West? What strait is between North America and Asia? What land is connected with North America on the south? How is it connected?

How many sides has North America? Is the coast line on any of these sides a straight line? Find a place where the shore bends inward so far that a portion of water seems shut in by the land. A body of water extending into the land is called a *gulf, bay, or sea.*

What bay is west of Greenland? What strait connects this bay with the Atlantic Ocean? In these waters, great blocks of ice, called *icebergs*, and vast fields of ice can always be seen floating about. Seals, and other animals that live in cold water often climb upon the floating ice. Great white, or polar bears often swim out to these floating masses of ice to catch and eat these animals.



Polar Bears and Seals.

What bay and strait south of Baffin Bay? They were named after Captain Henry Hudson, who was one of the first white men that sailed those waters.

What gulf is east of the widest part of North America? This gulf and that part of the ocean near it are among the best places in the world for catching codfish and mackerel, two of the most important fish used by man for food. What large gulf is in the south of North America? What sea is north of South America? What long, narrow gulf is on the west?

What sea is at the north-west between Asia and North America? In this sea and on some of its islands are killed the seals from whose furs the beautiful sealskin muffs, jackets, etc., are made. What strait is between this sea and the Arctic Ocean?

Find a place near the Tropic of Cancer where the mainland of North America stretches out into the Pacific so as to be nearly surrounded by water? A portion of land stretching out from a larger portion and nearly surrounded by water is called a *peninsula*. What is the name of this peninsula? What peninsula is south of the Gulf of St. Lawrence? What peninsula is between the Gulf of Mexico and the Atlantic? Between the Gulf of Mexico and the Caribbean Sea?

### 15. Islands.

On which of its three sides are most of the islands of North America? Find Greenland. This is the largest island north of North America. Most of this island is always buried deeply under snow and ice. This snow and ice, hundreds of feet in depth, extends, in the northern part of Greenland out into the water. Immense masses are broken off by the upward pressure of the water, and these floating away are the icebergs formerly mentioned. Immense masses of snow and ice on land are called *glaciers*. What island is east of Greenland?

What island is east of the Gulf of St. Lawrence? This island was discovered by English sailors under John Cabot a few years after Columbus came to America.

What islands are east of the Gulf of Mexico? One of these islands was the land first discovered by Columbus. He thought he had come, as he had expected, to India, by sailing westward. He, therefore, called the natives Indians, and afterwards the islands were called the West Indies.

What island is near the west coast, at the widest part of North America? This island belongs to our own country, Canada.

### 16. Mountains.

On the map on page 28 the broken and irregular shading shows where the surface of North America is mountainous, the smooth and even shading shows where the land is smoothest and flattest.

Where does the surface of North America appear roughest and most mountainous? The western part is almost entirely covered by mountains.

When a hill is so high that it seems to reach the clouds everybody calls it a *mountain*.



A Glacier—Parent of the Iceberg.



Hills and Ridges.

Generally, however, when a hill is much higher than the neighboring country it is called a mountain.

Sometimes a hill stands by itself and is surrounded by low lands. More frequently, the top of the hill extends in a long line, like the ridge of a roof. How many slopes would such a ridge have? A line of hills extending for a considerable distance is called a *ridge* or a *range*; and a number of ranges, parallel or nearly parallel to one another, is called a *chain* of hills or mountains.

What is the direction of most of the ranges in the west of North America? What name is given to the longest mountain chain? They extend nearly the whole length of North America. Even in the torrid zone, some of their highest points or *peaks* are covered with snow all the year round. You probably know that the higher we go the colder the air is so that even in the hottest part of the world, if the mountains are high enough, we find their tops as cold as it is in the frigid zone.

This snow which lies always on the tops of high mountains is called a *glacier*. It is continually sliding down the mountain to lower and warmer regions. When it arrives far enough down the mountain side, it melts and leaves masses of gravel, sand, earth, and stones which have fallen upon it. This mass is called the terminal *moraine* of the glacier. It crushes and smooths the rocks beneath it as it passes down. Geologists think that the northern half of North America in ages long past, was covered with a huge glacier which has left great *boulders* scattered about. In many places the surface of the ground consists of a tough clay mixed with stones which is called *till*. This also was left by the great glacier. The lakes scattered over the whole of the northern part of North America are supposed to have been ground out of the rock in some places by the glacier, while in other cases they have been produced by the damming across of old river valleys by the till and other glacial deposits. The period of time when the great glacier covered North America is called the *Glacial Period*.

Near the Pacific coast are shorter ranges between which and the Rocky Mountains is a broad *highland* or *plateau*. This plateau with the mountain ranges on its borders, is much higher than any other part of North America, and is sometimes called the *cordillera* or Cordilleran system of mountains. Find where this plateau is widest. What part of the whole width of the continent there does it occupy? Where does it occupy nearly the whole width of the continent?

What mountains are near the east coast of North America? In what direction do they extend? What gulf is at their north end? At their south end? The Appalachian Mountains are much lower than the Rocky Mountains. None of their peaks are high enough to be covered with snow all the year round, and in most cases grass and trees grow to their tops.

#### ORAL AND WRITTEN EXERCISES.

Compare the three coast lines of North America in length. Describe one, giving general direction, indentations, projections, and islands. How is North America joined to South America, and separated from Asia? Name and give the position of four peninsulas of North America. Name the largest island north of North America. How do icebergs originate? What plateau is in the west of North America? What is the direction of its greatest length? Where is it widest? Where narrowest? What ranges border it for the most part? Compare the Appalachian with the Rocky Mountains in height and appearance. Where are the Rocky Mountains covered with snow all the time? Where the Appalachians? Why is there such a difference? What is a glacier?

#### 17. Plains.

Have you ever seen a place where the ground for a great distance in every direction is flat and nearly level? Such a place is called a *plain*. Where in the map on page 28 does North America seem flattest and smoothest? The central part of North America is a vast plain. What mountains border this plain on the west? On the east? What borders it on the north? On the south?

In going to school, do you walk up-hill or down-hill? Perhaps the ground is so nearly level that you can hardly tell which way the ground slopes. If there was a stream beside your path you could tell then. How does the flow of water show which way the ground slopes?



Cattle grazing on a Plain.

Much of the great central plain is very nearly level. How can you tell which way it slopes? The rivers or large streams, are shown on the map.

Notice the rivers in the great central plain and tell which way the northern part of the plain slopes; the central part; the southern part.

The western part of this plain, near the Rocky Mountains, is really higher than the tops of the Appalachian Mountains and might be called a plateau. Curving round the Hudson Bay at a short distance from it, is also a low plateau. These higher parts slope gradually down to the central part of the plain, which is a broad *lowland*.

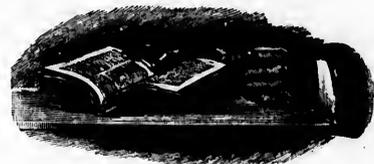
There is a small plain east of the Appalachians. Which way does it slope? As it borders the Atlantic, it is called the *Atlantic coast plain*.

#### ORAL AND WRITTEN EXERCISES.

Describe the great central plain; its location, borders, slopes, plateaus, lowlands. Describe the Atlantic coast plain; its location, slope.

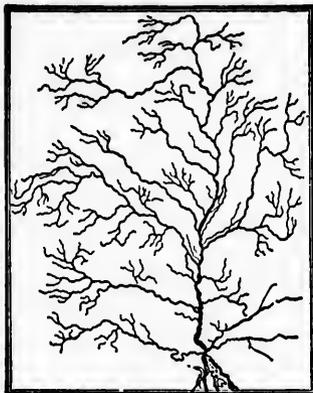
#### 18. Drainage.

In what direction does the Mississippi River flow? In what part of the central plain is it? Which way does the southern part of this plain slope? The Mississippi River is the largest river of North America. Several large rivers flow into it. Such rivers or streams flowing into another river or stream are called its *branches or tributaries*. Name a large branch of the Mississippi from the east. In what direction, then, does the eastern part of the central plain slope? Name two branches of the Mississippi from the west. What way does the western part of the central plain slope?



Hold a book open, as in the picture, so as to form a trough, with two side slopes and a bottom slope. The great trough of land in which the Mississippi flows is like this, except that the land is not so smooth and regular as the book. Such a trough is called a valley. The Mississippi valley is hundreds of miles wide, and all its slopes are very gradual.

Find the place where the Ohio joins the Mississippi. This place is called the *mouth* of the Ohio. The mouth of any stream is that place where it flows into a larger stream or other large body of water. On the map, find the mouth of the Missouri; of the Mississippi itself. If we travel up the

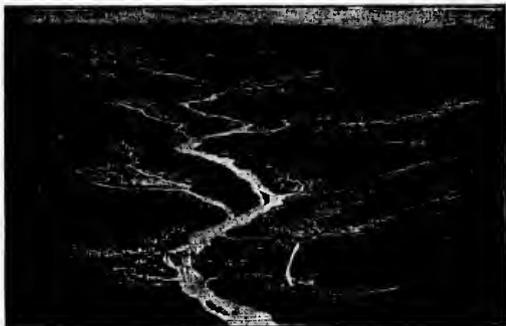


A River System.

branches, is called a river *system*.

When rain falls on the land, a great deal of it sinks into the ground and soaks away. If this water in sinking downwards meets a bed of rock or clay, it cannot sink deeper, but flows or trickles along the surface of this bed of rock or clay until it reaches the surface of the ground lower down where it bubbles out as a *spring*. Whenever you find a spring, you may be certain that the water bubbling out now fell some time ago, as rain, and has been flowing underground ever since. Why do springs often flow throughout dry seasons?

In ascending a river we should, probably, come at last to such a spring. The place where a river begins is called its *source*. Sometimes the source of a river is a spring, sometimes a marsh, sometimes a pond or lake, and sometimes the melting snow or ice of a glacier on the side of a mountain. Find the source of the Mississippi; of the Missouri.



A River Basin.

Missouri we shall find that it has many branches that are not shown on the map. If we go up these branches, we shall find that they, also, have smaller branches, and these have still smaller branches, until the streams are mere threads of water. A river, with all its

The land sloping towards a stream is drained into that stream. All the land drained by a river and its branches is called the river *basin*. Point out the basin of the river in the picture below. Trace on the map the basin of the Mississippi River.

After a rain you will find the water of the stream nearest you, muddy. Where does the mud come from? Rain washes particles of soil down the hill sides into the valley below and into the stream. Swift streams wash away part of the land through which they flow and carry it along with them. What will become of the hill in time, if this goes on? Rivers are continually carrying quantities of earth from the higher land. Why do they carry more in spring than at other seasons?

Put some earth into a glass of water and stir the water till it becomes muddy and then let it stand. What will happen to the earth? Sometimes the water in a river rises, overflows its banks, and covers the country on both sides with a shallow expanse of muddy water. When it does this, if it does not flow as fast as before, what will happen to the mud carried by the water? The land on both sides of the Mississippi near its mouth is covered many feet deep with soil left in this way by the river. The plain thus built up by the Mississippi or any other river is called its *alluvial* or *flood plain*. These flood plains are generally very fertile. Why?

When a river enters a lake, gulf, or sea, its current is checked and the earth which it has been carrying drops to the bottom. Gradually, the bottom is built up until a V-shaped tract of marshy ground is



A Delta.

formed, through which the river empties by several mouths. This triangular tract of land is called a *delta*. Most large rivers form deltas at their mouths and these deltas are continually extending farther.

Look at the picture on next page of two river basins. If rain falls on the rim between the two basins, which way will the water flow? Such a rim dividing two stream basins is called a *divide* or *watershed*.



A Watershed.

In what direction does the northern part of the central plain slope? How do you know? Find on the map the divide between the Mississippi and the basins north of it. This divide is not very high and in some places the ground slopes from it so gradually that it appears to be level.

What large river flows towards Hudson Bay down the eastern slope of the Rocky Mountains? A low plateau—the Laurentian—which curves round Hudson Bay forms a dam across the lower end of the valley of the Saskatchewan River. This obstruction has caused the water to spread out and fill the hollow place until it has found an outlet over the lower point of the dam. Such a great pond of water is called a *lake*. What is the name of this lake? It is quite large; in the widest place you cannot see across it. What river flows out of it? A river flowing out of a lake is called its *outlet*, while a river flowing into a lake is called an *inlet*. How many inlets do you think a lake may have? How many outlets?

What river flows down the eastern slope of the Rocky Mountains and then turns northward into the Arctic Ocean? What three lakes are in its course? There are thousands of lakes scattered about in the northern part of the central plain, only a few of which, however, are shown on any map. Can you explain the origin of many of these lakes? See page 30. Trace the divide between the Saskatchewan and Mackenzie basins.

What three river basins of North America have we found extending as far west as the Rocky Mountain highland? What great river basin of the central plain does not extend as far west as this highland? What lakes are included in the St. Lawrence basin? These are called the Great Lakes on account of their size. Which of them is the largest? It is the largest fresh water lake in the world.

Into what oceans do all the basins we have studied empty their waters? Into what ocean do the other

great river basins empty? The Rocky Mountain highland divides North America into two great slopes, one towards the Pacific Ocean, the other towards the Atlantic and Arctic Oceans. This great watershed is called the *continental divide*. Along the top of what mountains does most of it lie?

What is the most northern river of the Pacific slope? Into what sea does it flow? What large river of the Pacific slope flows directly into the Pacific Ocean? What river flows into the Gulf of California?

There are several small rivers which flow down the eastern slope of the Appalachian Mountains into the Atlantic Ocean. Name two of these.

#### ORAL AND WRITTEN EXERCISES.

Where is the Mississippi basin? How far does it extend? Name its three slopes, its chief branches. What is meant by the flood plain of a river? Explain the origin of a delta. Name a river that has not a delta. Give a reason for this. What is a divide? What is a continental divide? Where is the continental divide of North America? What are the two main slopes of North America? Name the other slopes. Of the two main slopes which is the longer? Name one river in the Arctic slope, three of the Atlantic slope, three of the Pacific slope.

#### 19. People and Subdivisions.

The map below shows by means of the little dots, the parts of North America in which most of the people live. Where the dots are closest the number of people is greatest.



PEOPLE ARE MOST NUMEROUS WHERE THE DOTS ARE THICKEST.

Where are the two great groups of people in North America? Why are there hardly any people in the north of North America? Very few people live in the Rocky Mountain highlands, except in the south.

The group of people at the south of North America are mostly descendants of people who followed Columbus to America from Spain. They mostly speak the Spanish language and would probably not understand us if we talked to them in English.

These people were ruled for many years by the King of Spain. At last these Spanish settlers rebelled against Spain and made themselves free, so that now they make their own laws and govern themselves.

West of the Gulf of Mexico these Spanish settlers have formed a country called Mexico. South of Mexico between it and South America the land is called Central America. This consists of several small countries, most of which make their own laws.

The more northern and larger group are mostly descendants of people of British origin who settled there about the same time that the Spaniards made settlements in the south. Find the Gulf of St. Lawrence. About the same time the French made settlements along the St. Lawrence River and Gulf. Their descendants live there still and speak French. What is the name of that part of North America west and north of the Great Lakes and the St. Lawrence River? Canada is owned by Britain. Most of the people speak English with the exception of the French Canadians mentioned above.

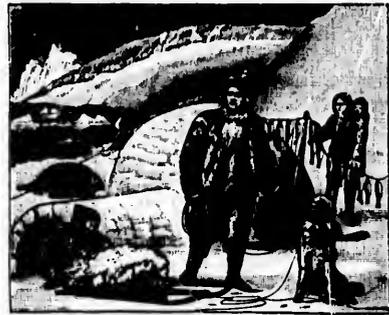
What country is south of Canada? The eastern part of the United States was settled by Englishmen and for a long time it was ruled by Britain. After a while these settlers rebelled against the King of Great Britain and took the country south of Canada for their own. They named it the United States of America. Other regions have been added to it since, so that now it extends from the Atlantic to the Pacific Ocean. Find Alaska on the map. It belongs to the United States. What language is spoken in the United States?

What language is spoken by the southern group of people in North America? What language is mostly spoken by the other group? One important difference between these two groups is, therefore, that the language of the northern group is mostly English, while that of the other group is mostly Spanish. What river forms part of the

northern boundary of Mexico? This river may be said to separate the English-speaking from the Spanish-speaking people of North America.

Besides these, there still remain scattered over the whole of North America, many Indians or people of the red race. Many of these have settled on farms and dress and live like their white neighbors. Some, however, still roam about, and live by hunting and fishing as their forefathers did.

In the northern part of Canada are found people who, perhaps, belong to the yellow race—the Eskimos. They are very short, but muscular and active. They live entirely on animals—fish, seals, whales, etc. In the winter they live mostly in huts made of ice or snow. They clothe themselves in the



Eskimos.

skins of seal and caribou. They make excellent canoes of bones and hides, and they are very skilful canoeists. Their sledges, made of similar materials, are drawn by dogs. The Eskimos are skilful in the manufacture and use of their harpoons and spears, and, on the whole, are an intelligent people.

ANIMALS.—On page 35 you will find a picture of some of the animals of North America. There are many species of snakes; the rattlesnake is the most dangerous; it is found in parts of Canada and in most parts of the United States. The huge alligator is found in the marshes and swamps of the southern United States. The waters, inland and coast, abound in the most valuable fish. Some of the sea fish are the cod, haddock, halibut, mackerel, herring and salmon. Of fresh water fish there are the lake sturgeon, the salmon trout, the white-fish, the brook trout, maskinonge, and bass. Oysters, lobsters, and shrimps are found on the eastern shores of Canada and the United States in great quantities. Fur-bearing animals abound, especially in Alaska and Canada. Game birds of all kinds are numerous.



1. PUMA. 2. EAGLE. 3. ANTELOPE.  
 4. ROCKY MOUNTAIN GOAT. 5. LYNX.  
 6. ROCKY MOUNTAIN SHEEP. 7. MOOSE.  
 8. GRIZZLY BEAR. 9. STAG. 10. WILD  
 TURKEY. 11. BISON. 12. MUSK OX. 13.  
 ELDER DUCK. 14. AUK. 15. WHITE BEAR.  
 16. SEAL. 17. WALRUS. 18. PELICAN.  
 19. CANVAS BACK DUCK. 20. BEAVER.  
 21. OTTER.

The Puma or Cougar, which is sometimes called the American Lion, and popularly known as the Painter, was formerly found as far north as the Great Lakes, but it is now found no farther north than Mexico. Eagles, of various species, are found in every part of the continent. The Antelope, or Prong-horn, is found on the western plains. The Rocky Mountain Goat, a sort of Antelope, and the Rocky Mountain Sheep or Big-horn, inhabit the inaccessible peaks of the Rocky Mountains. The Lynx, or Wild Cat, is found in all eastern North America. The Moose, or Elk, is found in all parts of Canada, as far north as the Arctic Ocean. The Grizzly Bear is found in the Rocky Mountains as far south as Mexico. Deer, of various species, are found in every part of the continent. The Wild Turkey was formerly common in Ontario and in the Eastern States, and especially in the Southern States. The Bison, or Buffalo, not long ago incredibly numerous on all the northern prairies, is now found only in the loneliest plains of the Northwest. The Musk Ox, or Musk Sheep, inhabits the barren plains of the far Northwest. The Elder Duck, the Auk, and the Walrus, are found in the northern and north-eastern vast regions of the continent. The White Bear is found only on the shores of the Arctic Ocean. The Brown Pelican is found in Central America and the West Indies; the White Pelican in summer migrates from the Gulf States to the lake regions of north-western Canada. The Canvas Back Duck is found on the coasts of the middle Atlantic States. The Beaver, formerly common throughout all the northern part of the continent, is now found chiefly in the loneliest parts of Canada. The Seal is found along the coasts of all the cold ocean waters of the continent. The Otter is found in all parts of Canada.

SOME ANIMALS OF NORTH AMERICA.

er may be  
 from the

l over the  
 people of  
 on farms  
 s. Some,  
 anting and



excellent  
 very skilful  
 materials,  
 lful in the  
 and spears,  
 le.

picture of  
 There are  
 s the most  
 ada and in  
 ge alligator  
 e southern  
 st, abound  
 ea fish are  
 ng and sal-  
 e sturgeon,  
 ook trout,  
 and shrimps  
 a and the  
 ur-bearing  
 d Canada.



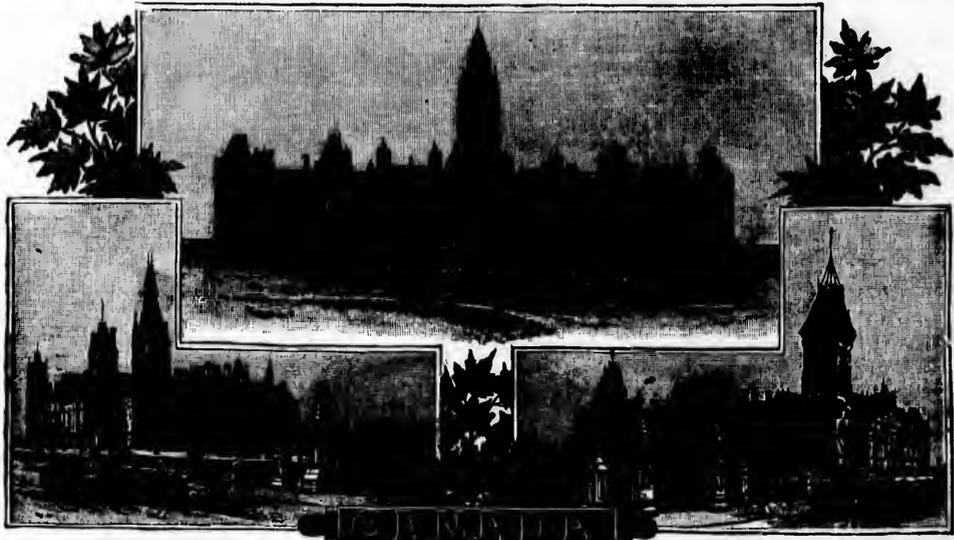
## ORAL AND WRITTEN EXERCISES.

In what parts of North America do the most people live? How are they divided as to language? What river forms the boundary between the English and Spanish-speaking groups? Where do the people speak French? Account for this. Name the English-speaking countries of North America? To whom does each belong? Name the countries of Spanish America. Who are the natives of North America? Where do they live? In what ways do they now live? To what race do the Eskimos probably belong? Describe them as to stature, food, and houses. Name some of the fur-bearing animals of North America, the chief animals of prey, some of the birds, and some of the fish. In what part of the grand division do the most valuable fur-bearing animals live? Why? In what zones is North America? Through what countries do the Arctic Circle and Tropic of Cancer pass? What strait separates North America from the nearest grand division on the North-west.

## Currents of Atlantic Ocean.

What ocean is east of America? The water of this ocean is in continual movement. There is a great stream of cold water always moving from the polar regions towards the equator. Such great streams are called *currents*. That from the north is called the Arctic current, while that from the south is known as the Antarctic current.

Besides these near the American continent there are two great streams of warm water flowing away from the equator towards the poles. The one flowing northward into the Gulf of Mexico is called the Gulf Stream. What strait south of Florida? The Gulf Stream flows out of this strait northward, not far from the eastern coast of the United States. As it proceeds on its course it spreads out to the north-east and reaches the western shores of Europe. During its course the Gulf Stream gives out an enormous amount of heat which makes the North Atlantic Ocean and the western part of Europe much warmer than they otherwise would be.



The Dominion Parliament Buildings, Ottawa.

## 20. Historical.

What large gulf is east of Canada? What large river empties into it? What peninsula is in the south-east of Canada?

Shortly after the discovery of America by Columbus, settlers from France began to occupy the valley of the St. Lawrence and the peninsula of Nova Scotia. These settlers did not cultivate the ground extensively but spent their time mostly in hunting, fishing, and trading with the Indians in furs.

What peninsula is in the south-eastern part of the United States? What plain extends between this peninsula and that of Nova Scotia?

While the French were settling on the St. Lawrence and in Nova Scotia, Englishmen were making settlements on the Atlantic coast. They came in parties, each party settling in a different locality. In time there were thirteen English *colonies*, or groups of settlements lying side by side and occupying almost the whole east coast between Nova Scotia and Florida.

In course of time, war occurred between the French colonists in Canada and the English colonists, and as a result Canada was conquered by Britain. The Canadians were allowed to use their own language, the French, and to practice their own religion, Roman Catholic. Shortly after this, the English

*DeLuz*

colonists rebelled against Britain, obtained their independence, and became known as the United States of America. The Canadians refused to join in rebellion and remained loyal to Britain. Many of the English colonists who would not join in rebellion against Britain, left the United States and settled in various parts of Canada. These settlers are known as the United Empire Loyalists.

What bay is north of Nova Scotia? What land is north of this bay? What is the largest branch or tributary of the St. Lawrence River from the north? What land is west of this river?

The United Empire Loyalists settled mostly in Nova Scotia, New Brunswick, and Ontario. Shortly afterward many *emigrants* from England, Scotland and Ireland also came and occupied these portions of Canada.

What large bay is in the north of Canada? The country east and west of this bay abounds in fur-bearing animals. The King of England early gave



Hudson Bay Company Trading Post.

the sole right to trade with the Indians in furs in this territory to a company of men called the Hudson Bay Company, and the country whose waters flowed into the Bay was known as The Hudson Bay Territory or Rupert's Land. In 1869 the claims of this Company to Rupert's Land were purchased by the Government of Canada. Since then thousands of people from Eastern Canada, Great Britain, Europe and the United States have settled upon the rich farming and ranching lands of this immense district, chiefly in Manitoba, Saskatchewan and Alberta.

What part of Canada borders on the Pacific Ocean? Not long ago, gold was discovered in the Mountains of British Columbia and crowds of people

poured in from all parts of the world. The miners were followed by farmers and fishermen, the latter attracted by the immense number of salmon to be found in the rivers.

Thus we see that Canada consisted of a number of widely separated settlements. In 1867, four of these provinces, Ontario, Quebec, New Brunswick, and Nova Scotia were united into the Dominion of Canada. Manitoba became a province of the Dominion in 1870, British Columbia in 1871, Prince Edward Island in 1873, Saskatchewan, and Alberta in 1905. The body of men chosen by the people to make laws for the Dominion is called a *parliament*. It meets at Ottawa each year. The body of men chosen by each province to make laws concerning provincial matters is called a *legislature*. Each legislature meets yearly at its provincial capital. The chief officer of a province is called the *lieutenant-governor*; the chief officer of the Dominion, the *governor-general*. Who is now the governor-general? Who is lieutenant-governor of your province?

In addition to these provinces Canada contains more sparsely peopled tracts of land called districts. The districts of Franklin, Ungava, and Mackenzie are known as the North-West Territories. The district of Keewatin is administered by the lieutenant-governor of Manitoba. The Yukon Territory, lying north of British Columbia, has a provisional government. What river drains this territory?

## 21. Position and Coast Line.

Canada comprises all that part of North America north of the United States except Alaska and Labrador. The northern part is too cold for food plants to grow, and in consequence that part is only peopled by a few Eskimo who live chiefly on seals.

This country is well situated for the exchange of goods with other parts of the world, being so near the eastern continent and having the Gulf of St. Lawrence opening out at the nearest point to that continent. Such trade is called *foreign commerce*. With the United States we trade across the border, and with other parts of the world in ships. Our coast is much indented with bays, and many of these contain sheltered places or *harbors* where ships may anchor. Since ships can be safely loaded and unloaded in these harbors, cities called *ports* are often built near them. Find two bays on the east

The miners  
men, the latter  
salmon to be

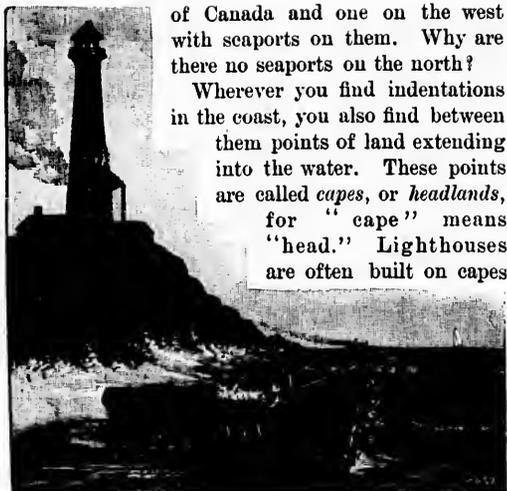
f a number of  
four of these  
unswick, and  
Dominion of  
vince of the  
n 1871, Prince  
, and Alberta  
the people to  
a *parliament*.

body of men  
vs concerning  
*ature*. Each  
incial capital.  
is called the  
the Dominion,  
the governor-  
r of your pro-

Canada contains  
alled districts.  
and Mackenzie  
ritories. The  
the lieutenant-  
territory, lying  
a provisional  
territory?

ne.

North America  
Alaska and  
gold for food  
t part is only  
ly on seals.  
exchange of  
eing so near  
Gulf of St.  
point to that  
m *commerce*.  
the border,  
ships. Our  
any of these  
re ships may  
loaded and  
d *ports* are  
on the east



A Lighthouse.

to warn sailors at night not to sail their ships against the shore, and so wreck them. What cape is south of Nova Scotia?

#### ORAL OR WRITTEN EXERCISES.

Sketch North America; show where the Tropic of Cancer and the Arctic Circle cross it; show Canada on the map. Name the most western province, and also the most eastern one. What provinces and what district touch Quebec? What part of Canada was settled first? By whom? Who were the United Empire Loyalists? Where did they settle? How was British Columbia first settled? What province is surrounded by water? What province is nearly surrounded by water? Which of the districts consists mostly of islands? What divisions of Canada are crossed by the Arctic Circle? What country borders Canada on the south? What borders it on the north-west?

### 22. Relief.

What peninsula is between Hudson Bay and the Gulf of St. Lawrence?

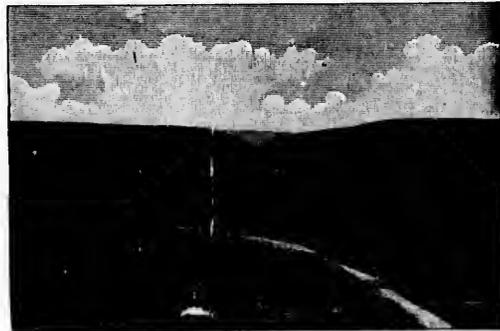
If an immense knife were to cut our country across in any direction, the upper edge of the cut would be called the *relief* of the country in the direction of the cut.

Surrounding Hudson Bay is an extensive but low plateau of hard crystalline rock in the shape of a horse-shoe. Spreading widely in the Labrador peninsula, this rocky plateau runs with narrower width round the southern extremity of the bay, and thence continues north-westward to the Arctic Ocean. The highest parts of this plateau are generally about 1500 feet above sea level, except on the coast of Labrador where they reach from 3000 to 6000 feet.

This plateau in ancient times was very much higher, but wind and rain and rivers have worn it down in the course of long ages and the parts worn off have been carried down to form the lower and generally fertile lands adjoining the plateau.

At later periods, the movements of the earth's crust have thrown up against this plateau and parallel to its main outlines the now higher ranges of the Appalachian and Rocky Mountain or Cordilleran systems. Between the two latter systems lies the great central plain of North America. Its northern extension in Canada lies between the western edge of the Laurentian highlands and the Cordilleran system. Between the eastern edge of the Laurentian plateau and the Appalachian range lies the valley of the St. Lawrence and the Great Lakes.

The continuation of the Appalachian system in Canada is called the *Notre Dame Mountains*. This range approaches the St. Lawrence just below Quebec and thence continues parallel to that river and its



Appalachian Mountains.

great *estuary*, or wide mouth, to the end of the peninsula of Gaspé. Between what two indentations is that peninsula found? These mountains are mostly from 1000 to 1500 feet in height, rising towards the terminus in Gaspé to about 3000 feet. Nearly parallel to this main range are two broken ranges in New Brunswick. The peninsula of Nova Scotia, though lying at a considerable distance from the main line, may also be regarded as a member of the Appalachian system of uplifts with which it is parallel.

The Cordillera of the Pacific comprises a region of about 400 miles in width from the Great Plains to the ocean and is about 1300 miles in length from the northern boundary of the United States to the Arctic Ocean. This system consists in the main of



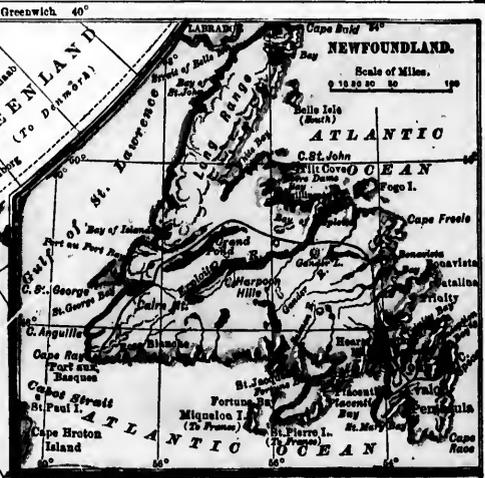
East of the Great North Bay



**DOMINION OF CANADA.**

Dominion Capital thus: Provincial Capitals thus:   
 Railways thus: Steamship lines thus:   
 Standard Time dividing lines:   
 Scale of Statute Miles:  
 0 100 200 300  
 1 INCH = 100 MILES

Note: CLOCKS SHOW COMPARATIVE TIME WHEN NOON AT LONDON.



and  
 ada  
 , in  
 the  
 can  
 ply  
 her  
 loes  
 are  
 m?  
 hey  
 tir.  
 por  
 of  
 the  
 ter  
 ses  
 eff  
 he  
 it

ed  
 he  
 pu  
 ne  
 id  
 to  
 ne  
 it  
 ig  
 r.  
 d  
 ut  
 or  
 e  
 a  
 g  
 e  
 r  
 l



Rocky Mountains.

two ranges—the Rocky Mountains in the east and the Coast Range in the west. The Rocky Mountains stretch almost continuously from a little south of the boundary to the Arctic Ocean, not far to the west of the Mackenzie delta. It is seldom more than sixty miles in width. Some peaks in the southern part of the range exceed 11,000 or 12,000 feet in height.

The Coast Range begins near the estuary of the Fraser River and runs northward with an average width of 100 miles for at least 900 miles. It is not, as a rule, as rugged in outline as the Rocky Mountains, but some of its peaks exceed 8000 or 9000 feet in height. Mount Logan in this range, over 19,000 feet high, is the highest peak in North America.

Included between these two main ranges is a plateau country whose average height is about 3500 feet above the sea. This plateau is broken by irregular ranges mostly parallel to the two main ranges. In what province is the greater part of this plateau?

The great central plain occupies the whole of Canada between the Rocky Mountains and the eastern edge of the Laurentian plateau. It has a width of 800 miles at the southern boundary but narrows northward and then expands again towards the Arctic Ocean where its width is about 300 miles. Its general slope is from the Rocky Mountains eastward and north-eastward towards the foot of the Laurentian highlands, its height above the sea level varying from 3000 feet at the west to 800 feet in the vicinity of Lake Winnipeg.

#### ORAL OR WRITTEN EXERCISES.

Draw a map of Canada, showing all the ranges described above, and in addition the Atlantic coast range in Nova Scotia

and the Cobequid Mountains. Under what name is the Coast Range of the Pacific known in the United States? What river drains the plateau of British Columbia? What highlands border the central plain in Canada? About what part of the width of Canada does the western plateau occupy? Between what highlands does the valley of the St. Lawrence lie?

### 23. Drainage.

Why is Canada well situated for foreign commerce? It is also well fitted for *domestic commerce*, or trade within the country. Steamers go from port to port along the sea coasts, the coasts of the great lakes, and along the rivers, especially the St. Lawrence. On the level surface of the great interior plain it is comparatively easy to build railroads.

The great lakes, Lake Winnipeg, and the lakes of the Mackenzie River, are all situated close to the outer edge of the Laurentian plateau, and in consequence the rivers flowing into these lakes from that side flow rapidly down their steep bed, in many cases, over rapids and falls. These falls and rapids are capable of furnishing power to machinery for use in manufacturing. Many of these streams, though not navigable for vessels, float immense quantities of lumber down them to sawmills, where it is cut up into boards, or to the larger rivers and lakes to be loaded on vessels for *export*, that is, to be carried out of the country.

Name the five great lakes. To what river system do they belong? This is one of the grandest rivers of the world. The immense volume of water contained in it, the beautiful scenery of its islands and tributaries, and its value for navigation make it one of the most important rivers of the world. Name five of its principal branches. Just after leaving Lake Ontario it flows among a large number of islands called The Thousand Islands. These are especially celebrated for their beauty and grandeur.

The inner slope of the great Laurentian highland is drained by numerous rivers into Hudson Bay. As no settlements have yet been made on the shores of this great inland sea, these rivers are not important commercially, and few, if any, of them are navigable.

The central plain is drained mainly by two great river systems—the Mackenzie and Nelson. The *Nelson* river, after receiving the waters of Lake Winnipeg, passes through a wide depression of the Laurentian highland and empties into Hudson Bay. This river has many rapids and falls in its course. The *Mackenzie* river receives the waters of many rivers and lakes and after a course of nearly 2000 miles empties into the Arctic Ocean by many mouths.

Why is the Mackenzie river of little value for commerce?

The Cordilleran region is drained chiefly by the *Fraser* and *Columbia* rivers. The *Peace* river drains a small portion of the plateau, then passes through a low gap or *pass* in the Rocky Mountains and joins the Mackenzie system. The *Fraser* rises west of the Rocky Mountains, runs northward, and then southward through the central plateau to the Gulf of Georgia. The *Columbia* rises in some lakes in the same valley as the *Fraser*, runs northwest for some distance, then turns to the south, passes into the United States and empties into the Pacific Ocean.

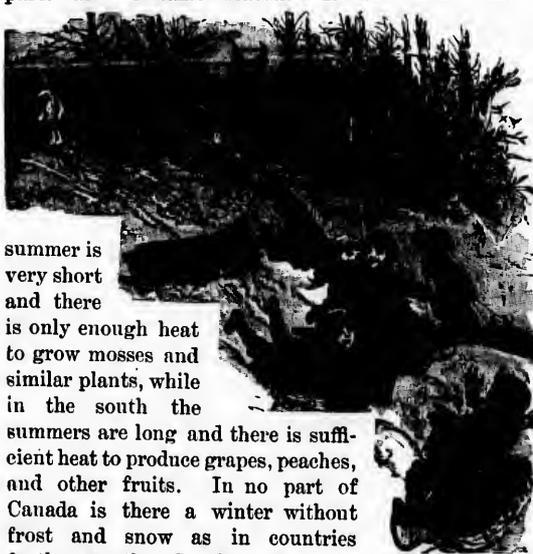
The Appalachian region, or the Maritime Provinces, are drained by many comparatively small rivers, the chief of which is the *St. John* in New Brunswick. Other rivers of this region are the *Restigouche* and the *Miramichi*.

#### ORAL OR WRITTEN EXERCISES.

Draw a map of Canada, showing all the rivers mentioned above, the chief lakes whose waters they receive, and their principal tributaries. Name three rivers that cross mountain ranges. What are the gaps through which they cross called? Account for the rapids and falls in the rivers flowing south from the Laurentian plateau. Of what value are these rivers to Canadian commerce and industry?

#### 24. Heat and Rainfall.

Canada is so wide from north to south that there is great difference between its northern and southern parts at the same season. In the north the



summer is very short and there is only enough heat to grow mosses and similar plants, while in the south the summers are long and there is sufficient heat to produce grapes, peaches, and other fruits. In no part of Canada is there a winter without frost and snow as in countries further south. In those countries

Winter in Canada.

the children know none of the joys of skating and sleighing, pastimes which make children in Canada often long for winter to come.

What is needed by plants to make them grow, in addition to heat? How is water supplied to the fields and forests of our country? Farming can only be carried on where there is sufficient supply of water for plants, either from rain or some other way. Where does the rain come from? How does this water get into the clouds? When clothes are hung out to dry what becomes of the water in them? It passes into the air in particles so small that they cannot be seen and so light that *they rise into the air*. When water takes this form it is called *vapor*. Vapor is continually rising into the air from the surface of every pond and stream, but most of all from the immense surface of the ocean. Although the water of the ocean is salt and bitter, the vapor that rises from it is fresh and pure, all the salt being left behind in the ocean. The vapor mingles with the air and is blown about with the wind, much of it being brought over the land.

Vapor, although it is invisible, is easily changed back again into water that can be seen. In the summer, fill a jug with ice water. What do you find on the outside of it? This water did not come through the jug from the inside. Where, then, did it come from? When air is chilled it is not able to hold so much vapor as before. The air around the jug was cooled by the cold surface of the jug and it dropped some of its vapor on the outside of the jug in the shape of tiny drops of water.

The air above the sea is loaded with vapor. When it moves about as wind and comes in contact with colder air, some of its vapor is changed into tiny drops of water or ice crystals. These float in the air forming clouds or unite in large drops or flakes which fall to the ground as *rain* or *snow*. Thus we can easily trace the rain or the snow to the water of the sea.

Most of the winds blowing over Canada come from the *westward*. Where, then, do the winds blowing over the western half of Canada get their moisture? They are so chilled in crossing the Coast Range of British Columbia that most of the moisture falls as rain on the western slopes of these mountains, giving that part of British Columbia an annual rainfall almost the greatest in the world. On the plateau to the east of this range the rainfall and snowfall are nowhere great, and at some places are very scanty. When these nearly dry winds reach the

high Rocky Mountains, they lose still more of their moisture. In consequence, the rainfall and snowfall of the eastern slope of the Rocky Mountains and of the western part of the great central plain are very small, and in some places few trees or food plants will grow. Such regions are called *deserts*. In the United States a large part of the great plain is *desert*, but fortunately in Canada, only a small portion, immediately north of the boundary, is as dry as that.

The rainfall in Manitoba and the southern parts of Saskatchewan and Alberta is small but sufficient to enable enormous crops of wheat to grow. These regions of small rainfall and snowfall have great extremes of temperature. Their winters are very cold and the summers very hot.

In Ontario the rainfall and snowfall are greater than in Manitoba. This is partly due to winds from the south and east, bringing moisture from the Gulf of Mexico and the Atlantic Ocean.

In Quebec the rainfall and snowfall are still greater than in Ontario, and in the provinces farther east they are still greater, exceeding even the rainfall and snowfall of British Columbia.



A Saw-mill.

The condition of a place with regard to heat, rainfall, and snowfall is called its *climate*.

#### ORAL AND WRITTEN EXERCISES.

Compare the rainfall of the western and eastern parts of British Columbia; of Ontario and Manitoba; of Ontario and Nova Scotia. Where is the driest part of Canada? Where does the water in the air come from? How does it get into the air? In what forms does it fall to the earth? How does it get back to the sea? Compare the temperature of Manitoba with that of Ontario: with that of British Columbia.

#### 25. Industries.

Mention some of the occupations in the neighborhood of your home. What things grown or made in your neighborhood are sent elsewhere to be sold? Mention anything used in your home which is not made or grown in your neighborhood, but is brought from some other part of the world. Some occupations, then, are not followed in your part of the country.

What is the *chief* occupation in the neighborhood of your home? What is the chief thing sold there? There are several great regions of our country in each of which the climate or the soil, or the character of the people make it possible to do some one kind of work more easily than any other. That kind of work is likely to be the chief occupation of that region. For instance, in the north of Ontario and Quebec there are immense forests of valuable trees such as pine, spruce, etc. In those regions

the chief occupation of the people is lumbering, that is, cutting down the trees, hauling or floating them to saw-mills, sawing them into boards, etc., and sending them by rivers, lakes and railroads to other parts of our country, or to other countries which need them.

Then, in parts of British Columbia, Quebec, Ontario, New Brunswick, Nova Scotia, and the Yukon District, valuable deposits of gold, silver, nickel,

copper, lead, iron, coal, etc., are found, and there the chief occupation of the people is mining.

Along the coasts and in the rivers of the eastern provinces and British Columbia, and in the Great Lakes, are caught immense quantities of fish. The chief occupation of the people of those parts will be the catching of these fish and *curing* them, that is, drying them or otherwise preparing them for market. Of the world's great fisheries those of Canada are, without doubt, the greatest in extent,



Lumbering—A Fine Forest.

and the most varied in their products. The waters on the Pacific and Atlantic shores of the Dominion teem with fish of the greatest value as food, while the system of fresh-water lakes, the lakelets, countless in number, and the noble rivers which flow through her far-reaching territory, provide the best opportunities for gigantic fishing industries.

In the northern parts of Canada, where the winters are long and extremely cold, valuable fur-bearing animals live: such as the beaver, otter, fox, ermine, marten, mink, raccoon, bear and skunk. This region is chiefly peopled by Indians. The chief occupation of these Indians and the few white men living there is the killing of these animals and



Fur-bearing Animals.

bringing their skins for sale or exchange to certain places or *posts* of the Hudson Bay Company. From these posts they are sent to England to be made into muffs, capes, and other garments.

In all the provinces there is more or less fertile land, and *agriculture*, or the tilling of land, is the occupation of by far the largest number of Canadians. In Manitoba, Saskatchewan, and Alberta farmers raise wheat and other grains chiefly, but in the eastern provinces, in addition to grain raising, they give considerable attention to *dairying*, that is, the making of butter and cheese, and to the *raising of horses, cattle, sheep, and hogs*.

Can you think of anything which you use daily that has not been altered in some way to fit it for your use? A great many stories are told of what has happened to each article you eat, or wear, or use.

The changing of any natural product to make it fit for the use of man is called *manufacture*. In many parts of Ontario, Quebec, and the eastern provinces the streams have falls or rapids not far from their outlet into the sea, lake, or large river. These places, then, become manufacturing centres because, being convenient to navigable waters, coal, iron, and other material to be manufactured are easily brought to them, and because machinery used in manufacture is run in many cases by the water power obtained from these streams. Other places, where two or more railroads join, being convenient for all kinds of materials to be brought to them by rail, become great manufacturing centres. In these places the power to run the machinery is usually obtained from steam. Manufactures may be divided into two great classes: 1st, those intended for use at home only; 2nd, those intended to be sent away from home to be sold. In every town are many carpenters, bricklayers, and bakers, but as their trades are common to all cities and as the things made by them do not enter largely into commerce, they need not be considered here.

Our most important manufactures which enter into commerce are:—

Flour,	Packed meats,
Cotton and woollen cloth,	Leather, boots and shoes,
Iron and steel goods,	Lumber,
Machinery,	Clothing,
Agricultural implements,	Liquors.

In addition to these we have in Western Ontario the salt industry and the petroleum industry, which will be more fully described under the province of Ontario.

## 26. Transportation.

Name some article which is made or produced in your neighborhood and sent to be consumed in some other part of the world. How is it taken to that place? Canada is fairly well supplied with railways. The principal railways are:—*The Canadian Pacific, The Grand Trunk, and The Intercolonial*.

The Canadian Pacific extends from St. John, N.B., through the State of Maine, thence through the province of Quebec to Montreal, thence westward through Northern Ontario along the shore of Lake Superior, then through Manitoba, Saskatchewan and Alberta, through the Kicking Horse Pass of the Rocky Mountains into British Columbia, terminating at Vancouver—a distance of 3,387 miles. The main line from Montreal to Vancouver is 2,906 miles in length. Including its numerous branches, it has 9,100 miles of road in Canada.

The Grand Trunk extends from Portland in the State of Maine to Windsor, Ontario, and has a branch in the United States to Chicago. It has a large number of branches, and has in Canada alone 3,483 miles of road.

The Intercolonial runs from Halifax, N.S., to Moncton, N.B., and thence extends to Montreal, province of Quebec. It has about 1200 miles of road. This road belongs to the people of Canada. They also own a short railway in Prince Edward Island.

Canada has also another method of carrying goods from one part of the country to another, that is, along its magnificent system of lakes and rivers. Unfortunately, in many cases, the navigable parts of a river are at different levels, owing to falls and rapids. This has been overcome at great expense by means of canals. The principal canals of Canada are: The *Welland canal*, the *St. Lawrence canals*, the *Ottawa canals*, the *Rideau canal*, and the *Sault Ste. Marie canal*.

The Welland canal, 27 miles long, connects Lakes Erie and Ontario. Find these lakes on the map.

The St. Lawrence canals are constructed along the bank of the river around the rapids which occur between Lake Ontario and Montreal. These are used mainly in ascending the river; steamers descending generally "run" the rapids. The Ottawa canals are similar to those of the St. Lawrence. The Rideau canal joins Kingston with Ottawa. Find these cities. In this route a system of natural lakes and rivers is used, canals being constructed to connect waters of different levels. The Sault Ste. Marie canal is built to overcome the rapid on that river. This canal cost \$3,250,000 and is one of the finest in the world. Altogether the canals of Canada have cost nearly \$70,000,000.

How are goods produced in Canada carried to other countries to be consumed? They are first brought by rail or water to ports, and there loaded on vessels to be carried across the ocean or some



Sault Ste. Marie Canal Locks.



Railway Trains

part of it to the place where they are needed. The principal ports of this country at which this kind of work is carried on are: Halifax, St. John, Quebec, Montreal, and Vancouver. In what province is each of these ports? To what part of the world would you expect goods to be carried from Vancouver? The Canadian Pacific Railway Com-

pany owns a line of steamships sailing from Vancouver to Japan and China, and another line sailing from the same port to New Zealand and Australia, calling at the principal islands in the Pacific Ocean on the way. There are many lines of steamers sailing from the eastern ports to the principal ports of the British Isles, Europe, the United States and the West Indies.

#### ORAL AND WRITTEN EXERCISES.

Name any place which is on the three chief railways of Canada. Explain the working of a lock on a canal. Compare the length of the C.P.R. with that of any other railway between the Atlantic and Pacific Oceans. Find on the map all the cities mentioned in this lesson, and trace the railways and canals described. Find New Zealand and Australia on the map of the World. In what direction from Vancouver are these places? Name one group of islands passed by C.P.R. steamers in going from Vancouver to Australia. In what direction from Halifax is England?

ONTARIO.

What river and bay form the greater part of the northern boundary of Ontario? What river forms the eastern boundary? Part of what province lies west of the Ottawa River? What lakes and rivers form the southern boundary? What country forms part of the southern boundary? Where is Lake Nipissing? What large island is in the north of Lake Huron? What large bay is east of Lake Huron? What peninsula is in the north of Lake Ontario?

The province of Ontario may be divided into two parts: NORTHERN ONTARIO, north of Lakes Superior, Huron, and Nipissing; and SOUTHERN ONTARIO, the remainder of the province. The latter is the settled part of Ontario and contains nearly all the population.

27. Northern Ontario.

This consists mainly of the southern part of the Laurentian plateau described in a former lesson and is divided into the four districts: *Rainy River, Thunder Bay, Algoma, and Nipissing.* Find these on the map.

The northern slope of this plateau towards James Bay contains about one-half of the entire province. This region has only been slightly explored but is known to contain very valuable resources in its fish, lumber, peat, and minerals. One of the most remarkable features of Northern Ontario is the endless number and variety of its lakes. There are hundreds of thousands of them varying in size from a hundred miles or more in length to tiny rock basins. They are supposed to have been eroded or ground out by the glaciers which covered the northern part of this continent ages ago. As these lakes occur in groups or chains, they afford a means of travelling in almost every direction, this being, indeed, the only way by which the interior of the country can be penetrated. The climate of Northern Ontario is subject to extremes of temperature, that is, it is very cold in winter and sometimes very hot in summer. The



Voyaging by Canoe in Northern Ontario.

rainfall and snowfall are so abundant that nearly the whole region is covered with valuable forests.

MINERALS. — Northern Ontario is noted for its mineral wealth. In the Rainy River District gold has been discovered in large quantities. The gold is not found in the beds of streams as it is in most countries but it is found in hard rocks mostly in the form of small specks of *free* gold, that is, gold not mixed with other substances such as sulphur, copper, etc. This rock is crushed to powder in stamp mills. Water is then run over it carrying off the lighter rock powder but leaving behind the heavier gold.



Nickel Mine—Sudbury.

Gold has also been found in Algoma District on the north shores of Lakes Superior and Huron.

Where is *Sudbury*? Near this place in Algoma District are found the most extensive deposits of *nickel* in the world. Before these were discovered most of the nickel used in the world was obtained from New Caledonia, an island in the Southern Pacific Ocean belonging to France. Find this island on the map of the world. This metal is used for plating articles made of steel and its use prevents them from rusting. It also improves their appearance on account of the high polish which can be given to the nickel. It has been found lately that a small quantity of nickel mixed with steel greatly increases its strength and hardness. This nickel-steel is largely used by the United States Government as armor for battle ships.

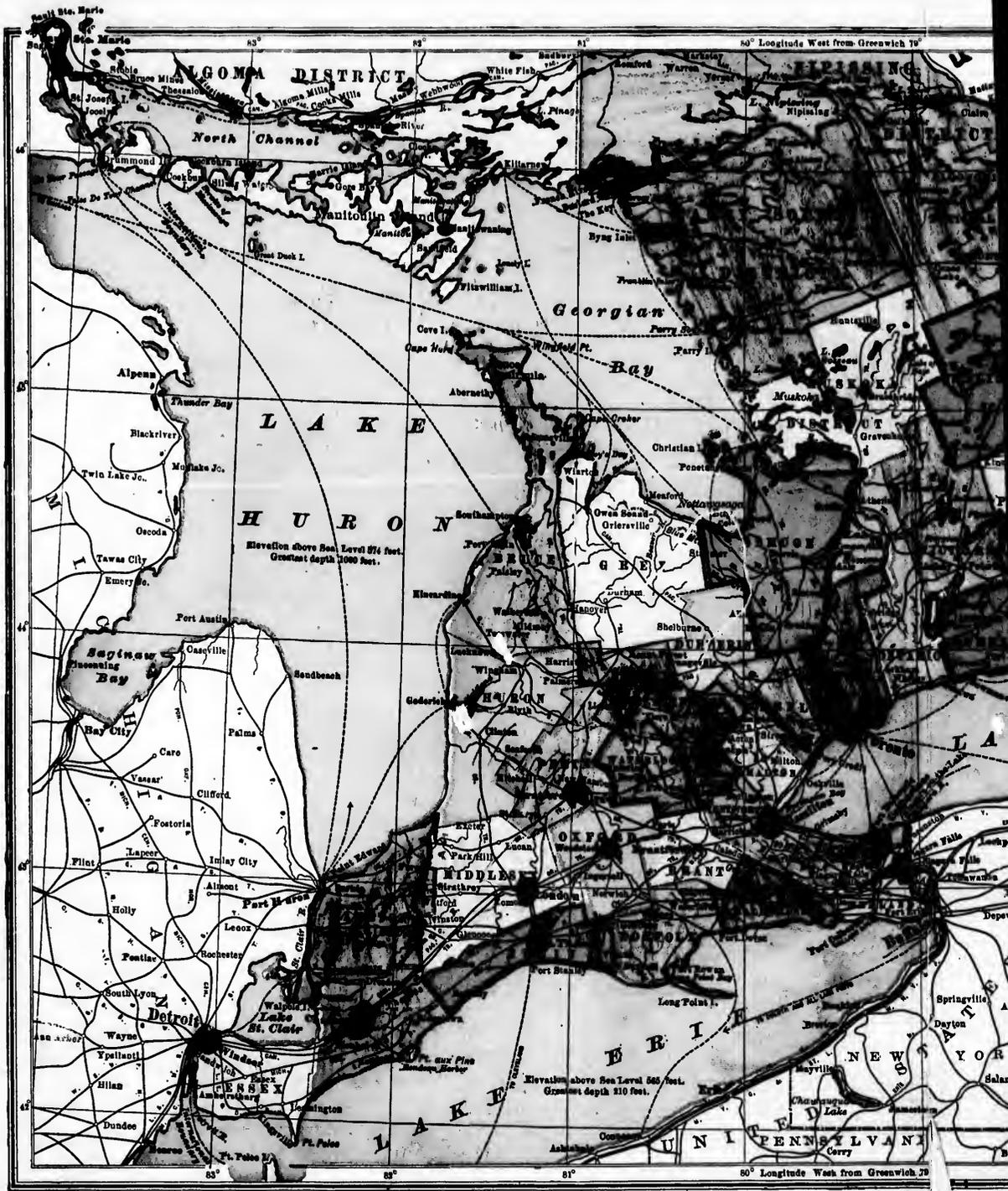
Copper is obtained from the same ore as the nickel. The ore is *smelted* and the copper and nickel run together, forming what is called a *matte*. This mixture of copper and nickel is sent to the United States to be *refined* or separated from impurities.



Canal Locks.

to the place  
are needed.  
al ports of  
y at which  
f work is  
are: Hali-  
n, Quebec,  
and Van-  
what pro-  
h of these  
what part  
rld would  
goods to  
from Van-  
e Canadian  
lway Com-  
ling from  
nother line  
aland and  
nds in the  
ny lines of  
rts to the  
urope, the

f railways of  
al. Compare  
lway between  
map all the  
railways and  
ralia on the  
ancouver are  
ed by C.P.R.  
ia. In what





There are immense deposits of iron ore north of Lakes Huron and Superior, but they are not mined to any great extent, owing to their distance from railways and the lack of cheap fuel.

Where is *Port Arthur*? On what bay is it situated? Near the mouth of this bay is a small island named Silver Islet. This contains the most important silver mine in Ontario. This mine was worked for several years and produced a very large amount of *silver*. Then the mine filled with water owing to the supply of coal for the pumping engine giving out. Since that time it has not been worked. Deposits of silver have been found on the mainland near Thunder Bay, but on account of the cheapness of silver and the cost of production the mines of this metal have not been worked lately.

LUMBER.—Much of the building lumber used in Ontario comes from the immense pine forests which cover so much of Northern Ontario. Large quantities of lumber are also sent from these same forests to Great Britain and the United States. This region also furnishes an inexhaustible supply of spruce for the manufacture of wood pulp. From this pulp, pails and



other utensils are made, and also paper. Where do you find *Sault Ste. Marie*? Lake Superior empties into Lake Huron by the

Ste. Marie river and in this river are rapids or low waterfalls called by the early French explorers a *Sault* (Soo). At the town of Sault Ste. Marie has been built one of the largest pulp mills in the world, the water supply being obtained from the rapids.

Rainy River District with its numerous lakes and



Elevator and Whaleback.

rivers produces large quantities of valuable fish, principally whitefish and sturgeon. *Caviare*, a food prepared from the salted *roe* or eggs of the sturgeon, is exported largely to the United States. The fisheries of Hudson Bay are also valuable, salmon and trout being especially abundant. Many whales, too, are caught every year, in the waters of this bay by American whalers.

*Port Arthur* is the largest town in Thunder Bay District. The Canadian Pacific Railway Company runs a line of magnificent steamers from this port to Owen Sound. On what bay is Owen Sound? During the summer immense quantities of grain are carried by these vessels from the *elevators* of Port Arthur, large buildings specially made for holding enormous amounts of grain and storing it for shipment.

Where is *Mattawa*? From Lake Nipissing to this



Rat Portage.

town lies a wide depression or river valley which is supposed to have emptied, at some former time, the waters of Lakes Huron, Michigan, and Superior into the Ottawa.

Where is *North Bay*? It is the capital of Nipissing District and is on the main line of the Canadian Pacific Railway.

~~Rat Portage~~ <sup>Rat Portage</sup>, in Rainy River District, is a great gold mining and lumbering centre.

### 28. Southern Ontario.

This includes all that part of Ontario that lies south of Lake Nipissing. The northern part of Southern Ontario is very sparsely settled, being mostly a rocky country containing a multitude of small lakes similar in character to those of Northern Ontario.

LOCAL GOVERNMENT.—We have seen that the people of the province choose men to make laws for

them and that these men meet as a body called a *legislature* in the capital city of the province. Likewise, the province is divided into smaller parts called *counties*, and the people in each county elect or choose men to make laws and to do certain work for the county. These men meet as a body called the *county council* in the *county town* or chief town of the county. The county also is divided into *townships*, and the people of each township elect a body of men, called a *township council*, who make laws for the township and look after certain business or work which belongs to the people of the township as a whole. In what county do you live? What is your county town? The head man in the county council is called a *warden* and the head man in the township council is called a *reeve*. Towns and cities also have councils and the head man is called the *mayor*. Who is the warden of your county or the mayor of your city, or the reeve of your township? Find out what your council can and ought to do. The northern part of Ontario is too thinly settled to be organized into counties, and is divided into *districts*. These districts are divided into *townships*. Some of these townships do not elect a council but their business is done for them by officers of the Legislature of Ontario. From the map make a list of the counties of Ontario and their county towns. Find the districts of Parry Sound and Muskoka.

**RELIEF AND DRAINAGE.**—Southern Ontario naturally divides into three parts. The eastern part is bounded by the Ottawa and St. Lawrence rivers and on the west by a spur of the Laurentian plateau which runs north and south a little west of Ottawa and crosses the St. Lawrence, forming the Thousand Islands, and running south through the state of New York. This is on the whole a low plain of arable land nowhere more than a few hundred feet above the sea.

West of this, between the southern edge of the Laurentian plateau and Lake Ontario, lies another plain. This plain is naturally bounded to the south and west by the rather bold escarpment of the Niagara limestone, which, after giving rise to the Falls of Niagara between lakes Ontario and Erie, runs across this part of the province to Lake Huron, forming there a long projecting peninsula, and continuing, further west, in the chain of the Manitoulin Islands. This plain at the level of Lake Ontario is 247 feet above sea-level, and its highest point is not more than 1,000 feet. Most of it is a fertile farming country.

The third sub-division of Southern Ontario is an area of triangular form between the Niagara escarpment and lakes Erie and Huron. This constitutes what is generally known as the Ontario peninsula, and is singularly favored both in soil and climate. Grapes, peaches, and Indian corn are grown to perfection in many districts. The height of this region varies from 500 feet to 1,000 feet above the sea.

With the exception of the Ontario peninsula, the whole of Southern Ontario is dotted over with lakes of all sizes. *Lake Simcoe* is the largest of these. What river empties it? Lakes *Joseph*, *Rosseau*, *Muskoka* and *Lake of Bays* are noted for their beautiful and romantic scenery. They are emptied into Georgian Bay by the *Muskoka* river. The *Trent* river includes some very beautiful lakes in its course, beginning with *Lake Scugog* and ending with *Rice Lake*. It empties into the Bay of Quinte. Other rivers of importance are the *Rideau*, with its lovely series of lakes, forming part of the Rideau canal, the *Mississippi*, the *Madawaska*, the *Bonnechere*, and the *Petawawa*, emptying into the Ottawa river; the *Grand* into Lake Erie; the *Thames* into Lake St. Clair; the *Saugeen*, *Maitland* and *Sable* into Lake Huron; the *French* (emptying Lake Nipissing), the *Magametawan*, the *Nottawasaga* into Georgian Bay.

#### ORAL OR WRITTEN EXERCISES.

Name the counties of Ontario on Lake Huron; on Georgian Bay; on the St. Lawrence; on the Ottawa; on Lake Ontario. Name the inland counties. Name the districts in Southern Ontario. Write out a brief description of the three subdivisions of Southern Ontario. In which do you live? What is the height of your home above sea-level? What height above Lake Ontario? Find all the rivers and lakes mentioned in this lesson on the map. What are the duties of a reeve, of a warden, of a mayor? How is each chosen?

#### 29. Great Lakes.

	LENGTH. MILES.	BREADTH. MILES.	DEPTH. FEET.	ELEVATION. FEET.	AREA. SQ. MILES.
Superior	390	160	1,000	600	31,420
Huron with Georgian Bay }	280	100	1,000	574	24,000
St. Clair	26	25	—	570	360
Erie	240	60	200	565	10,000
Ontario	190	55	600	247	7,330
Michigan	320	70	700	576	25,590

LAKE SUPERIOR is the largest body of fresh water on the globe, and is remarkable for the extensive iron, copper and silver mines on its shores; and for the Pictured Rocks, a high range of cliffs of various colors, along its southern coast. The St. Mary river connects Lake Superior with Lake Huron, and near its outlet from the former are the rapids of Sault Ste. Marie, to avoid which two canals have been made, one by the United States, and another by the Dominion of Canada.

LAKE HURON is noted for its extensive fisheries; for its valuable copper mines; and for its numerous islands, of which the Manitoulin are the principal. On the east GEORGIAN BAY, separated from Lake Huron by the Bruce peninsula,



Pictured Rocks—Lake Superior.

is noted for the immense number of its islands and for its beautiful scenery. The waters of Lake Huron flow into Lake St. Clair by the St. Clair river.

LAKE ST. CLAIR is a small shallow lake with a rapid current, and is dangerous for navigation. About the mouth of the Thames river the land is very flat and marshy, affording food and shelter to vast flocks of waterfowl. The Detroit river connects Lake St. Clair with Lake Erie.

LAKE ERIE is the shallowest of the great lakes, its average depth being less than 100 feet. It contains the islands Long Point and Pelee on the Canadian side. It is connected with Lake Ontario by the Niagara river, on which are the celebrated Falls of Niagara, distant from Lake Ontario about fourteen miles. About a mile and a half above the Falls a series of fierce rapids begins, until, at the Falls, the river descends about 160 feet. The Falls are divided by a little island called *Goat Island*, the large volume of water being on the Canadian side, and forming the "Horseshoe Falls," so called from its semi-circular form. The mass of water which falls is enormous, and produces a deafening roar. After flowing in a rapid, turbulent stream for about two miles, between lofty precipices, it forms the Whirlpool, and then flows with a smooth but rapid current to Lake Ontario.

LAKE ONTARIO is the smallest of the five great lakes, but is the most important for Canadian trade. *Burlington Bay*, on which *Hamilton* is built, forms the western extremity. On the north shore is the remarkable peninsula of *Prince Edward*, nearly separated from the mainland by the *Bay of Quinte*, which is noted for its beautiful scenery. The *Murray Canal* has been cut through the narrow isthmus which joins this peninsula to the mainland.

LAKE MICHIGAN is entirely within the United States, but is connected with Lake Huron by the Strait of Mackinaw.

The ST. LAWRENCE forms the outlet of the great chain of inland lakes, and flows from Lake Ontario into the Gulf of St.

Lawrence, a distance of about 750 miles. At the point where it issues from Lake Ontario it forms the Lake of "The Thousand Islands," celebrated for the beauty of their scenery.

Below this, and extending as far as Montreal, are several long and tumultuous rapids, called the *Galops*, *Long Sault*, *Coteau*, *Cedars*, *Cascades*, and *Lachine*. Steamers and rafts pass down these in safety; vessels can return only by means of canals on the bank of the river.

The *Ottawa* takes its rise in the western part of Quebec, flows west to Lake Temiscaming, thence south easterly, and joins the St. Lawrence at the Island of Montreal, after a course of 750 miles. The *Chaudiere Falls* at Ottawa are very grand. During the chief part of its course, it forms the boundary between Quebec and Ontario until near its mouth. It enters the St. Lawrence by three branches enclosing the Islands of Montreal, Bizarre and Jesus. This river is navigable for large river steamers as far up as Ottawa. Between this point and its mouth occur the famous Long Sault rapids overcome by the Grenville Canal.



Niagara Falls.

#### ORAL AND WRITTEN EXERCISES.

Make a sketch of the St. Lawrence river and the Great Lakes and mark the position of the following: Port Arthur, Sault Ste. Marie, Owen Sound, Sarnia, Windsor, Detroit, Buffalo, Toronto, Hamilton, Kingston, Montreal, Quebec. Name the principal rivers of Ontario emptying into each of the Great Lakes and into the Ottawa river. Give the position of four canals in Ontario. Explain why canals are necessary and show how they do what they are designed for.

30. Industries.

PRODUCTS.—Of what is bread made? Most of the flour is made from the seeds of the wheat plant. Wheat is a kind of grass. Some grasses have small seeds, and tender stalks which make excellent hay. Other grasses have coarser stalks, but their seeds are larger and contain the chief food matter stored up by the plant. These seeds are called grain. The chief grains are *wheat, corn, oats, barley, rye,* and *rice*, but wheat is the best for bread. Wheat, oats, barley and rye may be grown to perfection in all parts of Southern Ontario, and likewise the various grasses and clovers. In the Lake Erie counties the tall southern varieties of Indian corn ripen, and elsewhere the corns of the northern states grow to perfection. It is largely grown for *fodder*, that is for feeding cattle.

On the grass, corn, peas and coarse grains of Southern Ontario are fattened cattle, hogs and sheep, which furnish another important kind of food for man.

Consequently, *agriculture* or *farming* is the occupation of the majority of people in Southern Ontario.

The Niagara District, comprising that part of Ontario lying between Lakes Erie and Ontario on the west of the Niagara River, is celebrated for its fruits. *Peaches, grapes, plums,* and *small fruits* of all kinds

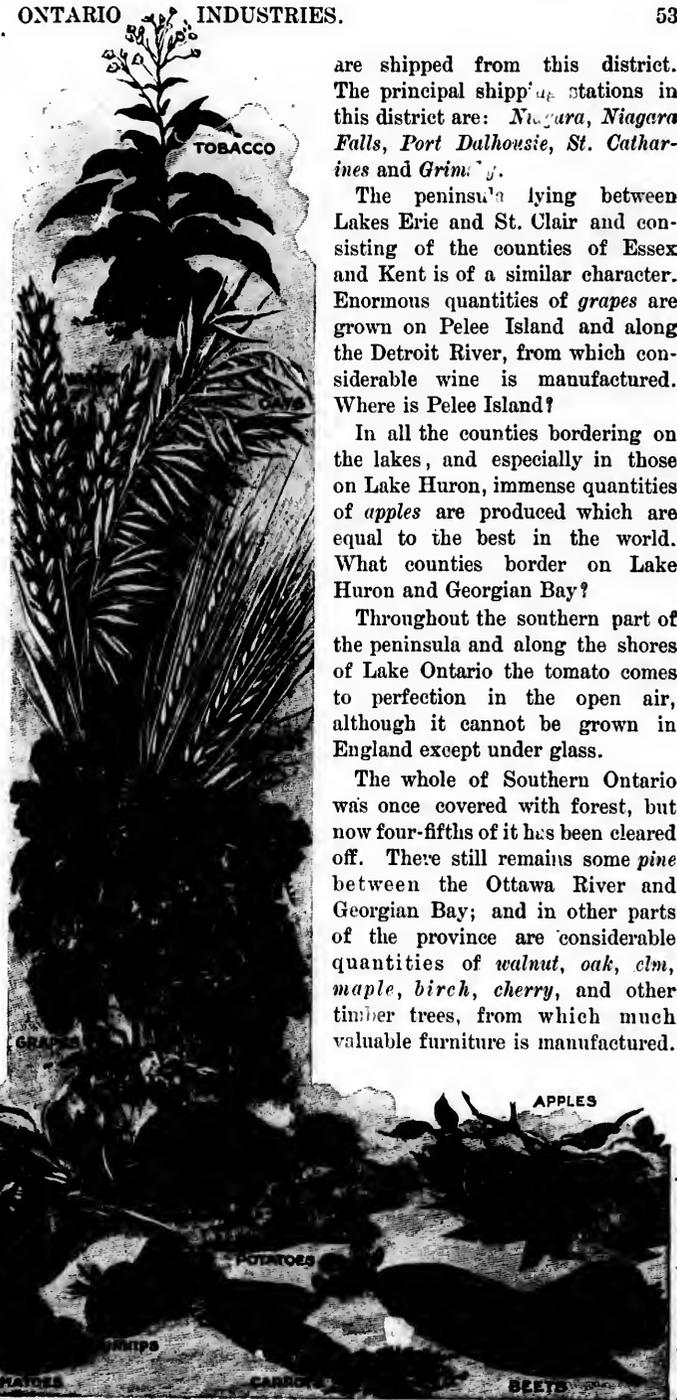
are shipped from this district. The principal shipping stations in this district are: *Niagara, Niagara Falls, Port Dalhousie, St. Catharines* and *Grimm's*.

The peninsula lying between Lakes Erie and St. Clair and consisting of the counties of Essex and Kent is of a similar character. Enormous quantities of *grapes* are grown on Pelee Island and along the Detroit River, from which considerable wine is manufactured. Where is Pelee Island?

In all the counties bordering on the lakes, and especially in those on Lake Huron, immense quantities of *apples* are produced which are equal to the best in the world. What counties border on Lake Huron and Georgian Bay?

Throughout the southern part of the peninsula and along the shores of Lake Ontario the tomato comes to perfection in the open air, although it cannot be grown in England except under glass.

The whole of Southern Ontario was once covered with forest, but now four-fifths of it has been cleared off. There still remains some *pine* between the Ottawa River and Georgian Bay; and in other parts of the province are considerable quantities of *walnut, oak, elm, maple, birch, cherry,* and other timber trees, from which much valuable furniture is manufactured.



where  
The  
their  
al, are  
d the  
e, and  
ese in  
s of  
part  
hence  
at the  
miles.  
grand.  
forms  
until  
ce by  
ntreal,  
large  
this  
Sault

Great  
thur,  
troit,  
ebee.  
ch of  
sition  
ssary

**MINERALS.**—In Hastings county, *gold* has been discovered; but the ore is not easily worked, owing to substances combined with the gold being difficult of separation. *Corundum*, a very hard mineral, next to the diamond in hardness, used in polishing and grinding of steel implements, cutlery, etc., has been found.

The counties of Lambton and Kent in the western peninsula produce *petroleum*. Wells are sunk to a depth of about 400 feet and the crude petroleum is pumped to the surface. This crude oil is then *refined* or made pure enough to use. Gas, naphtha, benzine, paraffin, and lubricating oils are also obtained by certain processes from the crude petroleum. Most of the oil refineries are situated at *Petrolia* in the county of Lambton.

Nearly all the *salt* used in Canada is obtained from the western part of Ontario, in the counties of Bruce, Huron, Lambton, Essex, and Kent. Like the petroleum this is obtained from wells bored to a depth of about 1000 feet. The brine is pumped to the surface and is evaporated. The resulting salt is very pure.

*Natural gas* has been discovered in a number of localities in Ontario but chiefly associated with petroleum. In the towns of *Leamington* and *Kingsville* in Essex, it is used for lighting and heating purposes, and large supplies are piped to the cities of Windsor and Detroit. From *Welland* it is piped into the city of Buffalo. In what country are Detroit and Buffalo?

Bricks, tiles and other products of clay are manufactured in large quantities in Ontario, especially in the neighborhood of Toronto.

Valuable building stone of various kinds is found in Ontario—granite, marble and sandstone in the northern and eastern parts; limestone and sandstone along the Niagara escarpment.

A large amount of *mica* is quarried in Eastern Ontario. This is very much used for stove windows and for the insulation of electrical machinery.

Mineral fertilizers exist in Ontario as *gypsum* and *phosphate of lime* or *apatite*. The Ottawa valley abounds in phosphates which are sent in considerable quantities to Great Britain. Gypsum is found over a large area in the counties of Brant and

Haldimand, where mines have been worked for half a century. The manufacture of fertilizers from these and other materials is carried on to some extent.

**MANUFACTURES.**—The chief manufacture of Ontario is connected with agriculture—*cheese* and *butter*. Ontario exports more cheese than the whole of the United States and it is decidedly superior in quality. Cheese in Ontario is made in factories on the *co-operative* system, that is, the farmers who supply the milk to the factory practically own it. Butter is not exported in such large quantities as cheese. More of this is made on the farm, but creameries are being established for butter-making in some parts of the Dominion. Improved cold storage arrangements for shipment will probably cause a large increase in the production of butter in Ontario.

*Flour* is manufactured in many towns and cities of Ontario, more especially in the western peninsula.

The farmers of Southern Ontario feed many hogs. These are sent alive to market where they are bought for packing factories. *Pork packing* is carried on chiefly at *Toronto*, *St. Thomas*, *Ingersoll*, and *Collingwood*. Find these places on the map.

The manufacture of wood into *doors*, *window frames*, etc., is carried on extensively in Ontario, and large quantities are

exported. *Furniture* also is manufactured extensively in Ontario and exported to Great Britain and the United States. *Agricultural implements* are also made in Ontario in large quantities at *Toronto*, *Brantford*, *Woodstock*, *London*, etc., and exported to other countries, especially to Australia.

The manufacture of *cloth*, *boots* and *shoes*, *cars* and *engines*, and *leather* is carried on to some extent in various parts of the province.

#### ORAL AND WRITTEN EXERCISES.

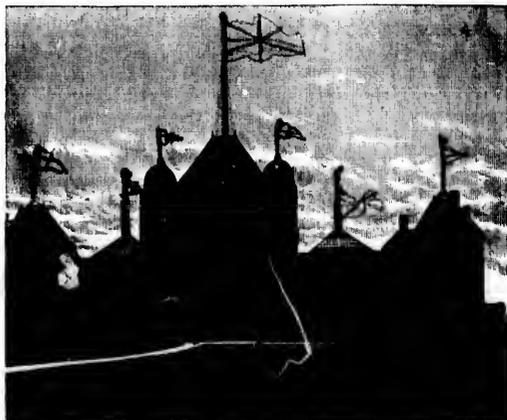
Name the chief grains used by man as food? Which of these grow well in all parts of Southern Ontario? What is the chief industry of Southern Ontario? Where do peaches grow most abundantly? Where do grapes? Where are apples grown in large quantities? Where are petroleum and salt found? In what counties is natural gas found? Where is mica found and for what used? Name the two chief manufactures of Southern Ontario. In what places is pork-packing carried on?



Oil Well and Derrick.

### 31. Cities and Towns.

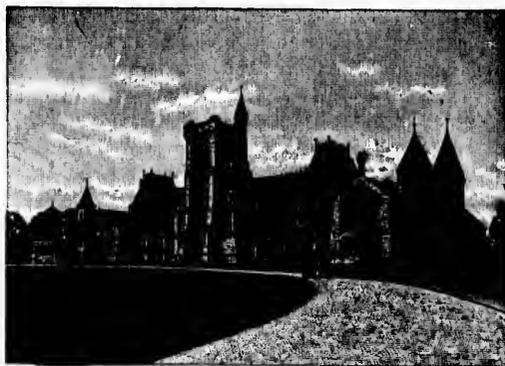
**TORONTO**, the capital, and, next to Montreal, the largest city of the Dominion, possesses a well-sheltered harbor and is connected by many railways with the rest of the continent. It is a commercial rather than a manufacturing city; that is, its people are mainly employed in collecting the products and manufactured articles of other places and distributing them again. Still, like all large cities, its manufactures are numerous and important. The chief of these are machinery of various kinds, articles of iron, agricultural implements, articles of leather — boots and shoes especially, — furniture, clothing, musical instruments, and malt and distilled liquors. During the summer a large lake trade is carried on, and the passenger travel to and from this city by water is very great. Lines of steamboats connect Toronto with Montreal, Niagara, St. Catharines, Hamilton and other ports on the lakes and River St. Lawrence. It is the political, legal, and educational centre of Ontario. It is distinguished for the number and elegance of its public buildings, among which are the Parliament Buildings, the City Hall and Court House, the University of Toronto, Trinity University, Osgoode Hall (occupied by the law courts), Knox College, McMaster Hall, Victoria



Ontario Parliament Buildings.

College, Wycliffe College, St. James Cathedral (Anglican), St. Michael's Cathedral (Roman Catholic), and others.

**OTTAWA**, the capital of the Dominion, is situated about 125 miles up the Ottawa River, just below the Chaudiere Falls on that river, and at the mouth of the Rideau. It is the centre of the lumber trade of



Provincial University, Toronto.

the Ottawa valley, and exceeds every other city in Canada in the value of lumber manufactured. It has the extreme Canadian climate—cold and clear in winter, warm in summer. It contains many fine buildings,—the Parliament Buildings, beautifully situated on the Ottawa River, being considered a model of architecture.

**HAMILTON**, situated at the head of Burlington Bay, the extreme western end of Lake Ontario, and at the foot of the Niagara escarpment, here called "The Mountain," is the third city in Ontario in population. On account of its situation, it does a large wholesale trade with the western peninsula. Besides, it has important manufactures of stoves, machinery, boots and shoes, glassware, sewing machines, and agricultural implements. It is well built, the principal buildings being of stone.

**LONDON**, in the centre of the rich agricultural western peninsula, is well situated as an inland commercial city. It does a large wholesale trade with the surrounding country, and has extensive manufactures of agricultural implements, furniture, railway cars, refined petroleum, and malt liquors. Its mineral springs attract a number of visitors during the summer. The Western University and Hellmuth Ladies' College are situated in this city.

**KINGSTON**, "The Limestone City," situated at the eastern extremity of Lake Ontario, just above "The Thousand Islands," is one of the oldest cities in Ontario. It possesses several forts, being the only fortified town in the province. Its buildings are mostly of stone, which is found in the neighborhood in great abundance. Its position, at the outlet of Lake Ontario, is important in lake and river navigation, and, in consequence, its leading industries are connected with such navigation. Vessels built for

lake navigation only, here transfer their cargoes to barges and other river boats to be taken to Montreal or farther, while these, in their turn, transfer to the lake boats, cargoes brought from Montreal. Queen's College and University, the Military School, and the Provincial Penitentiary are situated here.

**ST. CATHARINES**, beautifully situated on the Welland Canal, in the best fruit growing region of Canada, possesses mineral springs, and is a favorite resort for invalids. The Welland Canal supplies water power for flour mills and many factories.

**GUELPH**, in the centre of a rich agricultural district, has a large trade in grain and cattle, and manufactures flour, agricultural implements, sewing machines, musical instruments, and malt and distilled liquors. The Ontario Agricultural College and Experimental Farm are near Guelph.

**BRANTFORD** is beautifully situated on the Grand river. It has extensive manufactures of agricultural implements and contains the Institute for the Blind. The Mohawk Institute is near the city. The Public School buildings are among the finest in the province.

**BELLEVILLE**, on the Bay of Quinte, at the mouth of the Moira River, ships a large quantity of grain, cheese, lumber, and iron ore. The Institute for the Deaf and Dumb is located here.

**ST. THOMAS**, where three railroads intersect, has grown rapidly lately. It has an inland country trade.

**STRATFORD** is a large railway centre, and is the principal cheese market of western Ontario. It is situated in one of the finest farming districts in America.

**WINDSOR**, on the Detroit River, is a terminus of the Grand Trunk and Canadian Pacific Railways. Trains of cars are taken across the river on "car ferries" to the city of Detroit.

**CHATHAM**, on the Thames River, is situated in a very fertile district, sometimes called "The Garden of Canada."

**TOWNS.**—*Peterborough* is one of the most important towns in the eastern part of the province. It has important manufactures of machines, agricultural implements, and electrical appliances. The Canadian Pacific Railway and the Midland Division of the Grand Trunk Railway pass through it.

*Brockville*, named in honor of General Brock, who fell at Queenston Heights, in the war of 1812, is beautifully situated on the St. Lawrence just below The Thousand Islands. It is the principal market for cheese, east of Toronto. A Provincial Asylum for the Insane is situated here.

*Port Hope*, the terminus on Lake Ontario of the Midland Division of the Grand Trunk Railway, has regular steamboat connection with Charlotte, near Rochester, in New York state, and does a large export trade. It possesses an excellent harbor.

*Woodstock* is at the centre of one of the finest farming districts in the world. The Credit Valley Division of the Canadian Pacific Railway and two branches of the Grand Trunk Railway, pass through Woodstock. The manufactures include furniture, organs, and agricultural implements.

*Berlin* is noted for its manufacture of furniture, leather, buttons, machinery, felt goods, collars and shirts. Adjacent to it is *Waterloo*, with manufactures of woollen goods, agricultural implements, furniture and distilled liquors.

*Galt*, the "Manchester of Canada," in the western peninsula, manufactures machinery of all kinds, edge tools, woollen and knitted goods, flour, and oatmeal. The Grand River, which flows through the town, supplies abundant water-power.

*Paris, Ayr, Preston, and Hespeler*, having large woollen mills, breweries, and other factories, are near Galt. This is the manufacturing region of Ontario.

*Lindsay*, in the centre of a rich farming country, is at the junction of several branches of the Midland Division of the Grand Trunk Railway. The Scugog River, a tributary of the Trent, which passes through it, is navigable for barges and small steamers.

*Cobourg*, the county town of the united counties of Northumberland and Durham, has large car shops. Its harbor has been made a "harbor of refuge" by the Dominion Government. Much grain and iron-ore are shipped from this port.

*Barrie* has a most charming situation on Kempenfeldt Bay, an arm of Lake Simcoe. It has railway connection with Toronto and Hamilton, with the ports on Georgian Bay, and with the main line of the Canadian Pacific near Lake Nipissing.

*Goderich* is the most important port on Lake Huron. It is a terminus of the Buffalo and Lake Huron division of the Grand Trunk Railway. It has large flour mills and extensive salt works and soap works. It has, also, a large trade in fish. Its pleasant and cool situation makes it a favorite summer resort.

*Southampton and Kincardine* are important ports on Lake Huron. At both places branches of the Grand Trunk Railway terminate.

*Cornwall* is the county town of the united counties of Dundas, Stormont and Glengarry. It has excellent water power from the Long Sault Canal, and manufactures cotton, woollens, paper, machinery and pottery.

*Collingwood*, one of the principal ports on the Georgian Bay, is beautifully situated at the foot of the Blue Mountains. It has a large grain trade with Chicago, and a large lumber trade with all the north shore ports of Georgian Bay.

*Owen Sound* is the terminus of a division of the Canadian Pacific Railway, and the headquarters of its lake steamship line. The harbor is one of the best in Ontario. Shipbuilding is a thriving industry. At Owen Sound is one of the best dry docks on the lakes.

*Midland*, on Matchedash Bay, is the terminus of the Midland division of the Grand Trunk Railway. It has a large grain trade with the United States and manufactures lumber extensively.

*Parry Sound* has lately developed a very large grain trade with United States ports, being connected by rail with Ottawa and being situated on perhaps the shortest through route from the west to the Atlantic. It manufactures large quantities of lumber.

QUEBEC.

32. Relief.

What province and what country bound Quebec on the south? What district on the north? What bay is on the north-west? What river divides it into two parts?

Quebec divides naturally into three regions. The first is a continuation of the lowest of the plains into which Southern Ontario is divided. In Quebec this plain is nearly all on the south of the St. Lawrence, extending east as far as the city of Quebec, and south to the United States boundary. This region was the part of Canada first occupied by French settlers.

The second region is that north of the St. Lawrence, consisting mainly of the eastern part of the great Laurentian plateau, with the exception of a narrow strip of that plateau extending along the Atlantic coast, belonging to Newfoundland.

The third region is the continuation in Canada of the Appalachian highland. Find Lake Memphremagog. A little to the west of this lake, the main axis of the range enters the province under the name of the Notre Dame Mountains. It runs northeasterly at first, and then, from a point a short distance below Quebec, it runs nearly parallel to the St. Lawrence and at no great distance from that river. It attains the greatest height in Gaspé Peninsula. Find Mount Bayfield and Mount Logan. These peaks are nearly 4000 feet high.

**DRAINAGE.**—The rivers of Quebec flow into the St. Lawrence directly, or by the Ottawa. Since the Laurentian watershed is comparatively close to the St. Lawrence, the rivers from the north have a swift current, and abound in falls, rapids, and gorges. South of the St. Lawrence, in the western part of the province, a long stretch of level country lies between the rivers and the mountains; consequently, except in the vicinity of the mountains, there are few falls of importance. Find *Levis*. Below this, the rivers from the south are mostly mere torrents. Why?

The *St. Lawrence* enters Quebec just below the Long Sault rapids. The Coteau, Cedars, Cascades, and Lachine rapids are entirely in Quebec. Below Montreal the current is slight. Islands are numerous below Quebec and the river widens out into the Gulf. A serious drawback to the usefulness of this river, as to all northern rivers, is the fact that it is frozen over for several months every year.

*Petrolia* is the centre of the oil producing region and has a large number of oil refineries.

*Sarnia*, including Point Edward, is the western terminus of the Grand Trunk Railway in Canada. Trains pass from this place to the Michigan shore through an immense tunnel under the St. Clair River. This tunnel is 6,025 feet in length, and the approaches 5,603

feet, over two miles in all, making the longest submarine tunnel in the world. *Sarnia* is the headquarters of a line of steamships that trade with the principal ports on Lake Huron and Lake Superior. There is a large oil refinery here.

*Niagara*, at the mouth of Niagara river, the first capital of Upper Canada, is now a noted summer resort. It does a large business during the summer in the shipping of fruit.



St. Clair Tunnel.

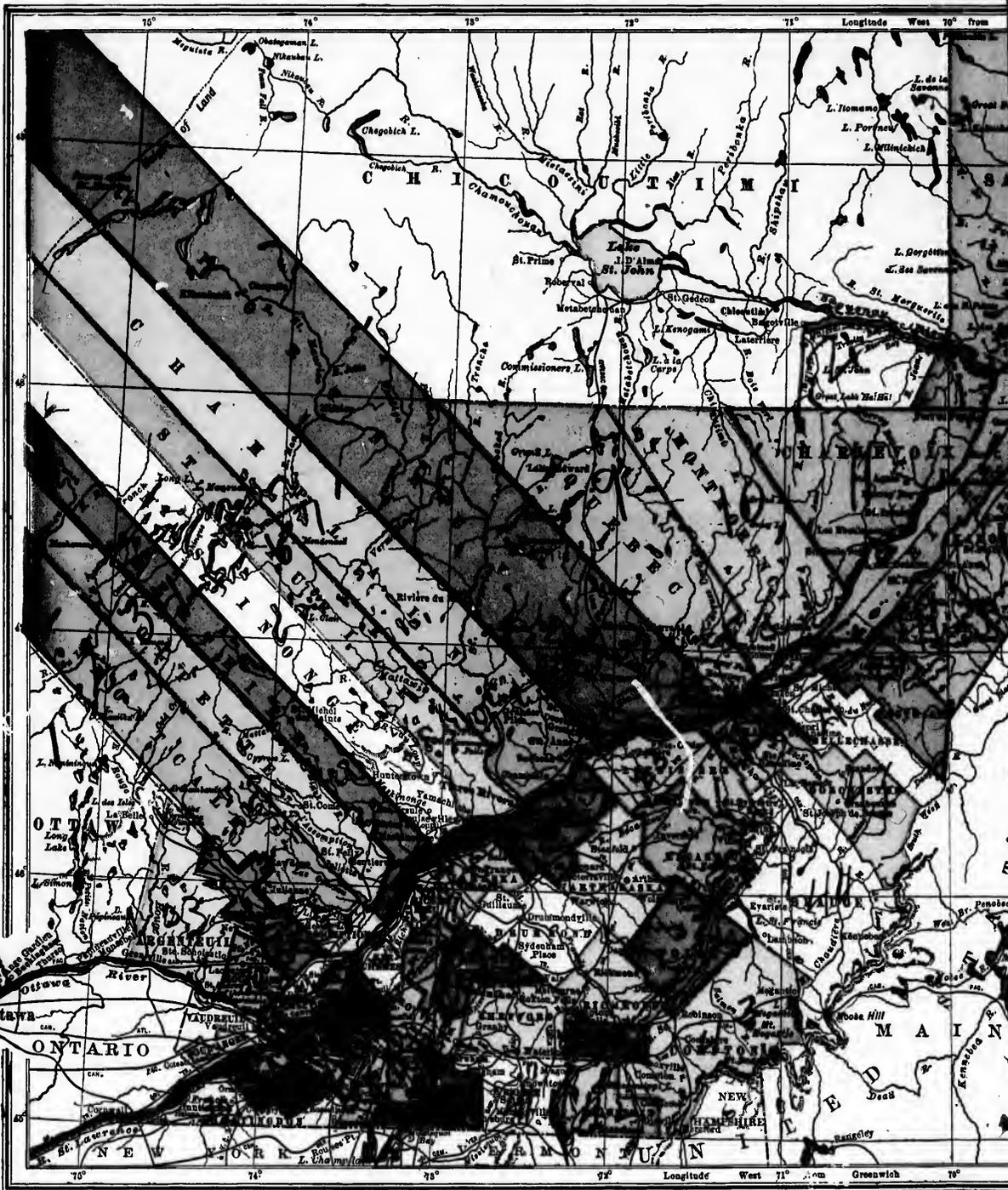


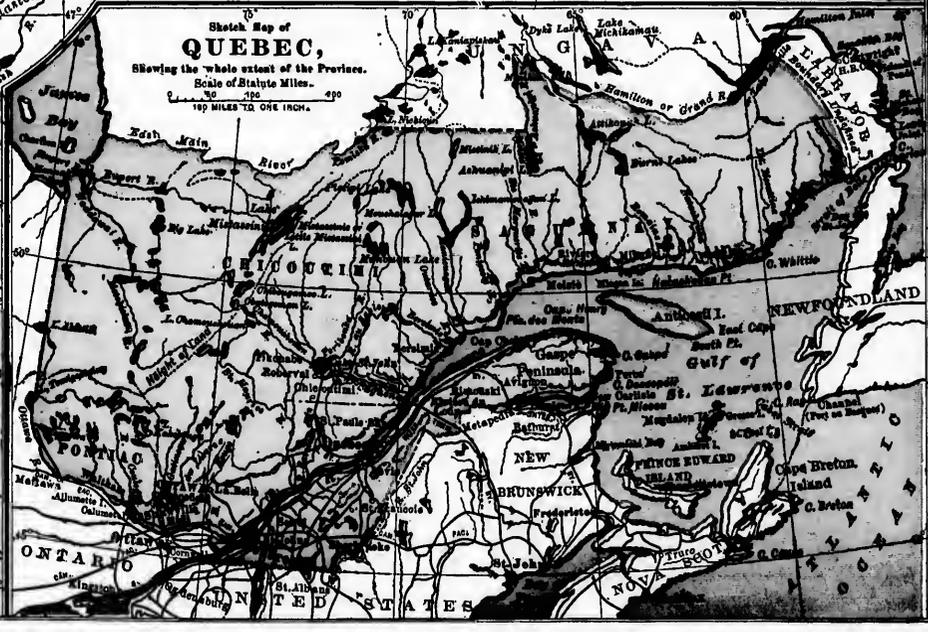
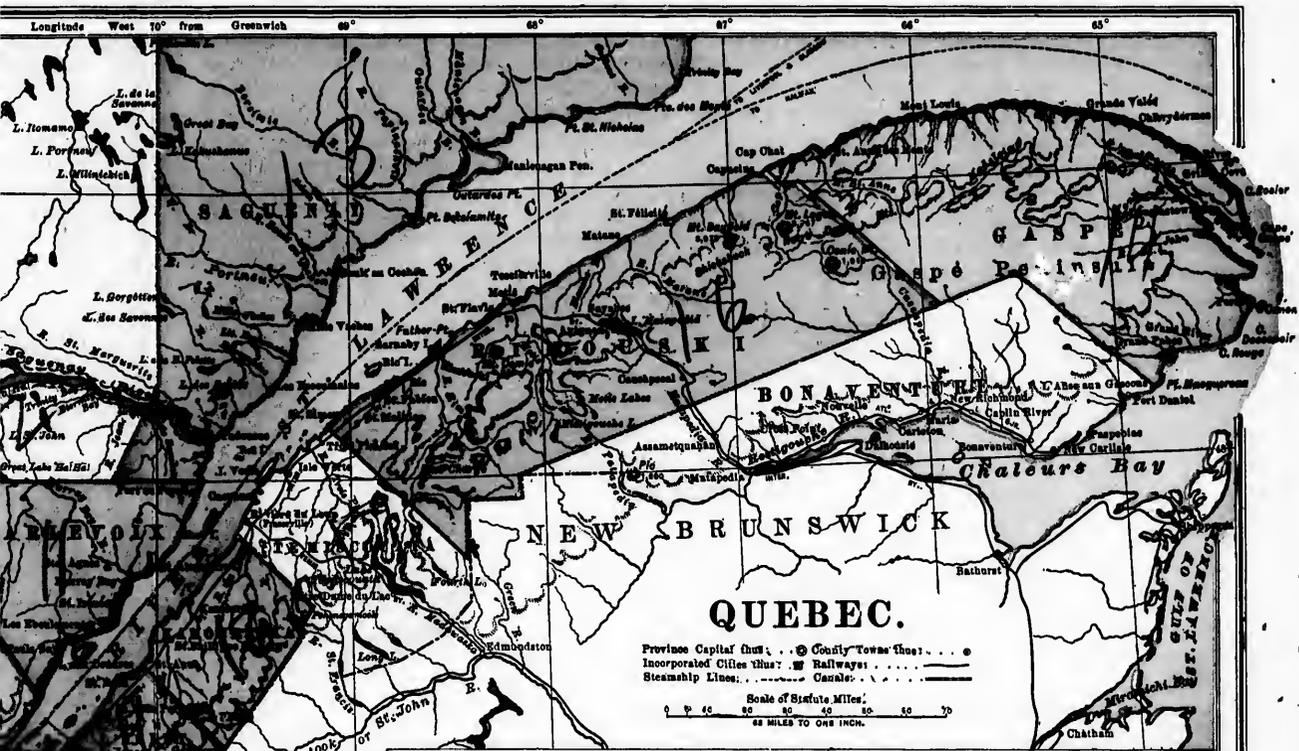
G. T. E. Single Span Steel Bridge over Niagara River.

Other important towns are *Gananoque*; *Smith's Falls*; *Dundas*; *Deseronto*, noted for its manufactures of lumber; *Toronto Junction*, a suburb of Toronto; *Gravenhurst*, noted as a summer resort and for its sanatorium; *Strathroy* and *Wingham*.

**ORAL AND WRITTEN EXERCISES.**

Name the cities of Ontario situated on the Great Lakes, the St. Lawrence and Ottawa rivers. Name the inland cities. Name two manufacturing cities, two that are educational centres, and three that are important ports. Name the chief ports on Georgian Bay, Lake Superior, Lake Huron, and the River St. Lawrence. Name two towns noted as cheese markets; three important grain shipping points. Where in Ontario are ships built? Where are agricultural implements made? Where is lumber manufactured? Where are musical instruments? Where cotton?





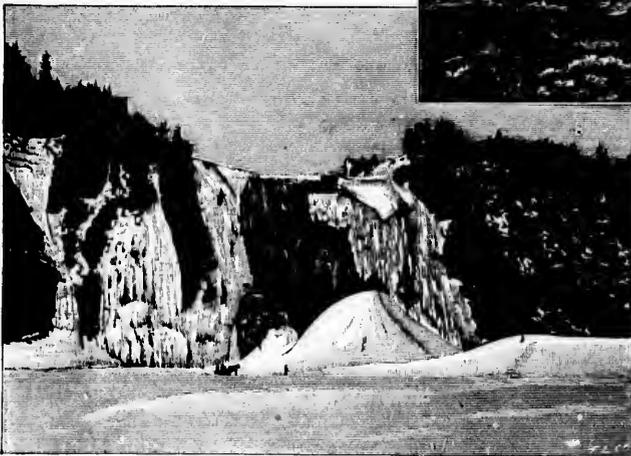
The *Gatineau* and *du Lievre* flow into the Ottawa. Find them.

The *St. Maurice* rises in a number of small lakes and after a course of over 400 miles enters the St. Lawrence. What city is at its mouth?

The *Saguenay*, rising in Lake St. John, enters the St. Lawrence at Tadousac after a course of 100 miles. For the last 75 miles it flows between perpendicular cliffs often 1200 feet or more in height. Its waters are deep and dark, abounding in fish. The grand scenery and the splendid fishing bring many tourists to this river every summer.

Besides these, from the north, are the *Batiscan*, the *Ste. Anne*, the *Jacques Cartier*, and the *Montmorency*, the last which enters the St. Lawrence a little below Quebec being celebrated for the beautiful falls, 250 feet high, near its mouth.

From the Appalachians on the south, come the *Richelieu*, the *St. Francis*, the *Yumaska*, and the *Chaudiere*. What lakes do the first two drain? All these



Montmorency Falls in Winter.

ivers, except the *Richelieu*, rise on the south of the main ridge of the Appalachian range and cross this ridge through deep gorges.

**LAKES.**—As in Ontario, the whole of the Laurentian area is dotted with lakes, the largest being *Lake St. John* in which the *Saguenay* rises. In the Appalachian region, the chief lakes are *Champlain*, *Memphremagog* and *Megantic*.

**ISLANDS.**—The principal islands in the St. Law-

rence are: *Montreal*, *Jesus*, *Bizarre*, and *Perrot*, at the mouth of the Ottawa; *Orleans* and *Aux Coudres* below Quebec. In the Gulf, we have *Anticosti*, a large barren island; and the *Magdalen Islands*, north of Prince Edward Island, important for the fisheries carried on by their inhabitants, who are of French descent.

#### ORAL AND WRITTEN EXERCISES.

Between what gulf and what bay is Gaspé Peninsula? Why is that part of Quebec south and south-east of Montreal thickly settled? Why is Quebec well adapted for manufacturing? Explain the origin of the numerous lakes north of the St. Lawrence.



Lachine Rapids, St. Lawrence River.

### 33. Climate, etc.

The climate of Quebec being without the modifying influence of the great lakes is more extreme than that of Ontario. In the southern part the heat of summer is as intense as in Ontario, while the cold of winter is considerably greater. As stated in the lesson on the heat and rainfall of Canada, the rainfall and snowfall are greater than in Ontario.

**SUBDIVISIONS.**—Quebec is divided into *counties*, *townships*, and *parishes*. There are sixty-one counties in the settled portion of Quebec. These are shown along with their county towns on the map. Twelve of these in the south-east are known as the "Eastern Townships." These are peopled by descendants of the old United Empire Loyalists and contain most of the English-speaking inhabitants of the province outside the cities.

**PRODUCTS.**—The south-western part of Quebec is a fine farming region, almost equal to the best in Ontario. All the grains thrive in this region except

Indian corn. In some parts, *grapes* and *tomatoes* ripen in the open air. Large quantities of *tobacco*, *hemp*, and *flax* are raised. *Potatoes* are extensively grown. In the Eastern Townships *apples* are very plentiful.



Tobacco Plant.

The forests of Quebec are practically inexhaustible. They cover nearly the whole of the province north of the St. Lawrence and the Appalachian region to the south.

*White pine* is found chiefly in the counties along the Ottawa. *Spruce* is very common. Large forests of *maple* and *birch* intermingled exist in the western part of the province.

**INDUSTRIES.**—The majority of the people of the province are engaged directly or indirectly in *farming*. *Dairy farming* is extensively carried on, much of the province being well adapted for grazing. *Stock-raising*, in all its branches, is carried on with profit, the nearness to the shipping ports and to the United States ensuring a ready market.

*Lumbering* is the chief commercial industry of the province. The innumerable streams that lead to the main artery, the St. Lawrence, afford everywhere excellent and ready means of transportation for forest products. The chief lumbering regions are Lake St. John district, north of Quebec, the large and very valuable tract of country towards the sources of the Ottawa, and a small area in the Appalachians.

*Fishing* is an important industry, confined, however, to the eastern part of the province; on Gaspé Peninsula, the north shore of the St. Lawrence and the Magdalen Islands. The fisheries of the St. Lawrence are very valuable, consisting chiefly of *cod*, *mackerel*, *herring*, *salmon*, and *seals*.

The *manufactures* of Quebec, like those in Ontario, are mostly for home *consumption* or use, few manufactured articles being exported. In the Eastern Townships there are many cheese factories. The

other principal manufactures are: *flour*, *refined sugar*, *boots and shoes*, *fur goods*, *soap*, *locomotives*, and *maple sugar*.

**TRADE.**—Quebec is well situated for trade, for through its ports must pass, not only its ocean commerce, but also that of all the Dominion to the west. As the rapids on the St. Lawrence obstruct navigation for large sea-going vessels beyond Montreal, that city has become the trade centre of the west. The great drawback to this trade is the long



The Citadel, Quebec.

period during which no vessels can ascend the river on account of the ice. Through what Canadian ports would the winter trade pass?

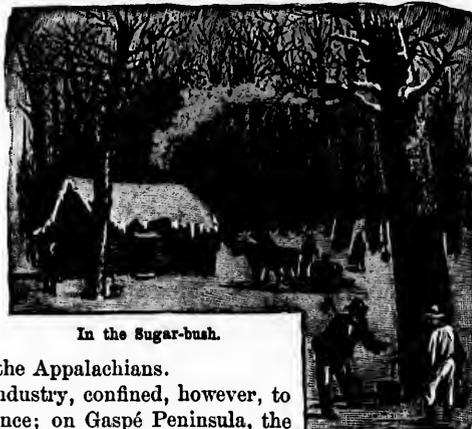
#### ORAL AND WRITTEN EXERCISES.

How does the climate of Quebec differ from that of Ontario? Where are the Eastern Townships? Where is the farming region of Quebec? Where are the lumbering regions? Why has Montreal become the great commercial city of Canada?

#### 34. Cities and Towns.

QUEBEC, the capital, the oldest city in Canada, and one of the oldest in America, stands on a high bluff at the junction of the St. Charles river with the St. Lawrence. Near the city

are the Plains of Abraham, famous for the battle which won Canada for the British, in which both commanders, Wolfe and Montcalm, were killed. Quebec is the third commercial city of Canada. It is the great centre of the ocean lumber trade. The chief industries are: the sawing of lumber, ship-building; manufactures of tobacco, fur, soap, and



In the Sugar-bush.

machinery; tanning and the manufacture of boots and shoes. It possesses a very large number of ships engaged in both ocean and river trade. It is the most strongly fortified city in America. A branch of the Canadian Pacific Railway along the north shore of the St. Lawrence connects it with Montreal and the west, and another railway connects it with Lake St. John.

MONTREAL is the largest city in Canada, and one of the large cities of America. It is splendidly situated for commerce. Ocean steamers and sailing vessels bring their cargoes up the river and discharge them here for distribution to the west, and then take on board the freight of the river boats and railway cars,—goods of all kinds, that come from western Canada and the United States, and even from China and Japan. The Richelieu River, with its short canals and locks, leads by Lake Champlain and the Hudson River to the great seaports of the United States. Trace this route on the map.

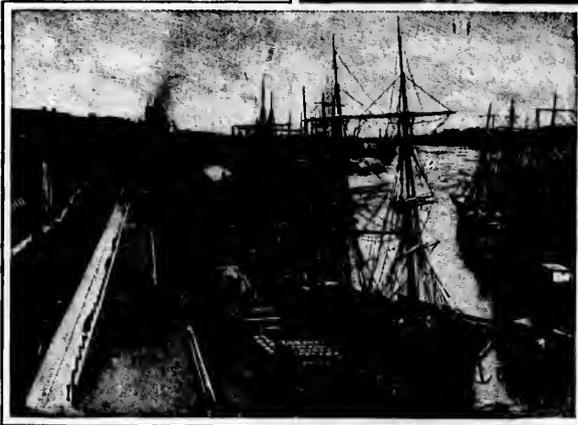
The articles exported are the farm products of the west and its own neighborhood—grain, flour, dairy produce, cattle, sheep, horses, &c.; the minerals of the regions to the north-west, furs from the west and north, lumber from the Ottawa valley, and manufactures from Ontario and Quebec.

Montreal has the most extensive manufactures of all the cities of Canada; consisting of cotton and woollen fabrics, refined sugar, articles of tobacco, leather and leather goods, clothing (including furs), engines and machinery, articles of wood, rubber goods, paint, paper, cars and locomotives, nails, saws, flour, &c.

Its shipping, too, is very important and extensive.

It is connected by railways with all the cities of Canada and the United States. The Grand Trunk Railway crosses the St. Lawrence from the south bank by a very fine bridge called the Victoria Bridge, nearly two miles long. The Canadian Pacific and Intercolonial railways also run into Montreal.

THREE RIVERS, one of the oldest cities in Canada, obtains its name from the fact that here the St. Maurice joins the St. Lawrence by three mouths. It carries on a large lumber trade, and has smelting



Montreal Docks

Dominion Square, Montreal.

works and foundries. There are valuable iron mines in its vicinity.

HULL, on the Ottawa, opposite the city of Ottawa, with which it is connected by a suspension bridge, is a thriving city, with manufactures of lumber, woodenware matches, &c.

ST. HYACINTHE, on the Yamaska river, east of

Montreal, has a Roman Catholic Cathedral and College.

SHERBROOKE, on the St. Francis, has important manufactures, especially of woollens and machinery.

ST. HENRI is a prosperous suburb of Montreal.

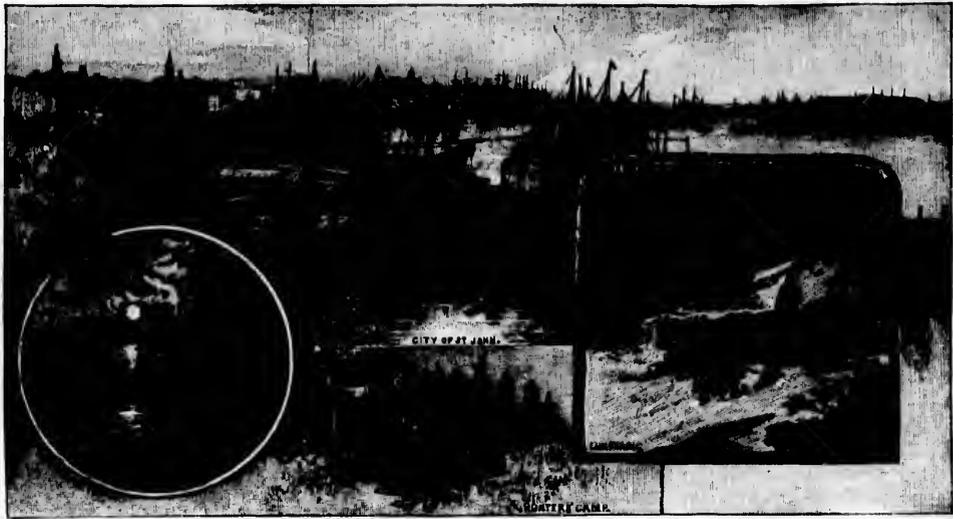
Levis, on the south shore of the St. Lawrence, opposite Quebec, was formerly the western terminus of the Intercolonial which now extends to Montreal.

Richmond is an important town on the Grand Trunk Railway, east of Montreal.

Soiel and Valleyfield are thriving manufacturing towns.

Murray Bay and Tadousac are summer resorts on the St. Lawrence.

the cities of  
Grand Trunk  
in the south  
Victoria Bridge,  
Pacific and  
Montreal.  
es in Canada,  
here the St.  
e mouths. It  
has smelting



## NEW BRUNSWICK.

### 35. Relief, etc.

What bay forms part of the northern boundary of this province? What bay the southern boundary? What province is on the south? What country on the west?

From the Bay of Chaleur, just below its head, a ridge of the Appalachian system strikes across the province to the south-west, and another somewhat lower, borders the southern shore of the province along the Bay of Fundy. Nowhere are these ranges more than 1500 feet above sea-level. Between these ridges lies a broad triangular area nearly level. This and the river valleys furnish the greater part of the arable land of the province.

**DRAINAGE.**—What river empties into the Bay of Chaleur? What large river empties into the Bay of Fundy?

The western slope of the first mentioned ridge is drained partially into the Bay of Chaleur and partly by the St. John river. The level triangular area is drained by the St. John river and its numerous branches and the St. Croix into the Bay of Fundy; by the Miramichi, Richibucto, and others into the indentations of the Gulf of St. Lawrence.

Though the rivers of New Brunswick, except the St. John, are none of them large, yet their lower waters are deep and the tide reaches a long way up. This makes them navigable for comparatively long distances and very valuable for their fisheries. Besides, they furnish the means of transporting the

great forest wealth of the province to the coast.

The *St. John* river rises in Quebec in the main axis of the Appalachian range. At first it runs in a north-easterly direction, but after entering New Brunswick it turns to the south. The Grand Falls,



Lumbering—Driving Logs Down the River.

a cataract of great beauty and grandeur about 74 feet in height, occurs in this part of its course. Farther south it turns to the east and after passing Fredericton it turns southward again and reaches the Bay of Fundy, after a course of nearly 500 miles. This river is navigable for large vessels as far up as Fredericton, a distance of 85 miles, and

are, Montreal.

ndries. There  
on mines in its

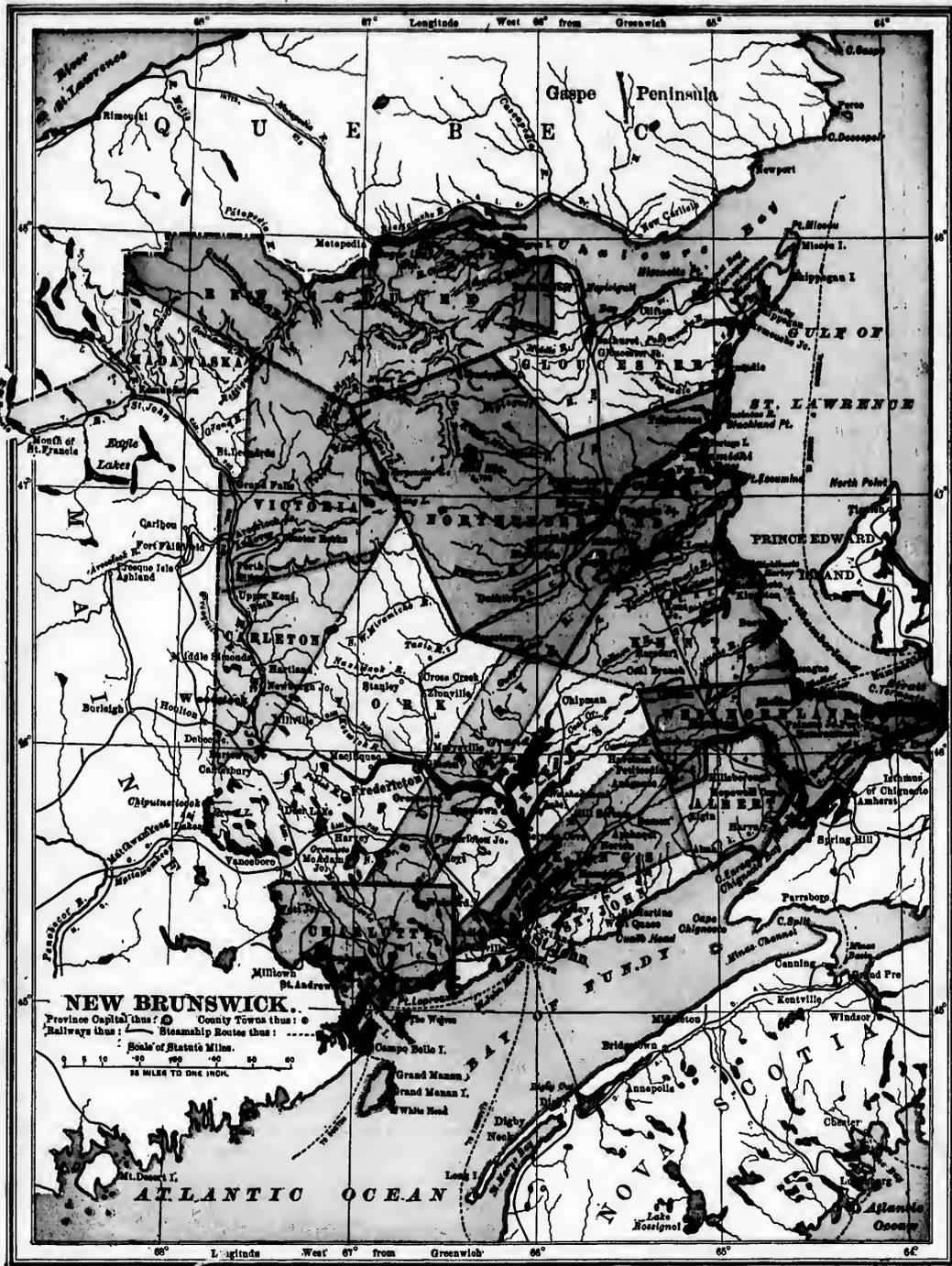
Ottawa, oppo-  
Ottawa, with  
ected by a sus-  
is a thriving  
actures of lum-  
e matches, &c.

THE, on the  
er, east of  
al and College.  
has important  
and machinery.  
of Montreal.

wrence, opposite  
the Intercolonial

and Trunk Rail-

facturing towns.  
sorts on the St.



for light craft, except during the very lowest water, as far as the Grand Falls—225 miles from its mouth. Just above the city of St. John at its mouth, the river passes between two perpendicular cliffs 300 feet apart called the Narrows. At this point, when the tide in St. John harbor is low, there is a fall outward of the water from above, and when the tide is high in the harbor there is a fall inward.

The *Miramichi*, 220 miles long, with its north-west and south-west branches uniting near its mouth, is navigable for large vessels about 50 miles. It has many branches spreading out over a wide area. The fisheries of this river are very valuable, and large quantities of timber are brought down to tide water which extends for fifty miles up the river.

The *Restigouche* forms part of the northern boundary between New Brunswick and Quebec, and flows into the Bay of Chaleur. This river, with its tributaries, is noted for its beautiful scenery and its excellent salmon fishing.

The *St. Croix*, forming part of the boundary between Canada and the State of Maine, flows into the Bay of Fundy.

The *Petitcodiac*, 100 miles in length, is noted for the great tides which run up it and change it twice a day from a small stream to a broad navigable river.

**COAST WATERS.**—These are highly important, for they surround New Brunswick on three sides, and are connected with the rivers that extend far into the country, bringing almost every part of the province into contact with ocean navigation; but above all, the innumerable little bays, curves, and shallows along the coasts afford feeding and spawning grounds for myriads of fish.

*Bay of Chaleur*, forming more than half the northern boundary of the province, is said to have neither shoal nor reef; its waters are cold like those of the Gulf north of the Magdalen Islands. Its fisheries are very important, consisting of salmon, cod, herring, mackerel, and lobster.

Find the bays on the east. Find the branches or offshoots of the Bay of Fundy. In *Shepody* and *Cumberland* bays, the tide rises very high, sometimes 50 feet.

The *Bay of Fundy* nearly separates Nova Scotia from New Brunswick. It is about 140 miles long and its greatest width is about 45 miles. It is remarkable for the rapid rise and great height of its tides, varying from 30 feet at St. John to 50 feet at the eastern extremity. In *Bay Verte*, only 14 miles

distant across the isthmus, the tide rises not more than four or five feet.

#### ORAL AND WRITTEN EXERCISES.

To what system do the ranges in New Brunswick belong? Trace as nearly as you can on the map the level tract referred to in this lesson. What is a peculiarity of the lower portions of the rivers of New Brunswick? Name four branches of the St. John. What curious phenomenon occurs at the mouth of the St. John?

#### 36. Islands, etc.

The islands are few and unimportant,—*Miscou* and *Shippegan* on the north-east, and *Grand Manan* and *Campobello* in the south-west, are the chief—all valuable as fishing grounds, the two latter especially noted for the enormous number of herring taken around them.

**CLIMATE.**—The climate of New Brunswick, owing to the vicinity of the ocean, is less subject to extremes than that of Ontario. It is not so cold in winter nor so warm in summer.

As in all the Appalachian region, the rainfall is abundant in summer, and the snow, away from the coast, deep in winter. The spring is tedious and disagreeable, the coasts, and the land for some distance inland, being often buried in fog; the summer and fall are clear and pleasant; the winter is not so clear and dry as in Ontario.

**PRODUCTS.**—Much of the land is rich and fertile, and when well cultivated yields good crops of grain. On the low lying lands along the rivers, especially on the St. John, large crops of hay are grown. Horses, cattle, and sheep are raised in considerable



Sheep Raising.

numbers and exported. The largervarieties of fruits are not much grown. The small fruits, however, are grown in

abundance, the cool weather in early summer causing them to ripen late. On this account large quantities of late strawberries find a ready market in the New England cities, at good prices.

**MINERALS.**—Where is Grand Lake? At the head of this lake, *coal* (bituminous or "soft") is found in workable quantities. Only a small quantity is

mined, most of the coal used in the province being obtained from Nova Scotia.

*Gypsum*, "Plaster of Paris," is very abundant, the chief mines being in Albert county.

*Limestone* abounds in the south-east and along the southern coast; large quantities of it are worked near St. John.



A Stone Quarry.

*Red Granite* for building and ornamental purposes is quarried extensively in Charlotte county; this is taking the place in Canada of the famous "Peterhead" granite of Scotland, to which it is fully equal in beauty.

*Gold*, *antimony*, and *plumbago* are found in limited quantities.

**INDUSTRIES.**—The chief industries of the province are *fishing* and *lumbering*. The former is carried on almost entirely in open boats, and by means of nets and weirs near the shore.

The *lumber trade* is still the great industry. Sawmills abound along the rivers, the larger ones being within reach of river boats, which in their turn transfer the sawn lumber to ocean-going vessels. Pine is becoming scarce—spruce lumber being the chief kind exported. It is mostly sent to Great Britain.

*Manufactures* are not numerous, but they are important. In addition to the various preparations of lum-

ber and fish for market, there are large cotton and woollen factories, sugar refineries, foundries, engine works, boot and shoe factories, ship yards, tanneries, &c.

*Shipping* and *commerce* employ a considerable proportion of the people. New Brunswick stands second of the provinces of Canada in the amount of tonnage registered and also in the number of new ships built in a year, Nova Scotia being the first.

**SUBDIVISIONS.**—There are fifteen counties in the province, subdivided into parishes. What county borders on Quebec? What is its county-town? Name the counties on the east coast and their county-towns; on the Bay of Fundy; bordering on the United States; the three inland counties.

**COMMUNICATIONS.**—In this respect New Brunswick is well supplied with good roads, steamboats on all the principal rivers, and railways connecting all the important points. The chief railways are as follows:—The *Intercolonial* (belonging to the Dominion Government) with lines running from Moncton to St. John, Halifax, and Quebec, and branches from these; the *Canadian Pacific*, connecting St. John with the upper provinces and the United States, with branches to many important towns in the province; and several minor lines.

### 37. Cities and Towns.

**FREDERICTON**, the capital, is situated on the right bank of the St. John River, at the head of navigation for larger river boats, and is distant from the



A Lumber Port.

mouth of the river about 85 miles by water and 67 miles by rail. The business of this city is chiefly connected with lumbering. There are several large sawmills in the vicinity. The Parliament Buildings, the University of New Brunswick, and the Provincial Normal School are the chief public buildings. The Canadian School of Infantry for the Maritime Provinces is situated here.

St. JOHN, the largest city and chief commercial centre, is situated at the mouth of the St. John river. It has a fine harbor, open to vessels of the largest size at all seasons of the year. It is well situated for trade and manufacture. Fuel is convenient and abundant. Raw material from other countries can be brought cheaply in vessels to the city, while the ocean and river water-ways, together with railways, reaching all points, afford excellent opportunity for the distribution of manufactures. In the number, tonnage, and size of vessels owned, St. John is said to rank fourth in the British Empire, being surpassed only by Liverpool, London, and Glasgow. The manufacturing industries of this city are of considerable extent, producing sawed lumber, shipping, steam-engines, railway-cars, castings, edge-tools, nails, bolts, agricultural implements, cotton and woollen fabrics, lime, leather, boots and shoes, paper, etc. The iron works and rolling mills are especially important. St. John is connected by means of the Intercolonial Railway with Nova Scotia and Quebec, and by the C.P.R. with the United States and the western provinces.

MONCTON, on the Petitcodiac river, is the headquarters of the Intercolonial Railway, and contains a large sugar refinery and a cotton factory. It is growing very rapidly. An interesting feature of the river Petitcodiac is the "bore" of the incoming tide which rushes up the river in a wave several feet high.

*St. Stephen* at the head of deep water navigation on the St. Croix, and *St. Andrews* at its mouth, are engaged in the lumber trade and fisheries chiefly. The latter town is a pleasant seaside resort.

Where are *Chatham* and *Newcastle*? They are ports shipping considerable quantities of lumber and fish. They also carry on ship building.

At *Bathurst*, *Richibucto* and *Shediac*, the same industries are carried on. Lobsters and oysters form an important part of the exports.

Where are *Woodstock* and *Sackville*? These towns are situated in fine farming districts. At *Dorchester*, near Sackville, is located the penitentiary of the Maritime Provinces.

Where is *Dalhousie*? It is an attractive summer resort, on account of its charming scenery and its facilities for fishing and salt-water bathing.

## NOVA SCOTIA.

### 38. Relief, etc.

What island forms part of the province of Nova Scotia? What body of water nearly divides this island into two parts? Between what parallels of latitude and meridians does Nova Scotia extend?

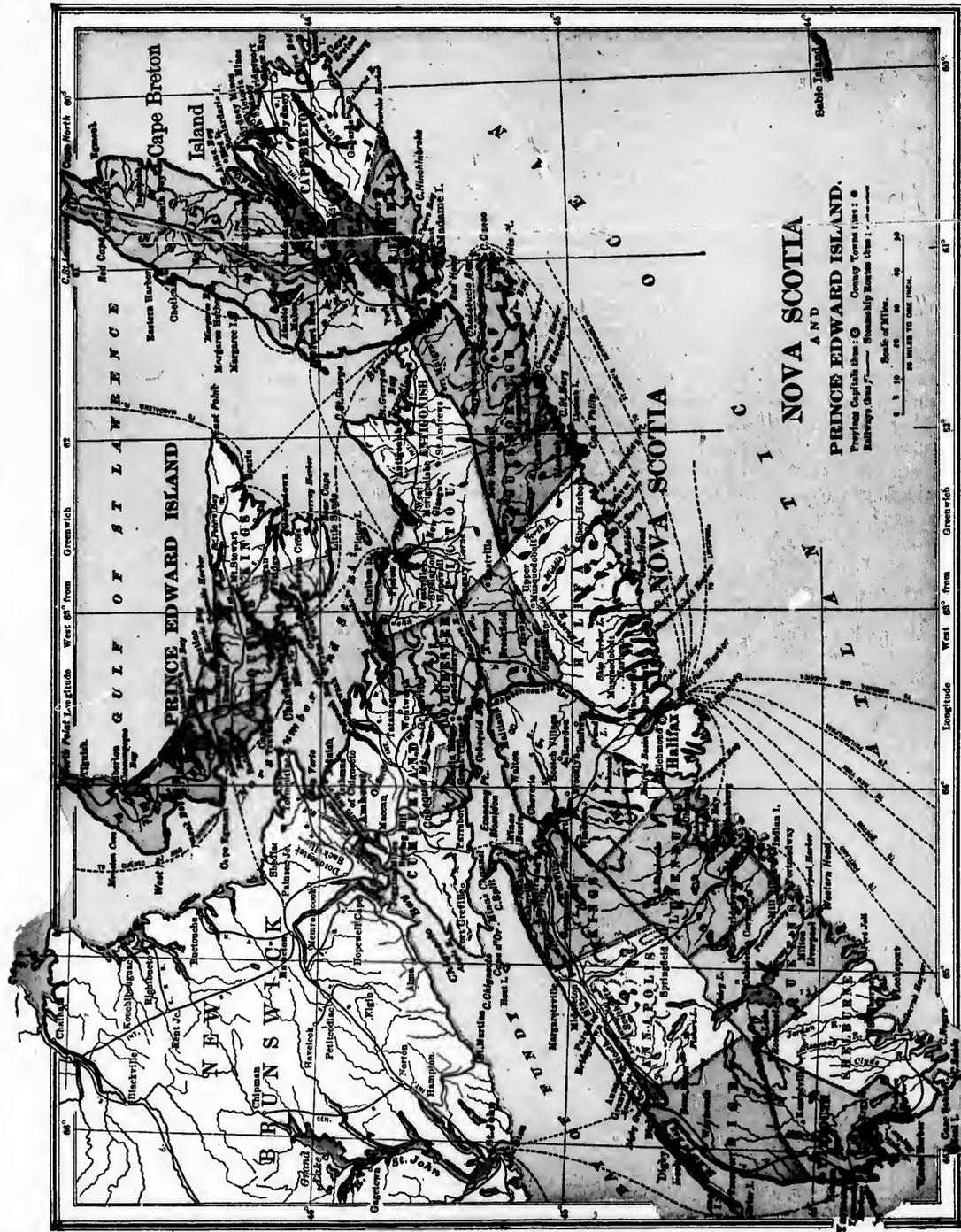
We have already seen that Nova Scotia is a part of the Appalachian system of plateaus; its elevation nowhere exceeds 1200 feet above the sea-level. A broad range of broken hills and uplands extends along the Atlantic coast of the province and into the island of Cape Breton. The *Cobequid Hills* are next in importance, though higher than the former, running to the north of that arm of the Bay of Fundy known as Minas Basin, and joining the former range at an angle, near the middle of the province. Along the south shore of the Bay of Fundy are two parallel ranges about 600 feet high called the *North* and *South Mountains*. Between these lies the beautiful *Annapolis* valley, the most fertile part of Nova Scotia, celebrated as the scene of Longfellow's "Evangeline."

A peculiar feature of Nova Scotia are the "Dyked Lands." Along the greater part of the shores of the inlets of the Bay of Fundy, mud-covered flats, often miles in extent, are laid bare at low water. At the mouths of the rivers entering these inlets the flats are higher, and are overflowed only during the highest tides; they are consequently covered here with a thick growth of sea-grass. Many of these marshes have been "dyked in," that is, dykes or walls have been built across them shutting out the sea. The fertility of these marshes, then, is inexhaustible.

**DRAINAGE.**—The rivers of Nova Scotia are not commercially important; none of them exceeding fifty miles in length. Why is this? Those which flow into the waters of the Bay of Fundy—the *Annapolis*, *Avon*, and *Shubenacadie*—are forty or fifty feet deep at high tide; but run dry, excepting a little stream of fresh water, at low tide. The *St. Mary* and *Musquodoboit* are the largest of the other rivers.

*Lakes* are numerous but most of them are small. *Lake Rossignol*, in Queen's County, and *Ship Harbor*, in Halifax County, are the largest.

**COAST WATERS.**—The coast line of Nova Scotia is deeply indented with numerous bays and harbors, which, like those of New Brunswick, are very valuable in connection with the inshore fisheries and with commerce. On the west, there are *St. Mary's*



66° 00' Cape North 60°

62° 00' Greenwich

60° 00' West 60° from Greenwich

60° 00' Longitude

62° 00' West 60° from Greenwich

64° 00' Longitude

66° 00' West 60° from Greenwich

68° 00' Longitude

70° 00' West 60° from Greenwich

72° 00' Longitude

74° 00' West 60° from Greenwich

76° 00' Longitude

78° 00' West 60° from Greenwich

80° 00' Longitude

82° 00' West 60° from Greenwich

84° 00' Longitude

86° 00' West 60° from Greenwich

88° 00' Longitude

Cape Breton

Island

PRINCE EDWARD ISLAND

GULF OF ST. LAWRENCE

NEW BRUNSWICK

NOVA SCOTIA

NOVA SCOTIA AND PRINCE EDWARD ISLAND.

PRINCE EDWARD ISLAND.  
Frigate Captains: ○  
County Vessels: ●  
Railways: ——— Steamship Routes: - - - - -  
Scale of Miles: 0 10 20 30 40 50 60  
IN INCHES TO ONE MILE.

60°

62°

64°

66°

68°

70°

72°

74°

76°

78°

80°

82°

84°

86°

88°

90°

92°

94°

96°

98°

100°

102°

104°

106°

108°

110°

112°

114°

116°

118°

120°

122°

124°

126°

128°

130°

132°

134°

136°

138°

140°

142°

144°

146°

148°

150°

152°

154°

156°

158°

160°

162°

164°

166°

168°

170°

172°

174°

176°

178°

180°

182°

184°

186°

188°

190°

192°

194°

196°

198°

200°

202°

204°

206°

208°

210°

212°

214°

216°

218°

220°

222°

224°

226°

228°

230°

232°

234°

236°

238°

240°

242°

244°

246°

248°

250°

252°

254°

256°

258°

260°

262°

264°

266°

268°

270°

272°

274°

276°

278°

280°

282°

284°

286°

288°

290°

292°

294°

296°

298°

300°

302°

304°

306°

308°

310°

312°

314°

316°

318°

320°

322°

324°

326°

328°

330°

332°

334°

336°

338°

340°

342°

344°

346°

348°

350°

352°

354°

356°

358°

360°

362°

364°

366°

368°

370°

372°

374°

376°

378°

380°

382°

384°

386°

388°

390°

392°

394°

396°

398°

400°

402°

404°

406°

408°

410°

412°

414°

416°

418°

420°

422°

424°

426°

428°

430°

432°

434°

436°

438°

440°

442°

444°

446°

448°

450°

452°

454°

456°

458°

460°

462°

464°

466°

468°

470°

472°

474°

476°

478°

480°

482°

484°

486°

488°

490°

492°

494°

496°

498°

500°

502°

504°

506°

508°

510°

512°

514°

516°

518°

520°

522°

524°

526°

528°

530°

532°

534°

536°

538°

540°

542°

544°

546°

548°

550°

552°

554°

556°

558°

560°

562°

564°

566°

568°

570°

572°

574°

576°

578°

580°

582°

584°

586°

588°

590°

592°

594°

596°

598°

600°

602°

604°

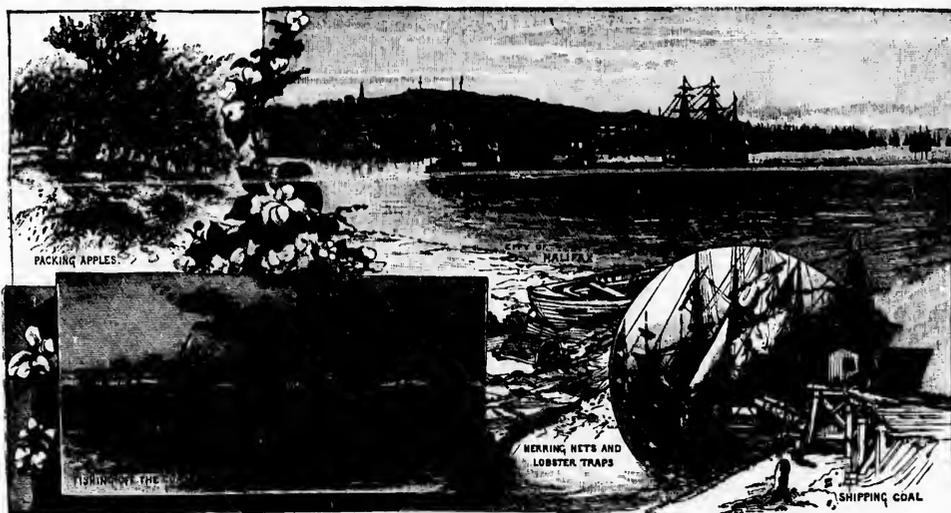
606°

608°

610°

612°

614°



Bay, Annapolis Basin, Minas Basin, Cobequid Bay and Bay of Fundy; on the south, Halifax Harbor, Margarets Bay, and Mahone Bay; on the north, Baie Verte, Tatamagouche Harbor, St. George's Bay; on the east, Chedabucto Bay. In Cape Breton Island are Bras d'Or Lake, really an inlet of the sea, Sydney Harbor, and St. Peter's Bay. Bras d'Or Lake is separated from St. Peter's Bay by a narrow neck of land less than half a mile wide. A canal is constructed across the isthmus.

ISLANDS.—The islands of Nova Scotia are innumerable, but with few exceptions are of little importance. They are all near the shore, and, for the most part, are rocky. Off the south-western extremity of the province are a number of low islands composed of drift sand deposited by the currents which in that region are very changeable. *Sable Island*, one of these, is very dangerous to navigation, lying directly in the line of Atlantic travel. It has been called the "graveyard of the Atlantic" from the number of wrecks which have taken place there.

Apart from *Cape Breton*, the principal island of the province is *Isle Madame*, a fertile and populous island south of Cape Breton. Next in importance is *Boulauderie*, lying in Bras d'Or Lake, between the two peninsulas of Cape Breton. *Pictou* is in Northumberland Strait on the north.

PENINSULAS.—Peninsulas are numerous in Nova Scotia. Cape Breton Island consists of two peninsulas. The North Mountains extend in the

south-west into the Atlantic, in a long narrow tongue of land called *Digby Neck*, while the Cobequid ridge projects into the Bay of Fundy, making a broad peninsula of the western part of Cumberland County. Along the Atlantic coast are numerous small projections.

CAPIES.—Capes are also numerous, many of them rising into rugged cliffs 500 feet in height. The principal are:—*Cape North* at the northern extremity of Cape Breton, *Cape Canso* terminating the central ridge in the north-east, *Cape Chignecto* the western termination of the Cobequid Mountains, *Capes Split* and *Blomidon* terminating the North Mountains towards *Minas Basin*.

CLIMATE.—The climate of Nova Scotia is similar to that of New Brunswick, the annual rainfall being somewhat greater, and the temperature less subject to extremes, owing to the proximity of the Gulf Stream. It is more temperate than any other province of the Dominion, western British Columbia excepted.

PRODUCTS.—The soil in the valleys and on the mountain slopes is rich and productive; but towards the Atlantic coast it is rocky and less fertile. All the ordinary grains and roots are grown. Oats, potatoes and hay are the principal agricultural products. Apples of the finest varieties grow abundantly in the west and immense quantities of them are exported to Great Britain. A considerable portion—about one-third—of the surface of Nova Scotia is still covered with forests.

## 39. Industries.

**MINERALS.**—Nova Scotia produces about two-thirds of the total amount of *coal* mined in Canada. The principal coal mines are in Cape Breton Island and the counties of Pictou and Cumberland. Nova Scotia exports coal chiefly to New Brunswick, Prince Edward Island, Quebec, Newfoundland, and the United States. The coal beds are about twenty-five feet in thickness—seventy feet in Pictou—and the area of the coal region is about 300,000 acres.

**GOLD.**—The gold region of Nova Scotia comprises the Atlantic coast counties, and has a total area of over 6000 square miles. The gold is found mostly in the quartzite rocks which are crushed in mills, the gold being separated by washing. There are over thirty mines in operation, and as the processes of extracting the gold are cheapened, the production of gold is increasing and will doubtless continue to increase.

**IRON.**—Nova Scotia produces more than half of the iron mined in Canada. It is found mostly in the northern counties and in Cape Breton. In Pictou county iron exists near the coal deposits, which insures the iron miner ample supplies of coal and coke for his operations. In consequence, the iron ores of Nova Scotia are being worked, smelted, and converted into steel in the vicinity of the mine.

**GYPSUM.**—The deposits of gypsum are very extensive in Nova Scotia. They occur chiefly in the coal district or *carboniferous area*. The beds vary in thickness from a few inches to 120 feet. At present Nova Scotia yields nearly two-thirds of the total amount of gypsum produced in Canada. The greater portion of this is exported, mainly,



## INDUSTRIES.

to Great Britain and the United States.

**LIMESTONE** is found everywhere in the carboniferous area and is quarried extensively.

*Grindstone* and *whetstone* materials are found along Cumberland Basin and vicinity and fine *building stone* (sandstone and granite) is afforded by nearly every part of the province.

The chief industry of Nova Scotia are the **FISHERIES**, carried on mainly by the Atlantic counties. The value of the fish caught in the waters of Nova Scotia is not much below that of all the rest of Canada.

**LUMBERING** is the industry next in importance. As with the fisheries so with the lumber—the Atlantic counties produce the greatest amount, Cumberland, however, exporting largely also. *Spruce* is the chief kind of wood, followed by *birch* and *maple*, *pine* being comparatively scarce.

**AGRICULTURE** is the chief industry of the counties which do not border on the Atlantic. *Wheat* and *oats* are grown extensively in the carboniferous area. Large quantities of *apples* are exported from the counties of Annapolis and King's on the Bay of Fundy. *Cattle* and *sheep* are extensively reared in the western counties. *Dairying* is carried on to a considerable extent. Large quantities of *hay* and *potatoes* are exported.

**MANUFACTURES.**—Nova Scotia has few manufactures as yet, but its extensive deposits of iron and coal so near together will undoubtedly make it some day a great manufacturing centre. The chief articles manufactured are: *ships*, *refined sugar*, *leather*, *boots* and *shoes*, *iron*, *machinery* of various kinds, *canned foods*, *butter* and *cheese*.

**SHIPPING.**—In proportion to its population, Nova Scotia has more shipping than any other country.

But the ships of Nova Scotia are for the most part engaged in the foreign carrying trade. Still it ranks third of the provinces in the tonnage of vessels engaged in the coasting trade, being exceeded by Ontario and Quebec.

#### 40. Subdivisions, Cities and Towns.

There are eighteen counties in Nova Scotia, four of which are in Cape Breton Island. Name these four and their county towns. Name the counties on the Atlantic and their county towns; those on the



Lumbering—Hauling Logs.

Bay of Fundy; those on Northumberland Strait.

INTERNAL COMMUNICATION. — There are several lines of railway in Nova Scotia; the *Intercolonial*, from Halifax to New Brunswick, with a branch from Truro to Pictou and thence to Port Mulgrave on the Strait of Canso; the *Dominion Atlantic*, from Windsor Junction to Windsor, Annapolis and Yarmouth; the *Sydney and Louisburg* in Cape Breton, and others.

HALIFAX, the only city in Nova Scotia, is situated about seven miles from the mouth of Halifax-harbor, on a tongue of land between the harbor proper and the "North-West Arm." In winter considerable export trade from the other provinces passes through Halifax by means of the Intercolonial Railway. Its manufactures are somewhat limited, the chief being boots and shoes, furniture, clothing, and malt liquors. There are, however, a large cotton-mill and a sugar refinery.

Halifax is the only place in Canada where the British Government maintains a garrison. It is also the summer station of the North American Squadron. Next to Quebec it is the most strongly fortified place in the Dominion. It contains many fine edifices—the Parliament and other public buildings, churches, &c. It also contains Her Majesty's dockyard. The largest *graving dock* in Canada is situated here; this

is a place in which the bottoms of vessels are examined and cleaned off.

Towns.—The towns of Nova Scotia differ from those of Ontario in that they have little or no manufacturing. They owe their importance, which is mainly local, to the mines in their vicinity, or to their possession of a good harbor:

*Pictou* and the adjacent town, *New Glasgow*, are important on account of the extensive coal mines near them. During the season of navigation their harbors are crowded with shipping. Pictou is connected with Quebec by a steamship line.

*Sydney*, in Cape Breton, exports more coal than any other town in Nova Scotia. Arrangements have been made for the manufacture of iron and steel on a very large scale.

*Yarmouth* owns more shipping in proportion to its population than any other town in the world, the vessels being remarkable for their large size and excellent workmanship. Its industries are almost entirely connected with the sea—fishing, ship-building, navigation, and some manufacture of rigging, canvas, etc.; woollen cloth is also manufactured.

*Lunenburg* is the next most important ship-building town and the most important for its fisheries. *Windsor*, on the Avon river, in a fine agricultural country, has almost all the trade in gypsum. It is the seat of King's College, the oldest in British North America. *Annapolis*, at the head of Annapolis Basin, was, under the French, the principal settlement. It has steamboat connection with St. John and Boston, and



ships much fruit to England. *Truro*, at the head of Cobequid Bay, contains the Provincial Norman School. *Liverpool* ships large quantities of lumber, as do many other little towns on the Atlantic coast.

*Louisburg*, in Cape Breton Island, was a very strong fortress during the time of French dominion.

#### ORAL AND WRITTEN EXERCISES.

What is the general character of the rivers of Nova Scotia? Name the principal bays or inlets of each coast. How is Cape Breton Island divided into two islands? How does the climate of Nova Scotia differ from that of Ontario? What are the chief vegetable productions? How does Nova Scotia compare with the rest of Canada in the production of coal? Of gold? What is the chief source of the gold of Nova Scotia? How would you go by rail from Halifax to Quebec? By water? Find on the map all the towns mentioned in the last lesson.

## PRINCE EDWARD ISLAND.

### 41. Outline, etc.

What strait separates Prince Edward Island from New Brunswick and Nova Scotia? What two bays nearly divide it into three parts? What is the latitude and longitude of its extreme points?

The *outline* of the island is much broken, more especially on the south side, the soft, coarse-grained rock not being able to resist the action of the waves and ice. In consequence capes are numerous. What capes are at the extreme north and east? *Cape Traverse* is the nearest point to the mainland, nine miles distant.

The *surface* of Prince Edward Island is gently undulating, except near the middle, which may be considered hilly; the whole presenting a charming agricultural aspect of hill and dale.

The *climate* is as equable as that of Nova Scotia, and is in marked contrast with that of the parts of Ontario—the region north of Lake Huron and around Lake Nipissing—in the same latitude as the island. The fall season is longer than on the mainland, but the spring is somewhat tedious, for the surrounding waters, being filled with floating ice, do not warm up again so readily as does a wide stretch of land. The rainfall is less than that of the southern coast of Nova Scotia and about the same as that of New Brunswick.

Prince Edward Island is surrounded by shallow water, possibly caused by the deposit of sediment derived from the wasting away of its shores. These shallow waters, as in the other maritime provinces, are the feeding grounds of valuable fishes.

**PRODUCTS.**—All the ordinary grains and fruits (except peaches and grapes) grow well and give excellent crops. The sandy loam soil is especially well adapted for *root crops* and *oats*. The forest growth is wholly of the northern type—*spruce* and *fir* being the prevailing trees; but *maple*, *beech*, *birch*, *hemlock*, *cedar*, *tamarack*, and *poplar* are abundant.

**INDUSTRIES.**—As might be supposed, *farming* in its various branches is the chief industry, the farm produce exported being mainly potatoes and oats, both in large quantities. This has resulted in the impoverishment of the soil, but lately the development of the *dairy* and *stock raising* industries is bringing about a steady improvement of the soil.

The *fisheries* are the next most important industry.

Fishing is pursued almost exclusively along the coast, few vessels going to the deep sea. The chief fish taken are *cod*, *mackerel*, *herring*, *lobsters* and *oysters*.



Fishing from Boats.

The manufactures are mostly for home use, the chief being *preserved meats* and other articles of food, and *starch*. There are no minerals of importance in Prince Edward Island.

**SUBDIVISIONS.**—There are three counties: Kings, Queens and Prince. These counties are not organized in the same way as counties in Ontario. They have no County Council. The province being so small the legislature takes under its control such matters as roads and bridges, ferries, fire departments, etc., which are in other provinces under the control of local bodies.

**COMMUNICATIONS.**—A railway called the Prince Edward Island Railway, owned by the Canadian Government, runs from Tignish in the west, to Souris in the east, with one branch to Cape Traverse, another to Charlottetown, and a third to Georgetown. Another branch from Charlottetown to Murray Bay has been surveyed and will probably soon be built. A submarine telegraph connects the island with New Brunswick, crossing the narrowest part of Northumberland Strait, between Capes Tormentine and Traverse, a distance of nine miles. In winter the Straits are often packed with ice, though never

785  
755

along the  
The chief  
lobsters and



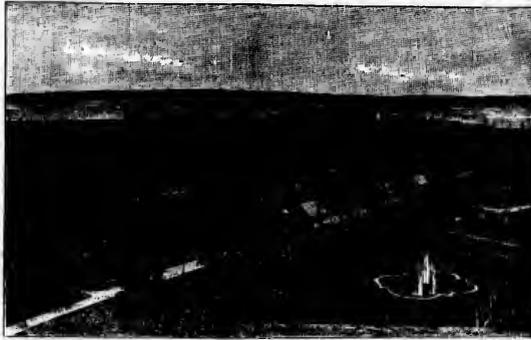
me use, the  
articles of  
of import-

es: Kings,  
s are not  
in Ontario.  
vince being  
ontrol such  
re depart-  
under the

the Prince  
Canadian  
west, to  
e Traverse,  
Georgetown.  
Murray Bay  
n be built.  
with New  
of Nor-  
entine and  
winter the  
ugh never

frozen across, and the mails are carried over between the same points in boats fitted for the ice or for water. Navigation is thus obstructed from the end of December till the beginning of April.

Prince Edward Island belonged to France, but became a British colony in 1793. It was at first called St. John's Island, but in the year 1800 it received its present name in honor of Edward, Duke of Kent, father of Queen Victoria. About nine-tenths of the inhabitants are of British origin, mostly of Scotch; the remainder are of French origin. Owing to the fertility of the soil, Prince Edward Island has be-



Charlottetown.

come the most densely populated province of Canada.

CHARLOTTETOWN, the capital, is a pretty little city on a fine harbor in Hillsborough Bay. The city is built a little back from the water, on gently rising ground, with very wide streets. There are some fine buildings, of which the Legislative Buildings are the chief. It is the county-town of Queens County and carries on the principal trade of the island.

SUMMERSIDE, the county-town of Prince County, about forty miles west of Charlottetown, carries on a considerable trade with New Brunswick.

Towns.—Georgetown, the county-town of Kings County, about 30 miles east of the capital, is an important place with a fine harbor. Montague and Souris are important towns in Kings County; Alberton and Tignish thriving towns in Prince County.

Many thriving villages are to be found all over the island not excelled anywhere for beauty and healthfulness. The chief of these are Kensington, Stanley, and Mt. Stewart.

**ORAL AND WRITTEN EXERCISES.**

How does the climate of Prince Edward Island compare with that of inland Canada in the same latitude? What are the chief industries? How are communications made between this island and the mainland in winter? Find the cities and towns mentioned. How do the counties of P.E.I. differ from those of Ontario? Trace the P.E.I.R. and its branches on the map.

**MANITOBA, SASKATCHEWAN,  
AND ALBERTA.**

**42. Introduction.**

What is the southern boundary of Canada, west of the Lake of the Woods? What branch of the Mississippi has part of its basin in Canada?

The forty-ninth parallel, by chance, nearly follows the divide between the Missouri and Saskatchewan river basins, about 20,000 square miles of the Missouri basin being in Canada. Find the divide between the Saskatchewan and Mackenzie river basins. This nearly coincides with the fifty-fourth parallel.

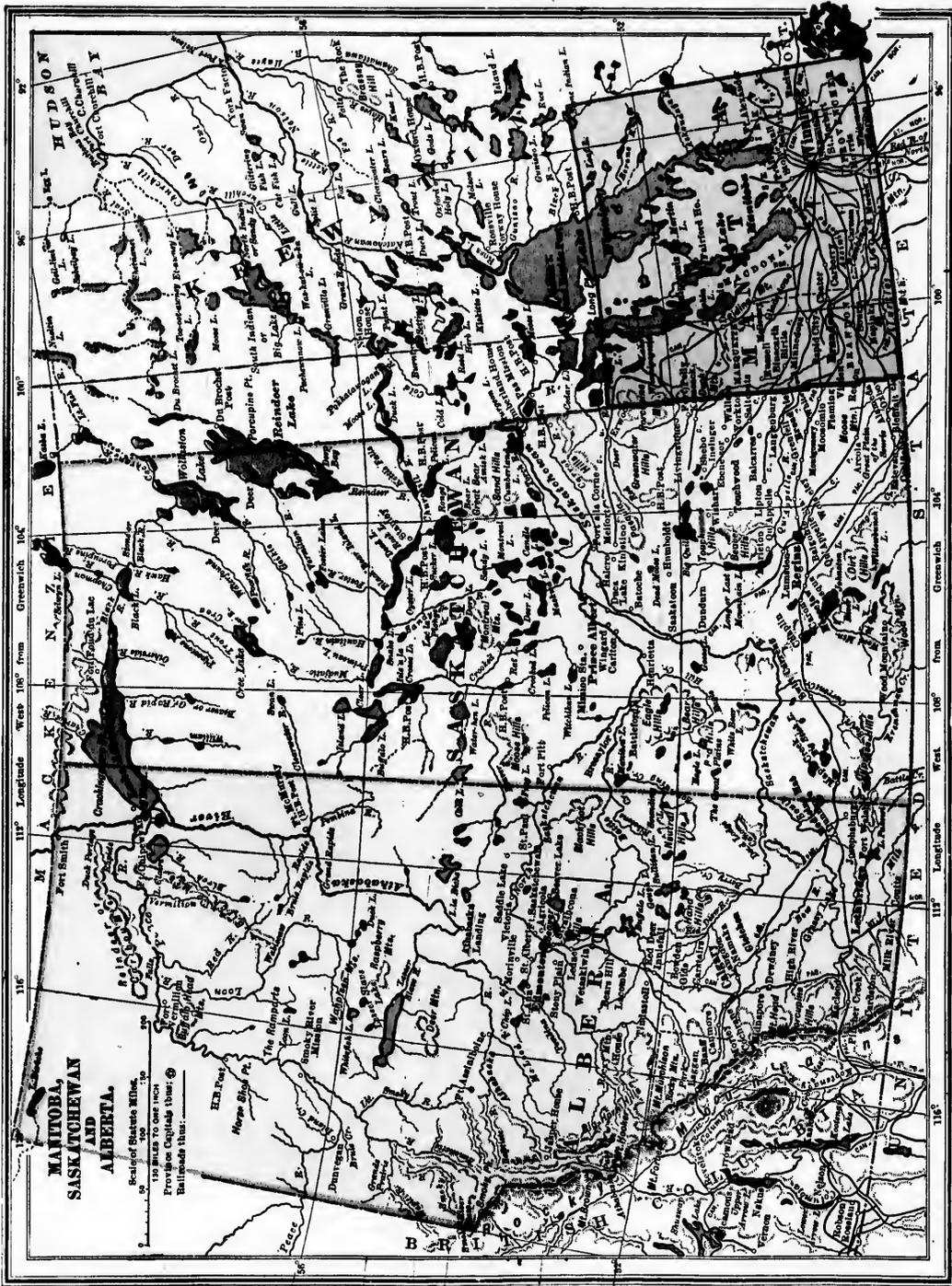
All this southern portion of the great central plain in Canada comprises about 295,000 square miles and is divided by two rather abrupt slopes or *escarpments* into three parts.

The first or lowest part is the Red River valley, of which the northern portion is occupied by the Winnipeg group of lakes. Its average elevation is 800 feet above the sea, gradually rising to the southwest till it reaches a height of 960 feet about 200 miles south of the boundary in the United States. Its area in Canada, including the lakes, is about 55,000 square miles. South of Lake Winnipeg, it comprises about 7000 square miles of prairie land, which, to the eye, is absolutely flat, although rising uniformly to the east and west of the river. Geologists suppose that the whole of the Red River valley was covered, ages ago, by the waters of a great lake called by them "Lake Agassiz." The sediment deposited in the bottom of this lake makes this the best wheat growing region in North America and perhaps in the world.

The escarpment bounding this plain on the west, begins at the south in what is known as "Pembina Mountain," and is continued northward in the Riding, Duck, Porcupine, and Pasqua hills, which overlook Manitoba and Winnipegosis Lakes. From this escarpment the second prairie level extends westward to a second and nearly parallel rise, which, in general, is known as the Missouri Coteau. The area of this plain is about 105,000 square miles, of which more than half is open prairie. Its average elevation is about 1600 feet, and the surface is more diversified by undulations than that of the last, while the river valleys are often deeply cut as well as wide.

The third and highest plain, lying between the last and the base of the Rocky Mountains, may be

2





stated to have an average elevation of 3000 feet, with an area between the forty-ninth and fifty-fourth parallels of about 134,000 square miles, most of which is devoid of forest. The surface of this plain is still more irregular than that of the last. The soil is generally good, but large tracts to the south and west are very dry and more suitable for pasturage than agriculture.

**DRAINAGE.**—From the Rocky Mountains east to the hundred and fourth meridian, where the Missouri Coteau crosses the forty-ninth parallel, the divide is on the Canadian side, and consequently the drainage to the west of that falls into the Missouri river and its branches.

Between this watershed and the fifty-fourth parallel lies a system of valleys, separated in the western part by very low elevations, but in the eastern, meeting in two valleys, those of the lower Saskatchewan and the Assiniboine, the latter of which flows into the Red River.

The principal river of this section is the *Saskatchewan*, formed by the union of the North and South Saskatchewan, both rising in the Rocky Mountains.

This river is navigable from the rapids at its outlet into Lake Winnipeg to Edmonton on the northern branch near the foot of the mountains.

The *Assiniboine* starts near the parallel of 52°, and runs close to the eastern side of the second prairie level, somewhat east of south, to about the parallel of 50°, and then it runs easterly to the *Red River*. Its southern tributary is the *Souris*, the western is the *Qu'Appelle* (cā-pel') which starts at the western boundary of the second prairie level and runs through a fine agricultural country.

The *Red River*, the valley of which begins in Dakota, 200 miles south of the boundary, is the chief river of Manitoba. It flows between banks eroded from the prairie, and still widens slowly, the water consequently being charged with sediment. The river is not deep, and in dry seasons is not navigable in the southern part of the province; in wet seasons it sometimes overflows its banks and produces destructive floods.

100  
Great Fish  
From  
106°  
West  
Longitude  
111°  
112°

The *Winnipeg River*, the outlet of the Lake of the Woods, is a characteristic Laurentian river, consisting of small lakes, and numerous waterfalls and rapids, with stretches of quiet water between them. Its scenery is very beautiful.

All these rivers flow into Lake Winnipeg, the waters of which are emptied into Hudson Bay by the Nelson River.

**LAKES.**—The great lakes of Manitoba are *Winnipeg*, *Winnipegosis*, and *Manitoba*, the latter two parallel to the first at a little distance to the west. *Winnipegosis* empties into *Manitoba* and the latter into *Winnipeg*. Lake *Winnipeg* is by far the largest, being 272 miles long, sixty at its greatest breadth (one mile at the narrowest part)

**CLIMATE.**—The winters in this part of Canada are very cold, the thermometer registering sometimes 40° below zero; but on account of the dryness of the air this very low temperature does not cause any more discomfort than the warmer but more variable winters of Eastern Canada. The summers are hot, the mean temperature for July being higher than that of any part of England. This, combined with the long clear days of summer, causes the crops to mature quickly. Spring is early, the mean temperature of April being slightly higher than that of south-western Ontario. The average rainfall of Manitoba is about 17 inches, not more than half that of Ontario, while to the west of Manitoba it is considerably less. About three-fourths of the total, however, falls during the summer, when it is of the greatest benefit to vegetation. In south-western Alberta the annual rainfall is not more than six inches. This region is a continuation of the Great American Desert of the United States. Fortunately it is of small extent in Canada. The winters, too, are milder here, so that cattle and horses graze out all the year round, finding shelter in the valleys or bottom lands when they need it. Warm winds, called the *Chinook* winds, often come down from the mountains, producing a rapid rise in temperature, and causing the snow to disappear as if by magic. It is seldom, if ever, that the prairie region of Canada is visited by such *tornadoes* as are common to the south.



A Prairie Herd.



Stock Yards.

*lignite*, a coal of poor quality, but which, in the absence of wood, will prove of great value in the



Shooting Prairie Hens.

prairie regions. This deposit continues westward to the Rocky Mountains.

## MANITOBA.

### 43. Position, etc.

Manitoba extends from the international boundary northward to latitude 53°, westward to the meridian of 101° 30' and eastward to 95°. All the first or lowest division of the plain region is in Manitoba, while a large part of the south-western part of Manitoba is in the second division; the eastern part of the province is in the Laurentian region.

**PRODUCTS.**—Forest growth in south-western Manitoba is confined to the banks of the streams,—a clump of trees on the prairie marks the presence of water; the trees are *poplar*, *elm*, *ash*, *basswood*, *negundo*, and *oak*. Along the lakes and in the Laurentian region, the forest is almost continuous, and pine, spruce, and other northern trees are found.

On account of the great fertility of the soil, all the ordinary grains, as well as potatoes and roots, are produced in abundance and are of the best quality. Manitoba *hard wheat* is considered by millers to be the best in the world.

Manitoba contains no minerals of value except coal. In western Manitoba there are deposits of

Immense numbers of wild fowl, such as ducks, geese, and prairie hens make Manitoba a "sportsman's paradise."

**INDUSTRIES.**—The principal industry is *grain-raising* which is rapidly increasing in magnitude. A few years ago wheat was the only product of the farms of Manitoba, but of late years *stock-raising* and *dairying* have been added. The abundance of grass in the low lying lands of the province and the healthfulness of the climate for cattle should make this province equal to any other for dairying and stock-raising.

The *fisheries* of the lakes of Manitoba are of considerable value, consisting mainly of white fish.

**INHABITANTS.**—There are still over 10,000 Indians in Manitoba, most of whom live on land reserved for them by the Canadian Government. Every year the Indian Inspector visits these reserves and distributes food, clothing, tools, seed, potatoes, etc.; encouraging them at the same time to cultivate the land for their own benefit.

A considerable number of the population are half-breeds, descendants of the employees of the Hudson Bay Company, who married Indian women.

Since Manitoba became a province of Canada there has been a great influx of Canadian, English, Irish, Scotch, French, Mennonite, Doukhobor, Finnish, Icelandic and Scandinavian settlers. Distinct colonies of some of these were formed and they still maintain their customs and language, although gradually giving way to the all-prevailing power of the English language, laws, customs, &c.

**RAILWAYS.**—The main line of the *Canadian Pacific* traverses the province from east to west, passing through Winnipeg, Portage la Prairie, Brandon, &c. Branches of this railway extend from Winnipeg to the south, south-west, and north.

The *Northern Pacific and Manitoba Railway* connects Winnipeg with the large cities of the United

States. A branch runs from Winnipeg to Portage la Prairie, and another from Morris westward to Brandon.

Besides these, there are other lines, the total number of miles of railway in Manitoba in 1898 being over 1600.

WINNIPEG, the capital of the province, is situated at the confluence of the Assiniboine and Red rivers, on the site of Old Fort Garry, a Hudson Bay post. It is the commercial, banking, legal, and educational centre of the province. Its principal buildings are the Government Buildings, Court House and City Hall. It has many fine business blocks and beautiful private residences. It has an efficient electric street car service, water works, electric and gas lights, and telephone service. Many railways, branching like spokes of a wheel in all directions, connect it with all the important towns and villages of the province, with the eastern and western provinces and districts, and with the neighboring republic to the south.

*Brandon*, one hundred and thirty-three miles west of Winnipeg on the main line of the Canadian

Pacific Railway, is situated on the Assiniboine River. It is noted for its elevators and mills. A branch of the Northern Pacific and Manitoba Railway connects it with Morris on the main line.

*Portage la Prairie*, fifty-six miles west of Winnipeg, on the main line of the C.P.R., is the market place for the immense wheat crops that grow and ripen on the Portage Plains.

*Morden*, a busy town on the Pembina branch of the C.P.R. has a hospital and a number of elevators.

Among many other towns and villages may be mentioned *Morris, Souris, Gretna, Emerson, St. Boniface*, across the Red River from Winnipeg, *East and West Selkirk*, and *Minnedosa*.

#### ORAL AND WRITTEN EXERCISES.

Describe the three parts into which the southern part of the great central plain of Canada is divided. Name the rivers which drain this region. Into what body of water do nearly all of them empty? Compare the climate of Manitoba with that of Ontario. What are the Chinook winds? Why is stock-raising the chief industry in Alberta and grain growing in Manitoba? How does the Winnipeg River differ from the Red River?



#### 44. Saskatchewan.

Saskatchewan is bounded on the east by Manitoba, on the south by the United States, on the west by Alberta, and on the north by Mackenzie. It has an area of 275,000 square miles. The eastern part lies on the second prairie level, while the western part is on the third level.

**SURFACE.**—The general appearance of south-eastern Saskatchewan is that of rolling prairie dotted over with clumps of trees usually found bordering lakes, streams and meadows; in the hollows grow the luxuriant grasses from which the farmer obtains his supply of hay. It is essentially a wheat growing and mixed farming country. South-western Saskatchewan is more broken and hilly, and is specially adapted for ranching. Northern Saskatchewan stretching back from the great plains is a mixed prairie and woodland region with abundant water and natural hay and suited by climate and soil for mixed farming.

**DRAINAGE.**—It is drained in the south by the Q'Appelle and the Souris, branches of the Assiniboine; in the centre by the Saskatchewan and its branches; in the north by the Churchill. The general slope is eastward and the waters of these rivers find their way into Hudson Bay.



Interior of Coal Mine.

**CLIMATE.**—The average weather during the winter is clear, calm, and cold with bright, cloudless days. The snowfall is light and of a dry, powdery quality. The long, bright, hot days of summer are relieved by cool nights. The extremes of temperature are modified by the dryness of the atmosphere. The

average rainfall is about 14 inches, June and the early part of July being the rainy season.

**PRODUCTS.**—South-eastern Saskatchewan, as far west as Moosejaw, is one of the greatest wheat producing sections of the American continent. Oats, barley, and flax are grown successfully. In South-western Saskatchewan great numbers of cattle,



Cowboys Lassoing Cattle.

horses, and sheep feed in the open on the rich natural grasses that grow on the ranges or great stock farms. In central Saskatchewan wheat, oats, barley, flax and all kinds of vegetables are grown. Berries of nearly every variety are found in profusion. Cattle, sheep and horses thrive in the immense tracts of hay land and areas of rich pasturage about the Saskatchewan river. Beyond this lies the great forest extending northward for many hundred miles. Spruce, tamarack, birch and white poplar are the principal woods. Generally, this province is well suited for dairying. Lignite coal is mined in quantity in the Souris district. Fish are plentiful, especially in the northern lakes and rivers. The prairie chicken is found everywhere on the plains and duck and other wild fowl are numerous.

**CITIES AND TOWNS.**—*Regina*, the capital, is on the main line of the Canadian Pacific Railway. The *Arcole* branch joins the main line here and another branch runs northward to *Prince Albert*. Here are situated the legislative buildings, court house, land and registry offices, headquarters of the Mounted Police, Normal School and Indian Industrial School. It is well supplied with churches, schools and banks, and has recently been made a distributing centre for wholesale houses.

*Moosejaw*, is the northern terminus of the Soo railway which affords direct communication with the United States by way of *St. Paul*. This railway joins the main line of the C. P. R. a few miles east of *Moosejaw*. *Maple Creek*, west of *Moosejaw*, is the most important stock centre in the province.

*Moosomin, Borden, Grenfell, Whitefoot, Wolsley, Indian Head and Qu'Appelle* are the business centres of extensive wheat growing districts along the C. P. R. *Yorkton and Saltcoats* are the leading towns on the north-western branch of the C. P. R. railway. *Gainsboro, Oxbow, and Alameda* are important towns on the south-eastern branch of the C. P. R. which connects with the Soo railway at Estevan.

*Prince Albert*, on the south branch of the Saskatchewan, is the chief town in the centre. It is connected with Regina by the C. P. R. and with Winnipeg by the Canadian Northern railway. *Battleford and Saskatoon* are growing centres.

#### 45 Alberta.

What are the boundaries of Alberta?

Alberta, with an area of 275,000 square miles, is in the third or highest prairie level. The western portion comprises the eastern ranges of the Rocky Mountains and is noted for the grandeur of its scenery. Southern Alberta, a vast undulating prairie plateau, covered with luxuriant grasses, is the country of the great cattle and horse ranches. These grasses are highly nutritious and cure upon the stem. The cattle feed upon them through the winter, the climate being so mild and equable that little if any shelter is needed. Winter rarely sets in till late in December and lasts but ten or twelve weeks, the light snowfalls soon disappearing before the warm chinook winds. The soil is fertile but the rainfall has been too light for farming purposes. The construction of many irrigation canals and ditches is supplying the needed water and much of this great area promises to become a rich farming district.

The surface of Northern Alberta is undulating, wood and prairie alternating irregularly. There are large plains quite free from timber and also great areas heavily wooded. The soil is rich and vegetation luxuriant. This district is well watered and specially adapted for farming with stock raising and dairying as adjuncts. The Rocky Mountains to the west of the Peace River valley are low and so the warm winds from the Pacific reach this district and give it a comparatively mild climate. As a conse-

quence the valley is admirably adapted for stock raising, and indications are that it will prove valuable for general farming.

Alberta is drained by the Saskatchewan River and its branches, and by the Peace and Athabasca rivers of the Mackenzie system.

This province possesses great wealth in its mineral deposits. *Gold* is found in small but paying quantities in the North and South Saskatchewan and in the branches of the Athabasca river. Much of the province seems to be underlain with *coal* which is mined on a large scale at Lethbridge, Anthracite, Canmore and Edmonton. On the Athabasca are large *petroleum* deposits. Large quantities of valuable *furs* are obtained by the Hudson's Bay Company and other traders from northern Alberta and Mac-

kenzie. *Fish and wild fowl* abound in the streams and lakes, and *grouse* on the plains.

**CITIES AND TOWNS.**—*Edmonton* on the North Saskatchewan is the capital. It is the terminus of the Calgary and Edmonton branch of the C. P. R. and the headquarters of the trade with the Mackenzie Basin. It is one of the oldest Hudson Bay posts and a prosperous city.

*Calgary*, the largest city in Alberta, is situated at the confluence of the Bow and Elbow rivers. It is connected by branch railway lines with Macleod and Edmonton. It is the

centre of the trade of the great ranching country, the chief source of supply for the mining districts in the mountains beyond, and an important station of the Mounted Police.

*Medicine Hat*, an important town in the ranching district, is situated on the south branch of the Saskatchewan. It has natural gas wells, a fine general hospital and a good waterworks system.

*Lethbridge* is an important mining centre, most of Southern Alberta being supplied with soft coal from this source. Extensive irrigation works near Lethbridge have made a large area of excellent land available for settlement. At *Raymond* a large beet sugar factory has been erected.

*Macleod*, an important town in the ranching district and a Mounted Police station, is situated on the Crow's Nest Pass Railway at its junction with the Calgary and Edmonton Road.

From *Dunmore* on the C. P. R., the Crow's Nest Pass Railway runs west past Lethbridge and Macleod to the Kootenay.

*Banff*, in the Canadian National Park in the Rockies, is noted for its mineral springs and as a health resort.



Horse Ranch, Elbow River, Near Calgary.

*Strathcona, Wetaskiwin, Red Deer and Innisfail* are the centres of stock, dairying, and grain districts on the Calgary and Edmonton branch of the C. P. R.

#### ORAL AND WRITTEN EXERCISES.

Compare the climate of each of these provinces with that of Ontario in rainfall and temperature. What is the leading industry of each province? Why? Where are the minerals to be found? Where is coal mined in these provinces? By what great rivers is the drainage of these provinces conveyed to the sea?

#### 46. Mackenzie District.

This immense district is part of that great interior plain which slopes gradually northward to the Arctic. Its southern boundary is the parallel of 60° north latitude and its western boundary the Yukon Territory. The greater part of this district is covered with forest. The rivers and lakes teem with fish but



A Fur Trading Post in Winter.

this source of wealth has not yet been utilized. Cariboo, deer and musk oxen roam about the eastern part in immense numbers.

The main feature of this district is the Mackenzie River, 2,000 miles long, and its system of great inland lakes second only to the lakes of the St. Lawrence system. Beyond Great Slave Lake it is from one-half to four miles in width and is navigable for over 1,000 miles from its mouth. It flows through a level alluvial plain more or less broken by the foothills of the Rockies. Owing to the climate the balsam poplar grows to a large size in the islands in the river and its delta.

In the eastern portion of this district and in the northern part of Keewatin lies an extensive tract called "The Barren Lands"—a vast, level, treeless waste of rock and swamp. The long winters are

very severe and the short summers hardly endurable because of myriads of flies and mosquitos.

The inhabitants of Mackenzie are mainly Indians who are engaged in hunting and fishing, and live in settlements near the Hudson Bay Company's trading posts.

Its affairs are looked after by the Lieutenant-Governor of Alberta aided by a Council.

47. UNGAVA comprises that part of the Labrador Peninsula lying north of Quebec and west of that narrow strip along the Atlantic coast which is called Labrador, and is under the jurisdiction of Newfoundland. It is a plateau, highest near the centre of the southern boundary and watered by many streams and lakes. The southern part is covered with forest, mostly of pine, spruce and poplar trees, while in the north little but mosses and lichens grow owing to the severity of the climate.

The inhabitants are few and consist entirely of roaming Indians and Eskimos who live along the coast and subsist by fishing and hunting.

FRANKLIN includes the islands and peninsulas lying to the north of the continent. The climate is less severe than that of the neighbouring mainland. The musk ox and reindeer are found on the islands and, in the seas, the walrus, seal, and whale. The Eskimos (see page 34) are the only inhabitants.

#### ORAL AND WRITTEN EXERCISES.

In what province is Regina situated? Which of the western provinces is best for farming? Compare Alberta and Manitoba as farming districts. Why does snow disappear so rapidly under the Chinook winds? Which of these provinces and districts contain the largest lakes? Which contain large forest areas? Which contain large prairie regions? In which do Eskimos live? In which is coal found? In which is petroleum found? In which are the fisheries valuable? Where are the Barren Lands? What kind of people are the Eskimos? What is the chief business of the Hudson's Bay Company? What was the chief route to and from England?

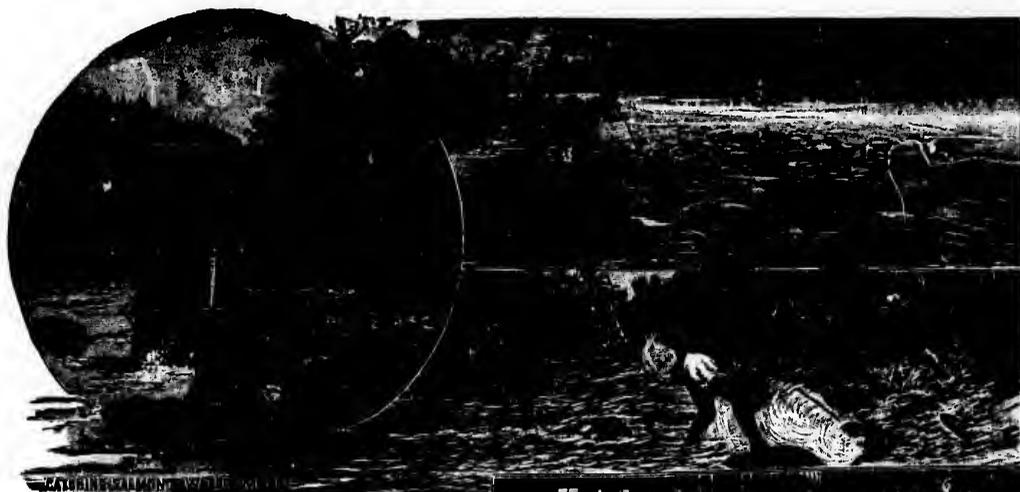
### BRITISH COLUMBIA.

#### 48. Relief, etc.

For a general description of the surface of British Columbia see Canada page 62.

*British Columbia*, including Vancouver Island, is bounded on the north by parallel 60°; on the east by the 120th meridian and the Rocky Mountains; on the south by the 49th parallel, the Gulf of Georgia, and Juan de Fuca Strait; on the west by the Pacific Ocean and part of Alaska.

Outside the Coast Range there described and in a



partly submerged condition lies another range of which Vancouver Island and the Queen Charlotte Islands are projecting ridges. The valley between this outlying range of the Cordilleras and the Coast Range constitutes the Gulf of Georgia.

The interior plateau terminates southward near the international boundary by the meeting of some rather irregular mountains and again to the northward in a similar running together of mountain ranges. Farther northward, the whole width of British Columbia, although very imperfectly explored as yet, appears to be mountainous to within a short distance of the northern boundary.



A Fiord.

A peculiar feature of British Columbia is the number of deep, narrow inlets, bordered by high

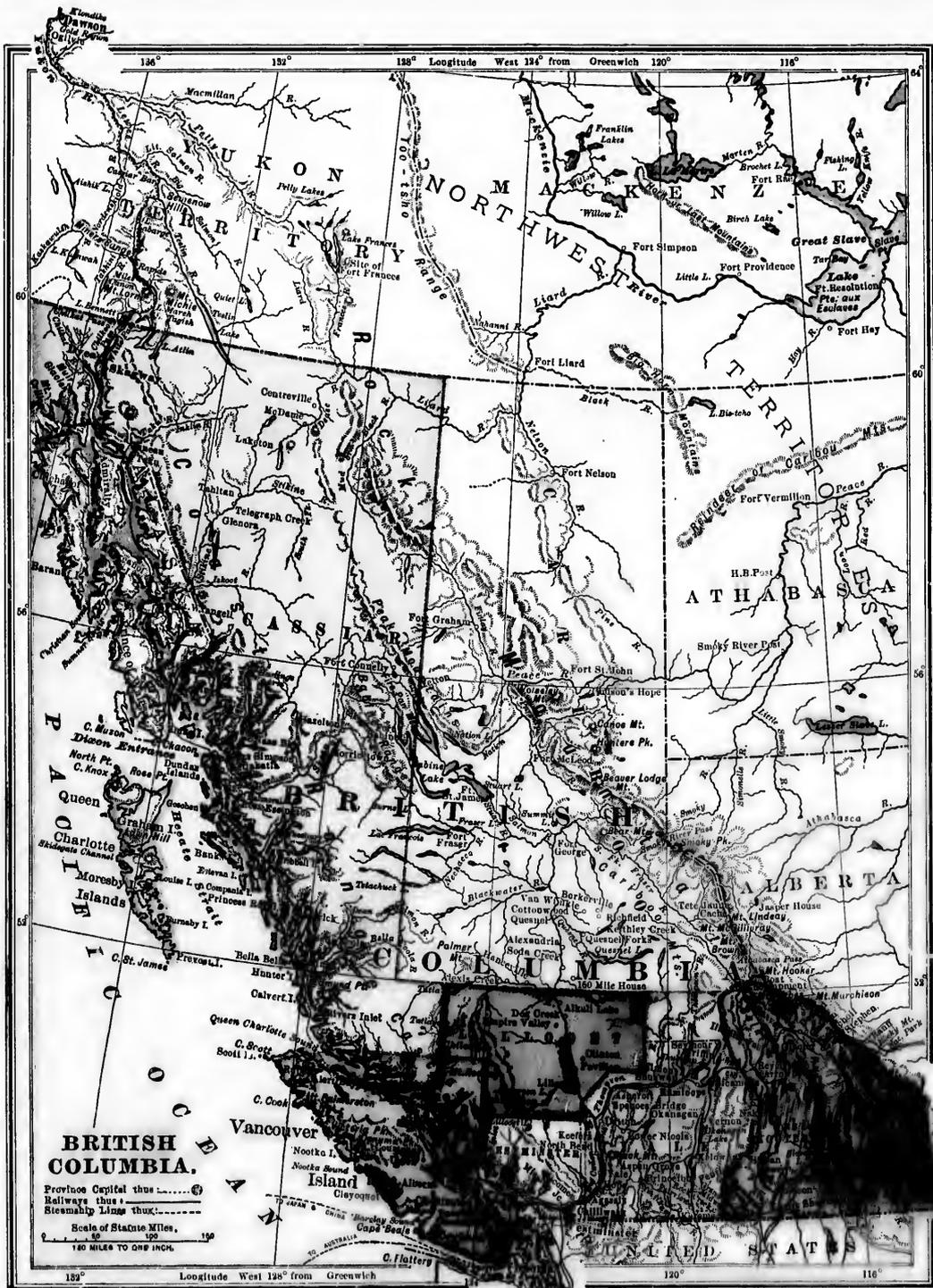


Catching and Canning Salmon.

perpendicular walls of rock. These *fiords*, as they are called, indicate that the country once stood at a higher level than at present, and the old river valleys are now submerged below the level of the ocean.

In the southern part of the province, immediately west of the Rocky Mountains, is a valley of remarkable length and regularity. To the west of this valley is the Purcell Range and farther north the Selkirk Range. This valley is over 700 miles in length. West of the Purcell and Selkirk ranges is the Gold Range. Geologists say that these ranges along with their extension on the north—the Cariboo Mountains—are the oldest of all the ranges in the Cordilleras.

**DRAINAGE.**—All the great rivers of North America west of the Rocky Mountains, except the *Colorado*, rise in British Columbia; the *Peace River* also traverses this province for 300 miles before it crosses the Rockies by a low pass to join the Mackenzie system. The *Liard*, another branch of the Mackenzie River, rises in British Columbia and flows for over 300 miles in this province. The *Stikine River* rises in the north of the province, and passing across the narrow strip of Alaska, empties into the Pacific near Fort Wrangel. The *Skeena* farther south empties into the Pacific. These rivers



are both navigable for a considerable distance from their mouths. The chief tributary of the Fraser is the *Thompson River*, along which the Canadian Pacific Railway runs for a considerable distance.

The lakes of British Columbia are innumerable, and of true mountain character,—long, narrow, often also very irregular in outline, and frequently very deep. *Upper and Lower Arrow Lakes*, expansions of the Columbia; *Kootenay Lake*, receiving the Kootenay River and emptying into the Columbia; *Okanagan*, discharging by a river of the same name into the Columbia; *Quesnelle Lake*, emptying into the Fraser River, are the principal.

**ISLANDS.**—The islands of British Columbia are very numerous and are disposed chiefly in two groups; the more southerly, of which Vancouver is the principal, being separated from the mainland by *Juan de Fuca Strait*, the *Gulf of Georgia*, and *Queen Charlotte Sound*; and the other, called the *Queen Charlotte Islands*, about 200 miles to the north-west, being separated from the mainland by *Hecate Strait*. The latter islands are rugged, deeply indented on the coast, covered with a dense forest growth of spruce, hemlock, and yellow cedar; they have a very equable climate, snow falling on the hills but rarely in the valleys; winter is a season of almost continuous rain and wind.

**COAST WATERS.**—Besides the straits mentioned above there are numerous deep indentations of the coast. The principal are *Burrard Inlet*, *Howe Sound*, *Jervis*, *Bute*, and *Knight Inlets* on the mainland; and the harbors of *Esquimalt*, *Victoria*, and *Nanaimo* in the south and east of Vancouver Island.

**CLIMATE.**—The climate of Vancouver Island varies considerably according to the physical features of the country. Along the western coast of the island the rainfall is very great, generally exceeding one hundred inches in a year. It is much less on the eastern side of the island, owing to the height of the range running through the interior. The annual mean temperature is like that of parts of England. From May to September, however, is usually a comparatively dry period, while copious rains fall between October and March.

On the mainland the summer is warm, with a winter increasing in severity with higher altitude. The rainfall of the Lower Fraser Valley is about 67 inches per year; the lowest temperature was 13° below zero and the highest was 97°

On the east of the coast ranges the climate changes. The westerly winds from the Pacific lose

much of their moisture on the western side of these ranges, and eastward from them to the Gold and Selkirk ranges. The rainfall and snowfall are nowhere great, and at some places they are very scanty. Extremely low temperatures occur here in winter and decidedly high temperatures are frequent in summer. The Chinook winds are very noticeable in these regions; the moisture-laden air from the ocean is deprived of much of its moisture in passing across the coast ranges and is heated as it descends the eastern slopes, and is thus rendered more capable of absorbing moisture and less capable of giving rain.

The rainfall and snowfall on the north-west coast of the mainland is very great, amounting in the year to over one hundred inches.

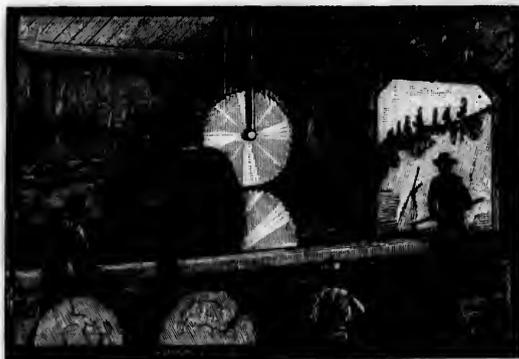
#### 49. Subdivisions, etc.

British Columbia is divided into political divisions or districts: *Kootenay*, *Yale*, *Lilloet*, *Westminster*, *Cariboo*, *Cassiar*, *Comox*, *Vancouver Island* (subdivided into several districts).

For judicial purposes the more thickly populated part of the province is divided into seven counties: *Victoria*, *New Westminster*, *Yale*, *Cariboo*, *Kootenay*, *Nanaimo*, *Vancouver*.

In these counties a number of smaller municipalities or *townships* have been formed for the management of their own local affairs as is done in Ontario. There are also a number of *urban municipalities* or *cities*.

**PRODUCTS.**—British Columbia now possesses the



Sawing Douglas Pine.

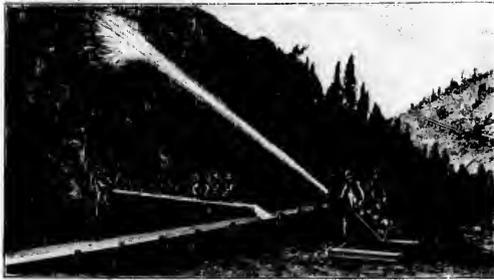
largest compact area of merchantable timber on the North American continent. On the coast and among the islands, immense trees of the *Douglas fir* grow, some of them being 300 feet in height. *Cedar*,

hemlock and spruce also abound. All the valleys of the Gold and Selkirk ranges are filled with cedar and spruce and the slopes are covered with Douglas fir and hemlock. The interior plateau, owing to the small rainfall, has few trees except in the river valleys.

West of the Coast Range, roots and vegetables flourish; the softer grains, such as roots and barley yield largely and grow to perfection; grasses are abundant; fruits, such as pears, cherries, plums and all small fruits yield enormously; and flowers, especially roses, bloom profusely.

In the interior, owing to the dryness of the climate and the altitude, it is mainly in the river valleys that the ordinary grains, fruits, and vegetables of Ontario can be grown with much success.

**INDUSTRIES.**—The leading industry of British Columbia is *mining*, about one-third of the total value of minerals produced in Canada being yielded



Hydraulic Mining.

by this province. *Gold* is found in large quantities in *Kootenay*, *Cariboo* and *Cassiar* districts. In *Kootenay* it is found in the quartz rock mixed with other metals. The rock is crushed by machinery and then mixed with coal or other fuel in a smelter. The metals run together in a mass called *matte*, which is sent to *refineries* to be separated or *refined*. Copper generally accompanies the gold. In *Cariboo* and *Cassiar* the gold is mostly *placer* gold, or small particles of gold found in greater or less quantities in the gravel and sand of river beds.

*Silver* and *lead*, also found together, are mined in very large quantities in the *Kootenay* district.

British Columbia is very rich in *coal*. At present the *Nanaimo* region on *Vancouver Island* is the most important in production. There are immense deposits of coal in *East Kootenay*, which will prove of great value to the smelters in both *East* and *West Kootenay* now that the *Crow Nest Pass Railway* is completed through that region.

The next industry in importance are the *fisheries*. All the gulfs, bays, rivers, and lakes teem with fish. Chief among these is the salmon for which the *Fraser* is famous. On this river especially, and along the coast, canning establishments are located which give employment to a considerable part of the population. Other varieties of fish,—oolakan, or candle fish, herring, cod, bass, flounder, halibut, and sturgeon abound. Great numbers of seals are caught off the coast. Still more are caught in *Behring Sea* and in waters around *Japan* by vessels owned in *British Columbia*.

*Lumbering*, the next most important industry, though capable of great development, is in its infancy; considerable quantities of timber, as logs and masts, are exported to *Great Britain* and various other European countries, *Australia*, *South America*, and *South Africa*.

*Agriculture*, owing to the rugged and mountainous character of the country, is not a very important industry. The principal agricultural regions are the *New Westminster* district, the river valleys of the interior, and *Queen Charlotte Islands*. In the first, as well as in *Vancouver Islands*, fruits grow to perfection. The valleys are covered with tall grass, and afford excellent ranges for cattle. In some



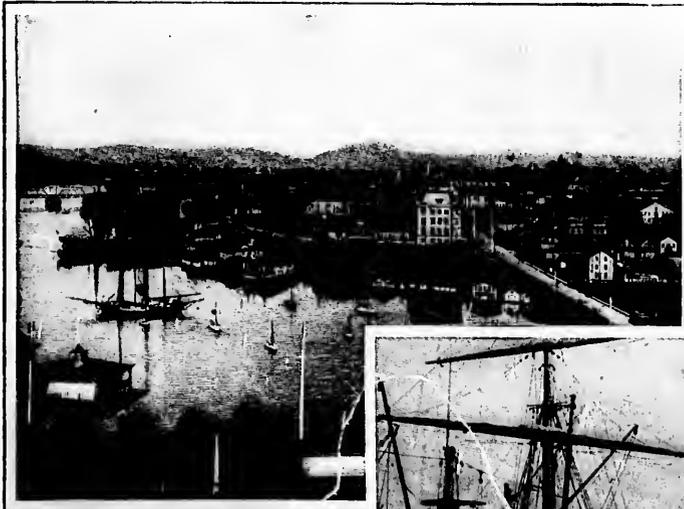
Indian Encampment, Rocky Mountains.

parts of the southern interior, irrigation is necessary.

There is but little *manufacturing*, except that connected with the canning of fish and the preparation of lumber.

**INHABITANTS.**—The population is of a mixed character, as in the other provinces; but there is also a large number of Chinese. The Indians are numerous, but of a more peaceful and industrious

A branch of the Canadian Pacific Railway from Lethbridge in Alberta passes through the Crow's Nest Pass into British Columbia, and terminates at Kootenay Landing on Kootenay Lake. From Revelstoke on the main line a short branch extends southward to Arrowhead on Upper Arrow Lake. From this point steamers give connection with many important points in Southern Kootenay.



City of Victoria.

character than those of the east. The Coast Indians, many of whom are in the employ of the canning establishments, live almost entirely on fish. They live in independent village communities, neighboring villages often differing in dialect and customs.

**COMMERCIAL ROUTES.**—The *Canadian Pacific Railway* enters British Columbia through the Wicking Horse Pass; passes the Selkirk and Gold ranges, and passes along the Thompson and Fraser rivers to Vancouver, near the entrance to Burrard Inlet.

The *Esquimalt and Nanaimo Railway* connects Victoria with the coal mines at Nanaimo.

There are a number of short lines joining points in Kootenay with each other or with the cities south of the border. The navigable stretches on the Columbia River and the Kootenay Lake and River are also used to a great extent by steamers.

## 50. Cities and Towns.

**VICTORIA**, the capital, occupies a commanding commercial position at the south-eastern extremity of Vancouver Island. It has a delightful climate. Its shipping trade is very extensive, one of the largest in tonnage in the Dominion. It has flour, feed, and rice mills, foundries and machine shops, furniture and biscuit



Docks at Vancouver.

factories, etc. It is a port of call for the China and Australasian steamships, and has direct communication with San Francisco, Puget Sound ports, and all points on the coast as far as Alaska. The Provincial Parliament Buildings situated here are very fine.

**VANCOUVER**, on Burrard Inlet, one of the finest natural harbors in the world, is the Pacific terminus of the Canadian Pacific Railway. It is the centre of the lumber trade of British Columbia, and the

shipping port of the Australian and Oriental steamers running in connection with the C.P.R. It has connection by steamer with Victoria, San Francisco, Puget Sound, and Alaska ports. Its industries are lumbering, sugar refining, iron works, etc.

NEW WESTMINSTER, the former capital of British Columbia, is situated on the north bank of the Fraser River, about 16 miles from its mouth. It is connected with Vancouver, about 12 miles distant, by a branch of the C.P.R. and by an electric railway. The Provincial Gaol, the Provincial Asylum for the Insane, and the Dominion Penitentiary are located here. There are several large saw-mills, iron foundries, carriage and furniture factories, and other industries.

ROSSLAND, situated about seven miles west of the Columbia River and eight miles north of the international boundary, derives its importance from the immense deposits of iron and copper ore carrying gold found in the hills surrounding it. It is connected with Trail on the Columbia River by a short railway and with the cities south of the boundary by another. From the falls on the Kootenay River is produced on a large scale electricity which will be utilized in operating and lighting the mines of this region. Rossland, notwithstanding its rapid growth, is well provided with the comforts and facilities found in eastern cities.

NELSON, on the west arm of Kootenay Lake, is the western terminus of the Crow's Nest Pass branch of the C.P.R. It is connected with Robson on the Columbia River by the Columbia and Kootenay Railway and with Spokane in the United States by another railway. There are valuable gold and silver mines in the vicinity and also a smelter.



Interior of a Gold Mine.

KASLO, on the west side of Lake Kootenay, is the central distributing point for the rich silver mines of the Sloean district.

KAMLOOPS is charmingly located at the junction of the North and South Thompson rivers, on the main line of the C.P.R. In the neighborhood of Kamloops are extensive cattle ranges. This city has a delightful climate, there being very little wet

weather. The remarkable salubrity of the climate has made Kamloops a favorite health resort.

NANAIMO, on the east coast of Vancouver Island, derives its importance from the vast deposits of bituminous coal in the vicinity. Nanaimo is connected with Victoria, seventy-eight miles distant, by the Esquimalt & Nanaimo Railway and by



A Pack Train.

steamers with Vancouver, thirty-five miles distant, across the Gulf of Georgia. Large quantities of coal are exported to San Francisco.

WELLINGTON, six miles north of Nanaimo, is the terminus of the Esquimalt & Nanaimo Railway. It also has valuable coal mines in the vicinity.

ESQUIMALT, three miles from Victoria, is the British Naval Station on the Pacific Coast, and possesses a magnificent harbor. It is a quaint old village and is one of the points for sightseers visiting Victoria.

REVELSTOKE is on the Columbia River, where it is crossed by the Canadian Pacific Railway. A branch line runs to Arrowhead, where steamers give connection with the rich mines of South Kootenay. It is also surrounded by rich mineral fields.

GOLDEN is situated on the Upper Columbia River at its junction with the Kicking Horse River. Lumbering is carried on here to a considerable extent and there are several gold mines in the vicinity. Agriculture is pursued in the Columbia Valley, special attention being given by the settlers to the raising of horses and cattle.

#### ORAL AND WRITTEN EXERCISES.

Name the minor ranges between the Rocky Mountains and the Coast Range. What two passes of the Rocky Mountains does the C.P.R. traverse? What great difference exists between the climate west of the Coast Range and that east of the same range? Account for the difference. Name the five leading minerals of British Columbia. Where is gold found alone? With what other metal is it frequently found? Where is coal found? What is the principal manufacture of British Columbia? How would a person go from Vancouver to Rossland? How, from Winnipeg to Rossland?

## YUKON TERRITORY, ETC.

## 51. Relief, etc.

Yukon Territory is bounded on the north by the Arctic Ocean, on the west by Alaska, on the south by British Columbia and Alaska, and on the east by Mackenzie District.

This region is a continuation northward of the Cordillera of Western Canada. The eastern boundary of Yukon Territory lies on the crest of the main ridge of the Rocky Mountains. The Coast Range continues northward through this territory and Alaska, both ranges preserving a course nearly parallel with the coast. Between these ranges in the south of the territory is a mountainous region similar to that of Northern British Columbia. This region decreases gradually in altitude towards the north and widens out into a low plain at the Arctic Ocean. In the south-western part of the territory are a few very high peaks of the Coast Range: Mt. Vancouver, 15,700; Mt. St. Elias, 18,000; Mt. Logan, 19,500 feet high.

**DRAINAGE.**—Nearly the whole of this territory is drained by the *Yukon River* and its tributaries, the *Lewis* and *Pelly Rivers*.

With the exception of one break these rivers form a connected system of waters navigable for light stern-wheel steamers, making travel throughout a large portion of the territory comparatively easy.

The recent discovery of rich deposits of gold in the Klondike district has given this territory a world-wide fame. The gold is found in the beds of rivers and creeks covered with soil and decayed vegetable matter sometimes to the depth of twenty feet. During the winter the miner digs a shaft down to the gold-bearing stratum which lies just above the hard rock called *bed rock*. As the ground is frozen he has to make a fire of wood in his shaft to thaw out the frozen ground. The dirt is then cleared out and fire again used. He proceeds thus, until, at last, he has reached the layer where he expects to find gold. If he is successful in this, he enlarges the hole at the bottom, using fire again, and removes the *pay dirt* as it is called to the surface. He works away in this manner till the spring rain fills up his hole and then he washes out the gold from his heap

of pay dirt. Enormous amounts of gold have been obtained by a few of the more lucky miners.

In consequence, there has been a great influx of population into the territory and particularly into the *Klondike district*. This includes the region drained by the Klondike river, a small branch of the Yukon, and its tributaries on which the greatest deposits of the precious metal have been found.

**DAWSON CITY**, the capital of the territory, is situated on a flat of the Yukon River just below the mouth of the Klondike River. It has grown in a year or two to be a city of over ten thousand people. It is connected by a telegraph line with Skagway on the coast.

The only industry, apart from that of the fur trade, is *gold mining* as described above. There is plenty of coal in the territory. Copper, lead, and silver have also been found; but the extent of the deposits of these metals is unknown at present.

Timber is plentiful along all the streams; but not large enough for other purposes than fire wood. For this purpose, however, it is of very great value to the gold miner, as we have seen.

**ROUTES.**—The chief routes to the Yukon Territory are the long river route by way of the *Yukon River*, entering that river at its mouth and proceeding by tedious river navigation up that river for over 1600 miles through Alaska into Yukon Territory to its capital, Dawson City; the *White Pass Route*, by steamer to Skagway at the head of the Lynn Canal, a deep inlet into the coast of Alaska, thence overland by railway through the *White Pass* of the Coast Range to Lake Bennett, a source of one of the branches of the Yukon river, thence by river steamers to Dawson City; the *Chilkoot Route*, by steamer to *Dyea*, a short distance north-west of Skagway, thence overland by trail through Chilkoot Pass to an arm of Lake Bennett, and thence to Dawson City.

## KEEWATIN DISTRICT.

Keewatin is bounded on the north by Franklin District, on the east by Hudson Bay and James Bay, on the south by Ontario, on the west by the province



Gold-washing.



Prospectors' Camp.

of Manitoba, the province of Saskatchewan, and the district of Mackenzie.

It consists largely of part of the Laurentian plateau, and is drained by the rivers Nelson, Churchill, Severn, &c.

It is sparsely inhabited by Indians and Esquimaux. Their principal occupation is hunting and fishing.

*York Fort*, at the mouth of the Nelson river, has for over two hundred years been the chief trading post of the Hudson Bay Company. To this port every summer came the Company's vessels with supplies for their trading posts scattered over Northern Canada, and from this port they departed laden with the furs sent down the rivers in canoes and boats from these posts. Now, however, a good deal of this business is done by way of Montreal along the C.P.R. *Fort Churchill*, at the mouth of the Churchill, and *Norway House*, where the Nelson River leaves Lake Winnipeg, are important trading posts.

Keewatin is under the Lieutenant-Governor of Manitoba.

#### FRANKLIN.

The islands on the north, together with the two peninsulas of Boothia and Melville, constitute the District of Franklin, of which little is known. It is under the direct control of the Dominion Government.

#### ORAL AND WRITTEN EXERCISES.

What is the difference between a territory and a province? Between a district and a territory? What district of Canada is under the direct control of the Canadian Government? What parts of Canada are in the North-West Territories? Describe the easiest route from Vancouver to Dawson in Yukon Territory. In what parts of Canada is gold found? Coal?

## NEWFOUNDLAND.

### 52. Relief, etc.

What water separates Newfoundland from the mainland? This island is the nearest part of North America to Europe—the distance from the eastern point to Ireland, being only 1640 miles. What is the extreme eastern point? The extreme northern point? The south-western point?

This island is the north-eastern extension of the Appalachian system of mountains, the valley between it and the rest of the system to the south-west, being below the sea-level. It is crossed by several low ranges of hills whose general direction is nearly parallel to the other members of the system. The chief of these ranges is the Long Range, extending from Cape Ray to Cape Bauld.

**DRAINAGE.**—Newfoundland has numerous rivers flowing in the valleys between the ridges of hills. The *Exploits River* is the largest. It rises in the south-west of the island near the sea and runs north-easterly to the Bay of Exploits, two hundred miles distant. It has several falls and receives the water of several lakes, the principal being the *Red Indian Lake*. Another river is the *Humber*, which empties *Grand Lake*.

Lakes are very numerous, one-third of the entire surface of the island being covered with lakes—large and small.

**COAST WATERS.**—The inlets of the sea are numerous and important; they stretch very far into the land; and are the feeding place of untold multitudes of the most valuable of the food fishes: cod, herring, salmon, and lobsters.

Placentia Bay on the south is noted for its splendid fisheries of cod, salmon, and herring. Fortune Bay has also important fisheries. White, Notre Dame, Bonavista, Trinity, and Conception bays on the east are large and important. St. George Bay and Bay of Islands are the most important on the west.

**PENINSULAS AND ISLANDS.**—There are numerous peninsulas, the two most important being *Avalon* on the south and the *Northern* on the north. There are numerous islands, but they are not important. Find the islands of *St. Pierre* and *Miquelon* on the map. They belong to France and carry on an extensive trade with Canada and Newfoundland, being very valuable as fishing stations for French fishermen on the banks.

**CLIMATE.**—Newfoundland, being surrounded by water, has an *insular* climate. The water around it prevents the temperature from rising as high in summer or falling as low in winter as in the interior

of the continent. The air is full of moisture also, and on that account the cold is more keenly felt than a more intense cold in the drier air of central Canada. It is colder on the east than on the west, on account of the chilling effect of the Arctic current, which passes near the eastern coast. The rainfall and snowfall are large but not excessive. Fogs are very prevalent on the coast, but much more so on the ocean to the east of the island. These fogs are

**INDUSTRIES.**—The great industry of the island is the fisheries, the most important of these being the *cod-fishery*. Newfoundland leads the world in the catch of cod-fish. These are caught with hook and line in the waters near the shore in open boats, or on the Labrador coast which belongs to Newfoundland. Of late years fishermen of the island resort to the *Banks* along with Americans, Frenchmen, and Nova Scotians.

The Banks of Newfoundland are elevated plateaus of the ocean-bed rising far above the level of the bottom of the Atlantic. They are about 100 miles from the shore of Newfoundland, and are more than 600 miles long and 200 miles broad. The water on them varies in depth from fifty to six hundred feet, and forms the favorite feeding ground of the cod-fish.

What ocean current from the north passes near Newfoundland? The icy waters of this current abound with minute forms of life



Cod-fishing.

caused by the cold waters of the Arctic current meeting the warm waters of the Gulf Stream.

The northern trees—*pine, spruce, tamarack, birch*, and others—are found, often in dense forests along the rivers and lakes. Wild flowers and plants are like those of southern Quebec and Ontario; grasses grow abundantly; all the garden vegetables thrive well. *Barley* and *oats* do well everywhere, but wheat does not thrive in the east or south.

**ANIMALS.**—*Wild fowl* of all kinds are plentiful. The *caribou*, or *reindeer*, are very numerous; reptiles and poisonous animals are unknown.

**MINERALS.**—Newfoundland is fairly rich in minerals. *Copper* is extensively mined. *Lead* ore containing a small amount of silver occurs in large quantities. *Iron ore* is abundant. Bell Island on Conception Bay is a mass of iron ore of the best quality.

Immense quantities of *gypsum* occur in the neighborhood of St. George Bay. *Coal* also in large quantities is found in the St. George Bay region and in the south-west of the island. A very good quality of *asbestos* has been found on the peninsula of Port à Port on the west of the island. *Petroleum* has been found in small quantities.



Drying Codfish.

constituting in many places a vast ocean of living slime mostly of brown or green color. Among this slime are found swarms of minute shell fish which live on the slime. These shell-fish in turn become the food of millions of small fish such as caplin and herring, and on these caplin and herring the cod feed in immense numbers.

The *seal fishery* is next in importance. The fishing grounds for seal are off the coast of Labrador, off north-eastern Newfoundland, and in the Gulf of

St. Lawrence. The young seals are born on the floating ice about the middle of February, and are in good condition by the middle of March; they take to the water about the first of April. Before this they are easily slaughtered with clubs by the crews of the vessels hunting them. Seal fishing is a rough, dangerous employment; the vessels are sometimes crushed by the ice, or driven by the fierce storms away from the ice fields, and the hunters that are still on the ice, left to perish.

The *herring fishery* is very important. Beside the fish exported, vast numbers are used as bait in the cod-fishery. The foreign fishermen on the banks purchase great quantities of this bait. Fresh bait is better than salt, and so they are compelled to purchase from the Newfoundland fishermen. The chief centres of the herring fishery are Labrador, Bay of Islands, St. George Bay and Fortune Bay.

The Exploits River is the chief centre of the salmon fishery, though the fish are found in all the rivers.

The *lobster fishery* is also of great importance to the island and is increasing in value.

*Agriculture*, until late years, was discouraged by the great fish merchants of England. Outside the peninsula of Avalon very little land is cultivated. There is no reason either on account of the climate or soil why this state of things should continue. It is the opinion of men who are acquainted with the island, that Newfoundland is capable of raising large quantities of potatoes, vegetables, small fruits, oats and barley. On account of the abundance of grass and the short distance from Europe, *cattle* and *sheep-raising* will soon prove to be profitable industries.

The *mining of copper* and *iron* is carried on extensively.

*Manufactures* are few and only domestic, consisting of boots and shoes, some machinery, tobacco, twine, nets, ropes, and leather.

**FRENCH SHORE.**—By different treaties the French have been granted equal rights with British subjects in the fisheries on the western, northern, and north-eastern shores of the island from Cape Ray to Cape St. John. This is known as the *French Shore*. This right has proved, of late years, a great hindrance to the prosperity of Newfoundland, as the French in the exercise of their rights of free access to the shore for drying fish, etc., will not allow the Newfoundlanders to engage in any enterprise, such as mining, etc., which can be pretended by them to be an interference with their rights.

**RAILWAYS, ETC.**—There are more than 500 miles of railway in Newfoundland, nearly all the property of the Government of Newfoundland. A line extends from St. John's across Avalon Peninsula to Placentia. A branch runs around to Harbor Grace and Carbonear. Making connection with these lines is a long line touching the shore of Bonavista Bay, running for some distance up the valley of the Exploits River, and down that of the Humber to Bay of Islands, thence to St. George Bay and thence to Cape Ray. Regular steamers connect Cape Ray with Sydney in Cape Breton.

**GOVERNMENT.**—Newfoundland is a British colony, governed like Canada. It has a governor, appointed by the British sovereign, and a legislature, elected by the people. The narrow strip of Labrador, shown on the map of Canada, is under the control of Newfoundland.

ST. JOHN'S, the capital, is situated on a harbor of the same name, opening to the Atlantic. The entrance is narrow, and between hills six hundred feet high. The harbor—one of the best in the world—is nearly land-locked. A fine graving dock has been built, capable of holding the largest vessels. It is the nearest port in America to Europe. As Ottawa is a "lumber city" so St. John's is a "fish city," almost the sole export being fish. It is connected by railways with other chief points in Avalon Peninsula and also by a circuitous route with the western coast of the island.

*Harbor Grace*, on Conception Bay, is a thriving, active town, with a good deal of trade. *Carbonear* is a little north of Harbor Grace. They are both connected by rail with St. John's.

On what bay is *Heart's Content*? This is a pretty fishing village and is the landing place of five Atlantic cables.

*Bonavista*, at the entrance to Bonavista Bay, *Trillingate*, on Twillingate Island, in Notre Dame Bay, and *Placentia*, on the west of Avalon Peninsula, are important towns.

#### ORAL AND WRITTEN EXERCISES.

What part of Newfoundland would you think best suited for agriculture? What is meant by the French Shore? How does Newfoundland differ from Manitoba in climate? Explain a route passing through Newfoundland which would greatly shorten the ocean voyage from Canada to Europe. What two provinces of Canada are nearest to Newfoundland? What large bay penetrates the north-eastern part of Canada? Why is this bay not used as part of an ocean route to the interior of Canada? What part of the United States lies to the north-west of Canada? What sea lies to the west of Alaska? What industry is pursued in this sea by Canadians? What do the clocks shown on the map of Canada mean? Through how many degrees of longitude does Canada extend?



The Capitol, Washington.

## UNITED STATES.

### 53. Historical, etc.

What peninsula is in the south-eastern part of the United States? What peninsula in Canada just north-east of the United States? What plain extends between these peninsulas? What mountains border this plain on the west?

About the time when the French began to settle in Canada, Englishmen came to live in this plain. They came in parties and settled at different places along the coast. Altogether there were thirteen English *colonies*, or groups of settlements, lying side by side and including nearly all the coast plain between Nova Scotia and Florida.

Soon after the British took Canada from the French, these colonists rebelled against Britain and succeeded in compelling Britain to allow them to govern themselves. Each colony called itself a *state*, and decided to choose its own officers and make its own laws. All the states decided to unite into a nation, which was called the *United States of America*.

In course of time the United States obtained by purchase from France and Spain all the territory west of the Appalachians as far as the Pacific Ocean. This land was gradually settled by the people from the eastern states and from Europe, and when a sufficient number of people were settled in a district it was admitted into the Union as another state, and elected its own officers and made its own state laws. All this western land gradually became settled. There are now forty-five states, and five *territories*, or districts, which have not yet enough people to entitle them to be admitted to the Union as states.

Alaska Territory, on the north-west of Canada,

belongs to the United States. It was purchased some years ago from Russia.

The chief officer of each state is called a *governor*. The chief officer of the United States is chosen by the people every four years and is called a *president*. A government like that of the United States, in which the chief officer is chosen or *elected* by the people, is called a *republic*.

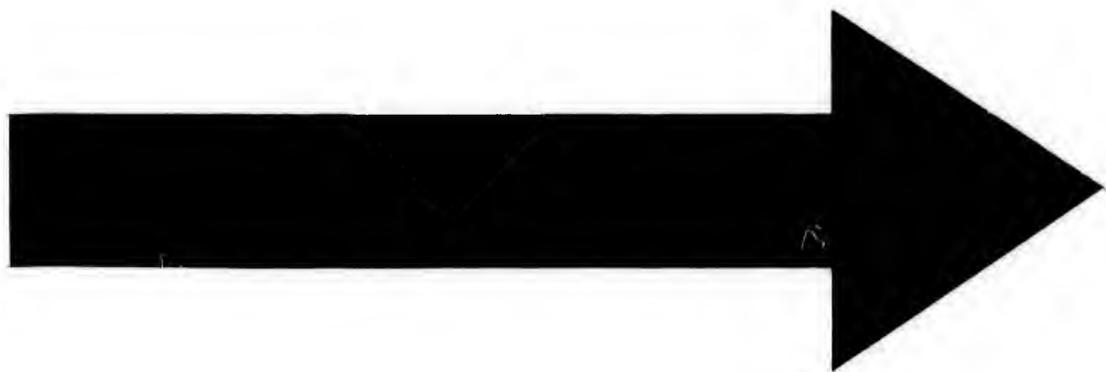
POSITION AND RELIEF.—What country north of the United States? What country to the south? What three bays on the east coast of the United States? What bay on the west coast? What large indentation is on the north-west of the United States?

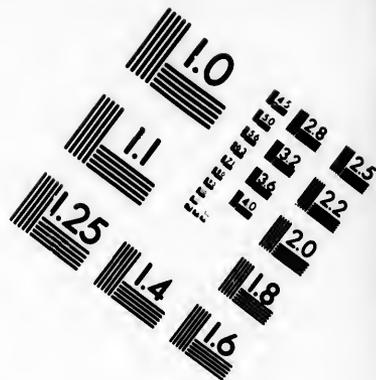
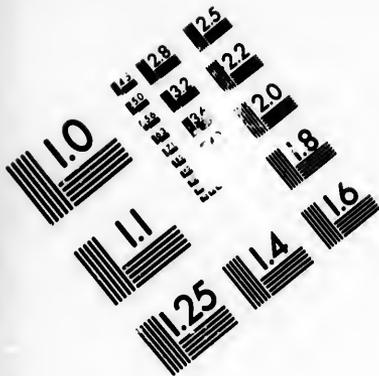
The western highland which forms so prominent a feature in Canada is continued into the United States and occupies nearly the whole of the western half of the country. The eastern half is mostly lowland.

The Appalachian Mountains are higher in the south than in the north. In the states of Pennsylvania, Virginia, and Tennessee, they lie in parallel ridges, with valleys between them. In what direction do these ridges extend?

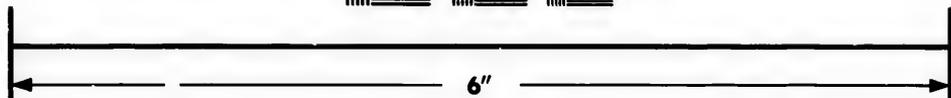
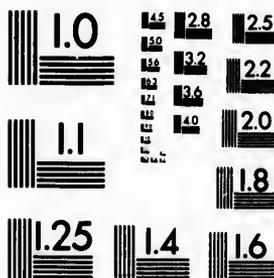
The central plain slopes gently on either side towards the Mississippi River. It slopes also from north to south. How can you tell this from the map? There are forests in the north, east, and south of the central plain, but the western part is treeless, and the central portion consists of open, grassy plains or *prairies*.

The western highland consists of a plateau, enclosed by two mountain chains. What is the name of the eastern? What is the name of the





**IMAGE EVALUATION  
TEST TARGET (MT-3)**



**Photographic  
Sciences  
Corporation**

23 WEST MAIN STREET  
WEBSTER, N.Y. 14500  
(716) 872-4503





21 + 22 days

ERS S



S

is going to be marked

my wife that I have on I can't



The Rocky Mountains.

western? *Sierra* is a Spanish word meaning "saw." Because the tops of many mountains are notched like a saw, the Spaniards call mountain ranges *Sierras*. Spaniards were the first settlers in the western part of the United States.

*Drainage*  
*facilities*

**DRAINAGE.**—The United States is well situated for domestic commerce, or trade within the country. Steamers go from port to port along the sea coast and the shores of the Great Lakes. The central plain is crossed by many deep, broad rivers on which goods can be carried, and the building of railways is easy on its level surface. The Mississippi River system is one of the greatest in the world. Name three western branches of the Mississippi. Measured up the Missouri branch, the Mississippi is the longest river in the world.

What is the eastern branch of the Mississippi? Name its principal branches.

Name the five Great Lakes. To what river system do they belong? What states are partly bordered by the lakes?

Some portions of the central plain are drained by short rivers into the Gulf of Mexico. What states are drained in this way? By what rivers?

What river flows northward into Lake Winnipeg? Where do these waters finally go?

On the map trace the divide between the rivers flowing into the Atlantic and those of the St. Lawrence and Mississippi systems.

In the south the Atlantic rivers rise on the east side of the Appalachian Mountains, but in the north many of them rise west of the mountains and flow across the ranges in narrow gorges, or *water gaps*, cut by running water. What river flows into Ches-

apeake Bay? Into Delaware Bay? These rivers rise west of the mountains, and through the water gaps in the mountains the early settlers went to the plains beyond. These gaps are very useful now, affording easy routes for roads, railways, and canals across the mountains.



Canyon of the Colorado.

Where is the Hudson River? It is the most important of the Atlantic rivers, because its valley is the lowest trade route across the Appalachian Mountains. The Erie canal connects this river with Lake Erie, and railways have been built through the low, narrow valley. Because of this low trade route, and because of the excellent harbor at the mouth of the Hudson, the city at the mouth of that river has grown to be the largest in America. What is the name of that city?

What two rivers flow from the Rocky Mountains into the Pacific Ocean? Which of these rivers flow into the Gulf of California? It is formed by the melting snows of the Rocky Mountains, and is constantly cutting its bed deeper and deeper; but as very little rain falls in that region, very little earth is washed from the sides of its valley. So its valley has become a deep and narrow gorge, or *canyon*,

James Graham

James Graham

through which the river rushes in a succession of falls and rapids. The sides of the canyon are so steep that for many miles a man cannot get down to the river. Is such a river of value to commerce?

The Columbia River is navigable for steamboats, both below and above the rapids where it flows through the Cascade Mountains. What large branch has the Columbia? The Snake River, like the Colorado, flows in a canyon, and for the same reason.

The plateau between the Wasatch Mountains and the Sierra Nevada, and between the Snake and the Colorado basins, is called the *Great Basin*. None of the streams of this region reach the sea. Some of them flow into lakes which have no outlet, and others sink into the hot sands, and dry up. Lakes which have no outlet are generally salt. Why? Name the largest lake in the Great Basin. Its water is so salt that fish cannot live in it.

**ORAL AND WRITTEN EXERCISES.**

How many English colonies were there at one time in the Atlantic coast plain? How many states are there now in the United States? What is the difference between a state and a territory? What lies between the Rocky Mountain highland and the Appalachian highland? Find on the map all the rivers mentioned in this lesson. Where in the United States do we find salt lakes? Why? What caused the formation of the Colorado canyon?

**54. Climate, etc.**

The United States is so wide from north to south that there is a great difference between its northern and southern parts at the same season. For instance, during December, in the north, the ground is covered with snow, and the trees are bare of leaves; while in the south the fields are green and the trees are in full leaf.

In the United States, most of the winds blow from the south and south-west. As in Canada, the winds from the Pacific, which lose their moisture in crossing the ranges near the coast, sweep over the western plateau as comparatively dry winds. They give up a little more moisture when they cross the Rocky Mountains. In consequence, much of the western highland and of the western part of the central plain is so dry that few trees and food plants thrive there. Regions so dry that few or no plants can grow are called *deserts*.

Since the winds generally blow from the south and south-west, where does the rain come from that falls on the eastern half of the United States? Much rain falls along the Gulf coast. Further north, the clouds having dropped part of their

moisture, less rain falls. Still over the whole of the eastern half of the United States sufficient rain falls for the production of splendid crops of wheat, cotton, corn, &c.

**SECTIONS OR DIVISIONS.**—We have seen that the United States may be divided into the moist eastern lowland, the dry western highland, and the moist Pacific region. Farming may be carried on in nearly all parts of the moist eastern lowland, but in the warm southern part, cotton is the chief crop, while in the north wheat and other food plants are the most valuable products. In the extreme north-east the surface is rough, and much of the soil is not fertile, so that farming is of less importance than manufacturing.

Hence we may study the United States in five great sections:—

1. The Northern or food producing Section; 1
2. The North-Eastern Section, where manufacturing is the chief industry; 2
3. The Southern or cotton and tobacco growing Section; 3
4. The Western Plateau Section, noted for grazing and the mining of gold and silver; 4
5. The Pacific Section, or western farming and fruit growing region. 5

There are about as many miles of railway in the United States as in all the rest of the world. In the Northern and North-Eastern Sections there are very few towns that are not on a railway or within easy drive of one. Several railways cross the entire country from the Atlantic to the Pacific.

**55. The Northern Section.**

The states of this section are: New York, New Jersey, Delaware, Pennsylvania, Maryland, Virginia, West Virginia, Ohio, Kentucky, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, Kansas, Nebraska, South Dakota, North Dakota.

Which states of this section border on Canada? On the Great Lakes? On the Atlantic? Which lie west of the Mississippi?

This section is noted for its production of wheat, corn, and other food products. The United States produces more corn and wheat than any other country in the world.

Iowa, Illinois, Kansas, Nebraska, and Missouri are the great corn-producing states. Minnesota, North Dakota, South Dakota, Indiana, Ohio, Illinois, and Missouri all have great wheat crops.

On the grass and corn of this section great numbers of cattle, hogs, and sheep are fattened. In the east,

James Graham

y?  
n-  
ps  
ers  
ese  
rd-  
ys,  
ns.

most  
valley  
chian  
with  
rough  
trade  
at the  
f that  
What  
ntains  
s flow  
by the  
s con-  
but as  
earth  
valley  
anyon.

vegetables and small fruits are grown in enormous quantities and much butter and cheese are made. In fact, along the shores of Delaware and Chesapeake Bays lie thousands of market gardens which supply the great eastern cities with food.

From the hides of the cattle leather is made, and cloth from the wool of sheep. In the north and in the mountains there are forests which supply lumber for building purposes. The iron and coal mines of this section are among the richest in the world. *Coal* is obtained chiefly in Pennsylvania and Ohio, *iron* in Pennsylvania and Michigan. In northern Michigan are some of the richest *copper* mines in the world. The oil wells of Pennsylvania produce nearly half of the *petroleum* used in the world. Lines of iron pipe convey the oil from the wells to the large cities where it is refined. *Salt* is obtained in Michigan and New York.

On account of the immense supplies of iron and coal in this section, large quantities of useful articles are manufactured from the products of the farm, forest, and mine.

**CITIES.**—*New York* city, mainly on Manhattan Island, has a fine harbor. Most of the foreign trade of the United States passes through this port. *New York* has more people, more manufactures, and greater wealth than any other city on the continent. The present city of Greater *New York* includes *Brooklyn* on Long Island and several smaller cities, and is



**Brooklyn Bridge.**

altogether one of the largest cities in the world. An immense suspension bridge connects *Brooklyn* with *Manhattan Island*.

*Buffalo*, in western *New York*, is one of the chief ports on *Lake Erie*. It is situated at the western end of the *Erie canal*, through which immense quantities of grain and lumber are sent to *New York*.

*Cleveland*, on *Lake Erie*, is a great *iron* and *steel* manufacturing city, and has great *oil refineries*.

*Detroit*, in *Michigan*, on the *Detroit River*. Much machinery

and other iron ware are made in *Detroit*. Great ferries carrying trains of cars ply across the river between this city and *Windsor* in *Canada*.

Where is *Chicago*? It is a great railway centre and is the



**Stock Yards, Chicago.**

greatest meat-packing city in the world. Next to *New York*, it is the largest city in *America*. It has also great manufactures of *iron* and *furniture*. Here also immense quantities of grain are collected in elevators and transferred to vessels which carry it down the *Great Lakes* on its way to *Europe*.

Find *Minneapolis*. It is at a waterfall on the *Mississippi River*. Here are the largest flour mills in the world.

*Duluth*, at the western end of *Lake Superior*, ships wheat, lumber, and *iron ore* down the lakes.

*St. Louis*, on the *Mississippi River*, near the mouth of the *Missouri*, is a great commercial and flour milling centre. In what state is it?

*Cincinnati* is the largest city in the *Ohio basin*. A great deal of clothing and leather is made there. Extensive pork packing is carried on.

*Pittsburg* is in the *Pennsylvania coal* and *iron* region, and is one of the chief centres of the *iron* and *steel* industry.

*Philadelphia*, at the head of *Chesapeake Bay*, is a seaport and a great coal market. It is the third city in size and manufactures in the *United States*. The chief manufactures are carpets and woollen goods, cotton goods, machinery, and leather. The *Declaration of Independence* was made in this city *July 4, 1776*.

*Baltimore*, on the west coast of *Chesapeake Bay*, ships much grain, meat, *petroleum*, and coal. It is the depot for the important oyster fisheries of *Chesapeake Bay*. Its chief manufactures are clothing, canned fruits, vegetables, oysters, and tobacco.

*Washington*, in the *District of Columbia*, is the capital of the *United States* and the most beautiful city of the *Union*. The *Capitol*, or the building in which the laws are made for the *United States*, and the *White House*, or the residence of the *President*, are situated here.

#### ORAL AND WRITTEN EXERCISES.

Name the sections into which the *United States* may be divided. In which one is the rainfall very small? Name the

chief products of the Northern Section. Where is corn produced? Where is coal found? In what state is each of the cities described in this lesson? Which are on the Atlantic coast? Which on the Mississippi? Which on the Great Lakes?

### 56. The North-Eastern Section.

Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut.

These six north-eastern states of the Union are called the New England states. Being so near the coast they are cooler in summer and have more snow in winter than many of the northern states farther inland.

The surface of this section is rough and rocky and not suitable for farming, except in the river valleys. The northern part is covered with forests, but southern New England forms part of the great manufacturing region of the country.

The streams afford abundant water near the coast, where there are many good harbors. To these, ships bring coal and iron from Pennsylvania, cotton from the southern states, rubber and hides from South America, wool from Australia, and other raw materials.

In no part of the world is there a greater variety of manufactures than in New England, but by far the most important are those of cotton and woollen cloth, and of boots and shoes. Paper is another great manufacture of this section.

**CITIES.**—*Boston* is the largest city in New England, and one of the great seaports and manufacturing cities of the country. It is the centre of the wool trade and is a great market for fish, especially for cod fish caught on the banks of Newfoundland.

*Fall River*, *Lowell*, *Manchester*, and *New Bedford* are the centres of the cotton weaving industry.

*Providence* is a great centre of woollen manufacture.

*Worcester*, *New Haven*, and *Hartford* manufacture sewing machines, clocks, watches, bicycles, firearms, &c.

*Portland* is the largest city in Maine and has one of the finest harbors in the country. It is the eastern terminus of the Grand Trunk Railway of Canada, and the winter port of that great highway.

*Lynn* and neighboring places in Massachusetts manufacture about half of the factory-made boots worn in the United States. At *Cambridge* is situated Harvard University.

### 57. The Southern Section.

North Carolina, Tennessee, Arkansas, Texas, Louisiana, Mississippi, Alabama, Georgia, South Carolina, Florida, Indian Territory, Oklahoma Territory.

What states of this section border on the Atlantic? Which border on the Gulf of Mexico? Which lie west of the Mississippi?

In the Southern Section the summers are long, and snow seldom lies on the ground in the winter. There are fewer cities than in the North for most of the people live on farms or plantations. Cotton is raised in all these states and is the most important crop.

Cotton is the fluffy thread or fibre that grows around the seed of a bush three or four feet high. About six weeks after the whitish blossoms of the plant have turned pink and withered, the seed pods, or *bolls*, ripen and burst, and the fluffy cotton hangs from them in white balls. Then the picking begins. Day after day the cotton is picked by hand from the freshly opened pods, until the crop has been harvested. The fibre is separated from the seed



Cotton—The Plant, Picking, Ginning, Pressing.

by a machine called a *gin*, and the cotton is then pressed and corded into bales.

From the seeds which are left a fine quality of oil is pressed, which is taking the place of olive oil; and the *cake*, or substance that remains after the oil is pressed out, is used to fatten cattle and as a fertilizer.

Much of the cotton is taken to the mills in the Southern Section; more is sent to those in New England; and a great part is taken across the Atlantic to Europe. Raw cotton is the most valuable export of the United States.

Besides cotton these states produce *corn*, *sugar*, *rice*, and *tobacco*. Fruit and vegetables are sent to cities in the north long before they are ripe in that region. Florida sends oranges and lemons in great

quantities. In the coast plain are extensive forests of southern pine which yield valuable lumber.

Manufacturing is not so extensive as in the Northern Section, but turpentine and resin have long been extracted from the pine trees in several of the states, and cotton cloth is made in many places, especially in South Carolina, North Carolina, and Georgia. Much tobacco also is manufactured in North Carolina.

In the mountains of Alabama and Tennessee iron ore is mined. Coal is abundant. They are also great iron-producing states.

The western part of Texas is a great grazing country, and wheat is raised in the northern part of that state.

**CITIES.**—*New Orleans*, on the Mississippi, about 100 miles from its mouth, is the great cotton market of the south and the largest city in the Southern Section. It is really a seaport, and exports many articles sent down the river from the Upper Mississippi valley, in addition to cotton, rice, and sugar raised in the south. The city was at first settled by the French. Many people of French descent still live there and speak the French language.

*Memphis*, a river port in Tennessee, has a large trade in cotton, and is the great manufacturing centre of cotton-seed oil.

*Mobile*, in Alabama, at the head-of Mobile Bay, is the oldest large city in the section. It is a great cotton shipping port, and has large lumber mills.

*Birmingham* is the centre of the iron producing district of Alabama, and has many rolling mills.

*Wilmington*, in North Carolina; *Charleston*, in South Carolina, and *Savannah* in Georgia, are important ports on the Atlantic. They all ship cotton and lumber.

*St. Augustine*, in Florida, is the oldest town in the United States. It was originally settled by Spanish.

#### ORAL AND WRITTEN EXERCISES.

Why are the New England States better adapted for manufacturing than for farming? Which of the north-eastern states border on Canada? What are the chief products of the southern section? Which of the states in the Southern Section yield coal? Which produce lumber? Describe the cotton plant, its picking and marketing? Where is it sent to be manufactured?

#### 58. The Plateau Section.

Montana, Idaho, Wyoming, Colorado, Utah, Nevada, Arizona Territory, and New Mexico Territory.

What states of this section border on Canada? Which of them are crossed by the Rocky Mountains?

The whole of this section is in the highland region. Gold and silver are found in all the states of the section, and the mining of the precious metals is the most important industry in several of them. This dry plateau region is so high that its climate is healthful; its summers are very hot, and its winters, except in the extreme south, are quite cold.

That part of the section between the Rocky Mountains and the grain growing states on the east, is called the Great Plains.

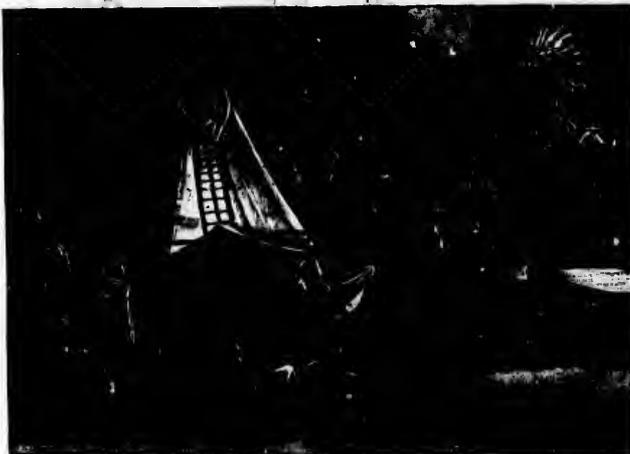
Although little rain falls, crops of grain, hay, and fruit are, nevertheless, grown in parts of this region. Most of the rivers of the Plateau Section rise in snow-covered mountains, and in the spring contain plenty of water. This water is led in canals or ditches over the land where the crops are grown. This manner of watering land is called *irrigation*.

The Great Plains are too dry for either farming or

forests, but as they are covered with good grass, they afford pasturage for immense herds of cattle.

The great stock farms of the plains are called *ranches*. Some of them are as large as one of the smaller eastern states. Very little land is cultivated. There are few fences, and the immense herds roam from one part of the country to another.

But most of the country is too dry for even herding. These mountainous regions are chiefly valuable for the *gold*, *silver*, and *copper*, which they contain. Most of the gold in this section and all the silver is mined from veins or ledges of rock. The rock is raised to the surface, crushed and smelted to get the precious metal from it. This region produces a large part of the gold and silver used in the world.



Indian Encampment.

Nevada was once the greatest silver producing state; but Colorado and Montana now surpass it. Montana contains the largest copper mines in the world.

Where is the Yellowstone National Park?



Old Faithful Geyser.

It is famous for its beautiful scenery, and for *geysers* or springs which frequently spout hot water high into the air.

**CITIES.**—*Denver*, in Colorado, is the largest city in the section. It is the chief railway centre of the section east of the Rocky Mountains. In this city and in *Pueblo* the chief industry is the smelting and reduction of ores.

*Salt Lake City*, in Utah, was settled originally by Mormons. The whole district in which the city is situated has been changed by the labor of these people from a desert to a garden, by means of irrigation.

*Helena* and *Butte*, in Montana, are great min-

ing centres, the latter being in the greatest copper producing district of the world.

*Carson City*, in Nevada, contains hot springs, and is a resort for invalids.

### 59. The Pacific Section.

Washington, Oregon, and California.

The three states of this section include the small but fertile food-producing region of the west. The eastern part of these states lies in the dry plateau region, but most of the western part, especially towards the north, receives sufficient rain for farming. In the south the nearness of the snow-clad mountains makes irrigation easy.

The westerly winds so modify the heat of the Pacific coast that there is very little difference be-

tween winter and summer except in the amount of rainfall. Most of the rain falls in the winter months, the summer being quite dry.

The grain fields of the Pacific coast are in the valleys between the Coast Range and the high mountains to the eastward. What two rivers occupy this valley in California? Much of the grain is shipped direct to Europe from the ports of San Francisco Bay and Puget Sound. Where is Puget Sound?

Fruit is grown in almost every part of the Pacific coast; in Southern California it is the chief product. *Oranges*, *grapes*, and *pears* are sent in great quantities to the eastern states in refrigerator cars. Most of the grapes are used to make wine or raisins. *Apples*, *plums*, and other fruits are canned and preserved.

*Cattle* and *sheep* are raised in the hilly lands, and much fine wool is produced.

Every year immense shoals of *salmon* ascend the Columbia and other northern rivers. These fish are caught in nets or weirs; their flesh cooked and canned is sold in almost every city of the United States and Europe.

The most extensive forests of the United States are in this section. The mountain slopes are densely covered with a kind of fir called *Oregon pine*. There are very large lumber mills around Puget Sound, and pine, cedar, and redwood are obtained from the forests of California. Small groves of "big trees" are found on the west slope of the Sierra Nevada.

These trees are taller than a high church spire, and are amongst the largest in the world.

California once belonged to Mexico. Soon after the

United States obtained possession of it, gold was discovered there, and crowds of people poured in from all parts of the world. The miners were followed by merchants and farmers, and now the chief wealth of the state lies in its farms rather than in its

mines. It still produces more gold than any other state. Coal is mined in Washington.

**CITIES.**—*San Francisco* is the largest city on the western



Irrigating an Orchard.



A Vineyard.

coast of America. The gap through which its bay opens to the ocean is called the Golden Gate. Lines of steamships connect it with New York, British Columbia, and Alaska ports, with Australia, and with Asia. There are more Chinamen in San Francisco than in any other city of the United States. Why is this?

Where is *Los Angeles*? It is the chief market for the fruit and wine region of Southern California.

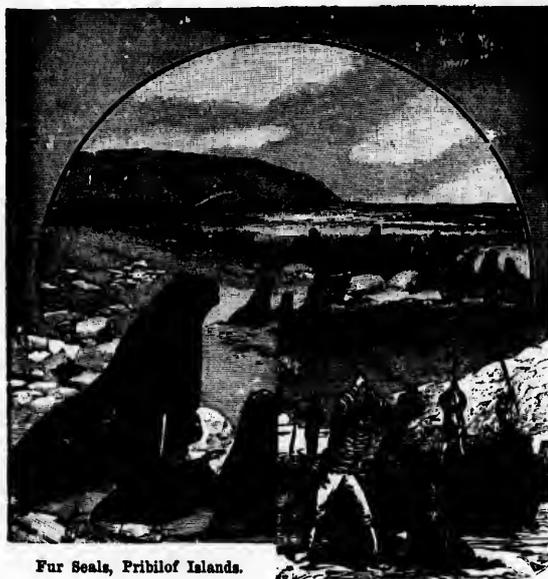
*Portland*, on the Columbia River, *Seattle* and *Tacoma* on Puget Sound are important ports. All these cities are connected by railway with the eastern states.

### 60. Alaska.

In what part of North America is Alaska? What strait separates it from Asia? What great river crosses it?

Alaska was purchased by the United States from Russia, a country which owns most of northern Europe and Asia. Alaska consists of a great peninsula and a long chain of islands which stretch across between America and Asia like stepping stones.

Southern Alaska is not so cold as the north-east coast of America, for warm south-westerly winds from the Pacific blow over its shores. Many of the mountain valleys are nearly filled with snow which forms glaciers. Some of these glaciers reach the sea, and icebergs are broken off from them to float away into the Pacific Ocean



Fur Seals, Pribilof Islands.

Where are the Pribilof Islands? Every summer seals come from the Pacific Ocean to these islands. Here the young seals are born and reared and taught

to swim. Many of the seals are killed here; their fur, and the cod fish and salmon caught in great numbers along the coast, form the chief products of Alaska. There are rich gold mines on the mainland.

There are few white people in Alaska, and they are mostly miners. Some Eskimos live in the bleak regions of the north, but most of the natives of the south-west coast are Indians.



Glacier.

Towns.—*Sitka*, on Baranoff Island, is the capital.

*Skagway* and *Dyea*, at the head of the Lynn canal, are towns which have sprung up and grown to considerable size in a year or two. They are the landing places for miners who seek the gold of the Klondike region in Canada. From *Dyea* a road leads over the Chilkoot Pass in the Coast Range, and from *Skagway* a railway has been built through the White Pass over the same range as far as Lake Bennett in Canada.

*St. Michaels*, on an island near the mouth of the Yukon, is the chief port for the shipping of gold, furs, &c., brought down the Yukon in steamers during the summer.

#### ORAL AND WRITTEN EXERCISES.

What are the leading industries of the Plateau Section? Where are the arid regions of the United States? How are some parts made suitable for agriculture? Where are the mining regions of this section? Which state produces the greatest amount of silver? Where are the Great Plains? Where is the Great Basin? Why are the lakes in this region salt? Where in the Pacific Section are salmon found in great numbers? Where does the grain of this section grow? What are the principal fruits of this region? What state produces the most gold? Where is Alaska? Where are the fur seals killed?

## THE MINOR COUNTRIES OF NORTH AMERICA.

### 61. Mexico.

What waters east of Mexico? What peninsula in the west of Mexico? In the south-east? What river between the United States and Mexico? What language is spoken south of that river? What land south-east of Mexico?

Mexico is a continuation southward of the plateau region of the United States. The coasts are low and level, but a little way from the shore the surface slopes rapidly upward to a high plateau. In the north this plateau is about three-fourths of a mile high, but it rises to twice that elevation in the south.

The plateau is bordered by mountain ranges like the plateau of the United States, but in the case of Mexico the western range is much higher than the eastern. Many of the peaks in these mountains are so high that they are always snow covered. At times some of them give out clouds of steam and streams of white-hot melted rock, or *lava*. Such peaks are called *volcanoes*; each is a sort of chimney through which steam and other gases formed within the earth may escape. One of these volcanoes, Mount Orizaba, is over three miles high. Earthquakes are not uncommon throughout Mexico.

The rivers of Mexico are small and of a mountain character. There are numerous lakes; some of them have no outlet and their waters are consequently salt.

Owing to the tropical position of Mexico, there is little difference between the temperature of summer and of winter in the same place; but because of the difference in elevation there is a great difference in the temperature of different regions. The lowlands are always hot; the plateau is always temperate; and the mountain region more than one and a half miles high, is cool or cold. The seasons of Mexico are the wet and the dry. Nearly all the rain falls during the summer months.

*Agriculture, cattle raising, and mining* are the chief occupations. In the hot lowlands are plantations of *cotton, sugar cane, coffee, and tobacco*, and groves of *orange trees and bananas*, and tall *palm trees*.

Along the foot and sides of the table-land is a region of forest where monkeys and birds are plenti-

ful. In these forests are *mahogany* trees, the vine bearing the *vanilla* bean, and the *sarsaparilla* plant.

Many of the plants of the table-land are like those of the United States, for the weather though dry is like that of the temperate zone. In the forests are oak and cedar trees, while corn, wheat, and beans grow on the farms. One of the most useful plants is the *maguey*. This is the same as the "century plant." From its sap a popular drink is prepared; its pulpy roots are used for food, and the fibre of one kind of maguey, called Sisal hemp, is used in making twine and coarse bagging.

But the chief wealth of the table-land comes from the *silver* mines and the herds of *cattle and sheep*. The Spaniards who first settled in Mexico went there in search of gold and silver, and Mexico is still one of the great *silver* producing countries of the world.

Many *cattle and hides*, and much *wool* are exported.

When the Spaniards came to Mexico they found the Indians there highly civilized, and not so fierce and warlike as those farther north. They were called Aztecs. They had fine buildings of stone, cultivated corn by the aid of irrigation, wore ornaments of gold, and knew something of working other metals.

The Spaniards were not long in conquering these Indians. Many of the Spanish settlers married Indian women, and their children were half-breeds. Most of the people now are half-breeds and partly civilized Indians. The Spaniards and a few

of the half-breeds own most of the land, and are rich and powerful; but the Indians, and most of the half-breeds, are poor, ignorant and wretched. They are the laborers on the farms, ranches, and in the mines, and are little better off than slaves.

Their houses are often wretched hovels; holes through the walls serve for windows, and the hard ground for a floor. The walls are of straw, or of sun-dried brick called *adobe*, and the roofs are often covered with coarse grass.

Indian corn and beans are the food of most of the people. The beans are cooked with red pepper pods. The corn is ground by hand, between two stones, into a coarse meal which is made into a dough and baked in a very hot clay oven in flat cakes.



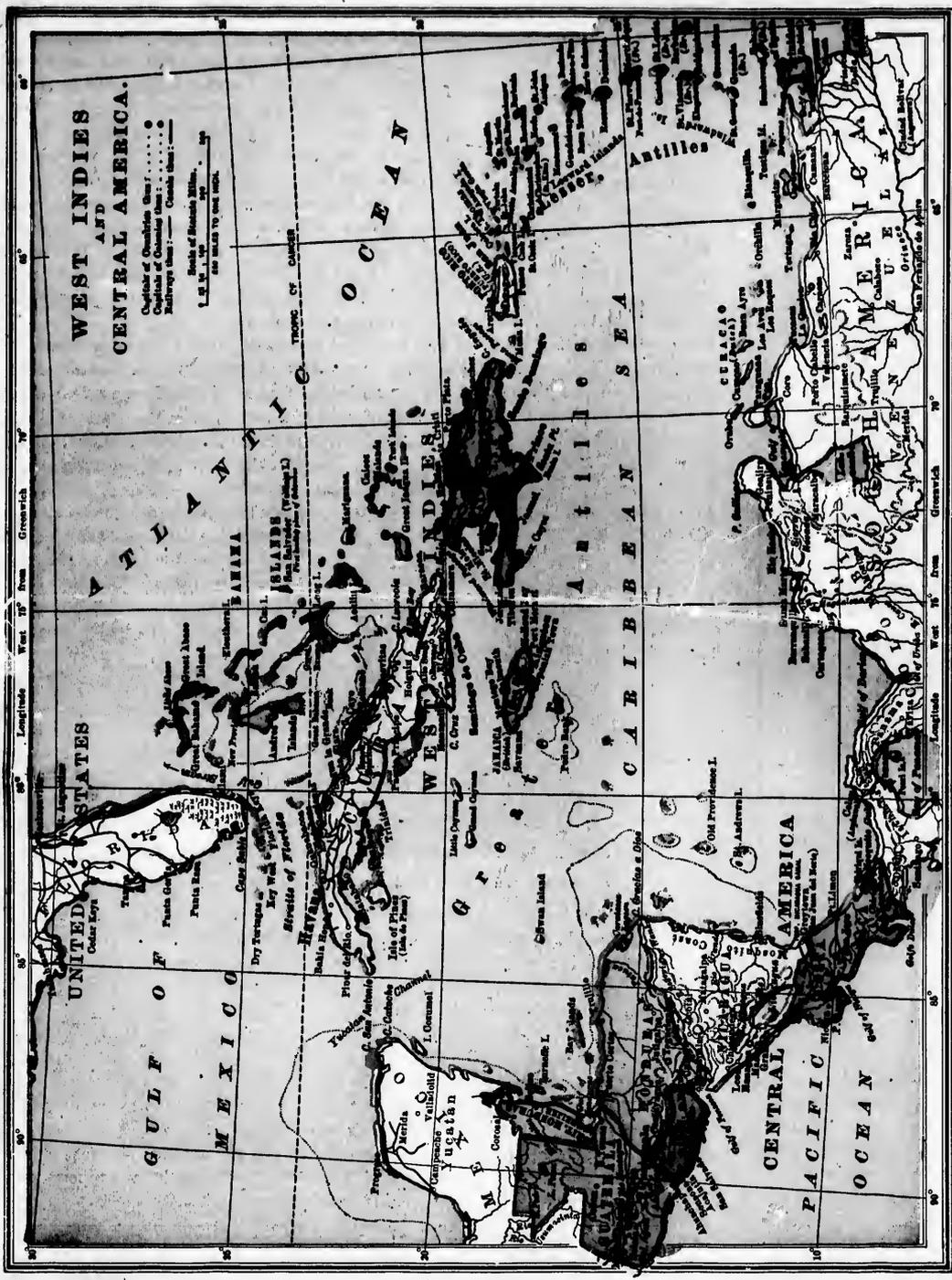
Volcano and Maguey Plant.

ere; their  
in great  
products of  
mainland.  
and they  
the bleak  
ves of the

ital.  
canal, are  
nsiderable  
places for  
n in Can-  
ot Pass in  
has been  
nge as far

ne Yukon,  
urs, &c.,  
summer.

Section f  
s? How  
Where  
tate pro-  
are the  
are the  
Section  
does the  
fruits of  
Where is



At the beginning of this century the descendants of the Spanish settlers made themselves free from Spain. Mexico is now a republic like that of the United States.

The city of *Mexico* is the capital and largest city in the republic. The ground on which the city is built is lower than several lakes near it, and it is protected from overflow by dykes or embankments. Railways connect the city with the railway system of the United States.

*Vera Cruz*, on the Gulf of Mexico, is the chief port. It is connected by railway with Mexico, and about two-thirds of the foreign trade goes through this port. The harbor is so shallow, however, that ships have to unload into small boats.

*Guaymas*, on the Gulf of California, has a good harbor, and is connected by rail with the railway system of the United States.

## 62. Central America.

By what waters is Central America bordered? Name the chief lake of Central America.

The plateau of Central America is neither so broad nor so high as that of Mexico. The mountain range on the west contains the high cones of many active volcanoes, and earthquakes are more frequent and severe than in Mexico. The climate is similar to that of southern Mexico, but warmer, and with a heavier rainfall on the north coast.

The countries of Central America are more uniformly covered with forest than Mexico, but in the interior there are large tracts of grass land. *Sugar, coffee, cocoa beans, or chocolate nuts, tropical fruits, and cabinet and dye woods* are exported.

Shortly after the discovery of America by Columbus, Spanish adventurers established colonies in various parts of Central America, and for about three hundred years Spain claimed the whole region, except a strip along the west coast of the Gulf of Hon-

duras, which was settled by English logwood cutters. This is still a British colony under the name of *British Honduras*. When Mexico rebelled against Spain, the Spanish people of Central America also became independent, and out of their territory founded five small republics. Name them from the map.

What is the capital of Guatemala? Of San Salvador? These two countries contain two-thirds of the people in Central America, and are by far the strongest and most progressive of the republics.

What is the capital of Honduras? Honduras

is specially noted for the production of mahogany.

What is the capital of Nicaragua? What river is the outlet of Lake Nicaragua? The lake and part of the river form portions of a proposed ship canal, which, if completed, will enable ocean steamers to cross from the Atlantic Ocean to the Pacific. Why will that be an advantage? Nicaragua exports a considerable quantity of gold.

"Costa Rica" means "rich coast." What is the capital of this state? Coffee has been cultivated in Costa Rica for a hundred years, and much of the product grown elsewhere in Central America is also called Costa Rica coffee.

Honduras, Nicaragua, and San Salvador have recently formed a union for certain purposes, under the name of the Greater Republic of Central America; but the other two republics have not as yet joined this union.

What is the capital of British Honduras? This colony exports chiefly *sugar, mahogany and logwood*. In addition to these, *coffee, India rubber, sarsaparilla and cocoa-nuts* are also exported.



Coffee Plantation.



Hauling Mahogany.

## ORAL AND WRITTEN EXERCISES.

Name the countries of North America south of the United States. Name the republics of Central America. What British colony is situated in this region? What are the principal products of Mexico? Of Central America? What is the principal mineral product of Mexico? What language is chiefly spoken in all these countries? Why? What are the two leading industries of the plateau region?

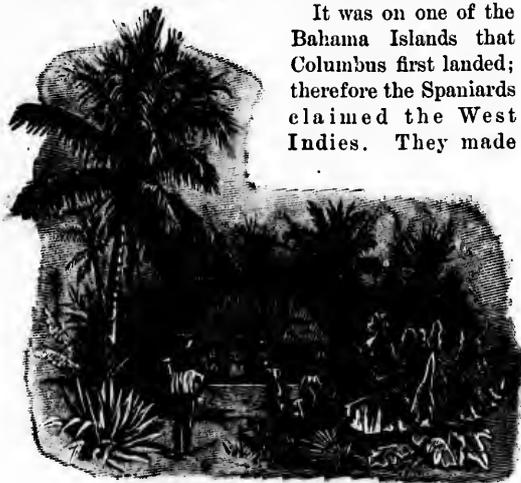
## 63. West Indies.

Name the four largest islands of the West Indies. What group east of Florida forms part of the West Indies? What sea between the West Indies and South America? In what zone are most of the West Indies? Of what three island groups does the chain consist?

The West Indies are so cooled by ocean breezes that they are cooler and more healthful than the lowlands of Central America; but at times they are visited by terrible wind storms, or *hurricanes* which destroy buildings and wreck vessels.

The *Bahamas* are low, sandy islands, surrounded by shallow waters, but the larger islands of the West Indies are the high and rugged tops of a range of mountains whose lower part is covered by the ocean.

It was on one of the Bahama Islands that Columbus first landed; therefore the Spaniards claimed the West Indies. They made



Scene, West Indies.

slaves of the Indians and worked them to death, and then negro slaves were brought to the plantations. Now there are more negroes than whites on the islands; but they were all set free many years ago.

Up to the year 1898 Cuba and Puerto Rico belonged to Spain; but in that year she lost them in a war with the United States. At present they are under the control of the latter country. All the

Bahamas and most of the other islands belong to Great Britain; but Hayti is occupied by two independent negro republics.

Many of the islands are surrounded by *coral reefs*. These are low rocks made by the coral animals, or *polyps*. They are found in many parts of the sea where the water is clear, warm, and not too deep.

The polyps live in great colonies and are attached to the bottom of the ocean. When they die their stony skeletons are left as a rocky mass, while other polyps grow, like buds on a branch, from the foundation thus left. In this way the rocky mass gradually grows upward to the surface of the water, where it forms a ragged reef of coral rock. By the aid of the sand piled up by the waves and the winds, reefs are sometimes built up above the surface of the water to form low coral islands. There are many such coral reefs and islands in the warmer parts of all oceans. In the Pacific Ocean some coral islands form a nearly complete ring, inclosing a portion of the sea. Such islands are called *atolls*.



In the shallow waters of the Bahamas, *sponges* are found. The sponges which you have seen are the skeletons of jelly like animals which fasten themselves to rocks and feed on what the water brings to them.

On the lowlands of the West Indies *palm trees* grow; *mahogany* and a very hard wood called *lignum vitae* grow on the higher slopes.

The most valuable product of the islands is *sugar*. It is made from the sugar cane, which looks much like a corn stalk, but has a sweeter sap. The cane is taken to mills, where the sap is squeezed out between heavy rollers. It is then boiled until it becomes brown sugar. This "raw" sugar is sent

to the United States, Canada, and Europe, where it is refined into white sugar. About one-fourth of all the cane sugar used in the world comes from the West Indies; and the greater part of it from Cuba.

Much of the finest *tobacco* also comes from the West Indies. *Coffee, bananas, pine apples, and cocoa-nuts* are exported from these islands.

## BRITISH ISLANDS.

The BAHAMAS comprise about 500 islands, few of which are inhabited. *Pineapples, oranges, turtles,*



and *sponges* are the principal articles exported. *Nassau*, the capital, on New Providence Island, has the only harbor in the group.

JAMAICA is the largest and most valuable of the British Islands. The Blue Mountains, rising to a height of 7000 feet, traverse the island from east to west. The forest trees and the cultivated fruits and plants are the same as those of tropical Mexico and Central America. The exports are mainly *sugar, molasses, and rum*; but *coffee, logwood, spices, bananas, and cocoa-nuts* are also exported. *Kingston*, the capital, has a fine harbor and carries on a large shipping trade.

LEEWARD ISLANDS.—Find them. They are all much alike—lofty volcanic peaks, surrounded by a low plain of coralline formation, with fertile soil, luxuriant vegetation, and healthful climate. The exports are similar to those of Jamaica and all of

them are thickly peopled. *St. John*, on the island of Antigua, is the capital.

WINDWARD ISLANDS.—Barbados is the most important island of this group. It is densely peopled and exports large quantities of *sugar and molasses*. *Bridgetown* is the chief city.

TRINIDAD.—Where is this island? It is neither coralline nor volcanic. It has mountains over 3000 feet high. The climate is moist, for the island is near the region of constant rains. It is famous for its wonderful *asphalt* lake, containing 90 acres of pure mineral pitch, of which great quantities are exported. *Port of Spain* is the capital.

THE BERMUDAS, east of the United States, consist, it is said, of 365 islands; only a few, however, are inhabited. These islands being situated in the Gulf Stream are West Indian in character,—in their coral formation and their vegetable products; the forest growth, however, is poor. Large quantities of early vegetables — *potatoes, cabbage, onions, peas, &c.*, are sent in early spring to the markets of the United States. Fresh water is obtained from rain alone. These islands are the winter station of the British North American fleet, and contain a royal dock yard. *Hamilton* is the capital. On account of its salubrious climate it is the winter resort of many invalids from the United States and Canada.

## CUBA AND PUERTO RICO.

Cuba is the largest of the West India Islands, being 700 miles long, and having an average width of 80 miles. *Iron and copper* exist and are mined to a slight extent. For the production of *sugar,*



The Pineapple.

ong to  
inde-

reefs.  
als, or  
the sea  
leep.

attached  
ie their  
e other  
om the  
y mass  
o water,  
By the  
winds,  
face of  
ere are  
warmer  
e coral  
osing a  
l atolls.

sponges  
seen are  
n fasten  
e water

alm trees  
I called

is sugar.  
ks much  
The cane  
ezed out  
until it  
is sent

*coffee*, and *tobacco*, and for all fine tropical fruits the climate and soil of Cuba are especially favorable; its forests contain the most valuable cabinet woods; yet, owing to the bad government of Spain in the past, the great natural wealth of the island is but partly developed. *Puerto Rico* is more densely peopled and better cultivated than Cuba.

*Havana*, the capital of Cuba, and the largest city in the West Indies, has a great export trade in tobacco, sugar, &c.; it is connected by railway with other places.

Where is *Santiago*? It is a large city and exports iron ore and copper.

*San Juan* is the capital of Puerto Rico.

#### HAITI.

This island is next to Cuba in size. Its natural wealth is very great. The people, however, who are nearly all black, are ignorant, lazy, and barbarous. In consequence, its natural resources are very poorly developed. It consists of two independent negro republics. Name them. Years ago *Haiti* was a French colony, and a form of the French language is used by the negro inhabitants. *Santo Domingo* was a Spanish colony and the Spanish language prevails in that part of the island.

*Port-au-Prince* is the capital of Haiti, and *Santo Domingo* that of Santo Domingo.

#### FRENCH ISLANDS.

These are but six; chief of which are Guadeloupe and Martinique; they are fine islands, engaged wholly in the production of *sugar cane*.

#### DANISH ISLANDS.

They are all small, *St. Croix* and *St. Thomas* being the chief; the latter is an important station in the passenger and mail traffic with Europe.

NOTE.—Greenland in the north also belongs to Denmark.



Relief Map of South America.

#### DUTCH ISLANDS.

They are all near the coast of South America. Curacao is the principal island.

The remaining islands off the coast of South America belong to Venezuela.

#### ORAL AND WRITTEN EXERCISES.

In what zones is North America? Canada? Mexico? In which part of Mexico is the climate moderate? Why? What large bay is on the north of North America? What large gulf on the south? Which is most used by vessels? Why? Name the four great rivers of North America east of the Rocky Mountains. Which is most useful? Which is least useful? Why? What three river systems have large lakes?



Some Animals of South America.

1. MONKEYS. 2. ANACONDA. 3. JAGUAR. 4. TOUCANS. 5. TAPIRS. 6. PECCARIES, or WILD HOGS. 7. ARMADILLO. 8. ANT-EATER. 9. LLAMA. 10. CONDORS. 11. CATMAN. 12. NANDUS, or RHEAS.

Monkeys are exceedingly numerous in all the tropical regions of South America, but especially in the forests of Brazil. They are of infinite variety, - among them being the large sluggish "howling" monkey, the easily-tamed "spider" monkey, the thumb'd "woolley" monkey, the beautiful little "squirrel" monkey, and the narrow-set, - all having prehensile tails, and of arboreal habits; and, besides its timid "short-tailed ape," which rarely ventures higher than the tops of bushes. The Jiboya, or Boa-Constrictor, a large serpent, sometimes twenty feet in length, inhabits the dry and sandy tropical districts. It is not venomous, and is afraid of man. It feeds on small animals, such as ant-bears and the lesser monkeys, though at times it seeks larger prey. Its jaws are capable of enormous extension. The Anaconda, or Water Boa, is a much more formidable creature; it is sometimes forty feet in length, and is the largest serpent now known. It inhabits lakes, rivers, and marshes, is exceedingly voracious, and feeds on fishes, and upon any animals which it can seize when they are unwarily drinking. It occasionally visits farm-yards, and carries off poultry and young cattle. The Jaguar is the largest animal of the cat kind in the western continent. It was once exceedingly numerous in South America. It preys by preference upon large animals, such as the horse, tapir, deer, dogs, and cattle. It is of immense strength, and has been known to swim across a river with a horse it had killed, and carry it off into the forest. The Toucan is a gaudy-colored bird with its powerful bill enabling it to kill them with a single squeeze. The Tapir is a thick-skinned animal which feeds upon the young shoots of trees and on fruits, but it relishes almost anything that comes in its way. It is inoffensive to man, but it is a favorite prey of the jaguar, from which, however, it sometimes frees itself by rushing into water. Peccaries somewhat resemble our domestic hogs; they live in herds. When assailed they vigorously defend themselves with their sharp tusks. Their flesh is eaten. The Armadillo is covered with a bony coat of armor. It is a nocturnal animal, and burrows in the earth for its food. Some species greedily devour the semi-putrid carcasses of wild cattle that have died on the Pampas, and even burrow into the graves of human beings. The Ant-Eater, or Ant Bear, is a toothless animal, with a long, round, slender tongue which easily seizes the ants and other insects that form its food. It is unsocial and stupid, and spends much of its time in sleep. The Llama has long been domesticated as a beast of burden. Its usual load is about 125 lbs., which it will carry twelve or fifteen miles a day. Without its aid the silver mines of the Andes could scarcely be worked. The Condor is an exceedingly voracious creature. It prefers carrion to other food, but it does not hesitate to attack goats, sheep, and deer. When gorged with a heavy meal it becomes stupid, and is then easily captured. The Alligator, or Cayman, abounds on the Amazon and Orinoco, and the silence of these regions is said to be rarely broken except by its nocturnal howling. The Nandu, Rhea, or American Ostrich, inhabits the plains of the Argentine Republic. It lives in families, the male bird hatching the eggs. The natives of Patagonia chase it on horseback, and catch it by throwing the *bola* - a ball attached to a string, something like a lasso.

America.

South

of In  
What  
ge gulf  
Name  
Rocky  
seful?



## SOUTH AMERICA.

## 64. Position, etc.

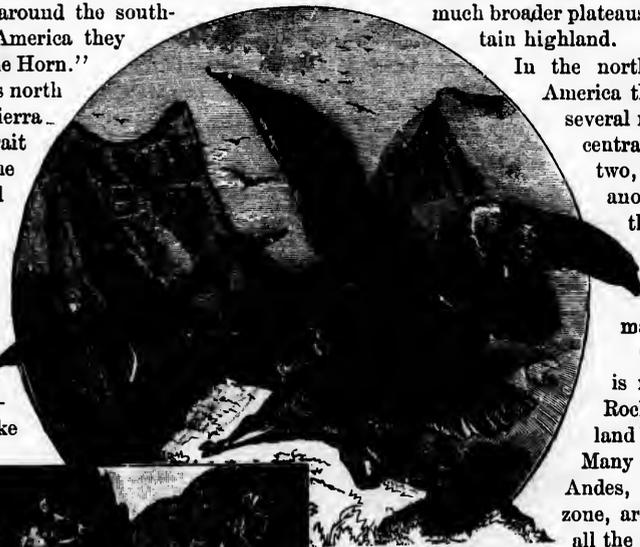
How is South America connected with North America? In what zones does South America lie? What large island is south of South America? What sea is north of South America?

Shortly after Columbus discovered America the Spaniards crossed the Isthmus of Panama on foot and discovered the Pacific Ocean. Now, there is a railway which carries passengers and goods across the isthmus from one ocean to the other. Men have tried several times to construct a ship canal across the isthmus, but so far they have not been successful.

When vessels go around the southern part of South America they are said to "round the Horn."

Why? What strait is north of the island of Tierra del Fuego? This strait was named after the first man who sailed round the world.

Which of the two continents, North and South America, has the greater number of gulfs and bays? Where is the Gulf of Guayaquil? Where is Lake



Llamas and Condors.

Maracaibo? It is a gulf rather than a lake. Name the two rivers on the east whose mouths widen out into bays.

Near what part of South America are most of the islands? Find the Falkland Islands. They belong to Great Britain.

**RELIEF.**—We have seen that the Rocky Mountains are composed of two main mountain chains. Name them. They are broken by many passes, through several of which railways are built, connecting the regions east and west of the mountains.

What mountains are in the west of South America? These mountains form an almost unbroken wall, having no passes at a low elevation. In consequence, no railway crosses the Andes, and travelling from one side to the other of these mountains is very difficult and dangerous. Where is the Andes highland broadest? This part of the highland is called the plateau of Bolivia. It is nearly twice as high as the much broader plateaus of the Rocky Mountain highland.

In the northern part of South America the highland contains several ranges, which, in the central part, merge into two, one on the east and another on the west of the plateau of Bolivia.

South of this plateau the highland has only one main range.

The Andes highland is not so broad as the Rocky Mountain highland but it is much higher. Many of the peaks of the Andes, even in the Torrid zone, are covered with snow all the year.

The Andes contain many volcanoes built up in part by the lava thrown out from their tops. Earthquakes frequently occur in these regions. They are often so violent that buildings are thrown down and many people killed.

The Andes have long been noted for mines of gold, silver, and copper; and the high slopes and plateaus afford pasture for sheep, cattle, and several kinds of llamas.

Llamas are woolly animals a little larger than sheep, now found only in or near the Andes, though ages ago they lived also in North America. Like the camel, the llama can live for several days without food or drink. Llamas are used to carry packs of merchandise in the Andes, and flocks of a smaller kind are kept for their fine long wool.

One of the largest of birds, the condor, is also

found only in the region of the Andes. It stands higher than a table, and from tip to tip of its outstretched wings measures about twelve feet. It prefers dead animals, *carrión*, for food, but when hungry sometimes kills and eats a sheep or deer.

From the Andes highland the country slopes gently toward the Atlantic Ocean but abruptly toward the Pacific.

The highlands in the eastern part of South America are very much lower than the Andes. They are traversed by mountain ranges generally parallel to one another. What is the name of the small north-eastern highland? Of the larger south-eastern highland?

Between the highland regions, extending the whole length of South America, is a vast lowland plain. Comparing it with the great central plain of North America, we see that each is a broad lowland plain with high mountain ranges on the west and low ranges on the east.

**DRAINAGE.**—The winds of the south temperate zone, like those of the north temperate zone, blow generally from the west. From what ocean then do the clouds of the southern part of South America get their water? On which side of the southern Andes is there most rainfall? Why? Why is there so little rainfall on the east side? The winds of the torrid zone blow generally from the east.

Knowing that the eastern highlands of South America are not very high, it is evident that the rainfall east of the Andes in the northern part of South America is very great. Why is there little or no rainfall west of the Andes in the Torrid zone?

What river drains the most northern part of the great plain? In what direction does this river flow? It is deep enough for large vessels for many hundred miles from its mouth. Its broad, flat valley is called the *llanos*, the Spanish word for "plains."

In the rainy seasons millions of cattle and horses graze on the llanos. The streams are flooded with water, and the swamps are fairly alive with alligators. When the dry season comes, the cattle seek the hills,

and the alligators bury themselves in the mud, and the whole region becomes dry and brown.

The basin of the Orinoco is not so large as that of the St. Lawrence; but the amount of water discharged is almost as great as that of the Mississippi. The delta of this river is larger than some of the smaller states of the United States of America.

What is the name of the longest river in South America? Near what circle is it? In what direction does it flow?

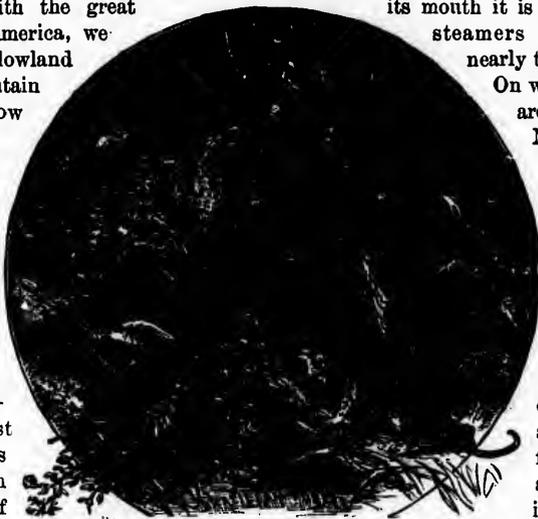
Most of the rain of South America falls in the Amazon basin. This basin is larger than that of the Mississippi in North America. The great rainfall and the size of the river basin make the Amazon the largest river in the world although it is not so long as the Missouri-Mississippi. Many miles from its mouth it is several miles wide, and steamers can ascend the river nearly to the foot of the Andes.

On which side of the Amazon are most of its branches? Name the longest. Name a northern branch. Find a channel that connects the Orinoco and the Rio Negro.

The plains of the Amazon are called *silvas* which means "forests." Dense, dark forests cover the whole country. Once or twice a year, the rivers overflow the banks, and hence a great part of the *silvas* is always swampy. In this part the tall trees are

matted together by hanging vines and air plants, while high ferns, mosses, and other plants fill the space between the trunks with vegetation that is always green. Boats on the river are the only means of travel. These forests abound with wild animals, most of which are climbers. The great catlike jaguar is the fiercest. The immense boa constrictor coils around his prey and crushes it. Troops of monkeys live and travel long distances among the tree tops. These forests yield *rubber*, *mahogany*, and *dyewoods*.

What large river system is south of the Amazon system? The basin of the La Plata River is about as large as the Mississippi basin, and it discharges a



## ORAL AND WRITTEN EXERCISES.

Compare North and South America in size and shape. Compare the Andes highland with the Rocky Mountain highland; in position; in direction; greatest height; greatest breadth; passes. Describe the Atlantic slope. Where is it broken by mountains? Describe the Pacific slope. Compare the central plain with that of North America in extent and rainfall. Where are the llanos? How are they drained? Describe the drainage, rainfall, and forests of the silvas. Where are the pampas? How are they drained?

## 65. People, etc.

From the map to the left tell what parts of South America are nearly uninhabited. The most thickly settled regions are about the mouth of the La Plata and northward along the east coast. Why is the region east of the Andes on the south thinly peopled? What river basin is rather densely settled? In what zone is this settlement?

When South America was first visited by white men it was inhabited only by Indians. Most of these were savages, but the Incas of Peru were partly civilized. They wove coarse cloth, made pottery, built great cities and good roads, and could work gold and silver. Find Peru.

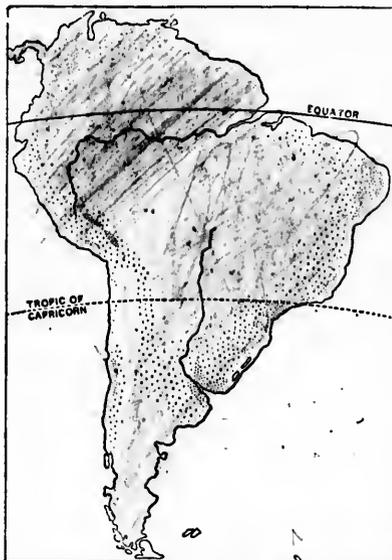
Many wild Indians still live in many parts of the interior of South America. Some of these live in the mountains, some in the desert region of the south, but most

of them live in the basin of the Amazon. Those in the south live chiefly by hunting the *guanaco*, a kind of llama which roams in great herds over the arid plains. Those along the Amazon hunt and fish. For weapons, they use a spear for killing fish and turtles, and a blow gun with poisoned arrows for birds and other game.

When the people of Europe found that gold and silver could be obtained in South America, many of them

went there to make their fortunes. Most of these were from Spain and Portugal, a country adjoining Spain.

The Spaniards settled in the Andes highland and in the basin of the La Plata. Many of the people living there now are descended from these Spanish settlers; but the working classes, as in Mexico, are

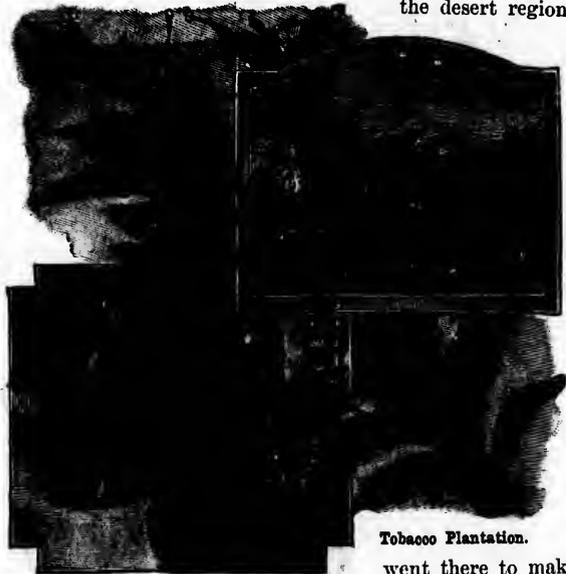


THE DOTS INDICATE WHERE THE MOST PEOPLE LIVE.

greater volume of water. The Parana branch of the La Plata is navigable for more than a thousand miles above its mouth. That part of the central plain drained by the La Plata is called the *pampas*. Its south-western part is an arid region. Why is it dry? In the north-west, however, enough rain falls for the growth of grain and fruit. Almost the whole region is covered with longgrass. It contains the best herding grounds and is the chief wheat growing region of South America.

Find the San Francisco River. Its lower course is much broken by falls and rapids by which it descends from the highlands, but its upper course is navigable for long distances.

The Magdalena River is navigable for a long distance into the mountains.



Tobacco Plantation.

mostly half-breeds of Spanish and Indian parentage.

The eastern part of South America was settled by Portuguese; their descendants, both whites and half-breeds, still live in Brazil and speak the Portuguese language.

In Brazil there are also many negroes, who with the half-breeds, form the working class. They were slaves until a few years ago, when they were made free.

All the countries of South America were formerly under the rule of European nations, chiefly Spain and Portugal. With the exception of Guiana they have all rebelled against the mother countries and established republics.

Very early in their history missions and schools were established by Roman Catholic priests in these South American countries, and the Roman Catholic is, at the present time, the religion of nearly all South America.

The chief industries in South America are *herding*, *agriculture*, and *mining*. The chief pasture lands are, as already mentioned, the llanos of the Orinoco and the pampas of Argentina. The valleys of the La Plata River system, the south-eastern part of the Brazilian plateau, and the river valleys along the northern coast of the grand division, are the chief agricultural regions. In the Torrid zone, *coffee*, *corn*, *sugar*, *cotton*, *cocoa*, *cassava*, *tobacco*, and *rubber* are produced; in the temperate zone, *wheat*, *corn*, and *barley*. *Gold*, *silver*, and *copper* are mined in the Andes region; but the chief mineral product is *nitrate of soda*, useful as a fertilizer and in making gun powder. This is obtained from old lake beds on the dry western slope. In the eastern highlands also some gold is found.

Most of the foreign trade is with the United States and Europe. The former country gets most of its coffee and rubber and many hides from South America, and sends in return flour and some manufactured goods, for there is very little manufacturing done in South America. Most of the South American imports come from Great Britain, Germany, and France, to which countries wool, beef, mutton, wheat, coffee, gold, silver, nitrates, and forest products are exported in return.

Where are most of the railways of South America? These carry the agricultural and animal products to the sea ports, while the railways in the north and west carry the products of the mines to the coast.

Where is the continent crossed by a short railway? Though short it is one of the most important railways in South America. Why? In the south

another transcontinental road is completed with the exception of a few miles in the Andes, there being no pass through that range sufficiently low. In the central region, the Amazon with its tributaries is the great commercial route by which rubber and other forest products are carried from the very base of the Andes to the mouth of the river.

#### ORAL AND WRITTEN EXERCISES.

What was the former condition of the Indians of South America? What the present condition? In what countries did the Spaniards settle? The Portuguese? What languages do the people of South America speak? What is the form of government in most of the countries? Which country is different in that respect? In what country do many negroes live? From what continent did they come?

#### 66. Brazil and Guiana.

Where is Brazil? Describe its surface. What great river runs through it? In what zone is it? Name the countries that border it.

Brazil is particularly noted for the production of *coffee*. About half the coffee used in the world is produced in Brazil. It also exports *rubber*, *cotton*, *sugar*, *tobacco*, and *hides*.

The coffee tree bears a beautiful purple berry containing two seeds. The ripe berries are picked two or three times a year and thrown into vats where the pulp is separated from the seeds by washing. The seeds are then dried, packed in sacks, and sent to market as coffee. The coffee plantations are mostly in the plateau region of southern Brazil.

The *rubber* trees grow in the silvas of the Amazon.



Collecting Sap.



Smoking Rubber.

An Indian cuts a gash in the bark of a rubber tree and fastens a little cup to catch the milky juice as it slowly trickles out. He collects the sap, and builds a fire of palm nuts. Dipping a wooden

paddle into the sap, he holds it in the smoke of the burning nuts until the sap becomes hard and elastic. This hardened sap is the rubber of commerce which is used for so many purposes.

The *Brazil-nut* tree and the *cacao* tree also grow in the silvas. From the bean, which is the fruit of the cacao, *cocoa* and *chocolate* are made. *Manioc*, a root from which tapioca is prepared, grows in Brazil. The Amazon valley has valuable forests of *mahogany*.

*Rio Janeiro* is the capital and largest city of Brazil, and is situated on a little river of the same name. The name means "River of January," and is so called because it was discovered one summer day in January. This city has one of the few fine harbors in South America and ships much coffee. It is the second city of South America in size.

*San Paulo*, west of Rio, situated in the coffee region, is the educational centre of Brazil.

*Santos*, the port of San Paulo, ships more coffee than Rio, mostly to Europe.

*Bahia* and *Pernambuco*, each about as large as Toronto, are the ports of the sugar and tobacco district.

*Para*, at the mouth of the Amazon, is the great rubber shipping port.

*Maranhao* ships raw cotton.

GULANA.

What countries border Guiana? To what European nations does it belong? What is the chief town of each division?

Sugar raising and gold mining are the chief occupations in British and Dutch Guiana, and both of these articles are exported. Cocoa is also exported. French Guiana has little trade, as it is used by France as a place to which criminals are banished.

ORAL AND WRITTEN EXERCISES.

What is coffee? Name the chief coffee ports. What is rubber? How is it gathered? Name some of its uses. Name the other chief products of Brazil and Guiana.

67. Argentina and La Plata Countries.

In what zone are the pampas? What river system drains this plain? In what direction does the plain slope? What mountains are west of it? What three countries are in this plain? Which is the largest? Which has no sea coast?

Next to Brazil, Argentina is the largest and richest country of South America. Every year many thousand people come from Europe, mostly from Italy

and the other warm southern countries, to make their homes in its grain-growing lands. There are now more white people in Argentina than in any other country of South America.

The herds of *cattle* and *sheep* form the chief wealth of the country, and great quantities of *live cattle*, *packed meats*, *beef extract*, *tallow*, *hides* and *wool* are shipped to Europe.

The herdsmen of the pampas are called *gauchos*, and are of mixed Spanish and Indian blood. There are no better horsemen in the world, and none more skilful with the lasso.

The farms are mainly in the river valleys in the north, from which the wheat can easily be carried to the markets by vessels; but railways have been built to many of the farming districts. Argentina has more miles of railway than any other country of

South America. Argentina is one of the greatest wheat-growing countries of the world, and exports large quantities of this useful grain, mostly to Great Britain and France.

*Buenos Ayres*, the largest city of South America, is nearly four times as large as Toronto, and is the great sea port of



Gauchos Lassoing Cattle.

the republic and of nearly the whole Plata valley. *Rosario*, *Cordova* and *Tucuman* are much smaller trade centres.

URUGUAY.

Though the smallest republic in South America, Uruguay ranks fourth in the value of its foreign commerce. Its industries are the same as those of Argentina.

*Montevideo*, the capital and chief commercial city, is about as large as Toronto.

PARAGUAY.

Paraguay has no sea coast. Cattle raising is an important industry, but the country is too warm for sheep. An important industry in Paraguay is the gathering, curing, and stripping of the leaves of a kind of holly, called *mate*, which are widely used in place of tea in all the southern part of South America. Lumbering is carried on in the extensive forests.

*Asuncion*, the capital, is the chief trade centre.

## ORAL AND WRITTEN EXERCISES.

Name the rivers of the system which drains Argentina, Uruguay and Paraguay. In what part of Argentina is the rainfall defective? What are the chief animal and vegetable products of each of the La Plata countries? Where does a railway penetrate but not cross the Andes?

## C. Andean Countries.

## CHILE.

What countries are east of Chile? What mountain peak is near the centre of its eastern boundary? It has an elevation of about  $4\frac{1}{2}$  miles and is the highest point of the Western Continent. What differences are there in the rainfall and temperature of northern and southern Chile? (See page 110).

There are many short streams flowing down the western slope of the Andes in Chile. In the fertile valleys of these streams are many farms. Much of the waters of these streams is used in irrigating the farms. The mountain slopes of southern Chile, where the rainfall is abundant, are covered with heavy forests, and lumbering is becoming an important industry.

In the warm northern deserts, mining is the chief industry. *Silver, gold, and copper* are mined; but the chief mineral product is *nitrate of soda* or Chile saltpeter, which is dug from old lake beds in the north.

Although not the most populous country, Chile is probably the most powerful country of South America. Its schools and colleges are excellent.

*Santiago*, the capital and largest city, is about fifty miles inland and almost half a mile above the sea. It was founded within fifty years after the discovery of America, and is, therefore, older than any city in Canada or the United States. Because of earthquakes, the houses, as in all other cities of the Andean region are low, and the streets wide.

*Valparaiso* is the largest sea port on the Pacific coast of South America. A railway runs from this city to the Andes to within a few miles of one on the east of the Andes from Buenos Ayres.

*Iquique* is the port from which most of the minerals are shipped. Why?

## BOLIVIA.

What countries border Bolivia? In what respect is Bolivia different from all other South American countries except Paraguay?

The eastern range of the Andes is wide and

exceedingly rugged in Bolivia. Several of its vast volcanic cones are nearly as high as Mt. Aconcagua. In these mountains are mined great quantities of *silver* and *tin*. On the plateau *wheat, corn, barley, beans, and potatoes* are raised for local consumption, and *cattle, sheep, and llamas* are herded. The *cinchona* tree, from the bark of which quinine is obtained, grows on the eastern slope of the Andes, as well as *cacao* beans and *rubber*, all of which are exported by way of the Madeira and Paraguay rivers.

Find Lake Titicaca. It is nearly half as large as Lake Ontario. Travellers now cross it in steamboats, but the natives use boats woven of rushes. On an island in this lake was a magnificent temple of the Incas.

*La Paz*, or "the pass," is the largest city of Bolivia. It is built in a deep gorge, through which Lake Titicaca once found an outlet into the Amazon system.

*Sucre*, near the rich silver mines of Potosi, is the capital.

## PERU.

What countries border Peru? What great river rises in Peru? In what three climatic regions does Peru lie?

Few people live on the desert coast because it is so dry, or in the inland forests, because they are so wet. Much *sugar* and *cotton* are

grown, by the aid of irrigation, in the valleys of the western slope. On the plateau *silver* is mined, the same kind of food plants are raised as in Bolivia, and *llamas, alpacas, and goats* are herded. On the east slope, *rubber, cacao beans, and cinchona* are gathered. There are *petroleum* wells in the north, and extensive deposits of *guano* along the dry coast and on the Chincha Islands. This guano is exported to Europe to be used as a fertilizer.

The Incas lived on the high plateaus of the Andes in Peru. Where is Cuzco? It was the capital of the Inca empire, and was surrounded by high walls of stone. Within was the Temple of the Sun, to which pilgrims came from all parts of the empire. After a savage war the Spanish conquered the Incas, so that, little by little, their great empire melted away. But a few of their descendants still live in this region. They are skilful weavers of woollen



Native Huts, Bolivia.

cloths, and own large herds of llamas and cattle.

*Lima*, the largest city, is about half the size of Toronto. What is its sea port?

*Arequipa* is an important railway town, more than one and a half miles above the sea.

#### ORAL AND WRITTEN EXERCISES.

In what zones is Chile? Bolivia? Peru? Why is the coast of Peru and northern Chile very dry? Where is nitrate of soda found? What is its source? Who were the Incas? What were they noted for? Where are large deposits of guano found? Where are the chief mining regions? Where does the cinchona tree grow? What is its use? Why are houses in Andean countries low and the streets wide?

#### ECUADOR.

What countries border Ecuador? Name two volcanoes in Ecuador.

Ecuador is the smallest country of the Andes, and has but little commercial importance. *Cacao* is cultivated on the Pacific slope, and *cocoa* is the chief export, though some *coffee* is exported.

*Quito*, the largest city, is nearly as large as Lima. Though situated nearly at the equator, it has a delightful climate on account of being two miles above the sea. Eleven snow-capped mountain peaks can be seen from its public square.

*Guayaquil* is the chief sea port.

#### COLOMBIA.

By what countries and waters is Colombia bordered? What isthmus connects it with Central America?

The western part of Colombia is a mass of mountains, the Andes dividing into three ranges; the eastern part is in the great central plain.

Most of the people live in the upper valleys of the Cauca and Magdalena rivers. On the hot lowlands *cassava* and *bananas* are cultivated; at more temperate elevations *corn*, *potatoes*, *tobacco*, and *cacao*; and on the cool highlands, *wheat*, *oats*, *potatoes*, and *beans*. *Herding* is an important industry. Much *gold* and some *silver* are mined and exported.

A very important railway crosses the isthmus of Panama in Colombia. What are its termini? Immense sums of money have been spent in attempting to dig a ship canal across the isthmus, and the work is still in progress.

*Bogota*, on the healthful highland, is the largest city. It is about half as large as Montreal.

*Medellin* is the centre of the chief gold-mining region.

*Baranquilla* is the great receiving and shipping port for Colombian trade.

*Aspinwall* or *Colon*, on the Caribbean Sea, and *Panama* on the Pacific, are important because they are the termini of the Isthmus railway.

#### VENEZUELA.

What countries border Venezuela? What river drains it? What lake is at the north?

Venezuela contains part of the eastern chain of the Andes and all the valley of the Orinoco.

Many years ago a Spanish sailor found in Lake Maracaibo, a village whose houses were built out in the water on posts. He called the village *Venezuela* or "little Venice," and this became the name of the whole country.

Most of the people in Venezuela live on the high slopes of the Andes in the north. On the uplands excellent "Maracaibo" *coffee* is grown for export. Some *hides* are exported from the llanos; from the southern forests some *rubber* and *dyewoods*; and much *gold* from the south-east.

*Caracas*, the largest city and capital, is more than half a mile above the sea, and is connected with its port La Guaira, by a railway eight miles long.

*Valencia*, also on the uplands, and *Maracaibo*, the only large town on the unhealthy lowlands, are trade centres.

#### ORAL AND WRITTEN EXERCISES.

Name the Andean countries north of Chile and give their capitals. Describe the climate of the eastern slope of the Andes in these countries and that of the western slope. Why are they so different? Where are the Andes highest? Where broadest? What are the chief products of these northern Andean countries? Where are the llanos? What source of wealth do they yield? What plateau of South America corresponds in position to the Laurentian highland of North America? Compare the Brazilian plateau with the Appalachian plateau in size and position. What three large rivers drain the Atlantic slope of South America? With what rivers of North America do they correspond in position? How does the Amazon compare with the Mississippi in length? In volume of water? Which basin has the greatest rainfall?



Interior of a Silver Mine.





**EURASIA.**

**69. Position, Size, etc.**

What continent lies east of the Atlantic Ocean? The larger part of this continent lying to the north and east is called *Eurasia*. What is the remaining part on the south-west of the Eastern Continent called? What isthmus joins these two grand divisions? What circle crosses the northern part of *Eurasia*? The southern part? In what zones then is *Eurasia*? What other grand division lies in three zones? Find the Ural Mountains. Into what two parts is *Eurasia* divided by these mountains? (See Relief Maps of Europe and Asia).

What oceans are on the north, south and east of *Eurasia*? What two seas lie between *Eurasia* and Africa? What strait connects the Mediterranean Sea with the Atlantic Ocean? The Red Sea with the Indian Ocean? What strait separates Asia from North America?

What is the general direction of the great mountain system of America? In *Eurasia* the great highland or chief mountain system extends from Behring Strait to the Strait of Gibraltar. At first the direction of this highland is from north-east to south-west. Find the Pamir Plateau. This is the highest plateau in the world. In this region the highland makes a great bend and then proceeds in a north-westerly direction. Find the Himalayas. These are the highest mountains in the world.

To the south and east this highland region extends nearly to the ocean. North and west of the highland is a great plain extending to the Arctic and Atlantic oceans. This great northern plain is broken by a low range of mountains which forms the boundary between Europe and Asia. What is the name of this range?

For Africa, Asia, Europe, and America, see pages 114, 115, 116, and 117 respectively.

South and west of the Ural Mountains lies a depression containing two large salt seas. What are their names? Some of the rivers draining the great northern plain flow southward into these seas; but many flow northward to the ocean. The largest of these rivers are in Asia. Why are they of little use for commerce?

Eurasia contains more than three-fourths of the population of the whole world. Where do the people of the yellow race live? Where the brown race? By what other names are these races known? The eastern part of Asia is mostly occupied by these two races.

The people of the white race live south of the Himalayas and about the western arm of the great highland. The Europeans are highly civilized white people, from whose ancestors most of the people of America are descended.

#### ORAL AND WRITTEN EXERCISES.

In what hemisphere is Eurasia? What four oceans border it? How does Eurasia compare with America in size? In what direction is Eurasia longest? In what general direction does its great highland extend? Do the highlands of North and South America extend in the direction of the greatest length of those grand divisions? In what respect are the highlands of Eurasia and America alike? In what respect are they different? Where is the great plain of Eurasia? How does this plain compare with the great plains of America in direction of greatest length? Name the chief rivers of the great northern plain of Eurasia. Does any part of this plain slope southward? How do you know? Name the chief rivers of Eurasia that flow to the Pacific and Indian oceans.

## EUROPE.

### 70. Position and Coast Line.

What part of Eurasia is called Europe? What circle crosses it in the north? In what two zones then is Europe? What grand division is south of Europe? What large sea lies between Europe and Africa?

The climate of Europe, as a whole, is much warmer than that of North America in the same latitude, for the western winds from the warm Atlantic penetrate far into Europe. What causes the Atlantic to be so warm?

The northern and north-eastern parts of Europe, however, are very cold. Find the Scandinavian Peninsula. Many valleys of this peninsula are filled with glaciers; and farther east the northern part of the great plain is covered with snow during most of the year.

Find three peninsulas in the south. The sheltered valleys of these peninsulas are very warm because hot winds from Africa blow freely over them, while

the cold northern winds cannot reach them. Why. This part of Europe is probably the greatest fruit-growing region of the world.

The coast line of Europe is very irregular, forming many peninsulas, with gulfs, bays, or seas between them. What sea in the north of Europe? What sea in the west of Europe? What sea opens into the North Sea? What bay is west of Europe? What seas open into the Mediterranean?

All these waters give Europe a very long coast line, and, as they extend far inland, no part of the grand division is very far from the sea. In consequence, the people of Europe have always been great sailors and traders.

What group of large islands is west of the North Sea? You have already learned that these islands are the home of our ancestors and the centre of the great British Empire, of which we form a part. What strait separates the largest of these islands from the mainland? Name the largest islands in the Mediterranean Sea. What sea opening into this sea



Iceland Geysers.

contains many small islands? A group of islands is sometimes called an *archipelago*. This particular group is generally called *The Archipelago*. What island is north-west of the British Islands in the Atlantic? This island is of volcanic origin and contains an active volcano, Mt. Hecla, and many geysers or boiling springs.

RELIEF.—Beginning at the Caucasus Mountains on the east, the great Eurasian highland extends

through the south of Europe to the Spanish Peninsula. Its highest mountains in Europe are the Caucasus and the Alps. The highest parts of these ranges are always covered with snow and many great glaciers creep slowly down their valleys. Between these two ranges are the Carpathians and westward of the Alps are the Pyrenees. The Spanish Peninsula is a plateau, an extension southward of the great highland. What branch extends southeast from the western end of the Alps? What peninsula does it form? What range extends southeast from the eastern end of the Alps? What peninsula does it form? The three southern peninsulas of Europe are really then plateaus or spurs from the Eurasian highland.

The Kiolen Mountains in the Scandinavian Peninsula are a low range rising abruptly on the west from deep bays, or fiords, but sloping more gently on the east towards the Baltic Sea.

Where is the great northern plain widest in Europe? Where is it very narrow? What mountains divide the European part of the plain from the Asiatic part?

Along what range of mountains lies the continental divide of North America? Trace in Europe a line between the sources of the rivers, flowing north and west, and the sources of those flowing south and east. This line is the continental divide of Europe. In what direction does it extend? Where is it high? What part of it is quite low? The divide is so low here that canals connect nearly all the rivers of Russia, flowing south, with those flowing north so that a vessel can pass easily from the Baltic Sea to the Black or Caspian Sea.

**DRAINAGE.**—What rivers of Europe flow into the White Sea and Arctic Ocean? The region drained by these rivers is the coldest part of Europe, the land being frozen to a great depth, thawing during the short summer only on the surface. Name two lakes in this northern part of Europe. Name a river flowing into the Baltic. Name a river which rises in the Alps and flows into the North Sea. The region at the mouth of this river is very low, the sea in many places being kept from the land by means of dykes. Name one river flowing into the English channel and one into the Bay of Biscay.

What river flows southward into the Caspian Sea? This is the largest river of Europe, and one of the most important for commerce in the world. Goods are shipped from the Volga basin, and by means of the canals mentioned above, are carried to ports on

the Baltic and Gulf of Finland. What other river flows into the Caspian Sea? This sea is about eighty feet below the level of the ocean and consequently it has no outlet and its waters are salt.

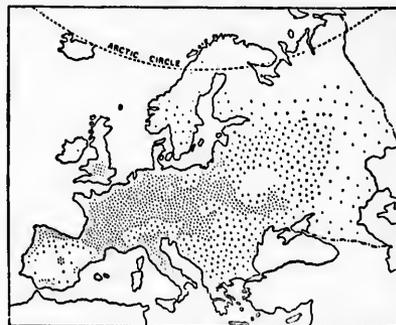
What two rivers flow into the Black Sea? The Danube flows through a gorge between the Carpathian and Balkan Mountains, which is called the Iron Gate. What two rivers flow into the Mediterranean from the Alps? What river of the Spanish peninsula flows into the Mediterranean?

The northern part of Europe, like that of North America, contains many lakes. This is a great region for hunting and fishing. Among the Alps Mountains, also, there are many lakes, comparatively small but noted for their great beauty.

Like North America, the northern part of Europe was covered at a time long past, with immense glaciers. The northern lakes as well as those of the Alps region are probably the result of the work of these glaciers.

#### ORAL AND WRITTEN EXERCISES.

Name the chief peninsulas and indentations of Europe. What is the position of the highlands of Europe? What relation do the southern peninsulas bear to the highlands? What mountains and river form the boundary between Europe and Asia? What part of Europe was covered by glaciers? Where are glaciers still found in Europe? Name the rivers of the north-western slope; of the south-eastern slope (1) of the Caspian basin; (2) of the Black Sea basin; (3) into the Mediterranean. Where are the lakes of Europe?



THE DOTS SHOW WHERE THE MOST PEOPLE LIVE.

#### 71. People, etc.

Although Europe is one of the smallest of the grand divisions, it is so thickly settled that Asia only of all the grand divisions exceeds it in population. While Europe is about the same size as Canada it contains more than sixty times as many people.

From the map above find what part of Europe is most thickly settled. What part is thinly peopled? The people of Europe are highly civilized, especially

in the more thickly settled parts. They have telegraph lines, railways—steam and electric—and are connected with the other grand divisions by means of telegraph cables on the bottom of the ocean.

It was about four hundred years ago that white men first came to America from Europe. The ancestors of the people of Europe lived in that grand division thousands of years ago. When white men first came to America they were civilized; but two thousand years ago most of the white people of Europe were savages something like our North American Indians.

The first part of Europe to be civilized was the Greek peninsula, perhaps about three thousand years ago. The *Greeks* were afterward conquered by the *Romans* of the Italian peninsula. The Romans in turn became highly civilized. They raised great armies, built great cities and splendid roads, and conquered all western Europe. They also conquered northern Africa and the western part of Asia. On the map of Europe find Spain, France, and England. The Romans conquered these countries and ruled them well for a long time. Draw a line from the east of the country called Belgium to Greece. All the countries south-west of that line were conquered by the Romans. In time the people of these countries spoke the same language as the *Romans*—the *Latin*. The languages of these countries are still much alike and they all bear some resemblance to the Latin. For this reason the south-western part of Europe is called Latin Europe, and the languages are called *Romance* languages. Draw another line from Greece to the east of Sweden. The region lying between these two lines was not conquered by the Romans, and from it poured forth the *Gothic* or *Teutonic* savages who conquered the Roman Empire. They soon learned civilized ways from the conquered people, and, being fewer in numbers, they soon spoke the same language—the Latin.

Where is Norway? Sweden? Denmark? The savages of these countries were called Northmen. They were pirates, who sailed about the neighboring seas, plundering and murdering the people in the more civilized lands. Some of these conquered Britain and were the ancestors of the English. This central part of Europe, from which these conquering Goths came, is called Gothic, Teutonic, or Germanic Europe. The people of these countries, and of the British Isles, all speak languages somewhat like German, and very different from the Romance languages.

Where is Russia? This was the last part of Europe to become civilized. Find Bulgaria and Servia. The languages of these two countries and that of Russia resemble each other and are called Slavonic languages; they are quite different from the other languages of Europe.

Find Turkey. The Turks belong to the yellow race, and are hardly considered to belong to the civilized nations of Europe.

Thus, although Europe has many countries, each having a language of its own, different from that of its neighbors, it may be divided into three parts by means of its languages: Middle or Teutonic Europe; South-western or Latin Europe; and Eastern or Slavonic Europe. In each of these parts the people are somewhat alike, not only in their language, but also in their manners and customs, in their religion, and often in their general appearance. Thus, while the people of Europe, except the Turks, are Christians, the people of Latin Europe are mostly Roman Catholics, those of Middle Europe are Protestants, and those of Eastern Europe mostly belong to the Greek Catholic Church.

VEGETATION.—The vegetation of Europe is similar in character to that of North America. The Arctic coast is bordered by dreary *tundras* in which mosses and lichens form the principal vegetation. South of the tundras is a broad belt of forest composed chiefly of cone-bearing evergreen trees, such as larches, pines, and firs. This forest belt is broken by many treeless areas and swamps covered with thickets of birch and willow. In the south-western part of this belt are fine forests of oak, beech, and other hardwood trees. Many years ago this forest belt extended westward to the Atlantic; but it has long since been cleared away from the fertile lowlands in that region. On these cleared lands the common food grains are cultivated even very far north, barley being grown almost to the northern extremity of the Scandinavian peninsula. Where is France? The vine is grown very extensively in that country. South of the highland in the Spanish, Italian, and Greek peninsulas, the sub-tropical fruits—figs, olives, lemons, oranges—grow in abundance.

ANIMALS.—The animal life of Europe also is very similar to that of North America. Since so much of Europe is under cultivation, the larger and more formidable wild animals are not plentiful; the wild boar, wolf, lynx, fox, and bear are found wherever there are large forests; in the Carpathians and in

Russia especially the wolf is found. The white bear is found on the Arctic coast; the brown bear in the Pyrenees, Kiolen, and Carpathian Mountains; the wild boar in the southern uninhabited regions.

The elk is found in Scandinavia and Russia; the chamois is common in the Alps. Fur-bearing animals, like the ermine or the marten, exist only in the north. Domestic animals are everywhere abundant; even the camel is found in the south-east. Birds are very numerous; the song birds of Europe surpass those of all other parts of the world. Sea-birds, whose feathers and eggs are important articles of commerce, are innumerable on all the islands and coasts of the north-west. The serpents are harmless, except the adder and spotted snake; no large reptiles exist. Fish abound in all waters; sardines in the south-west, herring and cod in the north-west, and salmon in all the rivers and inlets. Oysters are found in the north-west waters but they are inferior to those of America. In the North Atlantic and in the Arctic, whales are numerous. Seals, though becoming scarcer, are found on the shores of all European seas, including the Baltic and the Caspian.

#### ORAL AND WRITTEN EXERCISES.

Where is the population of Europe most dense? Where least? How does the population of Europe compare with that of the other grand divisions? Sketch the spread of civilization in Europe. How does the number of languages in Europe compare with the number in North America? Name the two languages mostly spoken in North America. What are the three great divisions of Europe? In what respects are all the countries of each division alike? To which of these divisions did the Northmen belong? From what countries did they come originally? What other countries have since been settled by them? Where are the forests of Europe? What are the principal trees? Where are figs grown? Oranges? Grapes? What wild animals are still found in Europe? Where? What valuable fish are found in European waters?



1. ERMINE. 2. SABLE. 3. SNOWY OWL. 4. REINDEER. 5. BARN OWL. 6. ELK. 7. WOLF. 8. FOX. 9. BROWN BEAR. 10. IBEX. 11. CHAMOIS. 12. WILD BOAR. 13. LAMMER-GEIER.

## UNITED KINGDOM OF GREAT BRITAIN AND IRELAND.

### 72. Historical, etc.

This kingdom includes all the British Isles. These contain altogether about five thousand islands. Name the largest island; the next in size. By what waters are these islands separated? Name two small groups off the north coast of Great Britain; one group off the north-west coast. What group of islands, belonging to Britain, lies off the coast of France? What island is off the south coast? What island is in the Irish Sea?

Name three great indentations of the east coast of Great Britain; four of the west coast; three of the west coast of Ireland.

What three countries are included in the island of Great Britain? Name four rivers of England; two of Scotland; three of Ireland.

England, Wales, Scotland and Ireland were at one time, separate nations. Now they form the United Kingdom of Great Britain and Ireland.

Canada, the Australian continent, a large part of Asia, and about one-third of Africa belong to this small but rich and powerful kingdom. The United Kingdom and all the colonies are together called the British Empire.

In the United Kingdom, the people choose the men who make the laws. These men when assembled together are called the *parliament*. The king or queen appoints men to see that the laws, made by the parliament, are obeyed. The ruler is not chosen as a president is. He holds his place as long as he lives, and when he dies one of his children or other near relatives becomes the ruler. A government in which the



ruler holds the position because of his birth is called a *hereditary monarchy*, and where, as in the United Kingdom, the laws are made by men chosen by the people, it is called a *limited monarchy*.

**PHYSICAL FEATURES.**—The main physical features of the two larger islands are somewhat similar—on the west a mountainous district, constituting as it were a "backbone" running from north-east to south-west; and on the east and south a district generally lowland in its character, varied, however, by elevations. In the larger of the two islands irregular masses of mountains and mountainous land occupy most of the north and west of Scotland. What range crosses Scotland from east to west? East and south of the *Highlands* is an irregular plain, called the *Lowlands*, in which, however, are several low ranges of hills. What range forms part of the boundary between Scotland and England? The mountains of Cumberland and Westmoreland and the Pennine Range continue the backbone in England as far south as the Peak in Derby. Here it turns to the west and covers most of Wales. It is continued into England again in low ranges which turn toward the west, terminating at last in Land's End in Cornwall. The highest peak in Great Britain is Ben Nevis in Scotland (4400 feet) and the highest in England and Wales is Snowdon in Wales (3570 feet).

In Ireland the western backbone is not continuous as it is in Great Britain. It occurs in detached mountain masses under different names. Find some of these.

Apart from these mountainous districts, England is, in the centre and south, generally undulating in surface, but in the east it is for the most part a low plain with a good deal of marshy or *fen* country; Scotland is generally hilly with a few large valleys or "*straths*;" and Ireland is, in the north and south, generally hilly, but its whole central plain is occupied by a low undulating plain stretching from shore to shore, and containing many bogs and lakes.

The outline of the islands is very irregular, especially in the west, there being many bays both large and small, affording splendid harbors. The *estuaries*, or wide mouths of the larger rivers, usually afford good harbors for the largest ships.

**DRAINAGE.**—Owing to the great rainfall and the favorable position of the mountain ranges, the British Islands are drained by numerous rivers, and many of these are suitable for navigation. In Great Britain most of the rivers flow from the main mountain

range to the east and south. Find the *Severn* and the *Clyde*. These two break through the mountain chain and flow westward. The rivers of England are connected into one system by a network of canals; in Scotland the Forth and the Clyde are joined by a canal; and so are Moray Firth and Loch Linne (by the Caledonian canal); and in Ireland, also, there are several canals joining the larger rivers.

Lakes are not numerous in England and Wales; *Windemere* and *Derwentwater* in the "lake region" are the most important. Find them. This part of England is noted for the beauty of its scenery. In Scotland "lochs" or lakes are numerous, especially in the highlands. Find *Loch Katrine* and *Loch Lomond*. The latter is the largest lake in Great Britain. In Ireland there are many lakes all over; not confined as in the larger island to the mountainous districts. Find *Lough Neagh*. This is the largest lake in the British Islands.

**CLIMATE.**—Surrounded by water and exposed to the south-west winds blowing over the warm waters of the Gulf Stream, the British Islands have a very equable climate. Neither the heat of summer nor the cold of winter is sufficient to prevent almost all kinds of labor being carried on out doors all the year round. The eastern part of each island is less equable than the western, and the northern part although as equable as the southern has a somewhat lower mean temperature.

The climate is everywhere moist, but it is especially so in the west of both islands, over a hundred inches of rain falling annually in the mountains of Wales and Cumberland. In some parts of eastern England, however, the annual rainfall hardly exceeds twenty inches. Snow, nowhere deep, is almost unknown in the south, especially in the Isle of Wight and the south-west. Compare the climate with that of Labrador, in the same latitude.

**SOIL AND PRODUCTIONS.**—The lowland districts are, on the whole, covered with a good depth of fertile soil, while a great deal of the hilly ground affords good pasturage for sheep. In England and Wales more than three-fourths of the land is available for cultivation, but more than half of this is fit only for pasturage. In Scotland only one-fourth of the soil can be cultivated and one-half of this must be given to pasturage. In Ireland nearly three-fourths is suitable for cultivation, but owing to the excess of moisture and rain, especially in the west and south, grain crops cannot be grown.

The British Islands were at one time well covered





with forests, but most of these have been cleared away. In England there is still some woodland in protected "forests;" in the Highlands of Scotland extensive forests of Scotch fir remain. In Ireland nearly all the forests have been destroyed, and wood is scarce. The principal crops are: in Great Britain—oats, barley, turnips, wheat, potatoes, beans, and peas; in Ireland—oats, potatoes, turnips, barley, and wheat. Grass for pasture and for hay is very extensively grown in western England, in the more elevated districts of the Lowlands, in the Highlands of Scotland, and in Ireland. For the supply of the vast populations of the manufacturing cities and towns of England and Scotland, immense quantities of garden vegetables are raised, especially in the district about London, and in the southern and eastern districts generally.

**MINERALS.**—In minerals, Great Britain is particularly rich, not in the precious metals, gold and silver, but in the more useful metals—iron, copper, tin, lead, and zinc—and in coal, porcelain clays, and salt. On account of the abundant stores of coal and iron very close to each other in both England and Scotland, these countries lead the world in arts and manufactures. These minerals are found and worked to the greatest extent in Wales, the north of England, and the southwest of Scotland. Find Cornwall. Tin is found there; copper also is found there and in the neighboring county of Devon. Lead is found in the north of England and in Wales. Zinc is found in Wales and in the west of England. Find Chester. Salt is found there, being obtained by mining and by evaporation of the brine as in Western Ontario. Ireland possesses immense stores of iron, but on account of coal not being found near, these stores cannot be profitably utilized. Ireland has some coal fields also, but they only produce about one-tenth of the quantity used in the island. Peat is largely used for fuel by the peasants of Ireland. Granite, marble, and slate are found in the Highlands of Scotland chiefly.

### 73. People, Subdivisions, etc.

The English and Lowland Scotch mostly belong to the Teutonic or German race, and are descended from the Saxons and other tribes, who conquered the ancient Britons in the fifth and sixth centuries. The Welsh and Cornish are mainly of the Celtic race, being the descendants of the ancient Britons. The Irish and Highlanders of Scotland also, are mainly of the Celtic race, being descended from

tribes akin to the ancient Britons. The population of England and Wales has increased very rapidly, and now it is one of the most densely populated countries in the world. The population of Scotland has also increased considerably; that of Ireland, however, has diminished, being less than half what it was in 1845.

**SUBDIVISIONS.**—England is divided into forty counties; Wales into twelve counties; Scotland into thirty-three counties; and Ireland into thirty-two counties. Ireland is also divided into four provinces: Ulster, Leinster, Munster, and Connaught. Find them. The general term "shire" is frequently added to the names of the counties of Great Britain; thus, "Yorkshire," "Devonshire," etc.

**INDUSTRIES.**—Nowhere are the occupations of the people more varied than in the British Islands. The chief industries are *manufactures, mining, commerce and agriculture*. Owing to the immense quantities of valuable food fish in the waters surrounding the islands the *fishing* industry is important in England, Scotland, and Ireland.

**MANUFACTURES.**—Great Britain is the most important *manufacturing* country in the world. In northern and western England the factories are so close together that the region seems a never-ending city of factories, furnaces, and mills, in which is made everything that can be made of iron or steel, cotton or wool. Many thousand steamships and sailing vessels carry the manufactured goods to other parts of the world and bring back raw materials and food. The leading manufactures of the United Kingdom are *cotton, woollen, iron, and silk goods; linen, carpets, chemicals, and earthenware*.

Cotton goods are mostly made in Lancashire, Cheshire, and neighboring counties, and Scotland. Raw cotton is chiefly imported from the United States, East Indies, Egypt, and Brazil.

Woollen goods are made in Yorkshire and in a few towns in the west of England (Wiltshire, Somersetshire, and Gloucestershire), and in Scotland. Wool is mostly imported from Australia, New Zealand, Cape Colony, Argentina, etc.

Linen goods are made in Yorkshire, Scotland, and in the north of Ireland.

The iron manufacture is divided into three important branches: the smelting of ironstone, or manufacture of *pig-iron*; the manufacture of iron or *hardware*; and the manufacture of *Bessemer steel*. They are carried on in Lancashire, Yorkshire, and neighboring counties in England, and in Scotland.







British Houses of Parliament.

and coal, give rise to a foreign commerce nearly twice as great as that of any other country. The greater part of this commerce is carried on in British vessels, for Great Britain owns nearly half the shipping in the world.

The facilities for domestic commerce are nearly perfect. Railways are spread like a network over all England and the greater part of Scotland. Ireland, too, is well supplied with railways. Canals connect all the navigable rivers of England. Good macadamized roads are found everywhere.

The post office and telegraph system are under the control of the Government. Ireland is connected with Great Britain by lines of steam *mail-packets* and by submarine telegraph cables. Submarine telegraph cables also connect the British Isles with the United States and Canada, and with France, Belgium, Holland, and other countries of the world.

ARMY AND NAVY.—Great Britain has a small army compared with the large countries of the continent, but its navy is the greatest in the world. "A British war vessel is within a day's sail of every place."

#### 74. Cities and Towns.

*London*, on the Thames, about 40 miles from its mouth, is the largest city in the world. It is the world's greatest commercial and financial centre. The productions of all parts of the world are brought here and then distributed. The manufactures of London represent almost every kind of industry, the more important being the production of leather, clothing, boots, watches, silks, and pottery. It has also immense breweries, distilleries, and sugar refineries. It contains many very fine buildings, some of the most important being Buckingham

*Earthenware*, including *porcelain*, is chiefly manufactured in Staffordshire and in London.

*Shipbuilding* is an important industry on the Tyne, Mersey, and Thames, in England; on the Clyde in Scotland, and in the north of Ireland.

Some of the less important manufactures are *leather*, *glass*, *clocks* and *watches*, and *paper*.

AGRICULTURE.—*Agriculture* is the chief industry of the south and east of England and of Ireland. Although the soil of the British Isles is not very fertile, this industry is carried on with such skill that larger crops of the leading grains are produced there than anywhere else in the world. The total amount produced, however, falls far short of the needs of the dense population. The industries of *stock-raising* and *dairy-farming* are very important. British breeds of cattle and horses are prized all over the world, and are exported in large numbers to the United States and the Colonies for the purpose of improving the breeds in these places. In the Highlands of Scotland and in England large numbers of the finest *sheep*, both for wool and mutton, are raised.

COMMERCE.—The importation of the raw materials used in manufactures, and the necessary food supplies, and the exportation of manufactured goods

Palace, the Tower, St. Paul's Cathedral, Westminster Abbey, the Houses of Parliament, and the Law Courts. London is especially noted for its system of underground railways. Although it is so large, by its excellent sanitary arrangements, London is one of the healthiest cities in the world.

Near London is Greenwich, the seat of the Royal Observatory, from which longitude is reckoned. Woolwich, another suburb, has the largest arsenal in Great Britain.

Liverpool, on the Mersey, next to London in commerce and wealth, is famous for the vast extent of its docks, covering more than 1000 acres, and extending for miles along the estuary. It is the great shipping port of the manufacturing district. Most of the passenger traffic to America takes place through this port. Its chief industry is shipbuilding. Opposite Liverpool on the Mersey is Birkenhead, an important port, whose chief industry also is shipbuilding.

Manchester, with Salford is the centre of the cotton manufacturing trade. A ship canal connects it with Liverpool and makes Manchester a seaport. It is one of the great railway centres of the kingdom.

Birmingham is the chief city in the kingdom for all sorts of metal work, including firearms, swords, pens, jewelry, electro-plated goods, machinery, nails, screws, tools of all kinds, which are made in vast quantities and exported to all parts of the world.

Leeds is the great centre of the woollen manufactures, which are also largely carried on at Bradford.

Sheffield is the chief seat of the manufacture of cutlery, silver plate, and plated goods. Its cutlery has a world-wide renown.

Nottingham is famous for its lace manufacture.

Bristol, on the Avon, is one of the most important seaports in the kingdom. There are potteries in the neighborhood, and large sugar refineries. It trades with Canada, United States, West Indies, and the Mediterranean countries.

Hull, on the Humber, is the chief seaport for the North Sea and Baltic trade.

Newcastle, on the Tyne, carries on an enormous coal trade, and has large engineering works and shipbuilding yards.

Portsmouth, in the south of England, is one of the strongest fortresses in the world, and the first naval arsenal of the kingdom.

Southampton, near Portsmouth, is specially engaged in the West Indian trade as well as with the United States and Africa.

York, one of the oldest cities in England, is celebrated for its beautiful Minster, the finest cathedral in England. It is the residence of one of the two archbishops of England. Canterbury is the residence of the other archbishop.

Cardiff, in the south of Wales, is a seaport, with large exports of coal and iron.

Merthyr Tydvil, near Cardiff, is noted for its coal and iron mines, and for its iron works.

Swansea is the great centre for copper-smelting. Copper ore is imported from Cornwall, Spain, Canada, Australia, and other countries, to be smelted here.

Edinburgh, the capital of the former kingdom of Scotland, is situated near the Firth of Forth. It is divided into the Old Town and New Town. The former is very ancient, and is built on hills, which gives it a picturesque appearance; the latter is celebrated for its beauty, and for its numerous fine monuments and public buildings. Its university is one of

the finest in Europe. Leith, the seaport of Edinburgh, of which city it really forms a part, carries on a large trade with the Baltic and North Sea ports.

Glasgow, on the Clyde, the second city in the kingdom, is celebrated for its extensive commerce, its manufactures of machinery, cotton and other textiles, and shipbuilding.

Dundee, on the Tay, is the principal seat of the linen, hemp, and jute manufacture. Many of its ships are engaged in the seal and whale fishery.

Aberdeen is the principal city in the north of Scotland. It is built mostly of granite, and is noted for its granite-works, and shipbuilding. Near it is Balmoral, the favorite Highland residence of the Queen.

Paisley is famous for its manufactures of silk and woollen goods, muslins, silks, fancy goods, cotton, and thread.

Dublin, on the Liffey, the capital of Ireland, is a handsome city, with splendid public buildings and fine squares. Its manufactures are few, being chiefly of ale, beer, and distilled liquors. It has three universities. It has a large export trade. Kingstown, six miles eastward, is its port for mail steamers to England and for large ships.

Belfast, on Belfast Lough, is the second city of Ireland in size, but the first in manufactures, trade, and commerce. It is the seat of the linen trade, and has also cotton factories, glass works, iron foundries, and shipbuilding yards.

Cork, on the Lee, has a fine harbor, and a considerable foreign trade. Large quantities of cattle and provisions are exported. At the entrance to Cork harbor is Queenstown, which is the port of Cork for large vessels.

Limerick, on the Shannon, has a considerable export trade in cattle and dairy produce, and is noted for its fine lace and gloves.

Londonderry, a handsome city on the Foyle river, has linen and other manufactures, and does a large export trade. At Moville, which is the seaport of Londonderry, ocean steamers on the Atlantic route from Canada and the United States to Glasgow and Liverpool call to put off and receive their mails.

#### BRITISH POSSESSIONS IN EUROPE.

GIBRALTAR, a fortified rock on the south of Spain, commanding the entrance to the Mediterranean, is the strongest fortress in the world.

MALTA, with the neighboring islands of Gozo and Comino, is situated in the Mediterranean, south of Sicily. It is the naval station for the British fleet in the Mediterranean. The chief industry is farming, and the chief products are cotton, potatoes, oranges, figs, honey, and corn.

#### ORAL AND WRITTEN EXERCISES.

What is the position of the British Islands with respect to Europe? Name the principal islands and the divisions of the largest. In what respect are the surfaces of the two larger islands alike? How does the climate compare with the rest of Europe in the same latitude as to (1) heat (2) moisture? Why does Great Britain excel in manufacturing? How does Great Britain compare with other countries as to trade? Locate carefully all the cities named in the text. What cities carry on shipbuilding? Cotton manufactures? Cutlery? Name the chief ports of the British Isles. Where in each of the islands are the lakes? Why are cattle and sheep imported? From what countries of America does Britain obtain wheat? Cheese? Hides?

### 75. The German Empire.

What peninsula is north of the German Empire? What waters are on the north? What countries west? South? East? What river of the German Empire flows into the Black Sea? Into what seas do all the other rivers flow? In what direction then does most of the surface slope? Find the river Rhine. It is noted for the beauty of the vine-clad hills bordering it.

That part of the great northern plain sloping to the Baltic and North Seas is the home of the Germans. When first known by the Romans they were savage and warlike. Now they are noted as well for their learning as for their military skill. Many students from America go to the universities of Germany to pursue special studies which cannot be done so well anywhere else.

discovered that sugar could be made from beets as profitably as from sugar-cane, and now nearly all the sugar used in Europe is beet sugar. Beets are now grown for this purpose in Germany and other countries. The beet is sliced and put into hot water to extract the juice, which is boiled down and purified in the same way as the sap of the sugar-cane is. The part of the beet that is left makes good cattle food.

Germany is a great manufacturing country. She mines more coal and makes more iron and steel than any other European nation except Great Britain. *Woolen, cotton, and linen*



View on the Rhine.—Tower and Ruined Castles.

Not long ago, this country was divided into a number of small monarchies, but in 1871, after a great war between France and Germany, these were united into one great nation. Each little nation still takes care of its own local affairs, but the king of Prussia, the largest of the monarchies, is the head of the united German nation. The men who make the laws are elected by the people much as they are in Canada. The whole united nation is called an *empire*, and the ruler is called an *emperor*.

The Germans are very industrious. They cultivate carefully every bit of land capable of bearing crops; even the banks of the rivers are dug into terraces and planted with trees and vines. Much of the outside work is done by women and girls, because the boys go to school and the men must spend at least a year in the army. *Rye* is the chief grain used for bread; large quantities of *wheat, barley, and oats* are also grown. Potatoes, hay, and grapes are produced very extensively.

About a hundred years ago, a German chemist

cloth are also manufactured. Much of the most beautiful *lace* in the world is woven by Germans.

Commerce is very active. There are more railways in Germany than in any other country except the United States. Nearly all the rivers are navigable and connected by canals. Even the Danube is thus connected with the Rhine. There is also a large ship-canal through the isthmus of the Danish peninsula, connecting the Baltic and the North Seas. This canal is called the *Kaiser Wilhelm Canal*.

Find *Berlin* on the map. It is the third city in Europe in population. Which are ahead of it? Because of its museums, libraries, and institutions of learning, the Germans call it the "City of Intelligence."

*Hamburg* on the Elbe, and *Bremen* on the Weser, are the principal ports of Germany. Hamburg is one of the chief seaports of the mainland of Europe.

Find *Munich* and *Dresden* on the map. Both these cities contain famous collections of pictures, and fine porcelain is made in the neighborhood of Dresden.

*Leipsic* is famous for its great book-publishing houses.

Where is *Essen*? This city is the centre of the iron and steel industry.

On what river is *Cologne*? It is a great cotton manufacturing centre, and is famous for the *Cologne water* made there.

*Heidelberg, Halle, Leipzig, Bonn, Berlin, Göttingen* are famous for their universities.

### 76. The Netherlands.

What country is south and east of the Netherlands? What country is west? What river flows through the country? What arm of the sea extends into the Netherlands?

This country is also called *Holland*. Several hundred years ago part of this country was covered by the sea, but the people built dikes, or walls of earth, so as to enclose a shallow part. The water was then pumped out of the enclosed basin. The land thus gained from the sea, being very fertile, was soon cultivated, and yielded enormous crops. At the present time much of the land in the west and south-west of this country is below the sea level. The water that falls on it is pumped out into the sea by windmills. It is a curious sight to see the great arms of these windmills with their flapping sails.

The country in consequence is crossed by many canals. Some of the larger canals are navigated by boats and barges; the smaller ones serve to drain the land or as fences. In winter, when these canals are frozen over, everybody goes about on skates, and nearly all the trade is carried on over the ice.

The Netherlands is the home of the Dutch, a people related to the English and Germans. They are very industrious, and as farmers are not surpassed in the world. They raise *grain* and *potatoes*, but are best known for their *butter* and *cheese*. The Dutch are also famous for their *flowers*, and especially for the production of *bulbs*.

Find *Amsterdam*. It is surrounded by dikes. The houses are mostly built on piles, and many of the streets contain canals. Most of the diamonds from the mines of Africa are sent to this city to be cut and polished. It is the largest city in the Netherlands and one of the busiest sea ports in Europe.

*Rotterdam* is one of the greatest sea ports on the mainland of Europe. More than half of the foreign trade of the Netherlands passes through this port.

*The Hague* is the capital and residence of the queen.

#### ORAL AND WRITTEN EXERCISES.

Give the position and boundaries of the German Empire and of the Netherlands. Name the rivers of the two countries. Describe the dikes of Holland and explain their uses. What are the principal occupations and productions of each country?

### 77. The Norse Countries.

In what part of Europe is the Scandinavian peninsula? What two countries does it contain? What country occupies a peninsula and some islands south of Sweden? What strait separates Denmark from Norway? From Sweden? Between what seas is Denmark? What waters nearly surround Norway and Sweden?

Norway, Sweden, and Denmark are often called the Norse countries, because they were the homes of the Northmen. These fierce warriors overran England, Ireland and the north of France, and even visited America long before the time of Columbus. The deep bays along the coast of Norway now called *fjords* were then called *viks*. Hence these bold Northmen were called Vikings.

SWEDEN and NORWAY are separate countries, but they have the same king. The languages and the customs of the two peoples are very much alike. Each of the countries has its own parliament.

NORWAY is mostly a mountainous plateau, which extends to the west coast. At the head of the fjords, which indent this coast, glaciers descend to the sea.

SWEDEN slopes gradually to the east, and is covered with glacial drift. It abounds in lakes and waterfalls like Canada. Why?

Cattle, sheep, and grain are the chief farm products, but in Norway, where much of the surface is too rough for farming, the fisheries and the forests give employment to many people. The *cod* and *herring* fisheries of Norway are among the most important in the world. The *Norway pine* is one of the very best kinds of timber. Some of it is used at home for ship building, and much of it is exported to different parts of Europe. Sweden is noted for its *iron ore*, which produces the best of steel.

Many people in the United States and Canada are natives of the Scandinavian countries.

*Stockholm*, the capital of Sweden, and the largest city of the peninsula, is a centre of iron manufacture.

Where is *Gothenberg*? It has cotton and woollen manufactures, and lumber mills.

Find *Christiania*. It is the capital of Norway.

*Bergen* is the centre of a great fish trade.

#### DENMARK.

The surface of Denmark is low and sandy. The sand in the west is blown up by the wind into hills or *dunes* along the seashore. These are generally planted with grass, so that the roots shall keep the sand from blowing inland and covering the farms.

*Grain* is grown and *cattle* are raised on the islands; *cattle*, *horses*, and *sheep* are raised on the mainland. Denmark is celebrated for its *butter*, which, with *meat*, forms its chief export. Most of the trade is with Great Britain and Germany.

Find the *Faroe Islands*, north-west of the British Isles. These islands, with Iceland, Greenland, and some of the West Indies, are Danish possessions.

Find *Copenhagen*. On what island is it? It is the capital



Lapps and Reindeer

of the kingdom of Denmark, as well as the largest city. It is noted for its libraries, museums, and art galleries.

#### ORAL AND WRITTEN EXERCISES.

Give the position and boundaries of each of the Norse countries. Name the principal islands of Denmark. Describe the government of each of the Norse countries.

### 78. Austria-Hungary and Switzerland.

What countries surround Austria-Hungary? Has it any sea-coast? What mountains are in the west? What mountains are in the east? What is the western mountainous region called? What river flows through this country? Next to Switzerland, Austria-Hungary is the most mountainous country of Europe.

AUSTRIA-HUNGARY is a great empire, containing many German-speaking people. It is formed of two countries, Austria and Hungary. Austria means "eastern kingdom." Hungary, nearly enclosed by the Carpathian Mountains, was named after the Huns, a people of the yellow race who came from Asia several hundred years ago, and whose descendants still live in Hungary. Long ago they adopted European habits and manners, but they still look and speak like the race to which they belong. A large part of Hungary consists of treeless plains, and produces great crops of wheat and corn.

The chief occupation is agriculture: *grain, flax, and hemp*, as well as *olives and grapes*, are raised. The rearing of *silkworms* is an important industry in the warmer parts of the country, and the cutting of *lumber* in the east, while in the north much *iron, coal, silver, and rock salt* are mined. In the north-west is a busy manufacturing region, in which cloth, iron and steel goods, fine Bohemian

glass, wooden ware, and pianos are made. Much wine is made, especially in Hungary.

*Vienna*, the capital, is the fourth city in Europe in size. It is a beautiful city, and is the chief educational centre of southern Europe. The people are noted for their love of music and gaiety.

*Budapest*, on both sides of the Danube, is in the midst of the Hungarian wheat fields, and is a great flour-milling centre.

Find *Prague*. It is a great manufacturing city.

*Trieste* is the chief sea port.

#### SWITZERLAND.

What is the name of the little country between the Tyrol and France? What countries border Switzerland on the north and on the south?

Switzerland is one of the smallest countries of Europe. It is so high up in the Alps that about one-third of its surface is always covered with snow.

It is much visited by tourists in summer, because of its high snow-covered mountains, its great glaciers, which creep down into the green valleys, its glacier-made lakes, and its beautiful waterfalls.

The land is utilized to the snow limit, largely for pasture, and *cattle raising* is a leading industry. While some *grapes, grain, and vegetables* are raised, much of the food is imported. In dairy products, however, there is a large surplus for export, chiefly in the form of *cheese and condensed milk*.

In the towns and villages of Switzerland, watches, music boxes, and carved wooden toys are made. Most of the articles are hand-made, almost every house being a little factory.

Formerly, the high ridges of the Alps prevented the Swiss people from trading much with Italy, but now the longest railway tunnel in the world has been dug through the Alps from one country to the other. It is known as the St. Gothard Tunnel.

The German language is spoken in the north of Switzerland, the French in the west, and the Italian in the south. The Swiss are as brave as they are clever, and for many years have held their little country as an independent republic.

*Berne* is the capital and chief railway centre. *Zurich*, the largest city, is a busy manufacturing town, producing chiefly leather and silk goods.

*Geneva*, on the beautiful Lake Geneva, is noted for watch-making.

#### ORAL AND WRITTEN EXERCISES.

Describe the surface of Austria-Hungary under the subdivisions of *Alps, Carpathians, Danube Basin*. Describe the people of Austria-Hungary. What governments have Austria-Hungary and Switzerland? What are the chief industries of Austria-Hungary and Switzerland?



# CENTRAL AND WESTERN EUROPE.

Capitals thus: ●●  
● Scale of Statute Miles.  
0 100 200  
200 MILES TO ONE INCH.

15° Longitude West 20° from Greenwich 0° 5° 10° 15° 20° 25° 30°

0° 5° 10° 15° 20° 25° 30°

15° Longitude West 10° from Greenwich 0° 5° 10° 15° 20° 25° 30°

0° 5° 10° 15° 20° 25° 30°

### 79. France and Belgium.

What water separates France from England? What bay is west of France? What sea on the south? What country on the south-west? What countries on the east? What mountains between France and Spain?

Most of the surface of France is in the great northern plain. Name the rivers flowing northward. What river flows south? All these rivers are connected by canals, providing France with splendid facilities for internal trade. Railways connect this country with Middle Europe. A long tunnel through the Alps called the Mt. Cenis tunnel connects France with Italy.

The island of Corsica in the Mediterranean Sea is part of France. A large part of northern Africa, too, belongs to France. What country of South America is owned by France? Many islands throughout the oceans of the world also belong to France.

In northern France more *wheat* is raised than in any other country of Europe except Russia, besides large quantities of other grains. Great crops of *sugar beets*, and other vegetables are grown, and thousands of *cattle* and *sheep* are raised.

The south of France is not so level and smooth as the north but is much warmer. Instead of wheat and other grains, the *vine*, *olive*, and *mulberry* flourish here. *Grapes* and *wine* are the most important products of France. Large quantities of the best olive oil pressed from the fruit of the olive tree come from France.

The mulberry tree is valuable because the *silk worm* feeds on its leaves. This silk worm is a kind of caterpillar. When the caterpillar is full grown it spins a cover about itself, winding the fine silk thread round and round its body until it is entirely covered in. This is called the *cocoon*. These *cocoons* are softened in hot water, and the silk fibres are wound off upon spools. They are then spun into

silk thread which is woven into silk cloth. France manufactures more silk than any other country in the world.

For a long time France was a monarchy, but it is now a republic.

Where is *Paris*? It is the third city of the world in population, but it probably surpasses all others in magnificence and beauty. In the galleries of Paris are many pictures and statues brought from Italy and other countries once conquered by the French. Students from every part of the world go to Paris to study painting, music, medicine, and science. It is an important railway centre and has water communication with its port, *Haere*, at the mouth of the Seine.

*Lyons*, on the Rhone, is the centre of the silk manufacture.

*Bordeaux*, on the Garonne River, is in the midst of vineyards, and wine is its chief export.

*Marseilles* is the greatest port on the Mediterranean Sea.

At *Lisle*, in the north-east, flax and hemp are made into yarn, and beet sugar is manufactured.

*St. Etienne*, near Lyons, in a region of coal and iron mines, is the great iron and steel manufacturing city of France.

#### BELGIUM.

What is the name of the small country north-east of France? By what countries and sea is it bordered?

About half the people of Belgium are nearly related to those of northern France, and speak a similar language; the other half are more like the Dutch in

speech, appearance and manners.

The small kingdom of Belgium has so many large cities that it is one of the most thickly peopled states in the world. Because of the careful cultivation of the land, Belgium has been called the "Garden of Europe;" because the neighboring nations have fought so often on its territory, it has been called the "Battle ground of Europe."

The greater part of Belgium is a low, fertile plain, much like Holland. Agriculture is here the chief occupation. Rye, wheat, flax, beets, and beans are raised, yet nearly half the food is imported.



Silk—The Mulberry, Worm, Moth, Cocoon and Manufacture.



In the south the land is poor, hilly, and forest-covered, but contains rich mines of coal and iron, and here manufacturing is the leading industry. Belgium is famous for the manufacture of *iron, steel, and hardware*. Woven goods—*carpets, woollens, linens, and lace*—are also made.

*Brussels*, the capital, is a fine city, noted for the manufacture of lace, carpets, linens, ribbons, and embroideries.

*Antwerp* is one of the chief seaports of the mainland of Europe.

*Ghent* is the chief seat of cotton weaving and leather manufacturing in Belgium.

*Liege*, in the iron and coal region, is noted for the making of firearms.

### 80. Spain and Portugal.

What two countries occupy the Spanish peninsula? What waters are east, south, and north of this peninsula? The Balearic Islands in the Mediterranean Sea belong to Spain.

The Spanish peninsula is a high plateau crossed by several mountain ranges. Name three of these ranges.

What mountains are between France and Spain?

The higher parts of this peninsula are very dry. On this account agriculture is not possible except on the moist slopes towards the sea and in the deep river valleys where irrigation is practicable. This makes the peninsula the most thinly settled part of Europe. What river flows south-east? What rivers flow westward?

About one-fourth of the land is cultivated. *Wheat, barley, and corn* are grown, but not enough to supply the home consumption. This region is celebrated for its fruits. *Oranges, lemons, olives, and grapes* are extensively grown. Much wine is exported. *Onions, garlic, peas, and beans* are also grown and constitute a large portion of the food of

the people. *Cork*, which is the bark of a kind of evergreen oak, is also produced. On the dry highlands large flocks of *merino* and other kinds of sheep find pasturage. Around the coasts the *sardine* and other fisheries are very valuable.

*Mining* is the most important industry in Spain. In the production of *copper, lead, and quicksilver*, Spain leads Europe. *Iron* ore is abundant, but, owing to the lack of coal, most of it is shipped to Great Britain to be smelted.

Spain and Portugal are both kingdoms. At one time Spain was very powerful. She had great possessions in Europe and America, but gradually she has lost nearly all of them. Portugal, too, had extensive possessions, but lost most of them. Many islands and large portions of Africa still remain in possession of Portugal.

What strait separates Spain from Africa? What waters are joined by this strait? On the Spanish side of the strait is a high rock called the Rock of Gibraltar. Nearly two hundred years ago, this rock was taken from the Spaniards by the British, who have made it the strongest fortress in the world. Gibraltar is important because it commands the entrance to the Mediterranean Sea.

*Madrid*, the capital and largest city of Spain,

is in the dry and barren plateau region. The nights are almost always cold, but the days are often so warm that nearly everyone takes a *siesta*, or nap, in the middle of the day. Near Madrid is the Escorial, one of the finest and most magnificent buildings in the world.

*Barcelona*, in the north-east, is the chief manufacturing centre and seaport of Spain.

*Valencia* manufactures silk and velvet and exports fruits, olive oil, and wine, produced in the region behind it.



Gathering Cork.



The Escorial.

*Seville*, at the head of tide water on the Guadalquivir, is a busy port, and has manufactures of silk and of iron.

*Malaga* exports grapes, wine, and raisins.

*Granada* contains the Alhambra, which was built by the Moors when they had dominion in Spain, and which is still in its interior one of the most beautiful buildings in the world.

*Lisbon*, the capital of Portugal, is the second city of the peninsula in size, and has one of the best harbors in the world.

Where is *Oporto*? It is a great shipping point for wine. The name "port" wine is a contraction of the name of this city.

#### ORAL AND WRITTEN EXERCISES.

Describe the location and boundaries of Spain and of Portugal. Describe the surface and climate of the peninsula. What are the chief productions: vegetable, animal, mineral? Where is the population mostly found? What do you know of the past history of these countries? Name any possessions of Spain in America. What parts of America were owned by Spain at one time? What part of America was owned by Portugal?

### 81. Italy.

What waters nearly surround Italy? What islands are west of Italy? To what country does Corsica belong? What island south-west? Sardinia and Sicily belong to Italy. What high mountains are on the north? What mountains extend the whole length of the peninsula? What river basin occupies the north-eastern part of Italy?

Italy is the most famous country of Europe. More than two thousand five hundred years ago, some people settled on the west coast of Italy and built a village which grew into the great city of Rome. This city gradually conquered the region around it until all Italy was under its control. Later on, the Romans conquered all the south and west of Europe and a large part of Asia and northern Africa, forming the great Roman Empire. Afterwards, parts of this Empire rebelled and formed independent nations, and other parts were conquered by Teutonic nations, so that the Roman Empire was entirely broken up. Even the Latin language used by the Romans ceased to be spoken, but not before it had given rise to the various Romance languages spoken now in the southern and western portions of Europe.

Many of the people of Italy are skilful in painting and sculpture; all are fond of music.

Much *wheat*, *corn*, and *rice* are grown, but not enough for the food of the people. More *raw silk* is produced in Italy than in any other country of Europe. *Olives*, *oranges*, *wine* and *chestnuts* are exported to other parts of Europe and to America.

Italy yields considerable quantities of *zinc*, *lead*, *iron*, and *copper*, but its chief mineral product is *sulphur* found in mountainous districts near the



Cathedral at Milan.

volcanoes Vesuvius on the mainland, and Etna on the island of Sicily.

Find *Rome*. It is the residence of the King of Italy, and of the Pope, who is the head of the Roman Catholic Church. The Pope's palace, called the Vatican, is near St. Peter's, the largest church in the world. Rome is famous for the ruins of its ancient buildings. Among these is the Coliseum, which was used by the ancient Romans as a sort of circus. It could hold 80,000 people.

Where is *Naples*? It is the largest city of Italy. Much macaroni is exported from this city. Near by are the ruins of Pompeii, a city buried nearly two thousand years ago by ashes falling from the neighboring volcano, Vesuvius. After hundreds of years the ruins were accidentally found, and much of the old city has been uncovered.

Find *Milan*. It is the chief market in the plain of the Po. It is noted for its fine buildings, especially for its grand cathedral.

*Turin*, farther up the Po, is also a great commercial and manufacturing city of northern Italy.

Where is *Venice*? In the days of Columbus it was the greatest commercial city of Europe. It is built on some low islands several miles from the shore. Canals take the place of the main streets, and the people go about in boats instead of in wagons or street cars. The city is noted for beautiful glassware, jewelry, and lace.

The Italian immigrants in America are among our most thrifty and industrious laborers. Nearly all our street "organ grinders" are the music-loving Italians, and many of the fruit stands in our large cities are kept by men or women who were born on the warm fruit-producing shores of Italy.

#### ORAL AND WRITTEN EXERCISES.

Describe the surface of Italy, the mountains and the Po basin. Tell what you can of the greatness of the ancient Romans. Describe the people, their occupations, and the products. Name the chief cities and tell what you can of Rome, Naples, and Venice.

### 82. Greece.

What mountains are partly contained in the Grecian peninsula? What water is east of Greece? Most of the islands in the Ægean Sea belong to Greece. The southern part of Greece is called the Morea—in ancient times, the Peloponnesus.

As we have already seen, this part of Europe was the first to become civilized. The Romans, who conquered Greece, learned the Greek civilization and carried it into western Europe when they conquered it.

The present kingdom of Greece is that small peninsula south of the Balkan plateau. The language of this nation is similar to that of ancient Greece, and the people are still great sailors and traders. They are not now so prosperous nor so far advanced in learning and civilization as the nations of western Europe.

The country is rather mountainous; the rivers are few and rapid, and, therefore, of little use for internal commerce. Its coast line is much indented, however, and has many good harbors. Many volcanic islands lie near it.

Large quantities of *wheat*, *barley*, and *corn* are grown in Greece. *Figs* and *olives* are also produced. But the chief product is the small dried grapes which are known as *currants*. Most of the fine *sponges* of commerce are gathered from the eastern part of the Mediterranean Sea and prepared for use by the Greeks. Considerable quantities of *wine* and *olive oil* are exported.

*Athens*, the capital, is noted for the ruins of its ancient beautiful buildings; most of the statues, however, which ornamented these buildings have been removed to the museums and art galleries of London, Rome, or Paris.

*Piræus*, the port of Athens, with which it is connected by a railway, is one of the chief industrial towns, having cotton factories, machine works, &c.

*Corinth*, on the isthmus of Corinth, which connects the Morea peninsula with the rest of Greece, is famous for its ancient greatness. From the name of this city the word "currants" has its origin.

### 83. Russia.

How does Russia compare in size with the rest of Europe? What land is east of Russia? What waters north? What countries and waters west? What sea or lake south-east? What mountain range is east of Russia? South?

The greater part of the Russian Empire is in Asia, but about six-sevenths of the people live in European Russia.

The surface of Russia is smooth and flat like the prairies of our own country. In the north there are many lakes and hills of glacial clays, and in the south are many small salt lakes. How were both kinds formed?

You will see that a vessel in sailing from a port in the Baltic to a port on the Black Sea will take a very roundabout course; also from a port on the Baltic to Archangel on the White Sea. To make up for the difficulties of a coasting trade an immense amount of trade is carried on by means of the rivers of Russia. The country being so level, these rivers are navigable for great distances, and are connected by many canals.

Nearly all Russia is in the North Temperate Zone. In what zone is the remainder? In all parts of Russia the winters are cold. In the north, during the short summers, only the surface of the ground thaws, and as the water cannot sink into the frozen ground, the whole region becomes a swamp, called a *tundra*. The chief vegetation here is a coarse moss. South of the tundras lies the great forest region which occupies nearly one-third of Russia. In the south-west are open plains on which great crops of *wheat* and other grains are grown. This is the most thickly settled part of the country. In the south-east, on account of the very small rainfall, are found dry, arid plains called *steppes*.

Most of the people of Russia belong to the Slavonic branch of the white race. The Finns, who live north of the Gulf of Finland, the Lapps of the far north, the Calmucks and Cossacks of the south—all belong to the yellow race. There are more Jews in Russia than in any other country.

In the north many people are engaged in *fishing*, *hunting*, or *lumbering*; in the south great numbers of *sheep*, *cattle*, and *horses* are raised; but the chief industry of Russia is *farming*. More *wheat* is grown in Russia than in any other country except the United States. *Rye* is grown in immense quantities and forms the chief food of the people. Much of the wheat is exported to western Europe. Great quantities of *flax* are grown. Much of this flax is sent to Great Britain to be made into linen cloth. In southern Russia the flax is grown for its seed from which linseed oil is made.

Most of the land in Russia belongs to the government or to the nobles. The peasants, or farmers, are generally very poor, and live in villages or *mir*s. The land around a village is rented to the whole mir. It is portioned out to each family according to the number of its members, a large piece being reserved as a common grazing ground.

Russia has fewer mills and factories than western Europe. Cotton and woollen cloths are made in some of the large cities, but much of the cloth worn

by the peasants is woven by their families during the long winters.

Most of the *platinum* of the world, much *gold*, and some *coal* and *iron* are mined in the Ural Mountains. *Salt* is obtained from salt lakes which occur in the south-east. On the western shores of the Caspian Sea, in the neighborhood of Baku, are the largest *petroleum* wells in the world. More petroleum is produced in this region than anywhere else in the world except in the United States.

Much of the trade of Russia is carried on by annual fairs to which merchants come from other parts of Europe and from Asia. The most celebrated of these fairs is that of Nijni Novgorod on the Volga. During three months of the summer the river is filled with boats, and the city with a bustling crowd of people. During the other nine months that part of the city is silent; weeds and grass grow in the deserted streets.

The ruler of Russia is called the *Czar*. He makes the laws without the help of a parliament, and also sees that these laws are carried out. Such a government is called an *absolute monarchy* or *despotism*.

Find *St. Petersburg*. It is the capital of the Russian Empire and the fifth city in Europe in size. Several railroads enter the city from other parts of the empire, and a ship canal connects it with the sea.

Where is *Moscow*? It is nearly as large as St. Petersburg, and is the railway centre of Russia. It was the ancient capital.

*Warsaw*, on the Vistula, is an important centre of manufacture and trade.

*Odessa*, on the Black Sea, is a flourishing modern city and the chief wheat shipping port.

*Riga*, at the mouth of the Duna, is the great northern seaport.

*Kharkof* and *Kief* are large trade centres of the agricultural region.

*Astrakhan* is an important port at the mouth of the Volga.

*Sebastopol*, on the Crimea peninsula, is noted for its siege by the British and French during the Russian war.

#### ORAL AND WRITTEN EXERCISES.

Describe Russia as to location and size. Describe the great plain of Russia; the surrounding mountains; the bordering seas; the regions: tundra, forest,

prairie, steppe. Name the chief occupations of the people. Describe the trade routes and the fairs. Name the subdivisions of the people, and show how the country is governed.

#### 84. States of the Balkan Peninsula.

What countries are north of Turkey? What sea west? What seas and what country south? What two straits are between Turkey and Asia? That part of Europe south of Austria-Hungary is often called the Balkan peninsula. Why?

About six hundred years ago the Turks, a fierce people of the yellow race who had conquered much of western Asia south of the Black Sea, crossed over into Europe and made themselves masters of the whole Balkan peninsula. Most of the people of this peninsula belonged to the white race and were Christians, while the Turks were Mohammedans. The Turks treated the conquered Christians with great cruelty. Hence the Christians were discontented and often rose in rebellion against their Turkish oppressors.

About seventy years ago, Greece, by the help of other Christian countries, became an independent kingdom. Afterwards, Rumania, Servia, and Montenegro freed themselves from Turkey. Bulgaria, though nominally under the control of Turkey, has her own ruler, the prince, and is really an independent state.

#### THE EMPIRE OF TURKEY.

All that is left of Turkey in Europe is a narrow strip between Greece and Bulgaria, though the Turkish Empire still includes much of western Asia and part of northern Africa. About half the people in European Turkey are Christians, and they are still trying to free themselves from the Turks.

In Turkey more land is devoted to pasture than to farming, and the agricultural methods and implements are very rude. *Grain*, *tobacco*, *cotton*, *grapes*, and tropical fruits are grown. *Carpets*, *rugs*, *cloth*, and *jewelry* are made by hand. The trade is conducted by Greeks, Jews, and other foreigners. *Silk*, *cotton*, *opium*, *wine*, and food are



A Mohammedan Mosque.

exported in exchange for manufactured goods. There are few railways in the country, and the roads are bad, so that domestic trade does not flourish.

*Constantinople*, on the Bosphorus, is the capital of the Turkish Empire. On account of its position it is considered to be the key to the military control of eastern Europe. It contains the beautiful palaces and gardens of the Sultan, and many fine *mosques*, or Mohammedan churches; but most of the houses are miserable wooden hovels, and consequently great conflagrations are common. The streets are narrow, filthy, and without sidewalks. The fine harbor is called the Golden Horn.

*Salonica*, in the southeast, is an important port. This place is connected by railway with the other countries of Europe. The shortest route to Egypt and the East is by means of *Salonica*.

### 85. The Minor Balkan States.

The *Kingdom of Rumania* and much of the *Principality of Bulgaria* lie in the fertile valley of the Danube, and from them great crops of grain are sent down the river for export. There are many vineyards and rose farms on the slopes of the Balkan Mountains. *Wine*, and the famous perfume, *attar of roses*, are made there. *Cattle* and *sheep* are also raised.

The language of Rumania, unlike the languages of the neighboring countries of eastern Europe, is something like the Latin, and it is thought the people are the descendants of Roman colonists who settled in that region nearly two thousand years ago. Bulgaria was settled by people of the yellow race. Both countries have been so overrun by Slavs, however, that there is little trace of the early settlers.

*Bukharest*, on a small tributary of the Danube, is the capital of Rumania.

*Sofia*, south of the Balkan Mountains, is the capital of Bulgaria.

The *Kingdom of Servia* and the *Principality of Montenegro* are rough and mountainous, and largely covered with forests. *Corn* and *wheat* are the chief grains, the former constituting the principal food of the people. The wealth of the country consists in the herding of *swine* and *cattle*. *Wine* is also produced.

*Belgrade*, on the Danube, is the capital and largest city of Servia.

*Cettinje* is the capital of Montenegro.

## ASIA.

### 86. Position and Coast, etc.

What is the eastern part of Eurasia called? How does Asia compare with Europe in size? With North America? Asia includes about one-third of the land surface of the world.

In what zones is Asia? In which zone is the greater part? What ocean is north of Asia? What ocean is east? What

strait separates Asia from North America? What ocean is south of Asia? What two seas are west of south-western Asia? What isthmus connects Asia with Africa? What canal crosses this isthmus? Name the strait through which the Red Sea opens.

What great bay and sea are south of Asia? Name six seas that wash the eastern shores of Asia. How are most of these seas separated from the rest of the Pacific Ocean? Name two peninsulas of eastern Asia. Name three peninsulas of southern Asia. Name one of western Asia.

On which side of Asia are there many islands? What islands extend from Kamchatka southwest to Formosa? Where are the Philippine Islands? Sumatra? Java? Celebes?

There are many volcanoes in the islands east and south-east of Asia, from which terrible eruptions sometimes occur. Earthquakes are also frequently felt in these islands.

**SURFACE.**—Does most of Asia lie in the highland or in the lowland part of Eurasia? (See map page 134). Find the region from which all the high mountain chains seem to extend. This high mountain-crowned region is called the Pamir plateau or the "Roof of the World."

From the Pamir plateau a succession of mountain ranges stretches westward to the Black Sea, and three chains extend eastward—one to the north-east, one to the east, and one to the south-east.

What is the range east of the Caspian Sea called? South of the Caspian Sea? Between the Caspian and the Black Seas? A low plateau extends southward from these ranges nearly to the coast.

This plateau is divided into two parts by a broad lowland at the head of the Persian Gulf. What is the south-western part of this plateau called? The eastern part? What plateau is south of the Black Sea?

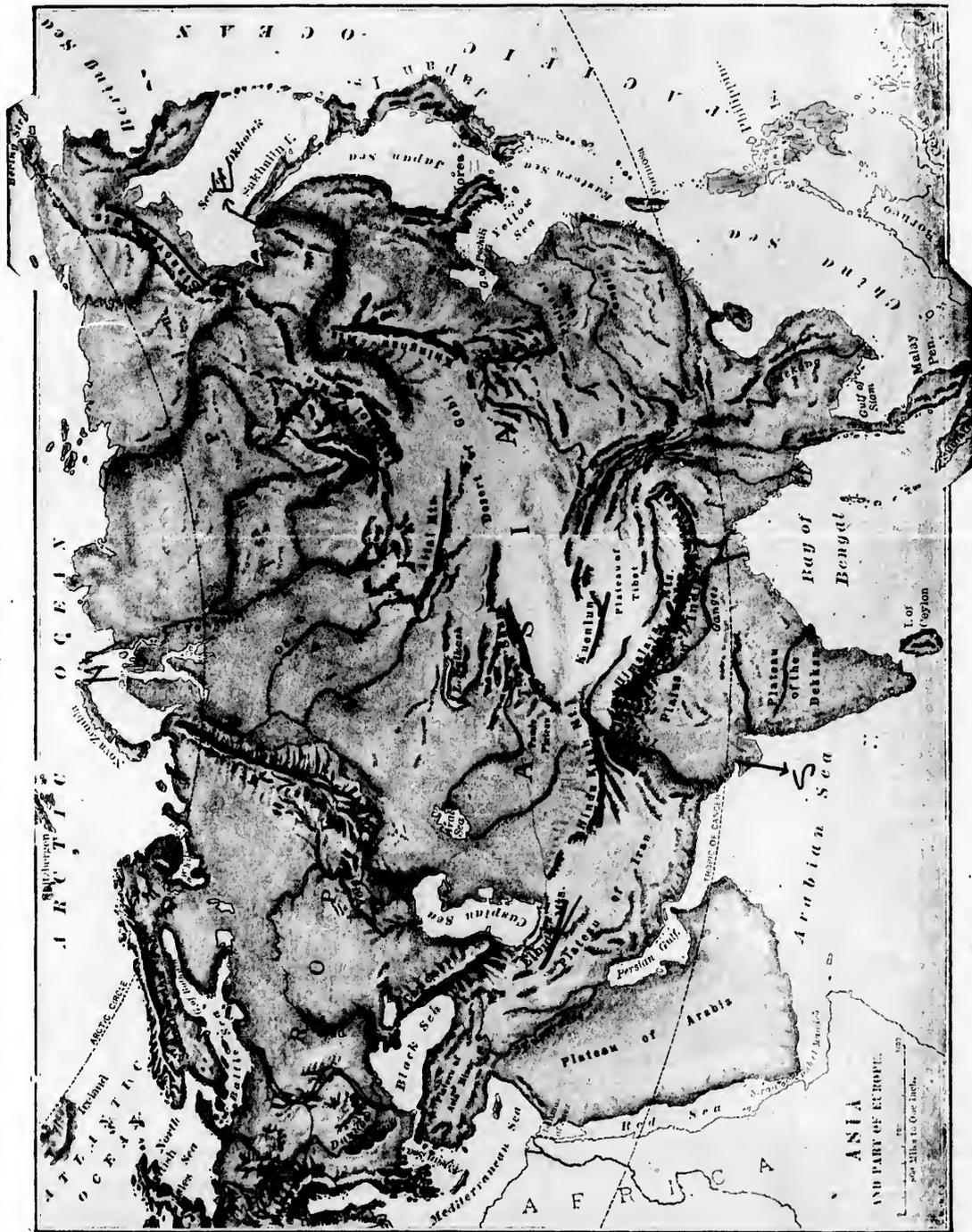
Name three of the different ranges extending north-east from the Pamir plateau? What range extends south-east from the Pamir plateau? This is the highest range on the earth. Mount Everest, the highest peak, is over five miles high. What range extends eastward from the Pamir plateau?

What plateau is between the Himalaya and Kuen-lun Mountains? This is the highest large plateau in the world, being more than twice as high as the western highland of Canada.

What desert is between the Altai and Kuen-lun Mountains? It is a low plateau where there is very little rain. The plateau of Tibet is also dry, but is much colder than the Desert of Gobi. Why?

There is little wealth produced in these highlands, except animals valued for their wool or fur. The chief occupation of the people is the herding of *sheep*, *goats*, *camels*, and *yaks*. The yak is a hairy animal like the ox.

The highlands are so broad and the mountains so



an is  
 tern  
 canal  
 Red

seas  
 these  
 e two  
 thern

What  
 nosn?  
 ebes?  
 a-east  
 occur.

in the  
 region  
 extend.  
 Pamir

tain  
 and  
 east,

lled?  
 spian  
 outh-

road  
 at is  
 The  
 Black

ding  
 range  
 his is  
 the  
 range

Kuen-  
 au in  
 s the

n-lun  
 very  
 out is

ands,  
 The  
 g of  
 hairy

US 40



**ASIA.**  
 Capital of Persia  
 Canals  
 Scale of Miles.  
 0 100 200 300 400 500 600 700 800  
 100 MILES TO ONE INCH.

90° Longitude East 70° from Greenwich  
 Magnetic Meridian

high that they form almost an impassable barrier between northern and southern Asia. Consequently, the plants, animals, and people north of the highland are quite different from those south of it.

The peninsulas of Asia, like those of Europe, are either mountainous plateaus or spurs extending from the Eurasian highland.

The islands on the east of Asia are also really mountain ranges, the valley between being covered by the ocean, thus forming partially enclosed seas. Name three of these seas.

The north of Asia is a great lowland plain like northern Europe. Immediately south of the Arctic Ocean is a frozen, moss-grown tundra; farther south are extensive forests; still farther inland are open prairies, which in the south-east are covered with coarse grass and are a continuation eastward of the steppes of south-eastern Europe.

There are several broad lowland plains among the eastern and southern highlands. The plains of the Hoang-ho, the Ganges, and the Indus rivers are some of these.

**DRAINAGE.**—In what direction do the rivers of the great northern plain flow, and into what body of water do they empty? Branches of these rivers rise so near each other that by means of them trade is carried on far into the interior. Why are they of little value in connection with sea-going commerce?

Name the four largest rivers of the Pacific slope. Into what body of water does each of them flow? The Amur flows through a fine wheat growing region. The Hoang-ho, or Yellow River, flows through a very level country and often overflows its banks, causing great loss of life and property. The Yangtze and Mekong rise in the high plateau of Tibet and reach the lowlands through deep gorges or canyons almost entirely unexplored by white men.

Name two rivers of the south-eastern peninsula of Asia. What two rivers flow into the Bay of Bengal through the same delta? What river flows into the Arabian Sea? The last three rivers drain both the north and the south slopes of the Himalaya Mountains. What rivers flow into the Persian Gulf?

To the south-east of the Ural Mountains is a great basin whose rivers do not reach the ocean. This interior basin occupies about one quarter of Asia, and contains many large salt lakes. Why are they salt? Aral Sea is nearly as large as Lake Superior. Lake Balkash is another large salt lake. There are fewer fresh water lakes in Asia than in North America; the only large one, Lake Baikal, is about

half as large as Lake Superior. What river is its outlet? Much trade is carried on over this lake by means of steamboats during summer and by ice sleds in winter.

#### ORAL AND WRITTEN EXERCISES.

Describe the position and direction of the chief mountain ranges of Asia, giving their names. Where are the following plateaus: Tibet, Gobi, Iran, Asia Minor, Arabia, Dekkan? Where are the principal lowlands of Asia? Name and describe the different parts of the great northern plain.

#### 87. People, etc.

What thickly peopled islands lie east of Asia? What two regions contain most of the people on the mainland? What parts of Asia contain very few people?

The climate of south-eastern Asia is so warm and moist that food plants grow there in abundance. Nearly half the people of the world live in this part of Asia.

In regions where it is too cold or dry for food plants to thrive, few people are found.

The people in the various countries of Asia differ greatly in language, in religion, and in manners and customs. There are at least three totally distinct races in Asia.

The people of the yellow race live mainly in the eastern and northern parts of Asia. How do they differ from people of the white race? What people of this race live in North America? In Europe?

The people of the brown race live mainly in the islands south-east of Asia, and in the Malay peninsula. Many of them are still savages, yet they are generally easy to civilize.

Most of the people of India and of south-western Asia belong to the white race, though they have a darker skin than the people of Europe. It is believed by many that originally the largest branch of the Caucasian or white race lived in the highland region in the neighborhood of the Hindukush Mountains, and that from this region they spread south-eastward into India, and westward into the various countries of Europe.

**ANIMAL LIFE.**—In respect to its animal life, Asia may be divided into three regions: (1) that part of the continent lying to the north of the great Himalaya range, in which the animals very much resemble those found in Europe; (2) the southern and south-eastern parts, or the Indian region, in which are found the tiger, the leopard, the elephant, the rhinoceros, the buffalo, the monkey, the cobra de capello, the crocodile, the pheasant, and the parrot; and (3) the south-western part, or the Arabian region, inhabited by the lion, the hyena, the ostrich,





1. ZEBU. 2. BACTRIAN CAMEL. 3. TIGER. 4. LEOPARD. 5. RHINOCEROS.  
6. INDIAN BISON. 7. INDIAN BUFFALO. 8. TAPIR. 9. YAK. 10. ERMINE.  
11. PORCUPINE. 12. ANT-EATER. 13. CHEETAH. 14. ARGUS PHEASANT.  
15. MUSK DEER. 16. COBRA DI CAPELLO.

The Zebu, or Indian Ox, is used as a beast of burden and of draught, especially in agriculture. The Zebu has always been held in high honor by the Brahmins, and he is treated with great consideration by them, being allowed to do almost everything that he pleases; it is thought wrong to beat him. The Bactrian or two-humped Camel is larger and more robust than the Arabian or one-humped Camel, and is much rarer. It is found in the more northerly and easterly parts of the continent, and can endure the severe winter cold of those regions. The Leopard, unlike the Tiger, is seldom found in open jungles; it haunts woody places. It is, however, far more common than the Tiger, and is equally destructive of life and property. The Cheetah, or Hunting Leopard, is found only in southern India. It is trained to hunt deer, and the swiftness with which it bounds upon its prey when let loose from the hunting-cart, exceeds that of any other animal. The Rhinoceroses found in Asia are usually one-horned, and in descriptions of them the fabulous accounts of the unicorn probably had their origin; but two-horned varieties are also found. The Indian Bison, or "Gaur," is a large and powerful animal, sometimes seven feet high. The pursuit of the Bison is as dangerous and exciting as that of the Tiger or elephant. The Indian Buffalo, whether wild or domesticated, is a strong and dangerous beast; of all the animals of Asia the Buffalo alone will charge upon man unprovoked. He is fond of immersing himself in water and of wallowing in mud. The Malayan Tapir is found in Malacca and Sumatra; it is larger than the American Tapir, and while its forward parts are of a glossy black color, its back, rump, and belly are white. The Ermine is a sort of weasel. Its fur, reddish brown in summer, turns to a snowy white in winter, except the tip of its tail, which always remains a jet black. Furriers insert these jet-black tips at regular intervals in the snow-white skin, and thus make the highly valued ermine of commerce. The Porcupine is quite common throughout southern Asia. The Ant-Eater of India differs from the American Ant-Eater in that its body is covered with scales instead of hair. The Argus Pheasant, so called from the beautiful eye-like marking of its plumage, is a native of Malacca and the East Indies. The Cobra di Capello, a very venomous serpent, is timid, and easily killed.

Some Animals of Asia.

and the scorpion. The domestic animals of Asia include not only the horse, the ox, the sheep, the goat, the mule, and the dog; but also the reindeer, in the northern parts of Siberia; the yak, in Tibet and other highlands of Central Asia; the elephant, in India and the Indo-Chinese peninsula; and the camel, in Arabia especially, but also in all the sandy and sterile parts of Asia generally.

#### ORAL AND WRITTEN EXERCISES.

Name the rivers of the northern slope; the eastern slope; the southern slope; the interior basin. How does Asia compare with North America as to the number and size of its lakes? Name the chief lakes of Asia. Compare the population of Asia with that of Europe. What do you know of the number of people of the northern slope and the race to which they belong? The eastern slope? The southern slope? The islands on the south-east? Name the principal wild animals of Asia. Name the domestic animals of Asia which are different from those of Canada.

### 88. Russia in Asia.

Where is Trans-Caucasia? Where is Central Asia or Turkestan? Where is Siberia? These three divisions make up Russia in Asia, part of the great Russian Empire. Many of the people are of the yellow race. In the north they are hunters and fishers, and in the south they are herders and farmers. But many white people have come into Siberia from Russia. The farmers in Russia can get land in Siberia free from rent, and hence many of them have moved eastward and settled there. In what direction has the settlement of Canada advanced?

People in Russia who offend the government are often sent to Siberia as a punishment. If their offences are slight, they may live where they choose in the villages of Siberia; for greater offences they are made to work in the mines which belong to the government. Many people are exiled to Siberia every year for such causes as speaking or writing against the government, or even of owning books in which the government is criticized.

The mines of Siberia are very valuable; they yield large quantities of *gold*, *silver*, and *platinum*.—The last is a valuable metal like silver in appearance. Some of the best *graphite*, or *plumbago*, of which lead pencils are made, is found in Siberia.

In the cold, northern part of Siberia are found the bodies of huge hairy elephants, or *mammoths*, frozen fast in the ice, and preserved by the cold for thousands of years. The tusks of these mammoths are sold for *ivory*.

In Central Siberia there is a vast forest region similar to that of Russia and of Canada, where

many animals are trapped for their valuable furs. Many wolves live in these forests.

Across the more open region south of the forests, a railroad is in course of construction, whose terminus on the Pacific is Vladivostok. A branch from this railroad is projected to terminate at Port Arthur, in China. Most of the inland traffic is now carried on by caravans, or parties of traders with pack animals. Most of the tea used in Russia is imported from China in this way. In the southern part of Siberia is much good farming land, on which large quantities of *wheat* and other grain are grown.

Find *Tashkent*. It is the largest city of Russian Turkestan. Coarse cotton cloth and leather goods are made in the towns and villages near this city.

Where is *Tiflis*? It is the largest city in Asiatic Russia.

Find *Baku*. Near this city are petroleum wells, from which large quantities of that oil are shipped into Russia by the Caspian Sea and the Volga River routes. Much is also sent by rail to *Batum*, whence it is shipped to other countries.

Where is *Irkutsk*? It is the chief market of eastern Siberia.

*Omsk* and *Tomsk* are important cities in western Siberia.

Find *Vladivostok*. It is the great seaport of the Russian Empire on the Pacific Ocean. Its value is lessened, however, by the fact that it is closed by ice during the winter. On this account the Russian government has obtained from China, a port farther south, *Port Arthur*. Find it.

BOKHARA and KHIVA are small states under native rulers, who are vassals of Russia. They produce *corn*, *fruit*, *silk*, *tobacco*, and raise *goats*, *sheep*, *horses*, and *camels*.

### 89. Chinese Empire and Korea.

In what part of Asia is the Chinese Empire? In what zone is most of it? Of what five countries is it composed? Which of these countries lie in the highland region? Which lies partly in the lowlands? What two great rivers drain the greater part of China?—Where do they rise? Into what waters do they empty? Of what ocean are these waters a part?

The Chinese Empire is somewhat larger than Canada, and contains the greater part of the yellow race. The four countries belonging to China in the plateau and desert region of Central Asia, form the larger part of the empire, but their population is scanty. The fertile and thickly settled lowlands of China proper contain nearly one-fourth of all the people in the world.

China is a very old nation. The Chinese printed books and made gunpowder thousands of years before these inventions were known in Europe; yet they live in the same manner as their forefathers did long ago. What little machinery they use is awkward and old-fashioned.

It is only within the last few years that the Chinese have been allowed to leave China, or that foreigners

have been permitted to visit it; and even at the present time strangers in China are seldom allowed to travel far inland.

The Chinese are a polite people to one another. Parents are highly respected in China. A Chinaman obeys his father as long as his father lives, and worships him after he is dead. Although the Chinese seem stupid because they will not adopt new ways, they are very clever in doing things in their old-fashioned ways, and they are very industrious.

*Farming* is the chief occupation in China proper. Nearly every foot of land is cultivated, most of it by hand; and along the rivers great rafts made of *bamboo* are covered with earth and used as gardens. Thousands of people live on these rafts and on flat-bottomed boats moored with them.

In the lowlands *barley* and *rice* are the chief crops. The rice is grown on land that can be flooded easily, and thousands of men and women may sometimes be seen wading in the rice fields looking after their crops. On the hill slopes *tea* and many *fruits* and *vegetables* are raised.

Tea is the leaf of a shrub three or four feet high. The leaves are picked three or four times a year. They are heated in shallow pans, rolled with the hands upon a table, and then dried in sieves over charcoal fires. Much of the tea is shipped in lead-lined boxes to England and America. Quantities of an inferior kind are pressed into "bricks" and sent overland on the backs of camels into Siberia and Russia.

Chinamen eat very little beef or mutton, but every hut has its *pig*, *ducks*, *geese*, and *chickens*. *Fish* cooked in lard or in castor oil are much used for food; but the chief food in China is rice. Famines often occur in China, and thousands of people starve to death. When crops fail in one part of the country, food cannot be brought quickly from other regions, since there are no railways or good roads, and few horses and wagons. In China almost

all the merchandise is carried on the backs of men, on rude wheelbarrows, or on the rivers and canals in boats called *junks*.

China has the greatest area of *coal fields* in the world, but, owing to the lack of transportation, they are not worked to any great extent. *Iron* and *copper* are abundant.

The Chinese make many excellent and beautiful things, but mostly by hand. The best pottery and porcelain used to come from China, and to this day we call it *Chinaware*, even though it is made in England. Chinamen generally dress in cotton cloth made in China. It was from the Chinese that the world learned to make *silk*, and China even now produces more silk than any other country; but

most of the silk exported from China is raw silk which is manufactured into cloth, ribbon, or thread in Europe and America.

*Manchuria* is crossed by forest-covered mountains. Between them are wide, fertile valleys, in which *opium*, *indigo*, *cotton*, *tobacco*, and *wheat* are raised in abundance. The Manchus conquered China about three hundred years ago, and ever since the rulers of China have been Manchus.

*Mongolia* and *Chinese Turkestan* are mostly

desert or arid land, where the people live in a half-savage state, tending herds of *horses*, *cattle*, and *camels*. These people used to be robbers, and long ago one of the emperors of China built a great wall twelve hundred miles long to protect his people from them. Much of this wall is still standing.

The high, cold plateau of *Tibet* has seldom been visited by white men. The chief products are *silver*, *gold*, *salt*, *wool*, and *borax*. There are few manufactures, but woollen cloth is woven by the women and exported.

Find *Pekin*. It is the capital of the Chinese Empire, and is the centre of a large caravan trade chiefly with Siberia.

Where is *Canton*? It is one of the largest of the many large cities of China.



Tea—The Leaf and Blossom: Picking, Firing, Packing, Shipping.

Find *Shanghai*. It is the greatest seaport of China, and one of the few Chinese cities where foreigners are allowed to live. *Tientsin*, the port of Peking, is a large city.

**HONG KONG**, a small island near the coast, together with a portion of the mainland, forms a crown colony of Great Britain. A great many foreign merchants live there in order to trade with China. It is one of the great trading centres of the world.

#### KOREA.

What waters nearly surround Korea? What is the capital? Korea was once part of the Chinese Empire, but is now an independent kingdom. Like China, Korea has had very little to do with the outside world. The chief industry is agriculture, and the products are *rice*, *beans*, and *wheat*. *Gold*, *iron*, *copper*, and *coal* are found, but not extensively mined.

#### 90. Japan.

What island empire is east of China? In what zone are most of the islands? What is the name of the largest island? What is the name of the large island at the south end of the group? What sea lies between Hondo and the mainland? What ocean is east of these islands?

Japanese islands are mountainous, and the rivers are generally mountain torrents. The scenery is very beautiful. There are many volcanoes and hot springs among the mountains, and earthquakes are frequent. The summers are warm and moist but the winters are quite cold.

Until very lately, the Japanese would not allow foreigners to visit their country. Lately they have made wonderful progress in civilization. Railways and telegraph lines have been built; newspapers have been published; and education has been promoted.

The people of Japan resemble the Chinese in appearance. In stature, they are considerably shorter than Europeans generally.



Japanese Town.

The houses are made of bamboo, with sliding walls in front which are pushed aside during the day, showing the inside. The Japanese merchant, dressed in a long gown with very loose sleeves, squats upon

the floor and sells his goods. If he is a mechanic, he manufactures by hand—sometimes by his foot also, as he can use his toes almost as well as his fingers. His wife squats near him, braiding her hair, or playing a kind of guitar, or boiling the rice for dinner; the children play around, the older one having the baby strapped to his back. At night the sliding walls are closed, the family take a hot bath, and go to sleep on quilts laid on the floor, with their heads resting on little padded wooden stools. Almost the only foods of the poorer classes are rice, fish, and radishes.



A Japanese Carriage or Jinrikisha.

Like China, Japan produces large quantities of *raw silk* and *tea*. *Rice*, *wheat*, and *sugar* are also produced. The forests on the mountain slopes produce *camphor*, *lacquer gum* and *lumber*. The Japanese are very fond of flowers, and call their country the "Land of the Chrysanthemum." On their small farms they keep very few cattle, sheep, or horses, but *hogs* and *fowls* are raised. The fisheries of Japan are very valuable. In the cities, passengers are drawn by men, in little two-wheeled carriages called *jinrikishas*.

The chief minerals of Japan are *silver*, *copper*, *coal*, *iron*, and *sulphur*. What is the source of the last mineral?

The Japanese are very skilful at many kinds of manufacturing. Their *silk*, *porcelain*, *jute floor mats*, *paper*, *bamboo work*, and *lacquered ware* are exported to Europe and America.

Steamship lines connect Japan with Canada, the United States, and the chief ports of Europe and Asia.

Where is *Tokio*? It is the capital and the largest city. It has grown very rapidly.

Find *Yokohama*. It is the chief port of Japan and has a large foreign commerce. *Osaka* and *Kioto* are important manufacturing cities.

#### 91. India.

What three peninsulas of Asia project southward? In what zones is India? What mountains are north of India? What

waters east and west? What is the nature of the surface south of the Himalayas? Where is the Deccan? Describe its surface. Name the three chief rivers of India and trace their courses.

From May to October, south-west winds blow across India, bringing heavy rain from the Indian Ocean. During the rest of the year, dry winds blow from the north-east. A wind which changes its direction regularly in this way is called a *monsoon*, which means "season." When the south-west monsoon reaches the lofty Himalayas, it deposits nearly all its moisture on their tops, as snow, forming great glaciers.

The lower slopes of these mountains are covered with valuable forests; at their foot are dense thickets called *jungles*. The bamboo, teak, banyan, mangrove, and a variety of palms are the principal trees. The plains of northern India are very fertile and support an immense population.

In the jungles are many wild animals—the *tiger*, the *leopard*, the *elephant*, and the *rhinoceros*. The elephant is domesticated and is used for doing very heavy work. The *buffalo* is also found and is trained to work. The *cobra-de-capello*, the most venomous snake in the world, is found in India, and thousands of the natives die every year from its bite.

The people of India belong to many different races and religions. Hindus and Mohammedans, however, form by far the greater part. The Hindus are divided into classes, called *castes*, which never mingle with one another. The priests or Brahmins are the highest caste. The people of the lower castes are miserably poor. Their clothing consists of a strip of cotton about the loins, and perhaps another strip around the shoulders; they sleep in men huts, and live on rice and water, with an occasional piece of fish. The women of the lower castes work in the fields; in the upper castes many of the women are never seen by strangers, going out only in covered chairs or boxes, which are suspended from poles carried on the shoulders of men.

India is celebrated for the magnificent palaces, tombs and temples found everywhere, many of them beautifully decorated with wonderful carvings or beautiful gems.

India is the original home of most of our domestic animals; such as the horse, ox, dog, cat, hog, and chicken. Many of our grains, fruits, and vegetables also came originally from this region.

The chief occupation is agriculture, and, for the cultivation of much of the land, irrigation is employed, as the rainfall is irregular. *Rice*, *peas*, and *millet*, a grain like corn, constitute the chief food of the people. *Wheat* and *sugar* also are produced. The wheat is mostly exported to Europe. *Opium*, a valuable drug obtained from the poppy, and *indigo*, a beautiful blue dye, are also produced.

*Cotton*, *jute*, and *silk* are produced. *Jute* is a plant having coarse fibres from which coarse bags and rope are made.

The Hindus manufacture fine *shawls*, *carpets*, and *rugs*; they make fine gold thread and beautiful jewelry.

Nearly all India belongs to Great Britain. Some small settlements on the coasts belong to France and Portugal. The Queen is called the Empress of India. She appoints a British Governor-General, or *Viceroy*, who lives in India, and governs the country under the direction of the

British government in London.

The Ganges, the Indus, and the Brahmaputra rivers with their branches are largely used for local traffic. Canals are extensively used, especially in southern India. Railways, however, are rapidly spreading all over the peninsula, there being now over 20,000 miles of railway in India.

Where is *Calcutta*? It is the capital of British India and the largest city. It is the centre of an immense trade by sea, river, railway, and canal.

Find *Bombay*. It has a splendid harbor and its trade is very



Bamboo Grove.

great. It is connected with Calcutta by a railway, and is the terminus of the route from England to India via the Suez Canal.

Where is *Madras*? Although this city has no harbor it does a large trade.

Find *Lucknow*. It is noted for its mosques, temples, and palaces.

*Benares*, on the Ganges, is the "sacred" or "holy" city of the Hindus. Pilgrims come hither from all parts of India to bathe in the waters of the Ganges, which are here supposed to have the power of cleansing from all sin.

Where is *Delhi*? It was the former capital of India, and is the chief centre of Mohammedanism in India.

CEYLON. What strait is between this island and India? This island exports *tea*, *coffee*, *cocoanuts*, and *plumbago*. Ceylon is a separate British colony, and has a governor appointed by the Queen.

Where is *Colombo*? This is the capital of Ceylon, and the largest city. It has a good harbor.

## 92. South-Western Asia.

What five countries in Asia are west of India? Which has no sea coast? What gulf is south of Persia? What empire owns the western part of Arabia? Name the two principal rivers of south-western Asia.

This region is mostly a plateau with a very little lowland at the junction of the Tigris and Euphrates. Much of it is a dry sandy desert, for the south-west monsoon in this region blows mainly over a hot land, and therefore the rainfall is very slight.

As the country is rather too dry for extensive cultivation, grass for *cattle*, *camels*, *goats*, and *sheep* is the principal product. *Figs* and *dates* are used for food and are largely exported. *Cotton*, *tobacco*, *opium*, and *raw silk* are produced.

The wool grown in this dry region is of very fine quality. It is woven by hand into carpets and rugs, and the goats' hair is woven into shawls.

The camel is of the greatest value. It is the chief beast of burden, most of the merchandise of the country being transported, sometimes for hundreds of miles, on the backs of camels. This animal is often called "the ship of the desert."

The people chiefly belong to the white race, with the exception of the Turks, who belong to the yellow race.

### ASIATIC TURKEY.

Most of the events recorded in the Bible took place in this country. Find *Smyrna*, *Damascus*, and *Bagdad*. These are large commercial cities. Damascus is the oldest city in the world. Bagdad was, hundreds of years ago, the centre of the world's civilization. Where is *Jerusalem*. It was the

capital of the former kingdom of the Jews. Find *Mecca*. It was the birthplace of Mohammed.

### ARABIA.

What waters partly surround the Arabian peninsula? To what country does most of the coast land belong? The greater part of the peninsula is a desert plateau of considerable height. Why are there no large rivers in Arabia?

The people of Arabia have changed very little in four thousand years. There is no central government; but each tribe is ruled by a chief, or *sheik*. The *Bedouin*, or desert Arabs, wander about from place to place according to the season, to find pasture for their camels and horses.

The land yields abundantly wherever it is irrigated. The products, in addition to those already mentioned, are *indigo*, *coffee*, *myrrh*, and *gum-arabic*. *Pearls* are found in the Persian Gulf, and are exported. Trade is carried on by caravans.

Find *Aden*. It is the chief seaport for Arabia, and belongs to England.

Find OMAN. It is an Arabic state under the rule of its own Sultan, but is under the protection of Britain. The products are similar to those of Arabia.

Where is *Muscat*? It is the capital of Oman and is the chief port.

### PERSIA.

A great part of Persia is a desert, though near the sea coasts and mountains some rain falls. The raising of *cattle*, *sheep*, *camels*, and *horses* is the chief business of many of the people.

Hand-made carpets and camel's hair cloth are almost the only manufactures. The ruler of Persia is called the *Shah*, and he has absolute power.

Find *Teheran* and *Tabriz*. The former is the capital, and both cities are centres of the caravan trade.

### AFGHANISTAN.

What mountain range is on the north? What mountain range on the east?

The climate of Afghanistan is dry, but the soil is fertile in the valleys, and in many places yields two harvests a year. *Wheat* and *barley* are harvested in the summer, and *rice*, *millet*, and *corn* in the autumn. Fruit of all kinds is plentiful and many valuable drugs are produced.

The people of Afghanistan consist of many tribes under a ruler called the *Amir*.

Besides agriculture and stock raising, the chief industries are the manufacture of carpets, felts, and silk.

Two famous passes—the Khyber and Bholan—lead from Afghanistan, through the Suliman

Mountains into India. These passes are sometimes called "the gateways of India."

Find *Kabul*. It is the capital. *Herat* and *Kandahar* are fortified towns and centres of considerable caravan trade.

#### BALUCHISTAN.

This country forms part of the great Iranian plateau. The climate is dry and in consequence the agricultural products are limited. The chief occupation of its wandering tribes is the raising of *camels*, *horses*, *sheep*, and *cattle*.

It is governed by a native ruler, or *Khan*, who is under the control of the governor-general of India.

Where is *Kelat*? It is the capital of the country.

#### ORAL AND WRITTEN EXERCISES.

Name the countries of south-western Asia, and the chief cities of each. Describe the surface of the whole region. Name the chief products. Why is the rainfall slight? Name the principal occupations of the people. What parts belong to, or are under the protection of, European countries?

### 93. South-Eastern Asia.

What part of British India lies east of the Bay of Bengal? The peninsula of which Burma forms a part is sometimes called Indo-China. What narrow peninsula extends still farther south? What sea is east of Indo-China? What gulf opens into this sea? What island is south-west of the Malay peninsula? What strait separates the peninsula from the island?

The climate, animals and vegetation of Indo-China are similar to those of India. It is watered by several great rivers. The principal are the Irawady, Salwen, and Mekong. They are all navigable for considerable distances.

Most of the people of Indo-China belong to the yellow race, but in the southern part there are many Malays.

#### BURMA.

Upper and Lower Burma belong to Great Britain and are under the rule of the governor-general of India.

Where is *Mandalay*? It was the former capital of Burma before it was conquered by the British. Find *Rangoon*. It is the busiest port on the Bay of Bengal after Calcutta.

#### SIAM.

What country is east of Burma? It is an independent native kingdom. The soil is fertile and produces immense quantities of *rice* and *teak*; the latter is a hard wood used in shipbuilding. Precious stones and gold are also found. There are a few short railways, and trade is carried on by means of these and the rivers and caravans.

Find *Bangkok*. It is the capital and is the largest city between Calcutta and Canton. It is partly built on piles, and is intersected by numerous canals; therefore it is sometimes called "the Venice of the East."

#### FRENCH INDO-CHINA.

What country is east of Siam? What river forms part of its western boundary? *Rice*, *sugar*, *raw silk*, *cotton*, and *spices* are some of its numerous vegetable products. Its mineral products are *coal*, *gold*, *iron*, *copper*, and *tin*.

Where is *Saigon*? It is the capital of French Indo-China. Find *Hue* and *Hanoi*.

#### THE STRAITS SETTLEMENTS.

This is a British colony, consisting of several islands in the Strait of Malacca, together with some adjacent territory in the peninsula. *Spices*, *gutta-percha*, a kind of rubber, *sugar*, and *rice* are the chief products.

*Singapore* on Singapore Island, the capital, is an important coaling station for steamers. It imports immense quantities of the products of the surrounding regions and then exports them again chiefly to Europe. It also imports manufactured goods from Europe to be exported to the surrounding regions.

THE MALAY STATES are a number of small native states adjacent to the Straits Settlement and under the protection of Great Britain. Their products are similar to those of the Straits Settlements.

### 94. The East Indies, or the Malay Archipelago.

Name the largest islands south-east of Asia. Name the seas and straits between these islands.

The surface of these islands is somewhat mountainous. There are many active volcanoes in the islands. The soil is fertile. The larger islands have dense and extensive forests.

Nearly all of this group of islands belongs to the Netherlands, and is known as the Dutch East Indies. The inhabitants are chiefly Malays. There are many Chinese. The Europeans, who are the rulers, are few in number.

*Java* is the most important of the Dutch possessions, and is a densely populated island. It produces much *cane sugar*, and next to Brazil, more *coffee* than any other country in the world.

Find *Batavia*. It is the capital of the Dutch East Indies, and is a great commercial city.

*Sumatra* produces *coffee*, *sago*, *black pepper*, *rice*, and *India-rubber*. Sago is a starch-like substance found in the stem of the sago palm. It has mines of *gold*, *coal*, *tin*, and *lead*. Where are the islands of *Banca* and *Billiton*? These supply most of the *tin* used in the world. It is shipped to Singapore and then exported from that city.

The northern part of *Borneo* belongs to Great Britain; the rest, to the Netherlands. The chief products of this large island are *timber*, *sago*, *rice*, *coffee*, *pepper*, and *gutta-percha*.



Procuring Sago from the Palm.

## THE PHILIPPINE ISLANDS.

In what direction from Japan are the Philippine Islands? What waters surround them? Name the principal island.

These islands did belong to Spain; but at the close of the late Spanish-American war they were ceded, in 1898, to the United States. The people are chiefly Malays, but there are many Chinese, who are the traders and bankers. *Rice, sugar, coffee,* and *Manila hemp* are the chief products.

Where is *Manila*? It is the capital and an important commercial centre.

## ORAL AND WRITTEN EXERCISES.

Describe the surface and climate of Indo-China. Name the chief rivers. What parts of Indo-China belong to or are under the protection of Great Britain? What are the chief productions of Indo-China? Of the East India Islands? What is the chief mineral product? Name the chief cities of Indo-China. Which of them is the greatest commercial city?

## AFRICA.

## 95. Position, Coast Line, etc.

What sea is north of Africa? What ocean east? What ocean west? What gulf west? East? What large island is south-east of Africa? What separates it from the mainland? What isthmus joins Africa to Asia? What strait is at the southern entrance of the Red Sea?

In what zones is Africa? Why is Africa the hottest of the grand divisions?

Compare the outline of Africa with that of Eurasia. With that of North America.

What cape is south of Africa? It was so called by the Portuguese, who discovered it, because they believed they had found a new route to India. What other route by water is there from Europe to India? Which is the shorter?

Name three groups of islands west of Africa. The Canary Islands are the home of the canary birds. They belong to Spain. The other two groups belong to Portugal. All these islands are of volcanic origin, and there are still active volcanoes in the Canary Islands.

Name the circles crossing Africa. What is the length of Africa from north to south in degrees? What is its breadth in degrees? In miles?

How does Africa compare in size with Europe? With Asia? With North America?

## RELIEF AND DRAINAGE.

Find the divide between the Atlantic and Indian slopes of Africa. Which is the longer slope? What four rivers drain the longer slope? To what bodies of water? What river on the other slope? To what ocean does it flow?

The south-eastern half of Africa, extending from the Strait of Bab-el-Mandeb to the Atlantic Ocean, is mostly a great plateau. It is highest in the north-east, and generally is lower in the interior of the plateau than at the margin. From this plateau the surface slopes rapidly down to a narrow coast plain.

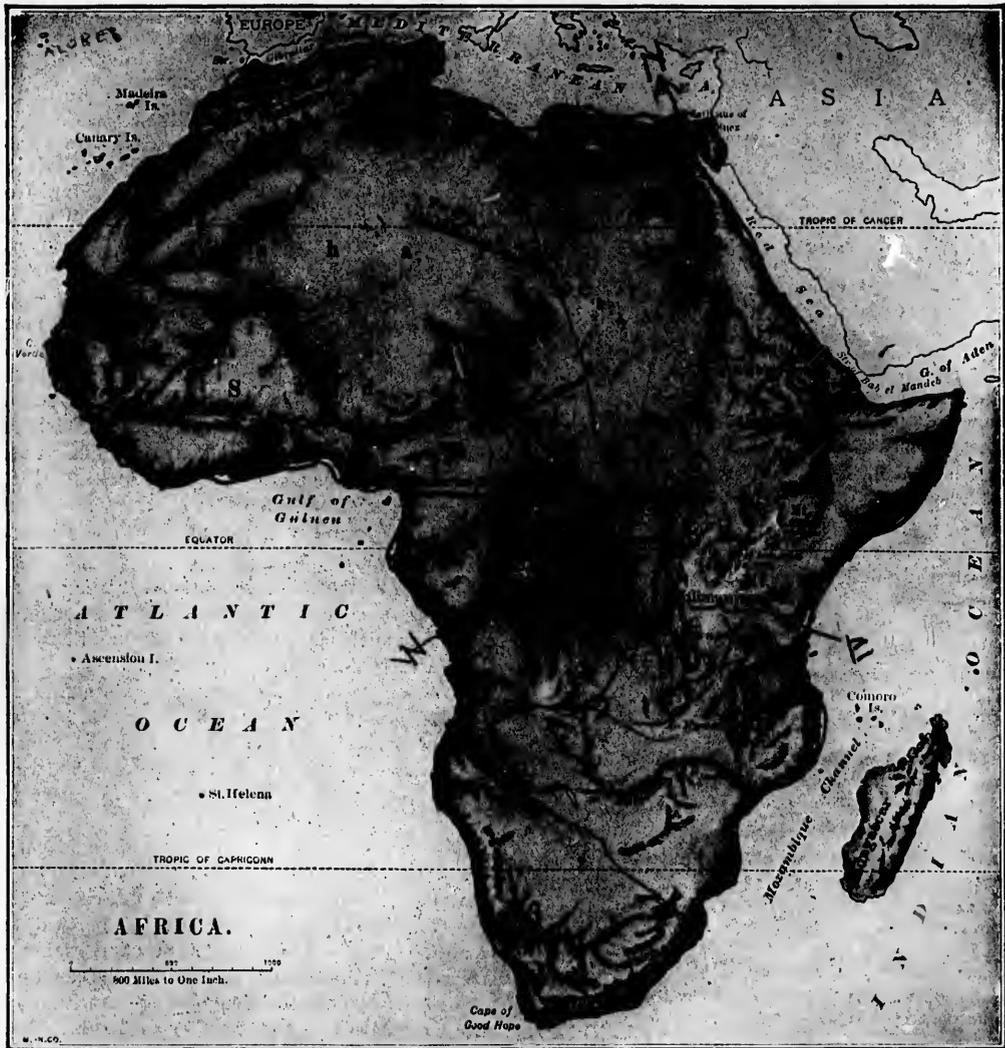
Three great tongues of highland extend north-west from the main mass. Where is the eastern? What is the name of the western? The highest part of the main plateau is the Highland of Abyssinia. Find Mount Kilimanjaro and Mount Kenia. These are the highest mountain peaks in Africa. In the southern part of the main plateau there are several short ranges. What is the name of the principal range?

Where are the Atlas Mountains? These mountains are a continuation of the Italian region of elevation which curves westward through Sicily and then extends along the north of Africa.

South of the Atlas Mountains, northern Africa is a great lowland region, with broad southern extensions on each side of the central highland tongue. The coast lowlands or plains decrease in width toward the south and are very narrow near the southern extremity of Africa.

From east to west, on both sides of the equator, is a broad, fertile belt of land with a very heavy rainfall. What continent resembles Africa in this respect? What is that part of this belt north of the equator called? Where are most of the lakes of Africa? What large river system is in this equatorial region? How does the Congo compare with other rivers of Africa in the number of its branches? What large river drains the western part of the Sudan?

What is that part of Africa north of the Sudan called? In this region the rainfall is so small that there is hardly any vegetation over an area extending from the Atlantic Ocean to the Red Sea. What large river crosses this desert to the Mediterranean Sea? Where does the Nile rise? In length it is next to the Mississippi. Why has it no tributary in the lower part of its course? Next to the Amazon the Congo discharges the greatest amount of water



into the sea. In the southern part of Africa, on both sides of the Tropic of Capricorn, is also a region of scanty rainfall and consequently desert. What rivers are in South Africa? Where does each flow?

Nearly all the large rivers of Africa are obstructed by rapids and falls, where they flow from the plateau to the coast plain. The lowest cataracts on the Nile and Niger are about 700 miles from the sea. In the Congo they occur much nearer the mouth—only a little over a hundred miles. These rapids and falls

have been the chief hindrance to the exploration of the interior of Africa.

It is only within the last few years that the central parts of Africa have become well known to white men.

What great lake of Africa is crossed by the equator? It is nearly as large as Lake Superior. What long, narrow lake is south-west of Lake Victoria? What great rivers empty these lakes? What lake farther south empties into the Zambezi? What large lake south of the Sahara Desert?

3 name 7 native races and where each lives  
 3 what colonies have settled in Africa and what part

VEGETATION, ETC.

ORAL AND WRITTEN EXERCISES.

Where is the plateau region of Africa? Where is the great plain of Africa? What is the region of greatest rainfall in Africa? Describe the position and extent of the two desert regions of Africa. Name the chief lakes of Africa.

96. Vegetation, etc.

North of the Sahara Desert the natural and cultivated products resemble those of Spain. At one time this region was the granary of the world. The delta and valley of the Nile by means of the annual overflow of that river is, perhaps, the most fertile region of the world. The principal crops are *cotton*, *wheat*, *maize*, *rice*, and *sugar*. Egypt is the third country in the world for the production of cotton. Name the first and second.

The Sahara has a very scanty vegetation, consisting mostly of prickly, leafless, fleshy plants, like *cactus*, which no domestic animal but the camel will eat. In the *oases*, or fertile spots, however, the *date palm* grows to perfection.

In the equatorial region there is a wealth of vegetation surpassed only in South America. The *sago* and *oil palms*, the *baobab* or monkey-bread tree, and the *rubber tree* grow plentifully. In the marshes along the coast are *man-grove* trees and enormous grasses resembling cane and bamboo. The *manioc*, from which a nutritious meal called *cassava* and *tapioca* is prepared, grows luxuriantly in tropical Africa. *Yams* and *bananas* are also cultivated, being much used for food. The yam is a kind of vine, with a tuberous root like a potato, which sometimes is three feet long and weighs thirty pounds.

In South Africa *wheat* and *maize* thrive well, as do also the *vine* and *tobacco* plant; *coffee* and *tea* now grow in Natal.

ANIMALS.—More large animals are found in Africa than in any other grand division. Among these are the African *elephant*, the *rhinoceros*, the *hippopotamus*, the *crocodile*, the *lion*, the one-humped *camel*, the *gorilla*, *chimpanzee*, and *baboon*. The *ostrich* ranges from Arabia to Cape Colony. The *python*, a huge serpent like the South American boa-constrictor, and many smaller venomous snakes abound. In

South Africa immense flocks of sheep and herds of cattle are raised.

With insects, Africa is, unfortunately, well provided. The *locust* is a scourge to the whole grand division. In central and southern Africa, the *tsetse* (a small fly) is a great pest. Its bite is fatal to horses and other domestic animals, though harmless to man and wild animals. On account of this insect, it is necessary to use men as carriers for all the traffic of those regions infested by this fly.

ORAL AND WRITTEN EXERCISES.

What are the principal vegetable products of Northern Africa? Of the Sahara? Of the oases? Describe the vegetation of Equatorial Africa. What other grand division resembles this part of Africa in wealth of vegetation? What are the chief products of South Africa? Name the principal wild animals found in Africa? Give a brief description of the tsetse fly.

97. People, etc.

Many parts of Africa are quite unfit for human habitation, but there are other fertile regions which support a teeming population. The most densely peopled regions are the basins of the Niger, Congo, Lower Nile, Lake Chad, and the great lake region. The people of northern Africa, including those of the Sahara, are mainly Berbers and Arabs; they



Carrying Hides to the Coast.

belong to the white race, but like the Turks, they believe in the Mohammedan religion. The Berbers resemble the people of southern Europe. Many of them are in a half savage state, and wander about the country with their herds of cattle and camels, sometimes plundering caravans. The Berbers once occupied the whole of northern Africa, but, about a thousand years ago, Arabs came from south-western Asia and now their descendants are the traders of the region. The Arabs wear loose robes and turbans, and are among the finest horsemen in the world. Most of the trade between the interior and the coast is carried on by means of Arab caravans.

South of the Sahara is the home of the Negro or black race. The negroes live in tribes which are frequently at war with one another. Many of the tribes raise corn and other grain to feed their cattle, and some of them can make cloth and leather.

many bananas - as the maize and sugar cotton  
 Sahara - cactus

of Aden  
 .O C E A N  
 A N  
 .O C E A N

oration of  
 the central  
 white men.  
 d by the  
 Superior.  
 of Lake  
 se lakes?  
 Zambezi?  
 t?



1. CAMEL.
2. HORNEB VIPER.
3. IBIS.
4. FLAMINGO.
5. CROCODILLE.
6. GORILLA.
7. LION.
8. ELEPHANT.
9. HIPPOPOTAMUS.
10. RHINOCEROS.
11. PUFF ADDEB.
12. OSTRICH.
13. GNU.
14. ZEBRA.
15. GHAFFB.
16. KOODOO.
17. STRIPED HYENA.

The single-humped Camel is used throughout all northern Africa as a beast of burden and travel. All traffic is carried on by his aid; without him commerce would be impossible. The Horned Viper is found in northern Africa, the Puff Adder in the deserts of south Africa; both are exceedingly venomous. The Puff Adder is of considerable size, and, when irritated, swells out the upper part of its body. The Flamingo is found in salt, marshy, tropical districts, and sometimes visits Europe. It is a bird of the goose kind, and is noted for its beautiful plumage, its body being of rich rose color, and its wings of a dark purple. The Ibis is found principally in the Nile valley. It was held sacred and worshipped by the ancient Egyptians, and was the object of numerous extraordinary beliefs—as, for example, that its flesh was incorruptible after death. The Crocodile is found in nearly all African rivers, especially the Upper Nile and the Limpopo. It attains a great length, sometimes as much as thirty feet; and it frequently seizes human beings as prey. It also was held sacred by the ancient Egyptians. The Gorilla is the largest and strongest of the apes, being about six feet in height, and able with its teeth to crack nuts which would otherwise require a heavy blow from a hammer. The Ostrich is found in almost every part of the continent, but especially in the deserts and open plains. It is very vigilant and fleet, and its capture can be effected only with great difficulty. The artificial breeding of the ostrich is now a successful and important industry in Cape Colony. The Koodoo is one of the largest of the antelope species. It lives in small families of four or five. Its principal beauty lies in its horns, which are about four feet long, and are gracefully twisted in a wide spiral. The koodoo may be easily domesticated. The Striped Hyena is peculiar to southwestern Asia and northern Africa; the Spotted Hyena is peculiar to southern Africa. The Jackal, a distant relative of the hyena, but a smaller animal, is common throughout all Africa. Both the hyena and the jackal are useful as scavengers, being fond of carrion; and both can be perfectly domesticated.



Some Animals of Africa.

Most of the negroes, however, are entirely uncivilized. They live in villages, some of which contain hundreds of low huts. They are fond of dancing and music, which sounds harsh and disagreeable to white people. They are very fond of ornaments, so that it is common to see a negro with his nostrils or lips pierced and ornaments fastened in the holes. Many of them grease and paint their bodies, and wear little or no clothing. A tribe of *pigmies*, or dwarfs, has been discovered in the forest region of Equatorial Africa. They shoot small animals with poisoned arrows which they blow through a blow-pipe made of the hollow stem of a reed.

In southern Africa live the Kaffirs and Zulus, men of fine physique and of much greater intelligence than the negroes farther north. Here also are found the Hottentots, a people of low stature, and though doubtless belonging to the negro race, they have a yellowish skin; they are savages in a very degraded state.

Besides the native races, there are English and Dutch colonists in the south; French in Algeria and in the west; Portuguese and Germans on the east and west coasts.

**INDUSTRIES.**—The industries of northern Africa are similar to those of southern Europe. Between the northern and central parts of Africa, trade is carried on by means of caravans of camels. These are continually crossing the great Sahara desert, carrying salt, cloth, knives and trinkets to the interior and returning with ivory and slaves mainly, but also with gold dust and ostrich feathers.

Great quantities of ivory are exported every year from Africa. Whence is it obtained? Elephants roam over all the great central region of Africa, but are killed so rapidly that the supply of ivory from that source will probably soon cease. In what other grand division are elephants found? From what other source is ivory supplied?

Though slave markets on the east and west coasts have been abolished, still slave hunting is pursued in the interior by Arab slave and ivory dealers, especially in the Sudan, the equatorial lake region, and the basin of the Congo. It is estimated that more than a million of lives are annually lost through the capture and transit of slaves.

The *ostrich* is one of the few animals that live in the desert. It is a huge bird standing about seven feet high. It cannot fly, but can run so fast that the swiftest horse can hardly overtake it. Its feathers are much used as ornaments. On the



Ostriches.

ostrich farms of southern Africa, these birds are raised in large numbers. The plumes are carefully cut each season. Most of the world's supply of ostrich feathers comes from these farms.

Africa has for a long time been noted for its yield of *gold*. In former time the Kong Mountains was the great source of this metal; but lately the mountainous regions of South Africa have supplied enormous quantities. Diamonds, also, are found in considerable quantities in southern Africa.

For centuries the interior of Africa was unknown to Europeans. Several nations, however, established trading stations on the coast. During recent years, when the interior became better known, these trading stations have expanded into important dominions. This has led to the practical partition of the whole continent among Great Britain, France, Germany, Italy, Spain, and Portugal. These nations have entered into treaties with one another by which each nation is allowed to trade in certain regions unmolested by any of the others. These regions are known as "spheres of influence."

Find Morocco and Abyssinia? These are the only countries of Africa that are really independent of all outside control.

#### ORAL AND WRITTEN EXERCISES.

What parts of Africa are most densely peopled? Why? What peoples of the white race inhabit northern Africa? Where is the home of the negro? Name the principal native peoples of South Africa. Name two tribes of dwarfs in Africa. Where are the principal European colonies in Africa? What is ivory? How is it carried to the coast? Where are slaves captured? Where sold? Where is the wild ostrich found? Where is it domesticated? Where are gold and diamonds obtained?

#### 98. Barbary States and The Sahara.

What four countries are west of Egypt along the Mediterranean Sea? What region lies south of them? Which are crossed by the Atlas Mountains?

These four countries are named the Barbary States after the Berbers—the people who occupied the land first. The eastern part of this region is too dry for agriculture, except in the oases. In the western

THE SAHARA.

part, where the rainfall is greater, *grain* is grown on the plateaus, and tropical fruits on the lower lands. The crops are generally small, owing to the rude methods of agriculture employed. Large numbers of *sheep, goats, camels, horses, and asses* are raised. Along the coast, fishing and the collection of *sponges and coral* are important industries. Manufacturing is carried on to a slight extent, chiefly by hand. The chief articles manufactured are *woollen and silk goods, shawls, carpets, felt, and leather*. The native peoples are Mohammedans.

MOROCCO.—What country is opposite Spain? It was named from its people, the Moors, a tribe very closely related to the Arabs. It is an empire with a despotic ruler who is called the *Sultan*. The chief wealth of the country is in the large herds of cattle, horses, camels, and asses, and flocks of sheep and goats.

Where is *Tangier*? It is the chief port of Morocco. Where are *Fez* and *Morocco*? The sultan resides alternately in these two cities; thus Morocco has two capitals. *Ceuta* belongs to Spain.

ALGERIA.—What country is east of Morocco? It is an important French colony. The region north of the Atlas Mountains is well watered, and produces abundant crops of *wheat, rice, olives, dates, grapes, cotton, and tobacco*; but the special production is *esparto*, a kind of grass from which paper is made. The French have made use of artesian wells to fertilize patches of the Sahara. *Iron, lead, zinc, copper, and quicksilver* are abundant.

Railways connect the chief cities of Algeria with Tunis.

Find *Algiers*. It is the capital and chief seaport. It is one of the most important coaling stations in the Mediterranean. *Oran* is also an important port with a large trade.

TUNIS.—This country is a French protectorate. It is nominally governed by its native ruler, the *bey*; but really it is ruled by the French resident-general. The products are similar to those of Algeria. Railways are taking the place of the old *caravans* in transporting goods from one part of the country to another.

Where is the city of *Tunis*? This is the capital, and the chief commercial city of northern Africa. Near it is the site of the ancient city of Carthage.

TRIPOLI.—This country, including Fezzan and Barca, is a Turkish province. Most of the land is desert.

Where is *Tripoli*? This is the chief city and port. It is the Mediterranean terminus of the great caravan route across the Sahara to the basin of Lake Chad.

The word *Sahara* means "desert." This region is part of the great barren tract which stretches across Africa and the greater part of Asia. Name the different deserts included in this belt in Asia. These are deserts not because of the quality of the soil, but because so little rain falls that few plants can grow. In the south of Sahara some rain falls, and consequently more or less grass grows, and still farther south the desert gradually gives place to the fertile lands of the Sudan. In the desert itself there are fertile spots where there is more moisture, owing to greater rainfall or to springs or wells. Such a fertile spot is called an *oasis*. Some of these oases are many miles in extent, and produce *dates, olives, wheat, and barley*.

The Sahara is probably the hottest part of the earth, though the nights are cool, sometimes cold enough to freeze water.

In some parts the surface of the Sahara is covered with loose rocks, and in others with sand that drifts about with the wind. Sometimes this sand is blown by fierce winds into the air, making it almost as dark as night. Camels and their drivers overtaken by these sand storms lie upon the ground with their heads almost buried in the sand until the storm has passed. The most important production of the desert itself is salt, found in depressions which are probably the beds of former seas.



Caravan on the Sahara.

Trade is carried on across the Sahara from the Sudan to the Mediterranean by means of *caravans*. These are huge travelling markets, comprising from one thousand to three thousand camels. They are escorted through hostile territories by hundreds of armed Arabs, and the journey from the Mediter-



anean to the Sudan occupies from two to three months. Besides these *trade routes* north and south, there are *pilgrim routes* crossing these to Mecca.

The greater portion of the Sahara is in the French *sphere of influence*.

#### ORAL AND WRITTEN EXERCISES.

Name the Barbary States and tell how each is governed. Describe their climate and productions. Name three kinds of people in these states. Why is the Sahara a desert? How is trade carried on across it?

#### 99. Egypt, etc.

What sea is north of Egypt? What sea east? What river flows through Egypt? How do you account for the Nile having no branches in Egypt? What great canal is in this country?

From the map you can see that Egypt is several hundred miles broad, but it is all desert except the flood plain of the Nile which is only four or five miles wide. Little or no rain ever falls on this flood plain; but once a year the river, swollen by the rain and melting snows in the southern highlands, overflows the plain. After the water subsides, a coating of mud remains, which yields wonderful crops of *rice, cotton, sugar, and wheat*. Egypt also produces *dates, melons, and figs* of the finest quality. The flood plain and delta of the Nile are very densely populated.

The people of Egypt are mostly a mixture of Negro and Arab blood, and in religion are Mohammedans. They mostly speak the Arabic language.

Egypt is nominally a Turkish province under a ruler called the *Khedive*. Not long ago Great Britain undertook the control of the country in order to compel the khedive to pay his debts to his European creditors. During British occupation, the prosperity of Egypt has increased wonderfully, owing partly to juster methods of taxation and partly to improvements in the irrigation of the country from the Nile.

The ancient Egyptians were a highly civilized people. Thousands of years ago, they built in the Nile valley many vast temples, monuments, and tombs. The *pyramids*, for which Egypt is so famous, were built as tombs for the kings.

Agriculture is the one great industry of Egypt, but the methods are very rude; the soil is not even plowed, but the seeds are scattered and then trampled in by oxen. The main labor of the people is devoted to regulating the water supply. Dikes and ditches are built, and the water is lifted from the river by clumsy wheels or by hand. Considerable numbers of *cattle, sheep, goats, camels, and asses* are raised on the pastures.

Trade is carried on by means of the Nile river, a railroad up the Nile valley, and other railways chiefly in the delta, sometimes called Lower Egypt. But the most important commercial route is the ship canal, constructed by Europeans across the Isthmus of Suez, and through which passes a large part of the commerce between Europe and Asia. The British government now owns the greatest share of the Suez canal, and fully twice as many British vessels as those of all other nations put together pass through it.

Find *Cairo*. It is the capital of Egypt and largest city in Africa. It is situated at the head of the delta of the Nile. Near it are the great pyramids.

Where is *Alexandria*? It is the chief seaport of Egypt. *Port Said* and *Suez* at the ends of the Suez canal are ports whose trade is rapidly increasing.

#### BRITISH-EGYPTIAN SUDAN.

What is the latitude of the southern boundary of Egypt? The country south of this boundary was formerly under the control of Egypt. A few years ago the tribes of mixed Arab and Negro blood united in a religious war under a leader called the *Mahdi*, and threw off the authority of the khedive. This region has recently been re-conquered by England and Egypt, and is under the joint control of Great Britain and Egypt.

This region consists mostly of a rainless desert across which the Upper Nile escapes through a narrow basin from the equatorial lakes towards Egypt. It is thinly peopled by unsettled and wandering tribes, mostly Mohammedans.

The principal products are *gum, cotton, indigo, millet* is the chief cereal food. *Ivory* is the most valuable article of commerce.

Where is *Khartum*? This is the chief city in British-Egyptian Sudan. Near it is *Omdurman*, the mahdi's capital; where he was finally defeated by the Anglo-Egyptian army.

*New Dongola* and *Berber* are important towns on the Nile. Where is *Suakin*? It is the chief port of the region.

#### ABYSSINIA.

This country forms part of the great plateau of south-eastern Africa. It contains many elevated lakes and is drained by many mountain torrents. The chief lake is Dembea, the source of the Blue Nile, and the principal rivers are the Blue Nile and the Atbara.

The people of Abyssinia are a mixture of Arabs and Negroes, and are mostly Christians, having been converted to Christianity in the fourth century.

Very little land is under cultivation, pasturage being the chief pursuit of the people, who raise large

herds of *cattle* and flocks of *sheep* and *goats*. Abyssinia is thought to be the native land of *coffee*, considerable quantities of which are exported.

Towns are numerous but small. The principal are *Gondar*, the former capital, and *Addis Abeba*, the present capital of the kingdom.

#### ORAL AND WRITTEN EXERCISES.

Describe the Nile Basin, giving its shape and position. What is the source of the water of the Nile? What is the relation of Great Britain towards Egypt? What is the chief industry? How is it carried on? Describe the surface of British-Egyptian Sudan. What is the chief industry of Abyssinia?

### 100. The Sudan.

The *Sudan*, "the land of the blacks," is the broad belt of country within the region of tropical rains, which, in its widest sense, extends from the Atlantic, on the west, to the Red Sea and Abyssinia, on the east. It is indefinitely bounded on the north by the Sahara, and on the south by the northern divide of the Congo. The eastern part of this region has been described under the name of British-Egyptian Sudan.

The interior of this region is in general a moderately high plateau, the Kong plateau, with the exception of the Lake Chad basin. Along the coast the land is flat, with innumerable channels, connecting the rivers with the ocean. This part is very unhealthy for Europeans.

The chief rivers are the Niger, Senegal, and Gambia. Find them. The Niger is the third river of Africa. It rises in the Kong plateau, and after a circuitous course, flows into the Gulf of Guinea. It is navigable for large vessels for 900 miles from its mouth. The Senegal and Gambia, though much smaller rivers, are also navigable for considerable distances.

Owing to the great rainfall, the Sudan is very fertile, and supports a dense population. The people are mostly Negroes, or a mixture of Negroes, Moors, and Berbers. The mixed races are fanatical Mohammedans, while the Negroes are pagans, and worship a multitude of *fetishes*, or idols made of metal, wood, or stone. The people are indolent and warlike. They are somewhat devoted to agricultural and grazing pursuits, raising of *grain* and *cattle*. Slave-hunting Arabs are still a terror to the natives of the Sudan; but European influence is gradually lessening this evil.

The productions of the Sudan are very valuable, consisting of *palm oil*, *rubber*, *ivory*, *varnish gums*, *hides*, and some *cotton*, *sugar*, *coffee*, and *gold*.

Nearly all the Sudan countries are under the control of some European country or within its "sphere of influence." There are a few native independent states around Lake Chad. These are governed by despotic rulers who treat their subjects with horrible cruelty.

#### FRENCH POSSESSIONS.

**SENEGAL.**—This is a French colony, including several stations on the river, with a certain area of land around each, and the coast from Cape Blanco to Gambia. A large territory, stretching away into the interior, is under the control of the governor of Senegal.

Where is *St. Louis*? This is the capital and chief town. Find *Timbuktu*. It is near the Niger, at the junction of several caravan routes, and is the most important city in Central Africa.

**FRENCH GUINEA AND DAHOMEY.**—This includes *French Guinea*, *Ivory Coast*, and *Dahomey*, the last being a kingdom under the protection of France.

**TOGO**, a small district between Ashanti and Dahomey, belongs to Germany.

**PORTUGUESE GUINEA**, a small district south of Gambia, belongs to Portugal. *Bissao* is the capital.

#### LIBERIA.

This is a negro republic, founded by citizens of the United States for freed slaves, from that country. Its constitution is modelled after that of the United States. *Monrovia* is the capital.

#### BRITISH POSSESSIONS.

**GAMBIA**, at the mouth of the Gambia River, is a British crown colony, that is, a colony entirely under the control of the British government. *Bathurst*, at the mouth of the Gambia River, is the capital.

**SIERRA LEONE.**—This is a crown colony, originally established as a settlement for slaves captured from slavers. Its climate is notoriously fatal to Europeans, so that it is called the "white man's grave." Find *Freetown*. This is the greatest seaport in West Africa, and is the headquarters of the British forces in West Africa.

**GOLD COAST**, including the *Protectorate of Ashanti*, is a crown colony. *Ashanti* is a native kingdom which has submitted to British control.

*Akkra* is the chief town. *Kumasi*, a short distance from the coast, is the capital of Ashanti.

**LAGOS**, an island and a small region on the mainland, is also a crown colony. The *Port of Lagos* is the capital.

**NIGER COAST PROTECTORATE.**—This region occupies the coast between Lagos and Kamerun, with the

exception of a small portion of the Niger delta, which is in the Niger Territories.

**NIGER TERRITORIES.**—These are governed by the Royal Niger Company. This is a company of rich English merchants, similar to the "East India Company." Under a charter from the British Parliament, they have made many treaties with the native chiefs, by which they have secured a monopoly of the trade in those regions. They will also gradually abolish slavery in the territories.

This region is densely peopled, and in time the trade will be very great.

Where is *Asaba*? It is the present capital of the territories.

#### ORAL AND WRITTEN EXERCISES.

What is the position of the Sudan? What is meant by "spheres of influence?" Name the possessions in the Sudan of the various European nations. Name the republics. What is a crown colony? What is a protectorate? How are the Niger Territories governed?

#### 101. Congo Free State, etc.

##### KAMERUN.

This is a German protectorate, south of the Sudan. The climate is unhealthful for Europeans. The chief products are *palm oil*, *ivory*, *ebony*, *rubber*, *dye-woods*, *bananas*, *yams*, and *coffee*.

*Buca* is the capital.

##### FRENCH CONGO.

This is a French protectorate. The chief products are *rubber*, *cocoa*, *coffee*, *ivory*, *palm oil*, and *varnish gums*.

*Brazzaville*, on the Congo, opposite *Leopoldville*, is the capital. *Libreville*, on the coast, is an important port.

##### CONGO FREE STATE.

What important line crosses the Congo Free State? What river drains it? What lakes are on its eastern boundary?

This immense territory in Equatorial Africa is under the sovereignty of the King of Belgium, and is equally free to the trade of all nations.

The surface is mountainous on the east, sloping gradually to the west.

The only river of importance is the Congo with its tributaries. This is one of the great rivers of the world, second only to the Amazon in the quantity of water discharged into the ocean. It is navigable for about 100 miles from its mouth. Above that there are numerous rapids, which render the river

unnavigable for over 200 miles, as far as Stanley Pool. Above this there are about 1000 miles of navigable water, as far as Stanley Falls, while several of the great tributaries are navigable for a considerable extent of their course. A railway has been built to overcome the lower rapids.

The chief productions are: *ivory*, *palm oil*, *nuts*, *rubber*, and *coffee*. *Manioc*, *bananas*, *pineapples*, and *sugar canes* abound.

Trade is carried on chiefly by means of steamers on the Congo and its numerous tributaries.

*Boma*, near the mouth of the Congo, is the capital and chief port. *Leopoldville*, at the head of the lower rapids, and *Equatorville*, on one of the branches of the Congo, are important trading stations.

##### PORTUGUESE WEST AFRICA.

What country is south of the Congo Free State?

For over four hundred years the Portuguese have had trading stations in this region; but, until the middle of the present century, these stations were used principally as depots for slaves to be sent to the plantations of Brazil.

The region is mountainous and well watered by numerous rivers, rising near the head waters of the Zambesi.

The chief products are *coffee*, *rubber*, *wax*, *ivory*, *cattle*, and *fish*. The province contains *copper*, *iron*, *petroleum*, *salt*, and *gold*.

*St. Paul de Loanda* is the capital and chief port.

##### GERMAN SOUTH-WEST AFRICA.

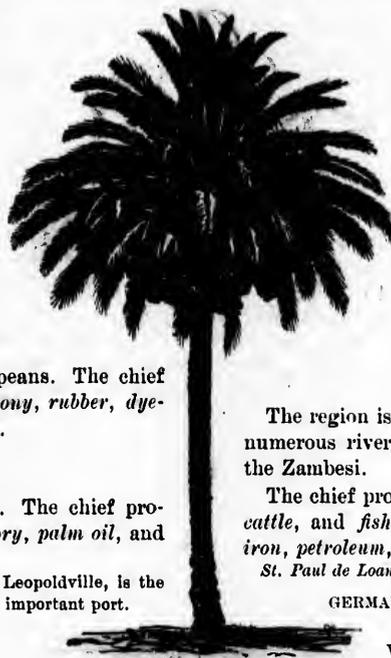
What river is north of German South-West Africa? What river south?

This is a German protectorate. The rainfall is slight, and in consequence a large part of the country is barren. The natives possess large herds of *cattle*, and considerable numbers of *sheep* and *goats*. *Copper* and *gold* are found, but not in paying quantities.

Around **WALFISH BAY** is a small district belonging to Britain and forming part of Cape Colony.

##### ORAL AND WRITTEN EXERCISES.

Describe the Congo river, its size, source, course, and navigation. What are the chief products of the Congo Free State? Name the European possessions between the Sudan and Cape Colony. Name the capital and chief productions of each.



The Date-Palm.

102. Cape Colony and Natal.

What river forms part of the boundary between Cape Colony and German South-West Africa? What oceans wash the shores of Cape Colony? What two capes are south of this colony?

This colony was first settled by the Dutch, over two hundred years ago. They gradually extended their settlements until the beginning of this century, when the country was conquered by Britain. After many wars with the natives the British have extended their dominion over nearly the whole of Africa south of the Congo Free State.

The surface is mountainous, the mountain ranges, of which there are three, being parallel to the coast. The innermost is the highest and is known under different names in different parts—the Snow Mountains, the Nieuweld Mountains and the Drakenberg Mountains.

The climate of South Africa is sunny, dry, and healthful. There are rainy and rainless regions. The high mountains deprive the inland districts of rain, which falls copiously on the slopes facing the Indian Ocean. In general there are two seasons—a dry season and a rainy season.

There are many rivers, but none are navigable. In the dry season, they consist of a series of pools; while in the rainy season, they become rushing torrents.

Wheat, oats, barley, and maize yield abundant crops everywhere. Tobacco is grown in large quantities. Oranges, lemons, peaches, etc., thrive. Vines are cultivated extensively, so that large quantities of wine and raisins are exported.

The lion, elephant, baboon, rhinoceros, and hippopotamus are still found, though they are less numerous than formerly. Antelopes are protected by the game laws, and so are elephants and buffaloes. The secretary-bird, which is very useful in destroying serpents and other reptiles, is a native of South Africa.

The chief industries are sheep, cattle, goat, and horse breeding, and in consequence, wools, skins, and hides are staple articles of export. Ostrich farming also is one of the industries of Cape Colony, most of the ostrich feathers used in the world, being the product of this colony.

In minerals, Cape Colony is rich, especially in diamonds, copper, and gold.

The chief manufactures are the making of wine and the preparation of leather.

Railways have been built through the colony and are extended from time to time.

The government of Cape Colony is similar to that of Canada. The governor is appointed by the English Crown. The laws are made by a parliament, consisting of two houses: A Legislative Council, elected for seven years, and a House of Assembly, elected for five years.

Find Cape Town. This is the capital of the colony and the chief city in South Africa. It is the chief coaling station on the long route from England to India and Australia. What is the short route?

Port Elizabeth, in the south-east of the colony, is a thriving and progressive city.

Find Kimberley. This is the centre of the greatest diamond mining district in the world. It is connected by railway with Cape Town.

NATAL.

What state is north of Natal? What state north-west?

The surface of Natal resembles that of Cape Colony. The coast plain is very fertile, producing sugar, cotton, rice, tobacco, indigo, and arrowroot in abundance. Tea-planting has recently been intro-

duced with considerable success.

The leading industries of Natal are the same as those of Cape Colony.

Coal and iron are the principal minerals. Some coal is exported, but the iron mines have not been worked to any great extent.

The government of Natal is similar to that of Cape Colony; but the Legislative Council is appointed by the governor and not elected by the people.

Pietermaritzburg, in the interior, is the capital.

Find Durban. It is the chief port and the largest town in the colony. It is connected by rail with the chief towns of the Transvaal. Much of the trade of the two Dutch republics finds its way to Durban.

BASUTOLAND is a small crown colony north of Natal and south of the Orange Free State. It is a lofty, rugged, and well watered plateau. Its exports are grain, cattle, and wool.



An Ostrich Farm.

### 103. Orange River Colony.

After Great Britain conquered Cape Colony, many of the *Boers* or Dutch settlers were dissatisfied with English rule, left Cape Colony, settled in the country lying north-eastward, and called it the Orange Free State. In 1899 they took up arms against Great Britain, but were defeated, and their State annexed to the British Crown as Orange River Colony.

The country is almost entirely a plateau. The soil is not very fertile, and it is thinly peopled. It is chiefly a grazing country. The chief exports are *wools, hides, ostrich feathers, diamonds, and cattle.*

*Bloemfontein* is the capital. A railway through Bloemfontein connects Cape Colony with the cities of the Transvaal and with the port of Lourenco Marquez in Portuguese East Africa.

#### Transvaal Colony.

This country, like the Orange River Colony, was settled by Dutch *Boers* from Cape Colony. After a great deal of fighting with the natives and the British, a republic was established in 1881. The people of the republic were left free to manage their own internal affairs, but the British reserved the right to control foreign relations.

The country is mountainous in the south, sloping somewhat toward the north.

It is well watered by numerous rivers, but none of them are navigable to any extent.

The climate is mild and the rainfall considerable, consequently, the vegetable productions are valuable, consisting of *sugar cane, coffee, rice, pineapples, wheat, etc.* *Horses, cattle, and sheep* are raised in large numbers. In the valley of the Limpopo the tsetse fly is very troublesome, and on the plateau, locusts.

The Transvaal is one of the richest countries in the world, in minerals. In the production of *gold*, it is exceeded only by the United States, Russia, and Australia. *Silver, copper, and lead* abound. Valuable deposits of *coal* are also found.

The discovery of gold caused a very large immigration of foreigners, mostly British. These foreigners, invested enormous sums in the mines and paid heavy taxes into the treasury of the republic, but had little, if any, share in the government, aliens not being allowed to vote or hold office. This caused great dissatisfaction among the *uitlanders*, or foreigners. In 1899 the *Boers* declared war against Great Britain, but were defeated and their country annexed to the British Crown.

*Pretoria* is the capital of the colony. It is connected by railways with Cape Town, Durban, and Lourenco Marquez.

*Johannesburg*, the largest city in South Africa, is the centre of the gold mines. It is connected by railway with Pretoria, and with the chief ports of South Africa.

#### ORAL AND WRITTEN EXERCISES.

Who first settled South Africa? What are their descendants called? Describe the surface and climate of South Africa. Name the chief occupations of the people of Cape Colony. Describe the government of Cape Colony and of Natal. Name the chief towns of Cape Colony and Natal.

### 104. Remaining British Possessions in Africa.

#### BRITISH SOUTH AND CENTRAL AFRICA.

This large territory, extending from the Congo Free State to Cape Colony and the Transvaal Colony, is controlled by the British South Africa Company.

This territory is in the plateau region and is high, dry, and generally healthful.

The eastern part of this district, known as Matabele Land, is rich in *gold, silver, and copper*, and considerable quantities of these metals have been mined.

The Cape Government railway has been extended from Kimberley to Salisbury. The telegraph system has been extended through this part, and even the telephone is in operation.

*Salisbury* and *Bulawayo* are rising towns, having banks, churches, hotels, schools, hospitals, and public libraries.

#### NYASSA LAND.

(The official name of this territory is the *British Central Africa Protectorate*.)

This is a small protectorate lying along the southern and western shores of Lake Nyassa, under a commissioner of the British Crown.

The chief products are *rice, wheat, barley, oats, and coffee*. The chief exports are *ivory and coffee*.

Steamboats run regularly on Lake Nyassa and on its outlet to the mouth of the Zambesi, except in one place, where navigation is obstructed by falls.

*Blantyre* is the chief town. The seat of the administration is *Zomba*.

#### BRITISH EAST AFRICA.

Between British East Africa and British Egyptian Sudan there is no definite boundary. The whole of this large territory is divided into two protectorates: The East Africa Protectorate, occupying the eastern part, and the Uganda Protectorate, the western part.

THE EAST AFRICA PROTECTORATE.—The principal exports are *ivory, rubber, cattle, gums, and hides*.

Find *Mombasa*. This is the capital. A railway from this town to Lake Victoria is in course of construction.

**UGANDA PROTECTORATE.**—The soil of this region is very fertile; but, until the railway from the coast is completed, outside trade is impossible. This district is rather densely populated.

*Mengo*, on Lake Victoria, is the capital.

#### ZANZIBAR PROTECTORATE.

Find the island of Zanzibar. Near it is the island of Pemba. These constitute the Zanzibar Protectorate. It is nominally governed by its own Arab Sultan, who is, however, under British control. Formerly a large portion of the neighboring coast was under the control of the Sultan of Zanzibar.

*Zanzibar* is the capital and chief port. Through it passes most of the trade of East Africa.

#### BRITISH SOMALI PROTECTORATE.

This is a small territory on the south of the Gulf of Aden. The chief exports are *hides, ostrich feathers, cattle, sheep, and gums*.

*Berbera* is the capital and chief sea port.

### 105. Remainder of Africa and the Islands.

#### PORTUGUESE EAST AFRICA.

What lake forms part of the western boundary of this colony? What rivers run through it? What channel on the east?

The land rises by slow degrees from the coast to the great plateau region of the Transvaal, Matabeleland, and Nyassaland. The climate is healthful for Europeans on the plateau, but the heat is often excessive. On the lowlands, near the coast, it is generally unhealthful for Europeans.

The chief products are *rubber, coffee, coconuts, rice, tea, and tobacco*.

The higher lands yield *gold, iron, and precious stones*.

Find *Lourenco Marquez*. It is the capital and chief port. A railway runs to the frontier of the South African Republic and is continued to Pretoria and thence to Cape Town. *Mozambique* and *Beira* are also important ports.

#### GERMAN EAST AFRICA.

What large lake is north of German East Africa? What lake is west? What high mountain is in the north-east?

German East Africa is mountainous in the north-east and centre. It has a fair rainfall and is well watered by numerous rivers.

The chief products are *rubber, gums, rice, coconuts, and ivory*.

*Dar-es-Salaam* is the capital and an important seaport. *Bagamoyo* is a sea port and terminus of an important caravan route in the interior.

#### ERITREA.

This is an Italian colony on the coast of the Red Sea. What country borders it on the south-west?

The climate is hot and very dry in the summer season. In the absence of irrigation, agriculture cannot be carried on with success, but pasture is abundant. On this account, *camels, cattle, sheep, and goats* are raised in large numbers. *Pearl fishing* is carried on.

*Massowah* (not shown on the map) is the capital and chief port. Most of the trade of Abyssinia passes through this port.

**ITALIAN SOMALI LAND.**—This is a narrow strip of land along the Indian Ocean, under the protection of Italy.

**FRENCH SOMALI LAND.**—This is a small district between Eritrea and British Somali Land. It is a French Protectorate.

#### ISLANDS OF AFRICA.

**SOKOTRA**, east of Cape Guardafui, belongs to Britain, and is under the governor of Aden.

**SEYCHELLES AND AMIRANTE ISLANDS**, north of Madagascar, are two groups of many islands, mostly of coral formation, belonging to Great Britain. *Cocoanuts* and *vanilla* are the chief products.

**MADAGASCAR.**—What channel on the west of Madagascar?

This is the third largest island in the world, New Guinea and Borneo being larger. It is a French colony. Cattle raising and agriculture are the chief occupations of the people. The chief products are *rice, sugar, coffee, cotton, and rubber*. *Gold, copper, iron, lead, and graphite* are found.

The natives, who are probably of Malay origin, are called Malagasies.

*Antananarivo* is the capital and *Tamatave* the chief seaport.

**MAURITIUS**, east of Madagascar, is a British Crown Colony. It is very fertile, and its chief product is *sugar*.

**REUNION**, south-west of Mauritius, belongs to France, and produces *sugar, coffee, vanilla, and spices*.

**MADEIRA ISLANDS.**—These islands belong to Portugal. They have a delightful climate, and produce choice *fruits and wines*. *Sugar* and *cochineal* are also produced.

**THE CANARIES** belong to Spain.

**THE CAPE VERDE ISLANDS** belong to Portugal.

**ST. HELENA** is a rocky island, celebrated for being the place of Napoleon's exile after the battle of Waterloo. It belongs to Great Britain, and *James Town* on it is a port of call for vessels sailing to the Cape of Good Hope.

**ASCENSION ISLAND** is a high rocky island belonging to Great Britain.

AUSTRALIA AND THE ISLANDS OF THE PACIFIC.

106. Australia.

In what direction from Asia is Australia? What tropic crosses it? What other grand divisions are crossed by the same tropic? In what zones is Australia? What are the winter months in southern Australia? Name the waters which surround Australia. Name the large islands near it. In what part of Australia are the highlands? In what part are the longest rivers? What obstacle to navigation is parallel to the north-east coast? Name two indentations of the coast. What peninsula is on the north?

The surface of the continent of Australia is mostly a low, dry plateau, with a range of mountains along the east coast. In the south-east, the mountains are separated from the interior plateau by broad lowlands. The longer rivers of Australia flow in this plain, most of them emptying into shallow lakes or losing themselves in the sandy soil. What kind of water would you expect to find in these lakes? The western half of Australia, with the exception of a narrow strip along the coast, is a desert.

Find the *Murray River*. This river with its tributary, the *Darling*, is the chief river of Australia.

CLIMATE.—The northern part of Australia, being in the torrid zone, is very hot, with plenty of rain on the northern coast in the spring and summer. In the south-east the vapor laden winds from the Pacific deposit ample moisture on the steep eastern slope; but much of the interior receives little rain and is a desert. The rainfall, even where it is greatest, is very irregular; there are years of great drought followed by years of flood.

VEGETATION.—The hot, well-watered, north-east coast has forests as dense and luxuriant as those of the Amazon and Congo valleys. From these fine cabinet woods are obtained, and, farther south on the east coast, pines, cedars, and tall eucalyptus, or gum trees, make splendid building timber. Much of the interior, however, is covered with a "scrub" of reed like grasses which make good pasturage, or, in the drier regions with such dense thickets of thorny acacias that only a few wild animals can crawl through them. Many plants which elsewhere appear only as herbs and shrubs, grow to a great size: ferns, nettles, reeds, lilies, fuchsias, and geraniums, grow as tall as many of our trees.

There are very few native fruits or grains; but the principal European and tropical fruits and grains have been introduced and thrive abundantly in districts suited to their growth.

ANIMALS.—The animals of Australia are very peculiar, most of the four-footed animals being *pouched*. There is a sac on the breast of the mother, in which the young are carried for some time after birth. The largest of these pouched animals is the *kangaroo*, which has very powerful hind legs on which it travels swiftly by jumping, without touching its weak fore legs to the ground. Much kangaroo leather is used in Europe and America.

The birds of Australia are also remarkable. The best known are the *emu* or Australian ostrich, the *lyre-bird*, the *black swan*, and the "laughing jack-ass," or great *kingfisher*. *Parrots* and *cockatoos* of beautiful plumage are common.

In the north *crocodiles* are abundant. *Lizards* are very numerous, especially in the hot, sandy, or rocky districts: one kind, the *iguana* attains a length of six feet. *Snakes* are numerous and many are venomous.

In the settled parts of Australia, English rabbits have been introduced, and they have increased so enormously that they have become a formidable nuisance.

PEOPLE.—The natives of Australia are black or sooty-brown in color, like the negro, but the hair is long and matted and not curly. They are noted for the manufacture and use of a curious weapon called the *boomerang*. It is made of a curved stick, and when thrown will return to the thrower if it does not strike the object aimed at. These natives are rapidly decreasing in number.

Most of the people of Australia are colonists, or the descendants of colonists from the British Islands. Many Chinese live in the east and south-east.

MINERALS.—Australia is very rich in minerals, especially *gold*, *silver*, *copper*, *tin*, *lead*, and *coal*. They are found principally in the mountains of the east. About one-fourth of the world's supply of gold comes from Australia. *Pearls* are obtained off the northern and western coasts.

INDUSTRIES.—The principal industry in Australia is *wool-growing*. About one-fourth of the world's wool product is grown in Australia, and great quantities of it are exported, mostly to England. *Cattle raising* is also an important industry. The cattle and



Native Australian.

JAMES GRAHAM. JAMES GRAHAM. JAMES GRAHAM.

*blistered with a*



sheep are kept on great stretches of pasture land, called "runs." All the ordinary grains and roots are cultivated, especially in the south. *Mining* is next to wool-growing in importance. *Sugar, cotton, and tea* are grown in Queensland and New South Wales; while the cultivation of the grape and wine-making have been very successful in New South Wales, Victoria, and South Australia. As more than half the people live in the cities, manufacturing is an important industry; the articles made are chiefly for home use. Large quantities of *leather* and *canned meat*, however, are exported.

GOVERNMENT. — Australia is divided into five colonies. Find them on the map. At present each of these colonies has a governor appointed by the British government, and a parliament similar to that of Canada, elected by the people. Unlike Canada, the colonies of Australia are not united into one dominion. What island is south of Australia?

It is expected, however, that very shortly all the colonies of Australia and Tasmania will be united into one *confederacy* like Canada, under the name of the *Commonwealth of Australia*. All the colonies except New South Wales have consented to the union.

very being other, after is the ys on ouch- kan-

The 1, the jack- of

ds are rocky of six mous. rabbits used so midable

ack or hair is



olonists e in the

herals, d coal. of the pply of ined off

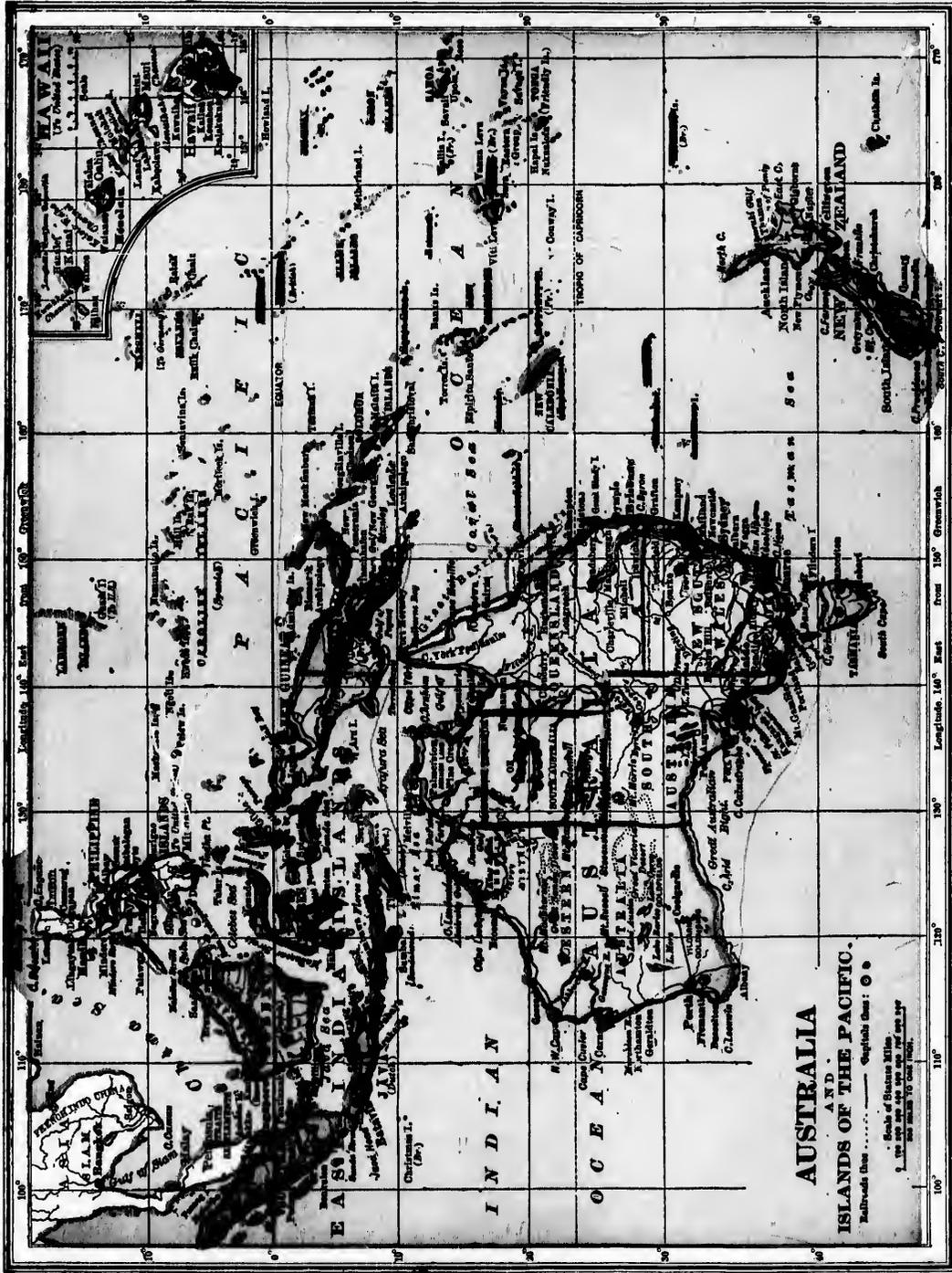
ustralia world's quanti- Cattle ttle and



Australian Capital = Dalgety

Western

102



## 107. Colonies of Australia.

## NEW SOUTH WALES.

Name the boundaries of this province. It is the oldest of the Australian colonies. It is traversed by the eastern coast range under the names of the Australian Alps and the Liverpool Range.

All the rivers of any length flow in a westerly direction. Why? The colony is fairly well watered.

Owing to the variation in elevation, the temperature varies from the coldest to be met with in the British Isles to the genial warmth of the Mediterranean. In the winter the mountains are covered with snow; but at the coast snow is very rarely seen.

New South Wales supplies one half of the wool product of Australia, besides much *wheat, corn, sugar-cane, wine, and oranges*. This colony has large numbers of *cattle and horses*, and exports *tallow, hides, canned and frozen meat*, in large quantities.

Gold, silver, and coal are extensively mined.

Find *Sydney*. This is the capital of New South Wales. It has one of the finest natural harbors in the world. Where is *Newcastle*? It is the second port of New South Wales, and derives its importance mainly from the coal mines in its vicinity. Railways connect these cities with the interior and with the cities of the neighboring colonies.

## VICTORIA.

What colony is on the north of Victoria? On the west? This is the smallest of the Australian colonies, but one of the richest and most prosperous.

A large part of the colony is covered by a part of the coast range, known as the Australian Alps.

The rivers are small, many of them being nearly dried up in the summer and so reduced to a series of pools.

Victoria, being farther south than the other Australian colonies, has a climate more suitable for Europeans than that of any of the others.

It produces *wheat, oats, barley, potatoes, and maize*. It is the chief wine-producing colony of Australia. As in New South Wales, wool is the chief product. Large quantities of *hides, tallow, canned and frozen meat* are prepared and exported.

Victoria is the chief *gold* mining colony of Australia, producing as much as all the other Australian colonies combined. Large quantities of *tin, copper, and silver* are mined in the colony. Coal is also found.

Find *Melbourne*. This is the capital and first port of Australia. It is a magnificent city. *Ballarat* is a large city in the gold fields.

## QUEENSLAND.

What colony is south of Queensland? West? What barrier to navigation is off the eastern coast?

In what zones is Queensland? What kind of climate would you expect this colony to have?

This is one of the largest of the Australian colonies. The coast range of New South Wales continues northward as far as Cape York, but is not so high in Queensland as farther south.

There are many rivers, but they are unimportant.

The climate is hot but is not unsuitable to Europeans. Along the coast the

rainfall is excessive, but west of the coast range it is very much less.

About one-half of Queensland is covered with forest. It is a great grazing colony, raising fully one-half the cattle in Australia. *Wool* is the chief product of Queensland also. *Maize* and *sugar-cane* are the principal agricultural crops of Queensland. *Cotton, pineapples, bananas, and grapes* are successfully cultivated. Many artesian wells have been bored for irrigation purposes.

Queensland is rich in minerals: *gold, copper, silver, and tin*; and the supply of *coal* is almost inexhaustible.



A Sheep Run.



The Brush Turkey, much esteemed for the delicacy of its flesh, is found only in the dense thickets of south-eastern Australia. Unlike other birds, the female does not hatch her eggs by incubation. The eggs are placed in great mounds of grass and weeds, which the birds heap up, and are there hatched by the heat of the decomposing vegetable matter. The Lyre-bird is found in the mountains of New South Wales. It flies but poorly, though it runs with great swiftness. It is about the size of a common hen. The Black Swan, a most graceful bird, is found in southern and central Australia. The Kangaroos are of very many species; they are mostly confined to Australia and Tasmania; a few species are found in Papua. To Australia the kangaroos are what deer and antelopes are to other continents. Many of the species might be domesticated. The Brush-tailed Bettongs are a sort of kangaroo; they have long, prehensile tails, which they use for carrying bundles of grass with which they build their nests. The Wombats are terrestrial burrowing animals, harmless, and slow moving; they inhabit southern Australia and Tasmania. The Bandicoots are also terrestrial animals; they make their nests out of dried leaves, grass and sticks. The Duck-billed Water-mole, and the Porcupine Ant-eater, are found only in Australia and Tasmania. The Emu is a bird of the ostrich kind. It has only rudimentary wings, and its feathers at a distance resemble fur. It is a very swift runner, but it is so much hunted that it is now found only in the interior parts of Australia. (NOTE—In the Malay Archipelago is found another bird of the ostrich kind, which much resembles the emu; it is called the Cassowary.) The Tasmanian Wolf, or Zebra-wolf, is a pouched animal, wolf-like in its habits, and having a head like a dog. It is found only in Tasmania. The Apteryx is found only in New Zealand. Like the emu, it has merely rudimentary wings. When resting, it partly supports itself by its long bill. Its feathers are furnished with long fine hair, so that, at a distance, it seems to be fur-covered.

Some Animals of Australia.

*Brisbane* is the chief port of the colony and the capital. *Rockhampton* and *Townsville* are important ports.

## SOUTH AUSTRALIA.

What colonies are east of South Australia? This colony occupies the central part of the island and extends from the north to the south coast. There are several lakes in the southern part. Name three of these lakes. Much of the interior is desert. Very little is known of the northern part of this colony.

The *Murray* River flows through this colony in the lower part of its course.

Nearly all the people of South Australia live in the southern part.

The climate is mostly dry and healthful. In the extreme south of the colony the rainfall is sufficient for agriculture, and such large quantities of wheat are grown in South Australia that it has been called the "Granary of Australia." All the colonies except Victoria depend on South Australia for part of their wheat supply. Like most of the other colonies, *wool* is the most valuable product.

South Australia is particularly rich in *copper*, possessing some of the most valuable copper mines in the world.

*Adelaide*, the capital, is the third port of Australia in importance. It is beautifully situated, but sometimes the weather is extremely hot.

## WESTERN AUSTRALIA.

This colony has the smallest population of all the Australian colonies, although it is the oldest. Lately, the discovery of very rich gold fields has attracted a large number of people.

The chief products of Western Australia are *wool*, *pearls*, *sandal-wood*, and other timber.

Large quantities of *gold* are mined and exported. Small quantities of *silver*, *copper*, *lead*, and *tin* are mined.

*Perth*, the capital, on the west coast, is a growing city. Railways connect it with other towns.

*Fremantle*, near Perth, is a thriving town. *Coolgardie* is an important mining centre connected by means of a railway with Perth.

## 108. Island Groups.

## TASMANIA.

What strait separates this island from Australia? The climate of Tasmania is not so hot and dry as that of Australia. Why?

Tasmania is about the size of New Brunswick. Its coast line is much indented and it is surrounded by many small islands. Its surface is quite mountainous, some of the peaks being over 5000 feet high.

The plants and animals are like those of Australia. The slopes of the mountains are covered with dense forests. All the European grains and fruits thrive and are grown in large quantities.

*Gold* and *tin* are mined in large quantities and exported mostly to Great Britain.

The chief industry is grazing, and the leading export is *wool*.

Tasmania is a British colony, having a government similar to that of Canada and the Australian colonies. It is probable that Tasmania will enter the Australian Commonwealth when it is established.

*Hobart*, the capital, is beautifully situated on a splendid harbor. It is a summer resort for people from Australia.

*Launceston* is a thriving city and port on the north.

## NEW ZEALAND.

Name the islands of this group. Which is the largest? What strait separates it from the island next in size?

This group of islands is nearly as large as Great Britain and Ireland. The surface is mountainous, the highest peak, Mount Cook, being 13,000 feet above the sea. The islands are of volcanic origin, there being several active volcanoes on North Island, as well as *geysers*, or natural fountains of hot water, which generally occur in volcanic regions.

The climate is similar to that of the British Islands, but warmer.

There is much fertile land. All the common grains are grown, and thrive better than in Australia. The *kauri pine* is a native of New Zealand, and supplies valuable lumber and the well-known *kauri gum*, exported in large quantities. Like Australia, New Zealand is a great grazing country, and immense herds of cattle and flocks of sheep are raised. *Wool* is by far the most valuable export; preserved and frozen meat is next in value. *Coal* is mined in considerable quantities, chiefly for home consumption. A large quantity of *gold* is exported annually.

New Zealand is a British colony, governed like Canada. Most of the people are of British origin. The natives of New Zealand, called Maoris, are of the Malay, or brown race. They are decreasing in number. Those who remain are fairly civilized. Some of the members of Parliament are Maoris.

Railways connect all the principal cities and towns. A large coasting trade is done by steamers.

*Wellington*, the capital, is situated at the south of North Island.

Where is *Auckland*? It is the chief sea port of New Zealand. *Christchurch* and *Dunedin* are thriving towns.

### 109. The Islands of the Pacific.

Scattered throughout the Pacific Ocean, particularly in the western part of it, are hundreds of islands of all sizes. The larger islands are mostly volcanic and fringed with coral reefs. The smaller islands are mostly of coral formation. There are many atolls among them. The climate is hot and moist. The products are *tropical fruits, vegetables, sugar, cotton, spices, pearls, and copra*, or the dried meat of cocoa nuts, from which cocoa nut oil is produced.

Nearly all these islands are under the control of one of the great commercial nations. Great Britain, Germany, France, and the United States have established *spheres of influence*, similar to those in Africa, each nation being guaranteed freedom from interference by other nations within its own sphere.

#### MELANESIA.

What is the largest island north of Australia? New Guinea and the islands to the south-east, as far as the Fiji Islands, are called *Melanesia*, or the *region of the blacks*, the natives being very dark in color.

NEW GUINEA.—This is the largest island in the world. It is considerably larger than the province of Ontario. The people are Malays and Papuans, with dark skins and frizzly hair. The cocoa nut and sago palms are plentiful. Sandal-wood, ebony, and other valuable woods are found. The Germans own the northern part of the island under the name of *Kaiser Wilhelm's Land*, the Dutch own the western portion; the remainder belongs to Great Britain and has been annexed to the colony of Queensland.

THE FIJI ISLANDS.—These belong to Britain. The climate is delightful. The chief exports are *sugar, copra, and bananas*.



Fiji Islander.

The islands lie on the route of steamers sailing from Vancouver to Australia.

NEW CALEDONIA.—This island belongs to France. Before the discovery of *nickel* in Ontario this island was the chief source of that metal. The island is used as a penal settlement for the worst convicts, who work in the nickel mines.

#### MICRONESIA.

Micronesia (region of small islands) consists of numerous groups of small coral islands lying in the Western Pacific, north and east of New Guinea. Find the principal groups. Guam, the largest of the Ladrões, belongs to the United States. The *cocoa nut* palm flourishes in most of these islands.

#### POLYNESIA.

This includes the islands in the Eastern Pacific. They extend eastward from the Tonga Islands and northward to Hawaii. Polynesia is celebrated for its charming atolls, whose central lagoons are fringed with a circle of cocoa nut palms. The fertility of the islands of volcanic origin surpasses that of all other parts of the world. The bread fruit-tree (whose unripe fruit is baked and eaten as bread) is the staple food of many of the islanders.

#### Spices.

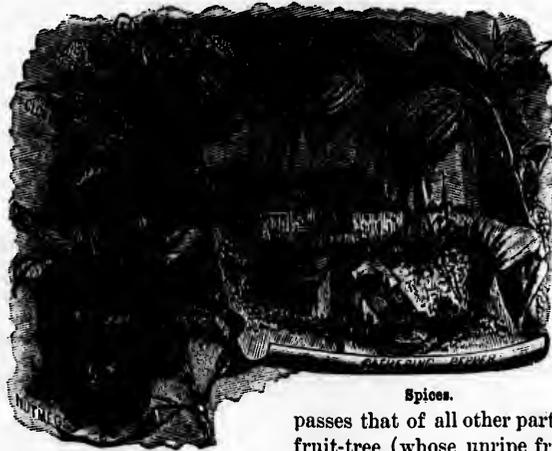
TONGA.—These, also called the Friendly Islands, are still independent, under a native king. *Copra* is the chief export.

SAMOA.—These islands, sometimes called the Navigator Islands, are volcanic and lofty. The natives are rapidly becoming Christians. They are governed by a native king, under the joint protection of Great Britain, Germany and the United States. It is probable that the United States and Great Britain will withdraw, leaving Samoa under German protection only. *Copra* is the only export.

*Apia*, the only town, is the capital.

THE SOCIETY ISLANDS.—These belong to France. The chief exports are *mother of pearl, copra, cotton, and vanilla*.

HAWAII.—This group has been annexed to the United States and is called the *Territory of Hawaii*. These islands are mountainous. The largest island contains two active volcanoes; Mauna Loa and



69 1/2 mls in a degree distance  
15 degrees make 1 hrs. difference in time.

## REVIEW QUESTIONS.

169

Kilauea; the crater of the latter is the largest in the world, being nine miles in circumference. The principal exports are *sugar, rice, coffee, and bananas.*

*Honolulu*, the capital, is a thriving city. It has connection by steamer with Canada, the United States, Japan, and Australia. It is lighted by electricity and has street cars. Nearly every family in Honolulu has its telephone.

### REVIEW QUESTIONS.

Where does the equator cross Africa? What other grand division does it cross? Where do the tropics cross Africa? What other grand divisions does each of them cross?

Where is the forest region of Africa? What other grand division has a vast equatorial forest region? Name some animals of the African forests. Of the South American forests.

To what race do most of the people of Africa belong? What part of Africa is the home of the black race? In what other grand divisions are many negroes found? To what race do most of the people of northern Africa belong? What natural barrier separates northern Africa from the home of the negro? What countries of Africa are independent?

What grand divisions lie wholly in the northern hemisphere? Which grand division has the most regular outline? Name the peninsulas of Eurasia. Of North America.

What highland is between the Cape of Good Hope and the Red Sea? What plateaus between the Red Sea and Bering Strait? What line of highlands extends from Bering Strait to Cape Horn? What plateaus does it include? What mountains? Beginning at South America name the mountains of the world not included in the highland region extending from Cape Horn to the Cape of Good Hope.

Into what ocean does the long slope of Africa drain? Of Eurasia? Of North America? Of South America? Name in order all the large rivers of the world which empty into the Arctic or Atlantic Oceans. Name the large rivers of the world which empty into the Pacific or Indian Oceans.

Which grand division has the greatest population? Which is second? Which races live in Eurasia? Where does each most live? What races live in America? Which came there? What race is the conquering race of the world? Which race has been used as slaves?

In what zone is the greatest rainfall? What large rivers are mostly in the torrid zone? Where are the rainless regions of Africa? Of Eurasia? Of America?

Make a list of the regions of the world where wheat grows. Where rice grows. Are the regions for each alike in climate? Make a list of the regions where animals graze. Are these regions alike in climate?

In what grand divisions and parts of each are gold, silver, iron, and coal found?

Which are the two great manufacturing grand divisions? Which grand divisions carry on the most trade?

Through what European and African countries does the meridian of Greenwich pass? Through what northern sea and near what southern islands does the 180th meridian pass?

What countries in Europe are in the same latitude as the province of Ontario? Compare the climate of one of them with that of Ontario. Compare the climate of the British Isles with the climate of that part of North America in the same latitude.

Arrange in order of size the British Isles, the Japan Islands, and New Zealand. Arrange in order of area and also of population, Canada, the United States of America, China, and Australia.

What route would you take, and what goods would you be likely to carry each way in making trips between Halifax and Madras; Odessa and London; San Francisco and Alexandria; Havana and Glasgow?

What is a delta? How is it formed? Name three rivers of America that have deltas. Two of Europe. Two of Asia. One of Africa. Why has the St. Lawrence no delta?

Where are nearly all the lakes of North America? Why are there hardly any lakes in the southern part of the United States? In what parts of Europe are there many lakes? In Canada and northern Europe many boulders are found, but very few in the United States. Account for this. How are icebergs formed?

What direction do the winds in the Torrid Zone mostly blow? In what direction do they mostly blow in the Temperate Zones? What effect do high mountains have on the winds that blow from the ocean towards them? On which side of such mountains would be the greater rainfall? Why is there so much rainfall in western Canada and in Ireland? Why so little east of the Rocky Mountains, and in the interior of Asia? Why is the Sahara a desert?

If the earth turned round on its axis once in twelve hours and took twice as long to go round the sun, how many of the new days would there be in the new year? If the earth turned on its axis from east to west what difference should we see in the apparent motions of the sun, moon, and stars?

Why are degrees of longitude not always of the same length? Where would a place have no latitude? Where no latitude or longitude? Do all countries use the same first meridian? If it is noon at a certain place when it is 10.30 a.m. at Greenwich, what is the longitude of the place? Louisburg, C.B., is in W. Long. 60°, what time is it in Louisburg when it is 2 p.m. at London, Eng.?

What is the greatest width of North America in degrees? In miles? In about what latitude is South America widest? What is its width in degrees? In miles? What is the greatest width of Africa in degrees and miles? What is the length of Africa from north to south in degrees and miles? What is the width of Eurasia from Spain to Japan in degrees and miles?

When it is noon in London, England, what time will it be in Japan? In Dawson City? In New Zealand? In Rio Janeiro? In San Francisco?

Make a list of the different parts of the world belonging to the British Empire. Name the chief self-governing colonies. Find out what each colony and possession contributes to and receives from the rest of the empire. Name and describe the possessions of the world's other great empires.

From the tables on pp. 170-172 make a list of the twenty most populous cities of the world. Tell about each its position and industries; the kind of country surrounding it; its facilities for trade; and something of its inhabitants.

What is meant by foreign commerce? What countries are well supplied with railroads? In what kind of countries is railroad building difficult? Why are there railways extending from the Atlantic to the Pacific in North America, but not in South America? Name the chief canal in the world.

## PHYSICAL GEOGRAPHY.

Physical Geography treats of the natural condition and development of the Earth as the home of Man. It involves an account of the land and the water on the globe's surface, the movements and other phenomena of the atmosphere and ocean, the various forms of life, past and present, the bearings of all these things on man in his industrial, social and political relations.

It will thus be seen that Physical Geography embraces many of the sciences—geology, which treats of the rocks of which the earth's crust is formed; meteorology, which expounds the laws that regulate the atmosphere; natural history, which treats of the life and distribution of plants and animals; and astronomy, in so far as it treats of the form, motions and magnitude of the earth as a member of the solar system.

### The Structure of the Earth.

The earth is practically a dense, solid globe, nearly covered by a layer of water, the whole surrounded by an envelope of gaseous matter called the atmosphere.

The shape of the globe and the condition of its component substances indicate that it was at one time intensely heated, and that much of the rock composing it was in a molten condition. The globular form is the result of gravitation acting on its particles when in a plastic state.

### Rocks of the Earth's Crust.

The term **rock** is applied to almost every mineral substance that forms a part of the earth's crust. The sand, gravel, clay, limestone, quartz, granite, lava, and even the fine blown rock-waste is called rock, as is also any mixture or combination of them.

**Igneous Rocks.**—Igneous rocks have come from the interior of the earth, and have reached their position in a molten condition. In cooling, their elements combine to form definite compounds known as **minerals**. These rocks are crystalline. The minerals most frequent in them are quartz, feldspar, hornblende and mica.

Igneous rocks vary not only in their composition but also in their coarseness. Just as the rapid or slow cooling of a hot, saturated salt solution will produce small or coarse grains of salt, so varying rates of cooling of the molten material of the earth have produced rocks of texture varying from the fine grained natural glass to the coarse grained granite. Examples of igneous rocks are granite, lava of various kinds, trap and basalt.

**Metamorphic Rocks.**—These are for the most part sedimentary rocks changed or metamorphosed through the action of heat and pressure in the presence of moisture. Through the action of these agencies beds of clay have been transformed into slate, chalk and limestone into crystalline marble, and bituminous coal into anthracite. These rocks are very common in Canada. They are very hard and, like the igneous rocks, are crystalline in structure.

**Sedimentary Rocks.**—Sedimentary rocks are mostly derived from sediments deposited in the ocean. There are three classes

of these rocks—mechanical, chemical and organic. Organic rocks are formed through the deposition of the remains of plants and animals; coal is an illustration of the former and coral of the latter.

Those formed through mechanical agency are by far the most important group. The materials which go to compose them are the wearings from the rocks of the earth's crust exposed to the forces of erosion.

**How Formed.**—Rocks cannot withstand the effects of sun, heat, frost, wind and water. They crumble or decay, and form **soil**. Every rain takes these wearings and carries them to streams, which in turn carry them towards the sea. To these are added others worn by the stream from its sides and bed, and in the ocean are added those worn from the shore by the action of the

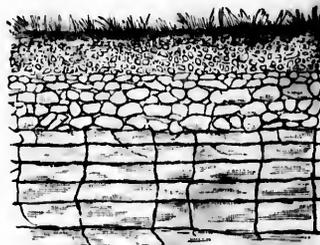


FIG. 1. Bed-rock changing into soil.

waves. In the ocean these all accumulate as **layers**; the coarsest where the water is in most rapid motion, the finest where it is still. Through the operation of pressure, heat, and chemical action these sedimentary fragments are solidified. The coarser rocks, intermingled with pebbles, are known as **conglomerates**; the finest sediments form the **shales**; and the intermediate sandy grains of quartz produce the **sandstones**.

**STRATIFICATION.**—The rock fragments, carried by streams or worn from the shore by waves are deposited in the sea. Since the floor of the ocean is comparatively level, the layers of sediment are nearly horizontal; but where an inclination occurs in the floor, the layers of sediment are inclined in conformity with the bed. Sedimentary rocks are now being formed all over the ocean floor, those of mechanical origin near the shores, those of organic origin in the deeper beds. Most of the rocks of the land are sedimentary, and their great thickness was brought about by a gradual sinking of the ocean bottom as deposition was going on. These rocks show us that large areas of the sea bottom continued to sink for a long time and then were elevated to form the continents. In many cases a second depression occurred, followed by a second deposition of strata, this in turn succeeded by another elevation.

**Order of Strata.**—By a study of the rocks of the earth its history is revealed. "The rocks form the pages and chapters of this history." The story is not perfect, for sometimes pages and whole chapters are missing; but enough remains to show that the earth is, indeed, very old.

Embedded in the sedimentary rocks are found **fossils**, the remains of plants and animals that lived and died when the rock, in which they are found, was being deposited. In stratified rock of great thickness, and where the layers have not suffered great disturbance, it is evident that the lowest strata will be the oldest, and the highest the newest. Hence a careful study of the fossils, found in the various strata from the oldest to the

youngest, reveals a history of the development of life from its beginning to the present.

**THE GEOLOGICAL AGES.**—The study of fossils has led scientists to recognize four or five periods in the history of life on

the earth. The first is the **Archean**, (beginning of life) or **Archean**; the second is called the **Palaozoic** (old life) period; the third is the **Mesozoic** (middle life) period; and the fourth is the **Cainozoic** (new life) period.

**The Archean.**—The Archean rocks underlie all other stratified rocks. They are all crystalline in structure, and their lowest beds are so modified by heat that they can hardly be distinguished from igneous rocks. They are never horizontal, but crumpled and folded and pierced by veins of igneous material. In these rocks are found some of our most useful minerals, such as iron, copper, and silver. Two prominent Archean rocks are the pinkish gneiss, crystalline and with dark bands of mica running through it; and mica schist, whose stratification is seen by its readily splitting into thin leaves.

The lowest beds of Archean rock show no evidence of life at the period of their formation; but the middle beds show remains of a sponge-like animal called the eo-zoon. Some geologists hold that the graphite found in these rocks is the remains of seaweed transformed by great heat from the interior of the earth.

In Archean times the only part of the North American continent appearing above the ocean was a V-shaped body of land about Hudson Bay, and the tops of the Rocky and Appalachian chains.

**The Palaozoic.**—This was a very long period, as shown by the great thickness of the strata, found in some places to a depth of 20,000 feet. The rocks which, in Archean times, appeared above the ocean supplied the material out of which, by wasting, was formed the strata of the Palaozoic period. In these strata lie the carboniferous rocks which furnish nearly all the coal, petroleum and natural gas of the world. The Palaozoic strata except those in mountainous regions, lie generally

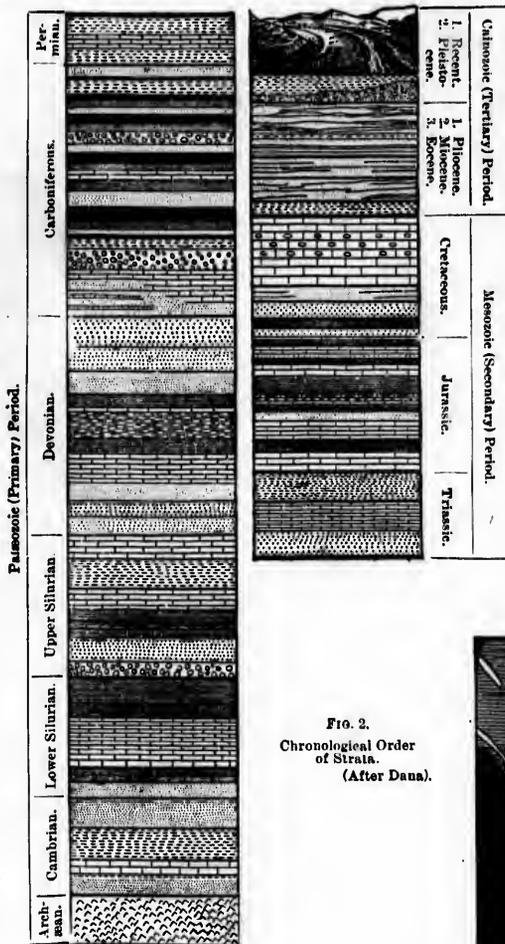


FIG. 2.  
Chronological Order  
of Strata.  
(After Dana.)



FIG. 3. A bit of banded gneiss with mica running through it.



FIG. 4. The Archean Continent. North America in outline, the white portions showing the regions of Archean rocks, viz.: Canada north of the Lakes and the St. Lawrence, and the mountain chains east and west. (After Dana.)

in a horizontal position, showing that the movements of the earth's crusts in those times must have been fairly uniform, and quite slow both in rising and in falling.

During this long period new and higher forms of life appeared, the strata revealing in its fossils, sponges, shell-fish, crustaceans, corals, fish and reptiles—the two latter being the beginning of vertebrate life. Insects first appeared, including the spiders and scorpions. Plant life was well represented in the mosses, horse-tails, ferns, and cone-bearing trees such as the firs and pines.

The coal beds are the remains of the dense vegetation of this period, which, through heat and pressure, have been converted into the black material which we burn in our stoves to-day.

The climate during this period must have been warm and moist, as shown by the rank growth of vegetation.

**The Mesozoic.**—In this period, North America and Europe had grown to about their present proportions. In the former only some additions were required in the south-east and about the Gulf of Mexico to bring the continent, in the next period, up to about its present size.

This period is divided into three divisions. The strata of the

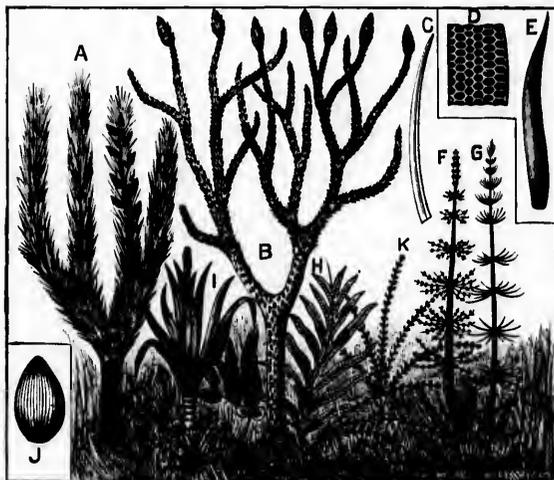


FIG. 5. Carboniferous Vegetation, restored. A and B are two kinds of Lycopods, club mosses, stems showing leaf-scars; C, the leaf of B, one-fourth natural size; D, part of stem, greatly reduced, of a kind of Cycad, resembling A, showing leaf-scars; E, leaf of same, one-fifth natural size;—this tree, called Sigillaria, had the most to do in forming coal; F, G, Equisetum (horse-tail); I, thought to be a Cycad, leaves very abundant in coal; H, K, ferns, another being figured in part, between I and B; K resembles a maiden-hair fern; J, a nut.

first two divisions are composed of red or brown sandstone, and in Canada are found only throughout Prince Edward Island, the Cornwallis and Annapolis Valley of Nova Scotia, and in a few narrow strips along the Pacific coast. The strata of the third division form the Rocky Mountain region throughout its entire length. In these strata are the coal beds of British Columbia.

This was the age of reptiles, some of them—the Dinosaurs—being over 90 feet in length; birds became numerous, but of the reptilian

type, with huge toothed jaws and hooked wings. Mammals of a low order appear, represented by the pouched species. In

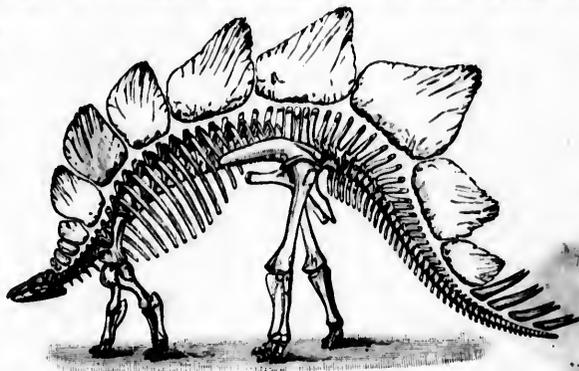


FIG. 6. A Deinosauro; the back protected by bony plates; length of living animal about forty feet. (After Dana). This is one of the largest lizards of Mesozoic times.

plant life, to the conifers were added oaks, beeches, poplars and palms. The fossilized tropical plants found in high latitudes lead us to infer that the climate during this period was still warm.

**The Cainozoic.**—This era is divided into two periods, the Tertiary and Quaternary. The Mesozoic period left the North American continent one of vast salt water lakes. In the Tertiary period great changes occurred. Vast accumulations of material worn from the surrounding lands by rain and wind and other agencies, were carried by streams and deposited along the south-eastern and western coasts, and also in the chain of the Great Lakes. In the later portion of the Tertiary period, a gradual elevation in the east and west took place, giving to the continent its present eastern and southern outline. In the west, owing to this elevation, the lakes were either wholly destroyed, leaving in their sites barren plains covered with alkali, or were shrunken to far smaller dimensions, as has occurred in the case of the Great Salt Lake.

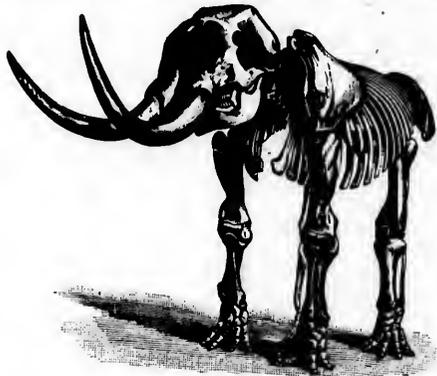


FIG. 7. A Mastodon, a mammal; skeletons have been found over 17 feet long and 11 feet high.

Most of the life forms that flourished in the preceding era were common in the Tertiary period, but mammals developed in a remarkable variety and to a great size. Their genera included the elephant, rhinoceros, camel, wolf, deer and horse. There was also an advance in plant life; the forest trees of North America included most of those we have to-day. The climate must have still been warm, for palms grew in Britain and magnolias (tropical trees) flourished in Greenland.

**The Quaternary Period.**—A great change now suddenly took place, due to a marked lowering of temperature on the North American Continent, more particularly the northern half, and giving rise to the great Ice Age or Glacial Epoch. Lying all over this portion of the continent, except the extreme north, are found great masses of clay, and sand or gravel mixed with boulders of prodigious size. Usually this drift, as it is called, is of the same materials as the rocks which underlie it; but the boulders are, in many cases, hundreds of miles away from rock of similar material, and must have been carried hither by some great force. These boulders are often rounded or scratched and grooved. The rocks which underlie this drift are found, where soft, to be worn smooth, or where their texture is very hard, to be scratched and grooved.

These strange effects have been the work of a vast mass of snow and ice, the accumulation of centuries, which capped to a very great depth the northern half of the continent, and which slowly gravitated southward, gouging out valleys and carrying with it the material scraped and wrenched from the land surface over which it moved. This movement continued till a change in temperature occurred, in which this ice could no longer exist.

#### Cause of the Glacial Epoch.

The widely accepted theory of this strange occurrence is that there was a general upheaval of the land mass in the northern hemisphere during the latter part of the Tertiary times, which had the effect of "shutting off from the Arctic seas the warm ocean currents, and of forcing to the higher regions of the air the warm moisture-laden winds from the south, and gradually bringing about conditions that could not fail to produce great cold and a heavy snowfall." The changes during the Quaternary age were disastrous to life. In the area covered by the ice most of the large mammals perished. The horse, rein-



FIG. 8. Bed-rock polished and striated by ice. Bale Verte, N.B.

deer, wolf and cave bear survived. It was probably during this period that man appeared.

### The Land Masses.

The present condition of the land masses of the earth is the result of many co-operating forces active since earliest times. These forces are still at work, ceaselessly destroying here and upbuilding there. In some cases marked effects have been produced with great suddenness; but generally nature works so slowly that many years elapse before an appreciable change is observable. The history of the Past is but a prophecy of the Future. The globe mass will continue to cool and contract; its surface crust will upheave and subside; volcanoes will erupt and earthquakes shock; mountains will be worn and valleys

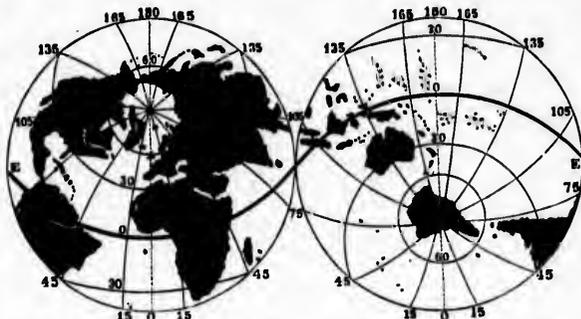


FIG. 9. Land and Water Hemispheres; the double-curved line EE is the Equator.

filled; and from the ocean's depth will spring up new island continents on whose stage will be re-enacted the drama of life, till from mere exhaustion the operating forces subside and the old earth, like its satellite, passes into its serenity.

**THE EARTHFOLD.**—An examination of the map of the world shows that the land masses aggregate in the northern hemisphere, and are at present continuous except for the slight break at Bering Strait and the wider gap between the northern part of the American Continent and Eurasia. These continental masses may however be considered continuous when the comparative shallowness of the water gaps is taken into account—the average depth of the former being but 200 feet, while that of the latter is but 2,500 feet, the rest of the Atlantic ranging from 6,000 to 20,000 feet. Soundings of nearly all parts of the ocean, and more especially of the waters bordering the continents and islands, have been carefully made and recorded. They "show us that the dry land is but the highest part of the flattened top of a huge irregular fold or wrinkle on the solid body of the earth, with some gaps or breaks in it of small but varying depth and breadth which the water fills."

**EXTENT OF LAND AND WATER.**—The superficial extent of the dry land is much less than that of the water. There are about 148,000,000 square miles of water, and only about 55,000,000 square miles of land. But this inequality is even more evident when it is considered that, if all the land elevations were levelled, and the depressions of the ocean bottom filled, the water would cover the whole earth's surface to a depth of 9,000 feet.

**THE CONTINENTS.**—The sea-filled depressions in the earthfold mark off the land surface into divisions or continents. The shape of these continents will depend upon the shape of the

earthfold; but the surface features of these land areas will depend upon the upbuilding and destructive forces within the fold itself. These continents, while having their individual peculiarities, possess some marked features in common.

The **North American Continent**; already was outlined and its northern part filled in during the Archæan period, the tops of the Rockies and of the Appalachians emerging from the ocean as islands. The whole outline was triangular. In succeeding ages these eastern and western regions suffered an uplift which placed them high above the level of the sea, while between them, partly from the lateral uplift and partly from depositions of wearings from the older land, gradually arose the great central plain with its strata which had suffered no great movements, almost uniformly horizontal. This great plain extends from the Gulf of Mexico to the Arctic, with its greatest elevation in the region of the Great Lakes.

**South America** has had a very similar geographical history with a very similar result. In the north was a large area of land already lifted above the ocean level in Archæan times, the tops of the Andes and eastern ridges already appearing as islands. A subsequent upheaval raised the eastern and western ridges; while later, as in North America, was formed the great Central Plain. This continent is also triangular in shape.

**Africa** is also triangular, and, like the Americas, has a great central plain girdled by elevated plateaus. Through these plateaus, three great rivers, the Congo, the Nile, and the Zambesi, have cut their way. Like the Americas, Africa too, has a block of Archæan plateau in the north.

**Europe and Asia** geographically are but one continent, since no natural division exists between them. These combined land masses are known as Eurasia. It presents a different appearance from the Americas and Africa. Its great plain is in the north, stretching from the coast of Spain to Bering Strait, while its highland region extends from Spain along the southern border to eastern Asia, where it spreads over the whole country, till, leaving but a narrow coast line, it falls away to the sea. There is, however, a similarity between Eurasia and the other continents, for its southern projections—Italy, the Balkan Peninsula, Arabia, Hindostan, and Farther India, all have a trend not unlike the continents themselves.

**Australasia**, as it appears above the sea, is not triangular, but when the submerged shallow area to the south through Tasmania is considered as a part of the continent, it then assumes the triangular form. Like the Americas and Africa, it has a central plain surrounded on all sides by highland. What rivers there are, with the exception of the Murray and Darling which find their way to the sea at the south, run inland, where they form shallow lakes or are lost in marshes. The island continent possesses no mountains of any importance. There are none in the south; in the west and north there are a few ranges running parallel to the coast, while in the east the country is a plateau with several ranges of mountains through which the only river of importance runs.

Such a uniformity in the configuration and surface of continental areas naturally points to uniformity of cause. In the endeavor to explain this uniformity, scientists have advanced many theories, two of which may be given.

It is held by Mr. G. H. Darwin that when the earth was in a liquid molten state, owing to the attraction of the moon

two great waves kept rolling round it. In time the crust grew denser owing to cooling, and the "mass of these waves became too thick and stiff to move farther, and thus remained as huge ridges on the earth's surface."

Another theory states that a hollow ball when the air is slowly withdrawn will gradually assume the tetrahedral shape, i.e. it will flatten till it has four faces each a perfect triangle, one forming the top, and the other three forming the three sides. Now the sphere presents the least surface for the most matter, while the tetrahedron presents the greatest surface for the least amount of matter. The earth, a sphere, became smaller as it cooled; "but the outside could not shrink faster than the inside as would be necessary in order to maintain the spherical shape, and so the surface grew larger and larger in proportion to the rest." This tetrahedral shape would have resulted had there not been interfering causes such as the rotation of the earth, the attraction of sun and moon, and upheavals and subsidences.

As it is, this theory has much to recommend it, for somewhat of the tetrahedron exists. The edges of the top triangle form the watershed that compasses the earth about the 50th parallel of north latitude. The four corners are the Archæan regions of Canada, of Norway (including Finland and Sweden), and of north-eastern Siberia, from which stretch out southward the great land lines that end in the fourth corner, the great Antarctic continent; while the flat sides are occupied as follows:—the top by the Arctic Ocean, two others by the Atlantic and Pacific Oceans, and a remnant of the fourth by the Indian Ocean, its northern part having been elevated into a low-lying plain.

### Islands.

Besides the continental land masses there are other land masses dotting the ocean, and varying in size from mere resting places for sea birds to great areas like those of Madagascar and Borneo. These Islands as they are called, are of different origins.

The **Continental Islands** rise from the shallow water bordering the continental plateaus, and since they resemble the adjacent continent in rock formation, in many life forms, and in the direction of their mountain ranges, they are thought to have been formed at the same time, by the same upheaving action, and to have been at one time connected with the Continent. Such islands are found stretching in a chain along the coasts of Western Europe and Eastern Asia, and they fill in the gap between North and South America. On the east coast of Africa there is only Madagascar; and on the east coast of America only Newfoundland; on the west of Africa there are none, and on the west of the Americas they are confined to the Northern Atlantic and Southern Pacific. The continental islands embrace by far the greater area of island surface of the world.

**Oceanic Islands** appear in vast numbers, especially in the Pacific Ocean. These are of two kinds—those produced by volcanic action and those of coral formation. These islands seem to have had no connection with the continents, from which they are usually separated by very deep water. Those of the former class rise from mountain ridges in the ocean floor, their igneous foundation having been poured forth from a submarine volcano. Examples of these are St. Helena, the Hawaiian group, and many of the Polynesian group.

The coral islands are due to the work of the coral polyp.

They are wholly limestone, and are found only in warm, clear waters; many of them rest on a foundation of igneous rock, which at present is far below the depth at which the coral works. When the coral began to build, this volcanic rock was much nearer the ocean surface, but as the little worker reared the mass the whole gradually sank, but not faster than the coral built. Some of these coral islands are circular and enclose a body of very deep water. Such are called **Atolls**.

### Destructive Agents.

Once the great forces of the earth have outlined the continents with their mountains and plains, other minor but none the less effective agents begin to carve and fashion them into the variety of forms which every landscape presents to us at present. Amongst these agents which modify the land masses, and which we may see at work everywhere, are air, heat, wind, frost, ice, waves, running water, earthquakes, volcanoes and glaciers.

**Air.**—The rocks that are strewn over the earth are all found to be bleached and discolored and roughened on their outer surface. This has been effected through the chemical action of the gases of the air, particularly of oxygen and carbon dioxide. Rocks are composed of many minerals, such as lime, soda, potash, magnesia, quartz or silica in various forms, iron, and many others. The oxygen and carbon dioxide of the air readily unite with these minerals, forming the compounds which give the bleached appearance to the rocks. These compounds are removed by the rain, and fresh surfaces of the rock exposed to the further action of the same gases; even the rocks beneath the soil suffer these chemical effects, for the gases are brought into contact with them by the rain which holds these gases in solution. This process is called **weathering**, and it is to us per-

During or after a heavy shower it will be noticed that the water, as it runs over even a grassy patch, is murky. A

tumbler of such water is found to have settlements in it of fine soil worn from the land surface. This erosive effect of the rain, while not completely counteracted is considerably diminished by the presence of grass.

The driving force of rain is sufficient to obliterate, in time, the lettering on tombstones,

and in the far east ancient monoliths have met the same fate. Quite similar effects are produced at Scarborough Heights, near Toronto. Here the rain has irregularly washed away portions of the heights, which are composed of till, and clay and sand, and thus fashioned them into fantastic forms.

Sometimes the rain works disastrous effects. The frost causes vast cracks in till cliffs, into which the rain falls, sometimes penetrating to a great depth and working its way out laterally, thus softening the underlying mass. The slippery clay can no longer support the weight above, so the whole side of the cliff slides and falls to the beach or into the valley. Some of these slides have been very destructive of life and property.

**Running Water.**—After a heavy rain it is noticed that streams are murky. This murkiness is caused by the presence of soil washed or worn from the land. A rushing stream channels a bed for itself in the hardest rock. If its bottom holds stones these are, in the movement, rubbed together and ground smaller. The river bed also suffers from erosion by the moving stones.

**Frost.**—Frost is one of the most effective of destructive agents. Water from the rains of summer fills every crevice in the rock and the expanding frost in winter splits it apart. If this action occurs on a hill-side, the fragments will be thrown to the valley below. Frost also disintegrates the hard masses of clayey soils.

**Ice.**—The glacial ice of mountain districts hollows out valleys and wears away mountain sides, tearing rocks from their foundations, and transporting them to the snow line moraines or to the sea. The drift of the northern part of our



FIG. 11. Soft strata wasting away by weather faster than the enclosing beds of harder strata. Lake St. John, Ont. Karl Lehman, B.A., Toronto, Photo.



FIG. 10. Front of limestone quarry at edge of escarpment, Hamilton, showing disintegration of rock by weathering; rock almost wholly disintegrated at top.

haps the most important rock-destroying process, for it makes the soil on which we are so dependent.

**Rain.**—Rain has mechanical as well as chemical action on rock.

continent is the result of glacial action, and the vast extent of its deposit is an evidence of the destructive power of ice.



FIG. 12. Fallen cliff of till—a land-slide, Scarborough Heights.

**Heat.**—In hot, dry climates, such as in Arabia and Northern Africa, the very high temperature of the day is often followed by a low temperature at night. This causes a rapid expansion and contraction of exposed rocks. They cannot adjust themselves to these conditions, and as a result scale off or split.

**Wind.**—Wind, like running water, tears down the land in some places and builds it up in others. In hot, dry, desert regions, as Arabia, Northern and Southern Africa, and parts of Asia, it catches up mud carries with it vast quantities of sand which strike opposing obstacles with such force as to wear them away. An obelisk in Egypt, partly buried by the sand, was discovered to have the hieroglyphics on its exposed part obliterated, while those on the part beneath the sand were well preserved. The effacement of the figures of the exposed part was effected through the wind-driven sand.

But while the wind wears away rock and soil it also up-builds. An excellent illustration of this is found in Prince Edward and Kent Counties, Ontario, where the beach sand has been carried inland by the wind, and trees and farms have been buried beneath it.



FIG. 13. Sand-dune partly burying trees, Point aux Pins, Kent Co. Norton, Ridgeway, photo.

**Waves.**—The elevated shores of all large bodies of water bear evidence of the erosive effects of waves. By incessantly rolling the beach stones about, by dashing against the rocks of the shore and tearing off fragments, and by again hurling these fragments against the shore, waves tend to wear down to a level the parts affected by their action. Where the shore is composed of hard material the wearing process is not so apparent, but where it is composed of softer and looser material as clay or sand and gravel, many feet are washed away each year, in some cases in spite of timber or brush used to prevent it.\*

### Plains and Plateaus.

Any level or nearly level area of land, a little above the sea, and of considerable extent, is called a plain. They are known by various names. The Spanish call the grassy plains of America, Savannas; the French call them Prairies. The vast plains of Argentina are called Pampas; the grassy plains of the Orinoco, Llanos; and the forest plains of the Amazon, Silvass. In Northern Eurasia the sub-arctic plains are known as Steppes, while in the British Isles plains are known as Moors and Heaths.

**Coastal Plains.**—These are found bordering a sea or lake. Their formation and growth follow the denudation and wasting of the land. Rivers carry rock waste to the sea and there deposit it near the shore where it is levelled by the action of the water. Frequently, vertical uplifts of the rock occur, result-



FIG. 14. Island destroyed by waves; north of Scotland.

ing in a level, flat area, extending from the older and higher land to the sea.

The low-lying land bordering the Gulf of Mexico, as well as the narrow area between the escarpment and the water on the shore of Lake Ontario, are good examples of this kind of plain.

**Plains of Subsidence.**—The low-lying land bordering the St. Lawrence in Eastern Ontario and Quebec, has many of the characteristics of a Coastal Plain. Its rock floor is nearly horizontal. The ice of the Glacial Epoch passed over it and left its marks. After this period a subsidence took place and the land was again *costal* by the sea, to be elevated again with its sea deposits.

**Plains of Erosion.**—These are all much older than the Coastal Plains and owe their surface characteristics to the

\* The destructive effects of volcanoes, earthquakes and glaciers are treated under their respective heads in succeeding pages.

action of land-denuding agents. Where the rocks of such plains are exposed in river courses, they show folding and faulting such as are found in mountains. In fact the area of some of these plains has at one time been a rough mountainous district, but the wasting and levelling influence of weather, rains, streams, and ice has, for ages, been reducing the inequalities, till now a comparatively level stretch of country is the result.

These plains have not the uniformly flat appearance of the other plains, but are interrupted here and there by high rocky hills and deep hollows; and their rivers have not the slow meandering flow of the rivers of the other plains. Their current is swifter, with rapids and falls frequently in their course. That portion of Ontario outside of the Archaean region may be considered as an example of a plain of erosion.

**The Western Plains.**—The great alluvial plains of Western Canada, extending from Lake Winnipeg to the base of the Rockies, present a gradual rise in a series of three "prairie Steppes" towards the west. The Eastern division is 750 feet above the sea, while the Western rises to a height of 4,000 feet above the sea. The soil of these plains is very deep and rich, such as is deposited in lakes and large ponds.

**Plateaus.**—"A Plateau is an extensive region or district with a uniformly high level above the sea, or above the surrounding country." It is a region of great uplift. Where this uplift has been attended with little disturbance of the strata, and more especially where the elevation occurs in dry climates, the wasting effect of the weather is reduced, and comparatively flat elevations are found, as in Colorado. In regions where the uplift has been accompanied by rock displacement, the eroding effects have covered the surface to such an extent that naught remains from which to infer the real plateau character save the one general level of its highest elevation.

The whole of Spain, much of France, Germany and Austria, the whole of the south-eastern part of Asia, and the interior of British Columbia are examples of plateaus. In Ontario the Muskoka district, the origin of many of our rivers, is also a plateau. The plateaus of highest elevation together with their accompanying mountain ranges form the nucleus or backbone of almost every continent, and determine its general shape and, to a great extent, the direction of its drainage.

### Mountains.

The term Mountain is applied to land elevations of various heights. In some districts it is applied to an elevation of 200 or 300 feet, while in others it is restricted to elevations of some thousands of feet.

Mountains are of various kinds and derived in a variety of ways. By far the most common cause of mountain forming is the folding of the earth's crust, combined with the action of denuding agents. A great mountain series, such as the Rockies originating in a set of mountain folds, is called a **system**. A number of systems such as the Rockies and the parallel systems to the west, combine to form a **Cordillera**. A single system is made up of **ranges**, while to the separate parts of a range the name **ridge** is given. A great elevation standing out prominently from a ridge is termed a **peak**. Its existence is due to

the fact that it is composed of rock that resists the weathering that has wasted the surrounding plateau.



FIG. 15. Mt. Ross, Canadian Rocky Mountains. A typical mountain with double peak, forest clad for the most part. Thompson, photo., New Westminster, B.C.

**Origin of Mountains.**—The folding of the earth's crust, which gives rise to mountains, is, in all probability, due to the cold outer crust accommodating itself to the continuously shrinking interior. This, as in the case of an apple exposed to a drying atmosphere, results in the wrinkling of the outer surface. This folding action is very slow, requiring ages for its completion. As soon as the fold appears above the ocean, the denuding agents set to work, carving and shaping it, till the original plateau in many cases presents only a series of rugged peaks, intersected by deep passes and valleys. Thus it will be seen that while the plateau is due to uplift or folding, the characteristic features of mountains are due to the continuous action of erosive forces.

It will be plain from what has thus far been stated, that the newest mountains are the highest and most rugged—those, in fact, which have not been exposed to denuding agencies so long as others. From this view, the Rockies are of comparatively recent origin, while the Appalachians are much older.

### Volcanoes.

Intimately connected with the folding of the earth's crust is the formation of Volcanoes which, within the memory of man, have wrought such destruction to life and property.

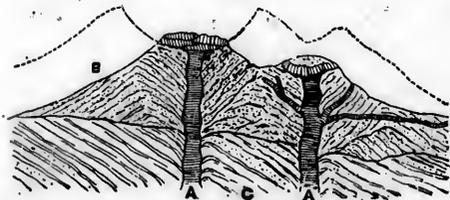


FIG. 16. Diagram of fossil volcano (Scotland). C, the strata pierced by the funnels A leading down into the earth, one of which shows dykes parting from it; B, the cone of volcanic material; the dotted lines show the original height of volcanoes, the fattened tops of the funnels, or pipes, being the lava floor of the craters.

A volcano is an opening in the rock envelope from which is emitted steam, ashes, and molten rock. The conical shape

which volcanoes usually assume is due to the quantity of ejected matter which falls about the vent, thus tending to increase its height. This conical pile is properly called a **cinder cone**, and the cup-shaped depression at the top and leading down into the interior is called the **crater**.

**Materials Erupted.**—Steam is by far the most important material emitted from volcanoes, not only because of the vast quantity ejected, but also because it is one of the prime causes of the volcano itself. Of solid materials sent forth there are **lava**, which is but molten rock, and **lava ash** or **pumice**, which is lava made porous by steam issuing through it. In addition to these there are hydrogen, chlorine and sulphurous gases.

**The Cause of Volcanoes.**—The eruption of a volcano may be compared to the bursting of a boiler. The immediate cause is the presence of steam. In the interior of the earth steam is present in a superheated condition, and this, seeking an exit, causes the eruption. The heat that gives rise to the molten condition of the rock ejected is doubtless due to the extreme pressure to which the interior materials of the earth are subjected.

**Phenomena of Eruption.**—The phenomena of volcanic outbursts are in many respects similar. Steam and lava are emitted from a subterranean source, and forced out of an opening or vent in the rock envelope. Frequently the eruption is preceded by earthquakes. Generally the beginning is marked by an explosion that rends the top of the cone into fragments. The violence of the explosion for the most part depends upon the size and weight of the plug of rock and lava which fills the crater. The amount of steam generated during an eruption causes torrents of rain, which deluge the area in the vicinity of the eruption. The flame-like phenomenon results from the reflection on the condensed steam and gases of the superheated mass within the crater.

**Earthquakes.**—An earthquake is a vibration or trembling of the rock envelope following a subterranean explosion or the sudden breaking of rock strata. The tremors rarely continue

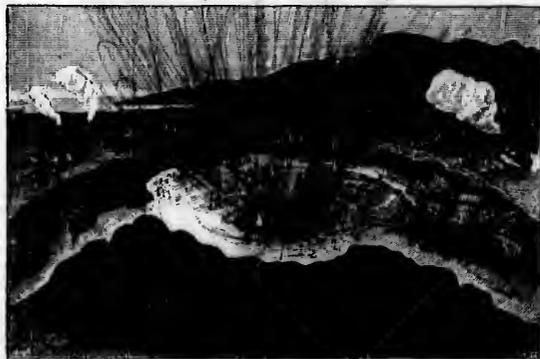


FIG. 17. Crater of the Great Geyser in Iceland.

for more than a few seconds, but the shock may be felt for thousands of miles away from the disturbing cause. Some-

times earthquakes are very destructive—tall cliffs are thrown down, trees uprooted, and houses demolished, and in many cases



FIG. 18. Chasm in Southern Italy caused by an earthquake in 1783.

the loss of human life has been appalling. When earthquake shocks occur in the ocean great waves are hurled far up on shore destroying coast towns. Notably this has been the case in Japan.

### Glaciers.

In some mountainous regions snow lies all the year round, and accumulates in the high valleys to a great depth. Occasional rains soak through the mass and make it more compact, while the frost and pressure complete the work of converting it into ice. Year after year it increases in bulk, layer upon layer, and moves slowly down the slope till it meets with a warm temperature, where it melts and forms streams which dash swiftly down the valley. Such a mass of ice and snow, slowly moving down a slope, is called a **glacier**.

This moving body of ice will receive waste of rock from both sides of the valley which contains it, while at the same time, by its weight it will gather into itself much of the rock material over which it passes, and carry it along in its movement. All this waste it deposits at the end where melting takes place. Frequently the accumulation of this detritus is sufficient to obstruct the passage of the river flowing from the glacier, thereby causing a lake to be formed.

The rock waste carried on the surface of the glacier or left at its melting end is called a **moraine**. On the sides of the surface of the glacier are **lateral moraines** formed by waste worn from the sides of the valley. Sometimes the glaciers of two valleys meet and move onward as one. When this occurs one lateral moraine of the one glacier joins with one of the other, forming what is called a **medial moraine**. The large moraine at the melting end of the glacier is called a **terminal moraine**.

Such a glacier as the one described is called a **mountain glacier**, to distinguish it from a **continental glacier** which may envelop nearly a whole continent. (See page 173.)

The vast size of glaciers, and their great weight combined with movement, cause them to be among the most powerful eroding agents in carving the surface of the earth. The glaciers of ancient days scooped out the basins which to-day are occupied by lakes. They reduced the elevation of mountains to that of mere hills, or lowered them to the level of

the lowlands, and have deposited over vast areas of the continent the soil which now supports large populations.

When the glaciers reach the sea, as they do in high latitudes, great icebergs break off and float out to sea, carrying with them stones, gravel and fine rock waste.

### Rivers and River Valleys.

Of the water that falls from the clouds to the land a part is evaporated into the atmosphere; another part seeks underground channels to reappear as springs; while the greatest portion gathers into surface channels and flows down to the sea.

Streams of water flowing over the land are variously known as rills, brooks, creeks, and rivers. The largest of these are called rivers.

The beginning of a river is called its source, and the end where it flows into the sea or other large body of water, is its mouth. Sometimes rivers in their courses flow very swiftly, and their currents furnish power for mills and factories. At such points large towns frequently spring up and thrive on the industries whose motive power is supplied by the rivers. If the river is deep and free from rapids and falls it is used for the transportation of passengers and freight. A careful examination of any map will disclose the fact that large and important towns and cities, when not on the sea coast, are situated on large rivers. The economic value of such a location is obvious.

Sometimes in very dry countries, rivers receiving little or no additional water from branches, dry out before reaching the sea. But though they are lost to the eye they often continue for a considerable distance immediately under the surface and furnish sufficient moisture for trees whose roots can reach down to the water supply. Often in such places the traveller can find water by scooping down a short depth in the soil.

The streams which flow into a river are called tributaries, and the river with all its tributaries is called a river system. All the land from which the water flows into a single system is a river basin, while the highland, which separates river basins, is called a divide or water parting.

The topography of a river valley is a result of the combined work of stream erosion, which tends to deepen it; weathering by atmospheric gases, rain and frost, which tends to

broaden it; and the transportation from place to place of the sediment furnished by these wearing agents. The longer a river

continues to flow the lower its basin is worn. When the river is swift, as it usually is in mountainous districts, its erosive power is very great. It tears stones and rock particles from its



FIG. 20. Drift Terrace on the Fraser River, B.C.; the river has cut down through the drift to the rock of its ancient bed.

Geological Survey of Canada.

sides and bottom and rolls them along, grinding them smaller and deepening its bed. This action will continue, unless intercepted by some other force, until the river bottom is worn almost to the level of the sea. Then its current will become slower and its wearing power decrease.

In some regions the effects of erosion are far greater than those of weathering. This may result from the dryness of the climate, as in parts of Colorado, or from the great resistance of the rocky slopes to weathering. In either case the river rushes through a deep gorge or canyon. In most cases, however, while the river is deepening the valley by erosion, rock waste from the slopes is creeping gradually down into the valley bottom or into the river, to be carried seaward. In this way the valley grows broader and its sides take on more gradual slope. The uplands are gradually being reduced and the hills made smaller from the continual wearing on both sides till, in the course of ages, unless new uplifts take place, the mountains are levelled to the plains.

Therefore where the rivers have cut but narrow valleys the land is comparatively young, as in the Rocky Mountain region, but, where the rivers have carved the valleys deep and wide and the mountains are nearly worn away, the land is old.

**Changes in Rivers.**—Changes are continually occurring in the upper courses of rivers where the volume of water is small and where elevation with wrinkling and folding is actively going on. Among the foot-hills of the Rockies in the Canadian North-West are to be found to-day many deserted river valleys, some of which are nearly 200 feet deep and a mile or so broad. Such a phenomenon can be accounted for only on the assumption that the river in its upper course had not a sufficient volume of water to overcome the obstruction placed before it by the earth-folding, and consequently had to seek out a path of less resistance. In other cases, in the highlands, we find that a river, in cutting its way backward across the divide, comes in contact with the source of another stream, from which it may draw off some of its water supply and thus deprive the latter river of



FIG. 19. Cañon on the Fraser River, B.C., on line of Canadian Pacific Railway. Water rises here over 150 feet in perpendicular height in time of flood.

Permission of W. Notman & Son, Montreal.

much of the water which otherwise would flow through its channel.

But other causes are at work changing the channels of rivers in their lower courses. In ancient times the St. Lawrence had hollowed out for itself a deep valley which does not now appear. At a later period, and when the river was already very old, an elevation of the land took place, in terraces across the path of the river between Montreal and Kingston. These terraces caused rapids to be formed on their edges and blocked back the water beyond the western boundary of the last terrace, thereby forming what is known as Lake Ontario. But the bottom of the lake is 500 feet below the sea level, and, being the old river bed, it must have suffered a subsidence in later years. Thus we see that upheaval and subsidence of land have had much to do with changing the appearance and bed of rivers.

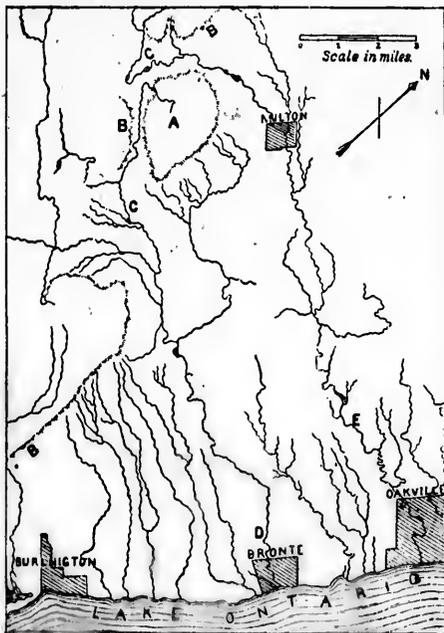


FIG. 21. Showing almost parallel course of streams from Niagara escarpment, B, to Lake Ontario; C, valleys cut in escarpment by Twelve Mile Creek, D, and Sixteen Mile Creek, E,—the Canadian Pacific Railway passing to the higher ground by the latter; A, a little plateau cut off from escarpment by streams.

Courtesy of Dr. A. W. G. Wilson, McGill University.

### The Transportation and Disposal of Sediment.

Rivers are continually wearing away the rocks of their bottoms and sides and carrying this waste and what is received by them from the weathering of the slopes, down towards their mouths. Those rivers which receive much water from tributary streams often overflow their banks, and cover the surrounding flats. Such low-lying flat areas are called **flood plains**. Flooded rivers are usually muddy. This is due to the abundance of rock waste or soil which they carry by virtue of their increased current at such times. The finest of this waste, called **silt**, is

spread out over the flood plain where the onward motion of the water is almost stopped. When the flood is over, this silt remains as a layer rich in materials for plant food. This is notably the case along the lower Nile in Egypt where the productivity of the soil is due to the annual deposition of silt by the flooding river. The extent of a flood plain depends, of course, on the width of the valley through which the river flows.

But most of the silt carried by rivers is washed down to the sea, and deposited where the current of the stream is arrested by the quieter water. Year after year this deposition of sediment continues, building up a mass of land intersected here and there by channels. Such a land formation at the mouth of a river is called a **delta**. These deltas are often of great extent, and separate

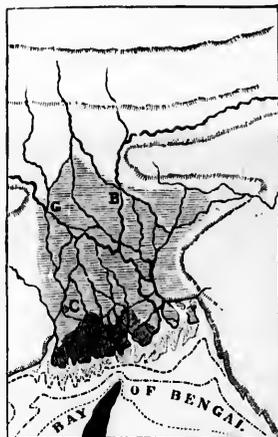


FIG. 22. United delta of the Ganges (G) and the Brahmaputra (B). Part dark-shaded, the Sunderbunds; lightest shaded, naked mud just at level water. (C), Calcutta.

the river into several mouths. The soil of such land is generally very fertile. The delta of the Yellow River in China supports a population of millions.

All rivers tend to form deltas, but frequently other influences are at work to counteract this. If the mouth of the river is subject to the action of tides or of marine currents, in either case the sediment will be washed away. But even here bars and shoals are found in sheltered places.

### Lakes.

**Origin.**—We learned in a previous chapter that when a terminal moraine obstructs the free passage or flow of a river, the water widens out into a lake. Now in a similar way many lakes are formed, with this difference, however, that the obstructions are not always from the cause mentioned above. In some cases artificial lakes are produced by the action of man in placing a dam across the narrow part of the stream, thus causing the water to back up and increase its surface area. Such lakes or ponds are formed frequently and their waters are thus held in reserve, to supply power for factories or for purposes of irrigation. In Egypt a great dam with sluiceways has just been completed across the Nile at Assuan, for the purpose of flooding the land at desirable seasons.

Sometimes this blocking of a river is caused by a glacier moving across a valley through which a river flows. In such cases the water in this valley will be dammed back and a mountain lake formed. Such a lake, however, is only short-lived, for crevices in the glacier will at times allow the river to cut through and drain the lake. Avalanches will also at times suddenly obstruct a river and cause a lake. Such a lake of large size was formed in Switzerland, and only a few years ago was drained away by carefully tunnelling through the avalanche of ice.

Lakes that have been directly the result of glaciers are also found in high mountainous regions. Their waters are of the beautiful glacier green, and usually very deep. The hollows have been for the most part scooped out by glaciers, and at the lower end of such basins is an obstruction of precipitous rocks like great pinnacles. When the glacier passed away, at least at this point, the lake was left to be fed from the same sources from which the glacier had been fed in former times. Such lakes are found in the Kootenay district of British Columbia.

Other lakes are now found in depressions formed by old river courses that have been dammed up by glacial drift. Such are the lakes of the Trent Valley system. Others are found in hollows scooped out of the old Archæan rocks by glaciers. The Muskoka lakes are examples of these. Lake Winnipeg also appears to have been formed in this way, as well as those lakes along the course of the Albany River. Along the sluggish streams of the level region lake expansions occur due to the deposition of sediment which they were unable to transport.

In volcanic regions lava sometimes flows across the course of a river thus blocking its course. Lake Yukon on the Yukon River has been formed in this way. The river however, has made a channel for itself along one side of the dam, and is deepening its channel, so that in course of time the lake will be drained.

The great lakes of Canada have doubtless been formed by the scooping power of glaciers, combined in some cases with subsidence, which brought their bottoms below the level of the sea.

**Salt Lakes.**—Salt lakes are numerous in the interior of continents. Some of these lakes, as the Great Salt Lake of Utah, have been caused by a decrease in rainfall and a consequent shrinkage of their extent and depth below the point where they flowed away through outlets. The amount of water received is not more than compensates for the evaporation. The saline substances carried into the lake remain, and the water is constantly growing more salt. In the same way are formed some of the small alkaline lakes of western Canada.

Other salt lakes are evidently the remains of an age when the ocean covered the land. Such are the Ural, Caspian, and Dead Seas. Their original saltiness has been retained, and the inflowing streams have greatly intensified this. The salt pools and marshes on the Steppes of Russia are also due to a similar cause.

**Destruction of Lakes.**—Freshwater lakes are destroyed in two ways. (1) The rivers are constantly bringing down sediment and depositing it in lakes, which in time become filled up, except for the channel of the river flowing through. This is the case with Lake St. Clair. (2) When the river draining a lake has worn through the barrier to the lake bottom level, the water barrier is removed and the lake drains. This applies only to lakes whose bottoms are above sea level, and not to such as Lake Ontario whose floor is below it. The barrier which gives rise to Lake Erie is gradually being worn away by the deepening of the channel of the Niagara River. The Falls are receding towards the upper lake at the rate of four or five feet a year. In course of time it must reach this lake and drain it, leaving nothing to mark its site but a great alluvial plain with the river occupying its lowest level.

**Destruction of Salt Lakes.**—Salt lakes that have no outlet must dry up by evaporation after their sources of supply have been cut off by some crust movement, or some change of climate. Others will become gradually filled with sediment and saline and alkaline deposits, and be changed to marshes. In the case of the great salt lakes of central Asia, where the evaporation is greater than the inflow of water, a shrinkage will take place till these operating factors are equal.

**Importance of Lakes.**—The larger lakes serve to modify the cold of winter and the heat of summer in the neighbouring regions. This is well exemplified in the lands bordering the



FIG. 23. A glacial lake almost filled in. In the left back ground the peat is firm and is covered with spruce and fir trees; growth of the peat is inward from the foreground. Here it is too soft to bear a man's weight.

(Great Lakes. They also serve to prevent great floods by acting as receiving basins for the surplus water of rivers, storing it up and letting it pass off gradually.

### The Ocean.

The Ocean is the great body of salt water surrounding the continents which appear as huge islands rising from its surface. It covers nearly three-fourths of the globe. If the earth be divided into two hemispheres with the British Isles as the centre of the curved surface of the one, and New Zealand as the centre of the other, the former will have within it nearly all the land surface of the earth and the latter nearly all the water.

As a result of the irregularity in the earth-fold two great depressions and many indentations occur, which have been filled by the ocean. The indentations are called, according to their area, seas, gulfs, bays; the great depressions are called oceans.

**The Pacific.**—This is the largest body of salt water on the earth's surface. It extends, as a triangular projection of the Great Southern Ocean, between Australia and Asia on the one side and the Americas on the other, tapering almost to a point at the Arctic Circle. It is about 10,000 miles wide at the equator, and is estimated to contain an area of 68,000,000 square miles. Rising from the floor of this ocean are many islands, particularly along its western side. These are, for the most part, volcanic in origin. They rise, in some cases, to a great height from the ocean level. The depth of this ocean, away from the islands and plateaus, is almost uniform, being about 2,500 fathoms. In some places, however, notably on the east

coast of Japan and the Kurile Islands, and immediately south of the Fiji Islands, it reaches a depth of over 4,000 fathoms.

**The Atlantic Ocean.**—This ocean is much smaller than the Pacific, containing 33,000,000 square miles. Except in its broadest part, between Northern Africa and America, it is comparatively free of islands. Its greatest depth is just north of the Island of Porto Rico, where soundings have reached 4,500 fathoms. Centrally throughout almost its entire length from north to south, extends an elevated plateau, with a depth of water less than 2,000 fathoms.

**The Indian Ocean.**—This is an extension of the great Southern Ocean northward between Australia and Africa. A plateau extends from Madagascar to India, from which rise the Seychelles and other islands. The depth of water over this plateau is only 1,000 fathoms. The existence of this plateau has led geologists to think that, at one time in the history of the globe, there was a land connection with India. The average depth of this ocean is 2,500 fathoms.

**The Arctic Ocean.**—This includes the ocean basin bounded by the Arctic Circle. It is a great expansion of the Atlantic, north of the northern continents, and connected with the Pacific by a mere thread of water between America and Asia. Of this continent, except its southern rim, comparatively little is known owing to its great untraversable ice fields. "The pack-ice blocks all entrance to its interior. This ice, owing to the movements of the underlying water, becomes broken and piled up, frequently to the height of one hundred feet. This mass does not melt in those northern regions, but goes on accumulating, portions breaking off and becoming 'floe-bergs,' which drift about with the currents."

**The Antarctic Ocean.**—This ocean, bounded by the Antarctic Circle, is much less accessible than the Arctic. A barrier of ice from one hundred to two hundred feet thick rims the whole region. By some this region is regarded as a low-lying ice-capped continent, by others as consisting of islands. Volcanoes are found—one, Mount Erebus, rising to a height of 12,400 feet and another, Mount Terror, to a height of 10,900 feet. Glaciers exist, and glacial drift is abundant.

**Sea Water.**—The ocean is between ninety-six and ninety-seven per cent. pure water; the remainder is made up of several salts, the most abundant being common salt. In addition to these impurities there is also a considerable amount of atmospheric gases which have been absorbed by the water, and which go to support ocean life. Representing fresh water as 1, the average density of the ocean water is 1.026. The variation in the density of ocean water in different localities is due to the difference in rates of evaporation.

Where rivers enter the ocean or in the regions of great rain the salinity of the ocean water is decreased owing to the increase of fresh water; but where evaporation is great the removal of the fresh water tends to concentrate the salt, and therefore to increase the density. Notable examples of this latter effect are the Mediterranean Sea and the Red Sea.

**The Temperature of the Ocean.**—In general the temperature of the ocean within the tropics is higher than elsewhere. This is due to the fact that more of the sun's heat is concentrated here than in a corresponding area north or south of this. But other

modifying influences are at work. "Land-locked seas, such as the Mediterranean, possess a higher temperature than the ocean in the same latitudes." The temperature of the Indian Ocean is, in some parts, as high as 94°. The currents of the ocean also exercise an influence, as seen in the comparative temperatures of the north Atlantic and north Pacific surface waters. That of the former is from 44° to 45°, while that of the latter is 70°. The reason for this is that the cold Polar currents have free access into the North Atlantic, while they are cut off from the North Pacific.

The higher temperatures of the ocean, however, are confined to the surface water. "In the North Atlantic, after a depth of from 750 to 1,000 fathoms, it is only three degrees above freezing point. In the South Atlantic this low temperature is reached at a depth of 300 fathoms. In the South Pacific the surface layer of warm water is only 100 fathoms deep. Within the tropics the water to the depth of 300 fathoms has a temperature of 70° to 80°. Below this depth it suddenly decreases to the temperature of the deep water generally."

**Material of the Ocean Floor.**—The sea floor, for a distance of two hundred or three hundred miles from the shore, consists of deposits of the washings from the land, the coarser material

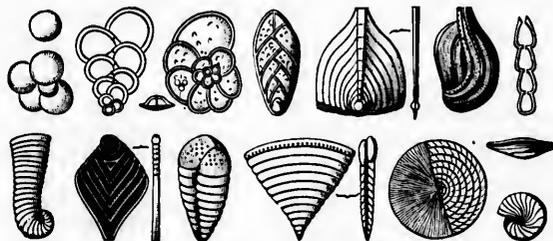


FIG. 24. Globigerinae ooze; individual forms highly magnified except the three on the right lower corner.

being found nearer the shore and in the paths of currents; the finer material, sand and clay, farther away. Beyond this area and in the more quiet depths "the deposits are almost wholly beds of limy skeletons or shells of little creatures that live at the surface of the sea." This chalky mud is called Globigerinae ooze. (Fig. 24). In the greatest depths of the ocean, below 2,500 fathoms, the sea floor is covered with a deposit of fine red clay. This is partly volcanic in origin, consisting of volcanic dust and minute fragments of decayed pumice stone, which have been emitted from volcanoes on land and under the sea. A large part of the red clay is also believed to come from the wholly decayed Globigerinae and other skeletons. The salt water of the ocean depths dissolves the limy portion of shells and animal skeletons, and the insoluble residue is deposited. Hard animal remains, such as the teeth of sharks and the carbones of whales, are found in this deposit.

### The Movements of the Ocean.

The waters of the ocean, however still at times they may appear, are never at rest. Invisible forces are constantly operating to disturb them. Atmospheric movements ruffle their surface; earthquake shocks disturb them to their depths; differences in temperature in different latitudes, combined with the

rotation of the earth, initiate currents; while the attractive forces of sun and moon are ceaselessly at work piling up these waters and leaving the continental shores with the tidal flow.

**Wind Waves.**—As a result of friction between the moving atmosphere and the surface of the ocean there is produced an alternate rising and falling of successive ridges of water. These waves vary in size from gentle ripples to the huge billows that toss the largest vessels. The fact that an object floating just beneath the surface simply oscillates with the rising and falling of the water, while its relative position remains almost constant, shows that the **water movement** is simply up and down, while the **wave form** passes on in the direction of the wind. When the wind blows strong the top or crest of the wave breaks into foam, forming **white caps**.

On approaching a shallow shore the form and action of the wave is much modified. As soon as the base of the wave touches the shallow bottom, its lower part is retarded, while the upper part moves forward and falls over or combs, producing **breakers**. "The distance from the shore at which waves begin to comb depends partly on the depth of the wave and partly on the depth of water along the shore." Where the shallows extend out for a considerable distance and the waves are deep the breakers begin a long way out.

Waves, as ocean agents, perform a vast amount of destructive work on shores, battering and tearing away fragments, and afterwards grinding these together till, in the process, they are worn round and become much diminished in size.

**Earthquake Waves.**—Severe earthquake shocks beneath the sea give rise to waves of enormous proportions. Though these waves are hardly perceptible far out at sea, they work appalling destruction to life and property as they reach shallow shores, where they rise sometimes to the height of 100 feet. Japan and some of the islands of the Polynesian group have many times suffered severely from this source. In 1854 the Japanese town of Simoda was destroyed by a succession of waves that rolled up on shore during an earthquake disturbance.

**Tides.**—The gradual rise and fall of the ocean level twice each day is an occurrence well known to those who have lived by the sea. For six hours the water gradually rises, overflowing the land and filling the mouths of rivers. During the next six hours the water slowly recedes to its former level. This activity of rise and fall repeats itself with marked regularity, approximately twice each day. The rise of the water is called **flood-tide**; its fall **ebb-tide**.

**Cause of Tides.**—One of the fundamental laws governing the universe is that every particle of matter attracts every other particle of matter. Every member of the solar system is exerting an attraction upon the earth. The effect of this attraction is proportional to the product of the masses, and inversely as the square of the distance.

For simplicity we shall consider for the present only the attractive force of the moon.

The surface XY being nearer to the moon than either AX or BY, the attraction of the moon on XY is greater than that on an equal area between either A and X or B and Y. Now, since the weight of the water on the earth's surface is the measure of the attractive force of the earth on this water, and since the attractive force of the moon is opposing that of the earth, it follows that the ocean water on the earth at XY is rendered lighter than that of a similar volume near A or B. As a result of this differ-

ence in weight there will be a flow of water from A and B and a consequent heaping of the water in the region of X Y.

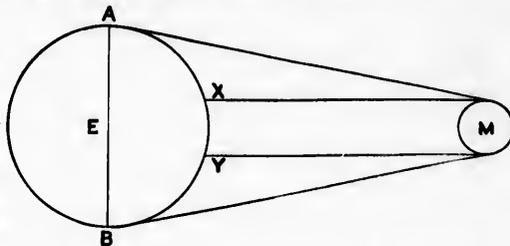


FIG. 25. Attraction of the moon upon the earth. E represents earth and M, moon.

Again, since the earth and moon revolve around a common centre of gravity, the centrifugal force of this revolution opposes the attractive force of the earth, and as a result there is a heaping of the ocean water on the surface farthest from the moon. Thus at the same time on opposite sides of the earth there are formed two tidal waves thousands of miles in length.

If the earth stood still and the moon revolved around it as a centre there would be but one tide at each ocean point each month; if the earth did not rotate on its axis, but only revolved with the moon about a common centre there would be but two tides a month at each ocean point. But the earth rotates on its axis daily and, as a consequence, we have two tides at each ocean point each day.

Thus far we have considered only the attraction of the moon on the earth. The sun also exerts a great attraction. On account of its greater size, its attractive force would be very much greater than that of the moon if they were equally distant from the earth, but the sun's distance from the earth is so many times greater than that of the moon that its attraction is rendered much less than that of the latter body.

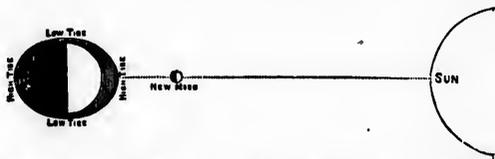


FIG. 26.—SPRING TIDES: the attraction of the sun and moon exerted in the same line. In both figures the water is represented by the shaded portions.

**Spring and Neap Tides.**—The joint attraction of the sun and the moon, acting in the same line, produces higher tides than those of the moon acting alone. This attraction of sun and moon in the same line occurs twice each month—namely at new moon and at full moon. In the former case the sun and moon are on the same side of the earth, in the latter they are on opposite sides. In both cases the sun's tide is added to that of the moon. Such tides are called **spring** or **high tides**. These spring tides are equally high on opposite sides of the earth.

When the sun and moon exert their influences at right angles to each other the sun tends to draw its tide away from that of the moon, and the moon's tide is rendered lower. This occurs twice in the month, namely when the moon is in quadrature.

These relative positions of sun and moon produce the **neap** or **low** tides.

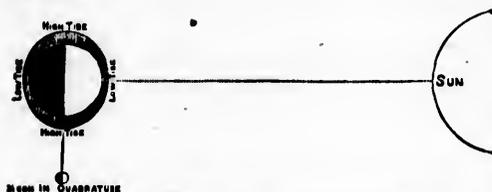


FIG. 27.—NEAP TIDES: attraction of moon and sun at right angles; the moon tide being higher than the sun tide.

Since the moon in its elliptical path round the earth is at times nearer the earth than at other times, its attractive force varies, being greatest when nearest the earth (in perigee) and least when farthest from the earth (in apogee). When the new or full moon comes during perigee the joint attraction of sun and moon produces a higher high tide, and when apogee occurs at the moon's quarters the tides are rendered unusually low.

**Effect of Land Masses on Tidal Action.**—If the ocean covered the surface of the earth to a uniform depth the tidal waves would have a uniform east to west direction. This theoretical direction actually obtains only in the great Southern Ocean where there is little continental obstruction; but such uniform movement is much interfered with in the northern hemisphere where the continental barriers deflect it northwards. In the Atlantic the tidal wave passes in a northerly direction till it enters the Arctic, and then passes eastwards.

V-shaped estuaries have the effect of increasing the tidal wave within them. If the containing sides are high so that the incoming water cannot freely spread then a tidal wave of great height results. The piling up of the tidal waters in the form of an advancing wave is called a **bore**. Such occurs in the Minas Basin at the head of the Bay of Fundy, and is common on the Amazon, the Ganges, and on several of the rivers of the British Isles.

**Currents in Water.**—If one side of a beaker of water be heated the warmed water begins to move from the source of heat, and cooler water moves in to take its place; if the air is made to move with force over a dish of water it is found that, owing to friction between the air and the water, there is a lowering of the level at the side from which the air is moving, and a consequent heaping of the water at the other side; if a lump of ice be placed in the vessel of water and some colored liquid of about the same density of the water be poured in by the side of the ice, this liquid becoming cooled descends to the bottom and other water flows towards the ice from the surface; if a cup of water be lifted from the vessel, water immediately flows into the space from which the water has been removed.

In the great ocean all of the above causes, and others, are at work producing movements to which the name of **ocean currents** has been given.

The observations made at different times and in different parts of the ocean have established the fact that currents do exist in it. Abandoned vessels have been found hundreds of miles away from where the crew left them, and in many cases their drifting has been with wind opposed. Between the years

1885 and 1887 the Prince of Monaco set adrift, between Newfoundland and the Azores, 1,700 floats, each of which contained a written request that the finder should report the time and place of finding it. Of these, 225 were reported within five years, and from the information so obtained was established the existence of a great circular current in the North Atlantic, from which a branch flows off to the British Isles and Norway.

The thermometer also reveals the existence of currents. Vessels crossing the Atlantic from America to Britain rapidly pass at a point in their course from water of a temperature of 50°F. to water of 60°F., and further on again into water of the former temperature. The maintenance of such a thread of water of higher temperature in the midst of water of a much lower temperature can be explained only on the assumption that this warmer water is in motion.

**Causes of Ocean Currents.**—Two causes are usually assigned for these phenomena. **Unequal distribution of temperature, and winds.** The water of Equatorial regions being exposed to greater heat, expands, and thus becoming higher flows away towards the cooler water of the Polar regions. Here the water becomes cold, contracts and sinks, its place being taken by the incoming surface water from the tropics. In turn this water sinking in Polar regions to lower depths flows along towards the Equator, to rise again and renew its circle.

But while such a general circulatory movement of ocean waters is traceable to difference in temperature, this cause plays only a secondary part in producing the system of surface currents which is so well developed. The fact that this system has a much greater development in the Northern Hemisphere, where the land formations offer much obstruction to a free interchange of warm and cold waters, than in the Southern Hemisphere where practically no such obstruction exists, at least proves that some more potent factor than that of temperature is operative in producing ocean currents.

The Equatorial currents move in the direction of the prevailing winds, and alter their course in conformity with the changed direction of these winds. In the Southern Ocean the currents move continuously eastward with the prevailing winds of that region; while in the northern Indian Ocean the currents change their direction with each change in the direction of the periodic winds or Monsoons. These phenomena show unmistakably that winds are the most powerful factors, not only in producing ocean currents, but also in determining their general direction.

But the course of these currents is also partly determined by the continental land masses and by the rotation of the earth. If there were no continents to obstruct the free flow of the water, the Trade winds would produce a surface drift which would pass around the earth within tropical regions. The land masses extending north and south prevent this free movement by deflecting the flow northward and southward. Owing to the earth's rotation these currents, after deflection, turn to the right in the Northern Hemisphere and to the left in the Southern Hemisphere.

**The Gulf Stream.**—Of the warm currents the most important is the Gulf Stream. This derives its name from the fact that it has its source in the Gulf of Mexico. It is a portion of the Equatorial drift which has passed into the Gulf of Mexico through the Caribbean Sea. Its speed as it passes Yucatan, is only one quarter of a mile per hour, its width about ninety miles, its depth about 1000 fathoms; but when it emerges between,

Florida and the Bahamas it has a speed of three to four miles an hour, a width of only fifty miles, and a depth of about 350 fathoms. As it flows northward its velocity gradually decreases, till off the coast of Newfoundland its rate is not more than one-half of what it was on emerging from the Gulf.

**The Cause of the Gulf Stream.**—The water of this comparatively shallow land-locked Gulf becomes much heated and tends to flow off. Its passage by the south-east opening is blocked by the incoming Equatorial current, so it takes the only means of exit—the quite narrow passage to the north-east, by the coast of Florida. This rise in the level of the gulf waters due to their high temperature is increased by the inflow of the Equatorial current, causing its issue through the narrow outlet to be like water forced through a narrowing nozzle. This accounts for the increased velocity as it passes the coast of Florida.

**The Kuro Siwo** flowing from seas between the Philippines and Asia, is also a warm current, though its temperature is not so high as that of the Gulf Stream, nor its rate so fast. It flows past Japan, then turns east, and forms the great Pacific whirl.

**Currents in Land-locked Seas.**—Land-locked Seas, such as the Mediterranean, the Red, and the Baltic, cut off from the general oceanic circulation, have a system of currents depending on local conditions. The evaporation of water from the Mediterranean is greater than the supply from rivers. Its level therefore tends to be lower than that of the Atlantic. A surface inflow of water cuts in through the Straits of Gibraltar, while the denser salt water flows out as an undercurrent. On the other hand, the Baltic has more fresh water entering it than it evaporates, consequently there is surface outflow from this sea into the North Sea, while an underflow of denser salt water sets in from the latter.

### Atmosphere.

The Atmosphere which surrounds the earth to an unknown height is necessary to the existence of all life, animal or vegetable, whether on the earth's surface or in the depths of the ocean.

**Composition of the Atmosphere.**—The atmosphere is a mixture of various gases with solid matter floating in it in the form of dust particles. "It consists chiefly of Oxygen and Nitrogen in the proportion of four volumes of Nitrogen to one volume of Oxygen. There is also present a small proportion of Argon and a still smaller proportion of Carbon Dioxide, and Ammonia. Minute analysis also reveals the presence of gaseous emanations such as Carburetted Hydrogen, Sulphuretted Hydrogen, and Sulphurous gases. These emanations, however, are in too small proportions to have any perceptible influence on its properties. Besides the above elements and compounds there are also present varying quantities of minute particles of solid matter held in suspension—volcanic dust, particles of iron, lime, silica, and other inorganic substances, organic matter."\* In addition to these there is present in all air, except such as is chemically dried, aqueous vapor, resulting from evaporation.

The Carbon Dioxide of the air results from the burning of wood, coal, and other substances, and from the decay of animal and vegetable matter. It is also emitted from volcanoes. It is heavier than air but, following the law of gases, it diffuses itself throughout the atmosphere permeating the whole

mass. The dust of the atmosphere which can be seen floating in a sunbeam is, to a great extent, swept from the soil by winds, or ejected from volcanoes. Some of its particles are the product of incomplete combustion, others are organic. The vegetable particles consist to some extent of minute spores which germinate when deposited on certain liquid or moist solid substances, giving rise to mould, mildew, and fermentation. The animal particles are believed to contain the germs by the agency of which certain diseases are spread. The dust particles of the atmosphere have much to do with the condensation of aqueous vapor by serving as nuclei around which this vapor can precipitate. Some other gases also have the same effect, especially Sulphur Dioxide, which is always present in the London fogs.

#### COMPOSITION OF DRY AIR BY VOLUME AND BY WEIGHT.

	Volume.	Weight.
Nitrogen.....	78.40 per cent.	75.95 per cent.
Oxygen.....	20.94 " "	23.10 " "
Argon.....	0.63 " "	0.90 " "
Carbon Dioxide.....	0.03 " "	0.05 " "

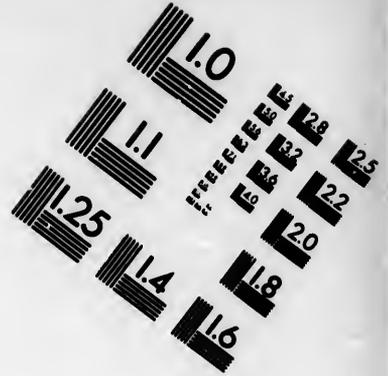
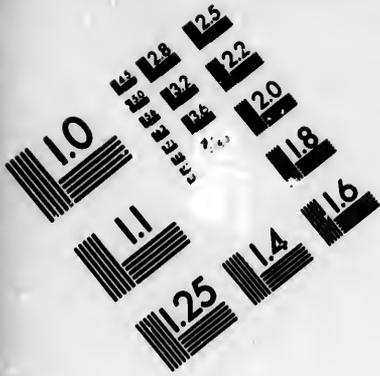
**Importance of these Gases.**—The Oxygen in the air is the great sustainer of animal and vegetable life. But this gas cannot, however, be used in large quantities without bringing destruction, so the Nitrogen of the air serves as a diluent. Plants absorb oxygen through their leaves and stems, and through its action are enabled to carry on their life processes. Land animals take it into their lungs or other organs, where it mingles with the blood and unites with the carbon impurities forming carbon dioxide. This carbon dioxide is exhaled to the air to be in turn absorbed by plants as food. Even life in the ocean is dependent upon oxygen for sustenance. Through the action of waves and ocean currents particles of air are mingled with the ocean water to its furthest depths. Water animals pass this water through their gills, thus bringing the oxygen of the air particles into contact with their blood, where, as in the case of land animals, it unites with the waste product forming carbon dioxide.

The aqueous vapor of the atmosphere is formed through evaporation from the earth's surface. When we consider the vast amount of water surface and moist land area that is exposed to the heat of the sun, we must admit that the atmosphere at all times contains a large amount of this vapor. Indeed no part of the atmosphere is at any time, and under natural conditions, wholly devoid of this aqueous vapor. It floats visibly as mist, fog, and clouds; it falls as rain, snow or hail; and is deposited as dew. The uses of the vapor in the economy of nature are manifold. Indirectly it supplies our rivers, lakes and springs with their water. It gives drink to plants and animals alike, and has much to do with controlling the sun's rays in heating the earth, and in preventing the too rapid radiation of the heat once obtained.

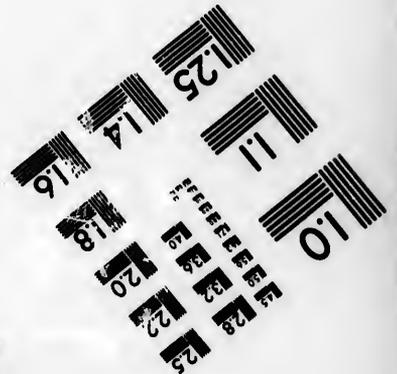
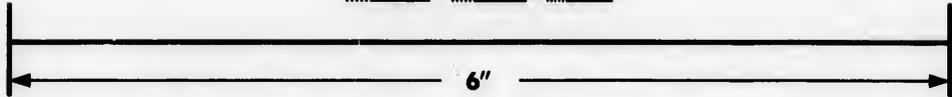
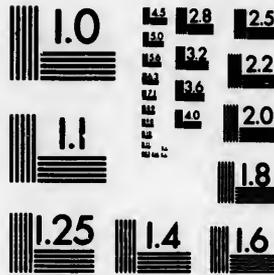
**Condensation of Aqueous Vapor.**—The higher the temperature of the air is the more moisture it can hold. When the atmosphere contains all the invisible vapor it is capable of holding at a given temperature, it is said to be saturated. Sometimes washed clothing placed on a line to dry remains as damp as when just placed there, even after several hours' exposure. This is due to the fact that the air is at or near saturation

\*Bloxam's Chemistry, by Thomson & Bloxam. 1903.





**IMAGE EVALUATION  
TEST TARGET (MT-3)**



**Photographic  
Sciences  
Corporation**

23 WEST MAIN STREET  
WEBSTER, N.Y. 14580  
(716) 872-4503

1.0  
1.2  
1.5  
1.8  
2.0  
2.2  
2.5  
2.8  
3.2  
3.6  
4.0  
4.5  
5.0  
5.6  
6.3  
7.1  
8.0  
9.0  
10.0

1.0

1.0  
1.2  
1.5  
1.8  
2.0  
2.2  
2.5  
2.8  
3.2  
3.6  
4.0  
4.5  
5.0  
5.6  
6.3  
7.1  
8.0  
9.0  
10.0

point. The slightest cooling of this atmosphere will result in the condensation of its vapor into a visible form.

**Clouds and Fog.**—When a vapor-filled mass of air has its temperature lowered from contact with a mass of cooler air, or from any other cause, condensation rapidly follows. This condensed vapor floating in the upper regions of the air is called *clouds*, while that at, or very close to, the earth's surface is called *fog*. Clouds assume a variety of forms. Those slightly feathery forms floating very high are called *Cirrus* clouds. They are supposed to be formed of very small ice particles which are buoyed up in the higher strata of air by the force of rising currents of warm air from below. The *Camulus* clouds are those great rough, fleecy masses which assume such fantastic forms. They present the appearance of hills piled one upon another. Growth in these clouds is sometimes visible to the naked eye. As the warm saturated lower strata of air rise into contact with these clouds and become cooled, they deposit their overplus of moisture and thus add to the size of the cloud. *Stratus* clouds are those which extend across the sky in bands. There is a uniformity about them not seen in other clouds. The *Nimbus* clouds are those which produce rain and snow. They are low, dark, and heavy, and obscure the sky.

**Rain, Hail, and Snow.**—When the temperature falls considerably the upper atmosphere becomes filled with minute water particles which by contact with each other, grow, till by sheer weight, they fall to earth as rain drops: If, in falling, these rain drops pass through a stratum of air below the freezing point, they become frozen, and reach the earth as *hail*. Again, if the atmosphere is at saturation point and its temperature falls to or below freezing point the water vapor will become frozen in the shape of small feathery ice crystals. These beautiful forms gather into clusters and fall as the *fluffy snow*.

**Dew.**—We are all familiar with the appearance of water films on grass and low plants after sundown during the summer season. This is known as *dew*. It is usually formed on a still, clear evening or night and rarely when the sky is overcast. If in summer a pitcher of cold water be placed on a table, in a very short time small particles of water will appear on its outside. This water on the outside of the pitcher has been supplied from the aqueous vapor of the atmosphere, and its condensation on the side of the vessel has been brought about by the temperature of the pitcher and its contents being below the saturation point of the air in contact with it. Now the dew on the earth is formed in a similar way. The earth gives off its heat by radiation, more rapidly than the air. The blades of grass and leaves of other low plants radiate their heat even more rapidly than soil does, and are in consequence soon cooled below not only the temperature of the soil, but also the temperature of the surrounding air. Contact with these objects reduces the temperature of the air below saturation point, (dew point,) and condensation of part of its moisture on the objects follows. If the objects are below freezing point then the water vapor is frozen as it condenses and appears as *hoar frost*.

**HEATING OF THE EARTH.**—The source of the earth's heat is the sun. Its rays pass through space, and are transformed into heat on contact with the earth and its atmosphere. The space between the sun and the atmosphere is not warmed by these rays as they pass through, because there is nothing there to absorb them. In the highest regions of the atmosphere com-

paratively few of the sun's rays are absorbed, as shown by the fact that in equatorial regions at a height of about 3½ miles the temperature is never above freezing point. Beyond this height the cold grows more intense till it reaches a point where absolutely no life could exist.

As the sun's rays pass through the atmosphere some are absorbed by the air, the aqueous vapor, and dust particles. The remaining rays pass to the earth, where some are absorbed and transformed into heat, while others are reflected to the atmosphere, particularly from snow and ice and water surfaces, and there absorbed. At all times, night and day, the earth is sending out heat rays to the atmosphere, thereby raising its temperature. Thus we see that the atmosphere derives its heat in three ways: first, by radiation from the sun; second, by reflection of the sun's rays from the earth; and third, by radiation from the earth.

But while the earth absorbs the sun's rays readily and becomes rapidly heated, it is a poor conductor, and in consequence of this the heating effect of the sun's rays does not penetrate beyond a few feet from the surface. Were it not for the fact that the earth radiates its heat very rapidly its surface would become unbearably hot. Again, the atmosphere does not part with its heat so readily as the earth. "Hence during the long days and higher sun of summer the heat accumulates in the air, while in winter the long nights allow more heat to pass away than the short days with their low sun can make good, and so the cold continually increases."

The sea absorbs the sun's rays more slowly than the land, but it is affected by those rays to a much greater depth. It also gives off its heat much more slowly than the land, and thus tends to keep the air in contact with it at a more uniform temperature. Through its system of currents the warmth of tropical waters is conveyed to northern and southern latitudes.

**HEIGHT OF THE ATMOSPHERE.**—It is not positively known to what height the atmosphere extends; but certain facts go to show that it must be considerable. Twilights are caused by the sun's light being reflected by vapors and dust of the atmosphere. Now it has been ascertained that the light "comes from no greater distance away than 50 miles;" above this the atmosphere is not sufficiently dense to reflect light. Yet the atmosphere extends beyond this height, for meteors, which are masses of solid matter flying through space at a fearful speed, only become visible through frictional contact with the atmosphere. This contact, scientists inform us, takes place as high as 200 miles above the earth. There is no doubt that the atmosphere extends even higher than this, but in a very rare form.

**PRESSURE OF THE ATMOSPHERE.**—"The air though so light, and apparently lacking in substance, actually has weight." Indeed with proper instruments a quantity of air may be weighed as we weigh tea or salt. At the sea level a column of air, reaching to the full height of the atmosphere and with a base an inch square, weighs about 15 lbs., that is, the pressure of the atmosphere on every square inch of the earth's surface at sea level is about 15 lbs. The pressure of the atmosphere is measured by an instrument called a barometer, which consists of a glass tube open at one end and filled with mercury. This tube is inverted, and the open end placed in a dish of mercury. The pressure of the atmosphere on the surface of the liquid in the dish forces up or balances the column of mercury in the tube. Variation in the pressure of the atmosphere is indicated

by variation in the barometric column. At the sea level this column of mercury is about 30 inches high. When the barometric reading at sea level is 30 inches or more it is termed high pressure; when below 30 inches it is termed low pressure.

As one ascends to higher levels above the earth's surface, the column of mercury in the barometer falls. At a height of 3½ miles it is only 15 inches, indicating that at that height the atmosphere exerts only one-half the pressure it does at the sea-level. This shows that the air is densest at the surface of the earth, and that it becomes thinner or rarer as we ascend.

But there are other causes than that of altitude, operating to raise or lower the height of the barometric column. Even at the same place on the earth the pressure is not constant. Heated air expands and is forced upward, thus producing a lower pressure than similar air of lower temperature. It is also known that aqueous vapor is lighter than air. If then the atmosphere be charged with much of this vapor it will weigh less than if it were dryer, and consequently show a lower barometric pressure. This latter fact is regularly taken into account in forecasting weather conditions—the low pressure pointing either to the presence of considerable moisture in the air, or to a rapid rise in temperature occasioning an atmospheric updraft, or to a combination of these causes.

Weather maps issued daily from the leading observatories of the world show in concise form the atmospheric conditions of all points of the country or continent at which observations are made, and with which they are in telegraphic communication. From these conditions inferences are drawn concerning the probable atmospheric conditions during the next twenty-four hours. These weather forecasts are then telegraphed to all stations throughout the country.

On these maps lines are drawn connecting all localities having at the time the same barometric pressures. These lines are called *isobars* (equal pressure lines). They show at a glance the areas of low and of high pressure and thus point out the location of storms.

### Movements of the Atmosphere.

The Atmosphere being gaseous is very sensitive to differences in pressure, in temperature, in density, or in anything that tends to disturb its equilibrium, and quickly responds to this disturbance by a movement to restore equality. This movement is termed *wind*.

The most prominent cause of this movement is the unequal distribution of temperature throughout the atmosphere. When the air at some locality is heated to a higher temperature than that of the air surrounding it, it expands, and being then comparatively lighter it is pressed upward by the heavier air that flows in. Standing close to a bon-fire on a calm night and facing it, gives us a marked illustration of these currents. The sparks and smoke ascend, being carried by a rising current of heated air, while the cooling of our backs points conclusively to an inflow of cooler and denser air toward the fire. Such is taking place on a grander scale on the earth as a whole.

The amount of heat received in tropical regions from the sun is vastly greater than that received in polar regions. This heated equatorial air rises, and currents of cooler and denser air set in from polar regions. The heated air that rises, flows off as an upper current towards the poles and compensates for the outflow from these regions toward the equator. Thus there are two constant atmospheric currents constituting what

is termed the planetary circulation, the inflowing under current and the outflowing upper current.

**The Trade Winds.**—These are winds blowing with marked steadiness from about the tropics towards the equator, and are so called from the fact that vessels, where possible, so plan their courses as to take advantage of them. They do not blow directly towards the equator. Owing to the rotation of the earth they are deflected. North of the equator they

blow from the north-east, and south of the equator from the south-east. They are not much developed over the land on account of so many opposing influences. On account of these winds moving from cooler to warmer regions their capacity for moisture steadily increases, till they reach the point of saturation at their nearest approach to the equator.

**The Doldrums or Calms.**—Between the north and south components of the system of trade winds is a belt of calms called the *Doldrums*. These are from 200 to 300 miles wide, and are located where the air in its planetary circulation rises on account of its low pressure. In the Atlantic this belt is wholly north of the equator during both summer and winter. In the Pacific it does not extend so far north of the equator; in summer and in winter its southern limit lies two or three degrees south of the equator. This region is one of low pressure. The atmosphere is cloudy, and is subject to great rainfall.

**Anti-Trade Winds.**—The air that flows from equatorial regions as an upper current sinks to the earth's surface at about the tropics and continues poleward. As in the case of the trade winds the rotation of the earth causes a deflection of this wind in the Northern Hemisphere from the north to north-east, and in the Southern Hemisphere from the south to south-east. These are called the *Anti-trade winds*, or *Return Trades*, because of their blowing in directions opposite to those of the Trades.

**Periodical Winds.**—At stated periods changes take place which tend to give a definite direction to air currents. "The most important of these changes is a variation in the supply of solar heat in different seasons, and in the change from day to night." In the equatorial belt the change of seasons is not so marked by variations in temperature as it is in temperate zones. In the latter the amount of solar energy received in summer is very much greater than that received in winter.

**The Monsoons.**—In regions outside the tropics where large

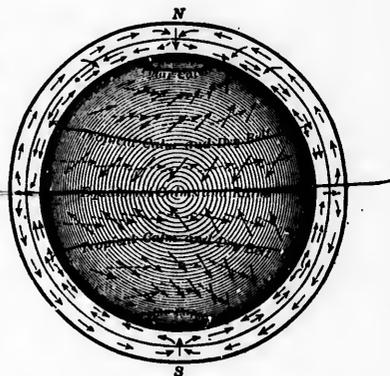


FIG. 28. The winds of the earth. Outer circle, the overflow to the poles; inner circle, the return current with Trades and Return Trades. Inner disk shows westerlies, Trades and Return Trades, and belts of calms at equator, tropics and poles.

land masses exist, there occur periodical winds called **Monsoons**, caused by the unequal heating of the land and the water. During the summer the land masses become warmed to a higher temperature than the water. A low pressure is thereby caused over the land and a consequent inflow of air from the sea to the land. During winter these conditions are reversed and, in consequence of the low pressure being over the sea, air currents set in from the land to the sea. The most striking example of the Monsoon is to be found in Central Asia and the Indian Ocean. During summer there is a low pressure over the land north of the Himalaya Range and an inflow of cooler air from the south—the southerly monsoons—bringing rain to a great part of India; during winter the low pressure over the ocean causes an inflow of dry air from the land—the northerly monsoons—bringing the dry season to northern and Central India; that portion of the monsoon which crosses the Bay of Bengal in its southerly course brings rain to south-eastern India.

**Land and Sea Breezes.**—These periodical winds are due to precisely the same causes as the monsoons. In regions outside the tropics they occur only during the fine weather of summer, and their effects are perceptible only a few miles inland or seaward; but within the tropics they occur throughout the year. During the day the land becomes warmer than the sea and a current of cool air sets in from the sea to the land and, if no other atmospheric disturbance occurs, continues till the sun declines. Soon after sundown the land has become cooled till its temperature is lower than that of the sea, and continues till sunrise.

**Cyclones.**—Wherever a region of low pressure occurs there will be an inflow of air from the surrounding regions of higher pressure. This inflowing air does not hold in a direct line towards the area of low pressure but rather whirls in a spiral path, just as water does in flowing from a vessel by means of an

opening at its bottom. Such a circular movement of air is called a **cyclone**, or cyclonic storm. Cyclones are usually divided

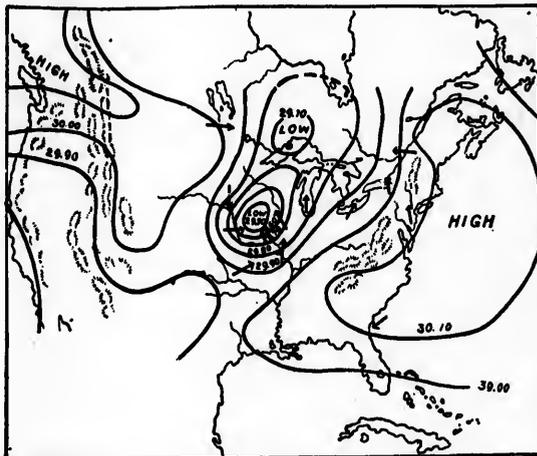


FIG. 30. The hurricane, now only a somewhat moderate cyclone as shown by isobars, approaching the Lakes from Iowa. Arrows show direction of winds. Note the secondary "Low" area.

Courtesy of R. F. Stupart.

into two groups, having to some extent a common origin, but differing generally in location and intensity, viz:—**Tropical cyclones or hurricanes** and **Cyclones of Temperate Regions**.

**Hurricanes.**—Within the hot moisture-laden Doldrums, especially during the months of August, September, and October, there often spring up "whirls of wind which grow larger and larger till they may reach a diameter of over 300 miles, and that move forward often at a rate of fifteen miles an hour." The air which from all directions moves spirally towards the centre of low pressure, is gentle at first, but it increases in intensity till it reaches a fearful velocity, while overhead dense black clouds gather and pour forth torrents of rain to the accompaniment of thunder and lightning. The centre of this whirl is perfectly calm, the air hot and dry, and the pressure very low. In the Northern Hemisphere these whirling winds move in a direction opposite to that of the hands of a watch; while in the Southern Hemisphere they move in the direction in which the hands move. The whirl as a whole moves north-westwardly till it reaches the limit of the return trade winds at about latitude 25°, then turns abruptly and follows a north-eastwardly course. In the Southern Hemisphere the whirl moves south-westwardly, then turns south-eastwardly gradually losing in force till it dies away.

These cyclones do not originate on land but far out at sea. If in their course they encounter a land area, they usually work great havoc, as is evidenced in the West Indies and the Southern United States. They occur in all the larger tropical bodies of water, in the middle and western Atlantic, in the China Sea where they are known as Typhoons, in the Indian Ocean, the Bay of Bengal, and the South Pacific, but not the South Atlantic.

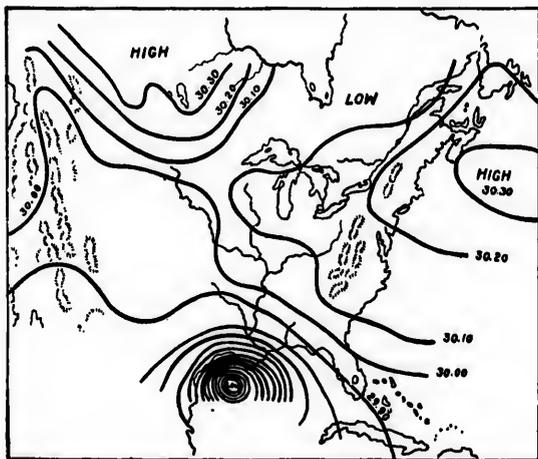


FIG. 29. Hurricane just nearing Galveston, Sept. 8th, 1900. Note very high pressure to north and north-east. Isobars lines for every tenth of an inch of fall of barometer; depression at the near centre not known.

Courtesy of R. F. Stupart, Director of Meteorological Service for Canada.

69 1/2 mls. in degree.

15 degree distance makes 1 hr. difference in time

PHYSICAL GEOGRAPHY.

Climate.

Cyclones in Temperate Zones.—These cyclones have the same whirling movement toward a centre of low pressure as the tropical cyclones, and the same movement of the whole whirl in a north-eastwardly direction in our Hemisphere, and in a south-eastwardly direction in the Southern Hemisphere. While they cover a greater area than the hurricanes the wind is not nearly so violent nor the pressure at the storm centre so low. They are oval in form while the hurricanes are circular, and they move forward with a greater velocity. They bring with them rain and snow.

Anticyclones.—Every cyclone is followed by a cyclone of an opposite kind. While with the former the whirl is spirally towards a centre of low pressure, in the latter the whirl is spirally outwards from a centre of high pressure. This latter is termed an Anticyclone. It follows in the path of the cyclone bringing

By climate is meant the prevailing weather conditions of a region. Since these conditions are ultimately dependent upon temperature and moisture, whatever influences operate to modify these for a lengthened period tend to modify climate. Among these influences the most important are latitude, elevation, proximity to the sea, prevailing winds and ocean currents.

Latitude.—The atmosphere is warmed principally by radiation from the earth, and "the amount of heat which the earth receives depends upon the angle at which the sun's rays strike its surface; the more nearly they approach the perpendicular the greater is the amount of heat." Hence it follows that, other things being equal, countries within the tropics are warmer than those nearer the poles. On this basis geographers have divided the earth's surface into Zones or belts—the Torrid Zone lying between the Tropics, the Frigid surrounding the Poles, and the Temperate lying between the former two.

If the earth were a perfect sphere and its surface composed altogether of land and with no inequalities, then the temperature of a place would directly depend upon its latitude; but such conditions are never present, and as a consequence such a division, as far as climate is concerned, is very artificial and misleading. It represents only in the most general way the distribution of temperature on the earth's surface, and will not hold when one descends into details. The hottest tract on the earth is not at the equator but fifteen or twenty degrees north of it in the desert of Sahara. The winter temperature of southern England is much higher than that of southern Ontario, and yet it is in a higher latitude. Facts such as these show conclusively that there are other causes affecting climate than that of position on the earth's surface with reference to the Equator.

Elevation of Surface.—Mountain ranges affect the climate of countries in various ways. When they lie across the path of moisture-laden winds they force the latter into higher and cooler altitudes where saturation point is quickly reached, and a heavy rainfall results on that side of the mountain from which the wind is blowing. The wind, forced into the higher atmosphere, becomes cooled and denser, and descends towards the warmer surface after crossing the mountains. With this rise in temperature the capacity of this wind for holding moisture is increased, and as a consequence little or no rainfall will occur until again a high elevation forces these winds upwards into a condensing temperature.

The Rocky mountains intercept the warm south-west return trade winds and cause a heavy precipitation in rain and snow on the western coast of Canada, and a correspondingly dry belt on the eastern side of the mountains. In South America the Andes cross the track of the south-east trades, and in consequence of this the eastern side of these mountains has heavy rain while the west suffers from drought. Similar conditions exist in India. The Western Ghats intercept the passage of the south-west monsoons and cause a heavy rainfall during the continuance of these winds on the west coast, while the east coast is dry and hot. But when the monsoon changes, and blows from the north-east across the Bay of Bengal, the south-

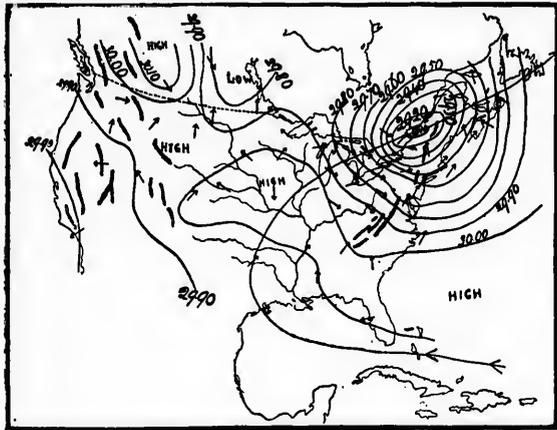


FIG. 31. The hurricane, now a furious cyclonic storm, centred on Montreal. The line running between Cuba and Florida marks the path of the hurricane, shown by arrow-heads; G. is Galveston; numbered lines are isobars; the arrows mark the direction of the winds. Note that the arrows point outward from the "High" or anticyclonic areas, and run parallel to the isobars or across them to the "Low" centre.

Courtesy of R. F. Stupart.

in summer a grateful coolness to the atmosphere, and in winter intense cold. Anticyclones are caused by a slow down-settling of air from the upper regions, and are the harbingers of fine weather.

Tornadoes.—These are very violent and destructive, usually accompanying a thunderstorm, and moving with it for twenty miles or more. The wind, warm and moisture-laden, whirls spirally with great violence about a centre of low pressure only a few feet or a few yards wide. The warm moist air as it rapidly rises is condensed, forming heavy clouds from which descend torrents of rain. The path of a tornado is usually marked by destruction. Nothing seems to withstand its violence. Houses are demolished and trees uprooted. Fortunately the path is very narrow, and its occurrence restricted to limited areas of the earth's surface. In North America they frequently occur in the Mississippi Valley, but are rare in the north.

of air is usually divided



as shown by direction of winds. R. F. Stupart.

on origin, but viz:—Tropical regions.

n Doldrums, er, and October grow larger 800 miles, and miles an hour." rally towards est, but it in- elocity, while orth torrents and lightning. e air hot and uthern Hemi- n opposite to uthern Hemi- h the hands wardly till it t about lati- a north-east- re the whirl a-eastwardly

ut far out at d area, they in the West y occur in all dle and west- ere known as Bengal, and

eastern coast has a plentiful supply of rain while the west becomes dry.

It is a well-known fact that as one ascends a mountain the temperature lowers and, if the mountain be very high, a point is reached above which are perpetual ice and snow. The altitude of this snow line varies with the latitude. Within the tropics it is higher than in the temperate zones. Because of this variation of temperature according to altitude, mountains within the torrid zone exhibit all variations of climate from perpetual heat to perpetual cold.

Lofty plateaus, especially in extra-tropical latitudes, are subject to greater extremes of temperature at opposite seasons than are experienced by lands of a different surface configuration. Being high and unsheltered they are exposed to the scorching sun of summer and the biting blast of winter.

**Prevailing Winds.**—Without doubt the most powerful agency in modifying the climate of a region is prevailing winds. The western coasts of countries in the line of the warm return trade winds have usually a higher average temperature, and possess a greater rainfall than corresponding eastern coasts. The presence of such winds accounts for the comparatively mild climates of Western British Columbia, of Ireland and Southern England, and of Western Norway.

The trade winds coming from cold into increasingly warmer regions have their capacity for absorbing and holding moisture much increased. When therefore they blow over wide stretches of level country and where there are no great elevations to bar their way they have the effect of parching the soil and rendering it barren. To such a cause, in no small degree, is owing the existence of the deserts of Lower Egypt, of Sahara, of Arabia, and of Australia.

**Proximity of the Sea.**—The sea is not so quickly raised in temperature as the land, and does not part with its heat so readily. Hence islands far from land, and the coasts of countries bordering on the sea, tend to have equable climates, as distinguished from the excessive climates of inland countries. The Philippines and the Hawaiian Islands, although situated within the torrid zone, have a climate of perpetual spring, and no excessive temperature such as is experienced in inland regions of corresponding latitude and altitude.

The influence of the sea on the temperature of the north-eastern coast of North America extends but a short distance inland. This is accounted for by the fact that the prevailing south-west wind blows from the land and not from the sea.

**Continental Climate.**—Apart from mountains and other elevations the land surface exerts a marked influence on climate. It absorbs and radiates heat readily and, as a result, fluctuations in temperature are numerous. In winter the temperature of land falls to a lower degree and more rapidly than does that of water, and in consequence the land in winter is colder than the water. In summer, owing to the rapid absorption of heat, the land is raised to a higher temperature than the water. Thus continental areas of land have excesses of temperature which islands or sea coasts do not experience.

### Life.

When life first appeared on the earth is not definitely known; but the conditions necessary to the support and development of life forms are known, and from these it can reason-

ably be inferred that if the nebular hypothesis is correct, long ages must have passed after the earth assumed its form, before its temperature had become sufficiently cooled to admit of the existence on its surface of life of any kind. From the fact that animal life is dependent for its sustenance upon plant life it may be safely inferred that animal life on the earth was preceded by plant life.

The plant organism may be considered as a laboratory in which the constituents of the soil and the air are chemically combined to form products suitable to its growth. Similarly the animal body may be considered as a laboratory in which, under certain conditions, the products of plant life are transformed into the constituents of the animal organism. Given the soil, moisture, and a suitable temperature, the plant sets to work, grows, and reproduces itself; but not so with the animal organism. Certain substances manufactured by plants are absolutely necessary to its existence.

The differences between the lowest forms of plants and animals are not easily determined, but between the higher forms they are very obvious. Both plants and animals are characterized by self-activity; but while plants move only in response to external stimulation and do not possess intelligence, all the higher animals possess the power of voluntary movement and the highest are capable of reasoning.

**Classification.**—On the basis of resemblance in form, structure, methods of reproduction, and general mode of life, plants and animals are each grouped into Orders, Genera and Species. A number of individuals possessing similar characteristics form a Species, a number of closely related Species constitute a Genera, and a number of closely related Genera form an Order.

### Classification of Plants.

- (1) **CRYPTOGAMS**—Flowerless plants.
  - Moulds, Bacteria, Diatoms, Sea-weeds, Fungi, Alge,
  - Lichens, Mosses, Ferns and Horsetails.
- (2) **PHANEROGAMS**—Plants producing flowers.
  - (a) *Gymnosperms*—Seeds not enclosed in an ovary.
    - Pine, Spruce, Cypress, Cedar.
  - (b) *Angiosperms*—Seeds enclosed in an ovary.
    - All the ordinary flowering plants.

### Classification of Animals.

- (a) *Invertebrata*—Animals without a backbone.
  - Protozoa—Ameba, Infusoria, Foraminifera.
  - Porifera—Sponges.
  - Cœlenterata—Jellyfish, Hydra, Corals.
  - Echinodermata—Starfish, Crinoids, Sea-urchins.
  - Vermes—Worms.
  - Arthropoda—Lobster, Spider, Centipede, Insects.
  - Mollusca—Clams, Oysters, Snails, Cuttlefish.
- (b) *Vertebrata*.
  - Fishes—Salmon, Shark.
  - Amphibians—Frog, Salamander.
  - Reptiles—Turtle, Snake, Lizard, Crocodile.
  - Birds—Crow, Condor, Ostrich, Sparrow.
  - Mammals—Kangaroo, Sloth, Elephant, Whale.

**Development of Life.**—An examination of these great groups will reveal a gradual increase in complexity of organism in passing from lower to higher forms. The earliest ancestors of our plants and animals consisted each of single cells without

special organs of motion or assimilation, but the gradual advance in life is marked by specialization of parts of the plant or animal body for definite purposes of life. A study of animal life, as revealed in the fossil-bearing rocks, shows a progressive development. The oldest of these rocks are found to contain the simplest fossils, while the later depositions contain the more highly specialized forms. In the oldest strata of sedimentary rocks—the Cambrian—we find many of the simpler forms of the invertebrates, but not a single vertebrate. The latter first appears in the lower Silurian rocks in the form of fishes. Amphibians next appear, followed by reptiles towards the close of the Primary age. Low forms of mammals first appear in the Secondary age, but not till the Tertiary age are the traces of the higher mammals met with. Finally man appears soon after the close of the Tertiary period.

A similar gradual advance is observed in plants as in animals. The Cryptogams or flowerless plants are abundant during the Primary age. The naked-seeded Conifers prevail during the Secondary period, while at its close appear the highly specialized flowering plants which prevail in our own times.

The countless species of plants and animals at present on the earth are all descended from the earlier and simpler forms which preceded them. This descent is marked by an increasing variety and complexity in structure caused evidently by the influence of environment. While the offspring of plants and animals are like their parents, slight variations will occur. If this variation adapts the organism more fully to its environment of soil, temperature, moisture, or other life, then such plant or animal has an advantage over its competitors in life's struggle. This advantageous peculiarity is transmitted to offspring and thus becomes more general. If, on the other hand, this variation prove a disadvantage to the plant or animal possessing it, it is likely to fail in the struggle for life.

**Dispersal of Animals.**—The conditions of environment frequently become such as to necessitate for animals a change of locality or an extension of the areas over which they range for food. The means of dispersal are various. Some animals roam on foot, others swim, while others are provided with wings which give them a great advantage in crossing mountains, deserts, and large bodies of water. Reptiles and amphibians are somewhat limited in their means of dispersal. "Insects have a great advantage over most animals in spreading over wide areas, and in consequence have an extensive range. They are borne long distances by the winds, and their eggs and larvæ are transported many miles in tree trunks or in other floating material."

**Dispersal of Plants.**—Plants distribute themselves by means of their seeds and spores or fruits. Many seeds are provided with appendages which facilitate their dispersal by the wind, while others bear hooks which easily attach them to the covering of animals, and bring about their transportation. Birds also convey seeds from place to place by eating fruits and depositing the indigestible seeds in their path. Some seeds are also carried from place to place through the transportation of merchandise, others float for long distances on water, and propagate plants on distant shores.

**Barriers.**—The means of dispersal at the command of nearly all plants and animals would soon render the various species almost universal were it not for the fact that natural conditions here and there act as barriers to their free distribution.

Among these the most effective are wide expanses of water, continuous high mountain chains, wide deserts, the preying propensity of larger animals, parasitism among insects, and climate.

Oceanic islands which have never had a land connection are usually without mammals and reptiles; wide deserts are not crossed by animals which live on arboreal or amphibious life; on opposite sides of high continuous mountain chains the flora and fauna are frequently quite different; the increase and consequent widening of range of many insects and plants are kept in check by parasites. Climate also restricts the distribution of many types of plants and animals so effectively that the floras and faunas of tropical, temperate, and polar regions are quite distinct.

**Zoological Regions.**—It has been customary to speak of three zoological regions corresponding to the climatic zones, but the fact that regions having quite similar climatic conditions possess quite different faunas shows that other factors than climate must be considered in accounting for animal distribution. We have already considered three of these factors, viz: means of dispersal, progressive development, and barriers, but a fourth remains which can only be mentioned here—"the great earth movements, which from time to time have affected the relations between the continents and the oceans."\*

From a consideration of all these factors the earth may be divided into six great zoological regions.

**1. The Eurasian.**—This region comprises Europe, Asia north of the Himalayas, and Africa north of the Sahara Desert, which was formerly connected with the Northern Continent. This region contains many types of animals, among which are bears, horses, antelopes, elephants, wolves, beavers, hares, hedge-hogs, wild boars, chamois, and the camel which came from North America overland in the pre-glacial epoch.

**2. The North American.**—This region comprises all of the North American Continent except Central America. The fauna of this region is very different to-day from what it was in earlier geological times. Before the Glacial Epoch lions, tigers, tapirs, camels and elephants were numerous. The present fauna of North America are, for the most part, descended from ancient types that migrated from Eurasia when land connections existed by way of Alaska and Greenland. Among these are bears, horses, antelopes, elk, and bison. The animals that are peculiar to this region are the racoon, prairie dog, opossum, skunk, mocking-bird, humming-bird, and some others.

**3. The South American.**—This is the American Continent south of the Tropic of Cancer. The ancestors of its present fauna have been derived mostly from North America in early geological ages. Its animals include sloths, ant-eaters, armadillos, llamas, alpacas, marmosets, guinea pigs, agouti, bears, and monkeys. There is also a great variety of birds, mostly of brilliant plumage.

**4. The African.**—This region includes all of the African Continent and Arabia south of the Tropic of Cancer, and the islands to the south-east of Africa formerly connected with the mainland. The ancestors of most of the animals of this region migrated from Eurasia when land connection was established with it by the elevation of the northern part of Africa. Its

\* See Chase's High School Geography, p. 243, etc.

animals include the giraffe, hippopotamus, elephant, rhinoceros, lion, zebra, different species of antelope, and man-like apes such as the gorilla and chimpanzee. Among its many species of birds is found the ostrich.

**5. The Oriental.**—“This region comprises that part of Asia south of the Himalayas” along with that part of the Malayan Archipelago including Sumatra, Java and Borneo. Its animals are the descendants of those which sought refuge in the warmer southern clime from the cold that developed over Eurasia prior to the elevation of the Himalayan barrier. They include orang-utans, long-armed apes and monkeys, wild cattle, tigers, tapers, elephants, and rhinoceroses.

**6. The Australian.**—This region includes Australia, New Zealand, and the islands to the east of Borneo and Java. Owing to its long isolation from the northern continent the Australian fauna, with the exception of a few animals with excellent means of dispersal, embraces animals of a low type of life. They are mostly marsupials or pouched animals, one of which is the kangaroo. Among the birds are the emu, the cassowary, the mound-builder, numerous parrots, birds of paradise, and guillemot-colored pigeons.

### Plants.

**Conditions of Vegetable Life.**—There are recognised by botanists over 100,000 species of plants, from the tallest forest trees to the minutest forms of vegetable life. The distribution of these plants over the earth's surface is controlled by many physical conditions, chief among which are light, heat, and moisture. The unhealthy appearance of plants that have been placed for some time in darkness, and the bending of the axis of plants towards the point from which the only light enters the room, show the necessity for light on the part of the plant. Indeed, it is only in light that the green chlorophyll of the plant cells can manufacture starch compounds for its own upbuilding. But all plants do not require the same amount of sunlight. The daisy thrives only in the open field or bank exposed to the direct rays of the sun, while the hepatica seeks the shade.

The total absence of plants in very high altitudes, as well as in high latitudes, in the presence of both light and moisture, when contrasted with the luxuriance of vegetation in warm tropical regions, shows that a temperature above freezing point is necessary to the life of a plant.

The moisture of the climate also affects the life and distribution of plants. In true deserts no vegetation whatever is found, while in dry regions which are not true deserts the vegetation is limited to stunted, spiny sage bush and cacti.

The intermingling of these conditions in various proportions, combined with other conditions governing distribution, give rise to different floras. The boundaries are not lines of latitude but rather isotherms or lines which pass through places of equal temperature. The plant world can be naturally arranged into three great floras, each of which has within its limits a number of sectional or subordinate floras, with characteristics so peculiar as to warrant their special mention.

**I. THE NORTHERN FLORA.**—This division embraces most of Eurasia and North America. The plants are the descendants of those which flourished in Tertiary times in the then united circum-polar lands. It embraces three sub-divisions:—

**1. Arctic-Alpine Flora.**—This is the characteristic flora of North America and Eurasia north of the Temperate Zone, and

of all the principal mountain chains of the world whose altitude ensures climatic conditions approximating those of Arctic latitudes. Its plants are small, hardy, and of slow growth, and include stunted willows, alders, birch, grasses, lichens, and mosses. Flowering plants are represented by the hardy saxifrage and Arctic poppy.

**2. The Temperate Flora.**—This flora is very varied, and is characterized by rapid growing herbs, shrubs, and forest trees. It includes the important grains—wheat, barley, oats, rye; deciduous trees, such as oak, beech, maple, elm, poplar and walnut; and the cone-bearing pines and firs.

**3. The Mediterranean Flora.**—The countries bordering on the Mediterranean have a flora sufficiently distinct to be marked off from the adjacent temperate and tropical floras. This flora includes such trees as the fig, olive, orange, cork oak, chestnut, and pine; low evergreen shrubs, such as the holly and laurel.

**II. THE SOUTHERN FLORA.**—Owing to the land masses of the Southern Hemisphere being much isolated by water, there is not to be found that floral continuity, even within the same Isotherms, which characterises the Northern Hemisphere. Owing to this fact there are several distinct sub-divisions in this flora.

**1. Antarctic-Alpine Flora.**—The vegetation of this flora is similar to that of the Arctic-Alpine, with the addition of a few Australian representatives whose presence points to a former Antarctic land connection between these continents.

**2. Australian Flora.**—The characteristic plants of Australia, owing to long isolation, possess marked peculiarities, not the least of which are the modifications of their structure to fit them to meet the climatic conditions of their arid homes. The leaves of some are thick and leathery, those of others assume a vertical rather than a horizontal position on their stems, while a few plants have long since discontinued the service of leaves and have flattened their stems in a degree to compensate for this lack. All these modifications are for the more effective control of evaporation from the plant body. Among the representative plants are myrtles, gum-trees, acacias, fern trees and beef trees.

**3. South African Flora.**—This vegetation is both rich and varied, including many of our most beautiful garden and house flowering plants, such as the pelargoniums, orchids, and lilies. Among its typical forest trees are the ironwood and the yellowwood.

**4. Patagonian Flora.**—This includes the plants of South America within the Temperate Zone. Among these are the fuchsia, calceolaria and paraguay tea. In its forests are found the beech, oak, chili pine, poplar and willow.

**III. THE TROPICAL FLORA.**—This flora has three sub-divisions:—

**1. The Indo-Malayan Flora.**—This is separated from the Temperate flora of Asia by the Himalayas. It extends northward to Japan and southward to the islands immediately off the coast. It is represented in the trees of the teak, banyan, ebony, sandalwood, bamboo, and cocoa and sago palms.

**2. The African Flora.**—Among the many genera here represented are the mangrove, oil palms, baobab, and giant euphorbias.

**3. American Flora.**—Some of the most common plants of this flora are the cinchona, mahogany, rosewood, rubber, palms, coffee and sugar.

### Life in the Ocean.

The ocean has its plants and animals as well as the land, and the conditions which control their distribution are to some extent similar to those on land. Among these conditions the most prominent are light, temperature, and food. We saw in the chapter on the ocean that there are depths which are not penetrated by the sun's rays, and since plant life is dependent on light we do not find plants beyond the light line within the ocean's depths. Again, as the land floras and faunas are controlled in their distribution by temperature, so also is their oceanic distribution governed. Some are found in the warmer shore or surface waters, and within certain latitudes; others live entirely within the cold polar waters; and others occupy the cold and quiet abyssal depths. On account of these facts ocean life may be divided into shore or littoral life, pelagic life, and abyssal life.

**Shore Life.**—This includes plants and animals living within the water belt extending from the shore proper to a line where the depth does not exceed 200 feet. Within these limits the plants are represented in the great strap-shaped seaweeds, beautiful fully colored corallines, the sea worts and various seagrasses.

On account of the abundance of plant food within this area, animal life is well represented. Here are to be found all forms from the lowly protozoans to the highly developed mammals. There are some that attach themselves to the rocks, as the corals, barnacles, oysters and sponges; others that crawl about, as the starfish, lobster, and crab; while others, as the fish, are free swimmers. It is within this zone that the greatest fishing grounds of the ocean are to be found.

**Pelagic Life.**—This includes all plants and animals that live in the open sea but do not descend to a greater depth than 1,200 feet. Within this sphere minute unicellular algae abound. There are also some corallines, and an abundance of seaweed that floats at or near the surface and collects in such abundance within the tropical calms. Animal life is well represented here, and includes a great variety of types from the protozoans to the porpoises and giant whales. Among these are found jelly-fishes, mollusks, crustaceans, fishes, turtles, birds, and mammals. Many of these minute protozoans, as well as the unicellular algae are provided with silicious skeletons which eventually go to form much of the white ooze of the ocean floor.

**Life in the Ocean Depths.**—The deep sea explorations of H.M.S. Challenger have revealed the fact that animal life exists even in the deepest parts of the oceans. Protozoans, sponges, erinoids, shell-fish, worms and fish were taken at a depth of three or four miles, and crustaceans at a depth of 12,000 feet. A large number of the deep sea animals are descendants of those which at one time were littoral or pelagic in their mode of life; but being unable to cope successfully with their environment they have retired to more quiet depths where the struggle is less fierce. In conformity with the darkness of their environment they are inky black in color, and are usually without eyes.

### Man.

Man stands indisputably at the head of the animal creation, by virtue of his superior structure and mental endowments. While his physical being is still in a measure subject to the same limiting laws of heredity and environment which control the life of lower animals, yet, by means of his superior intelli-

gence, and his wonderful power of adaptation, he can successfully contend with the most adverse physical conditions and make them minister to his advancement. On this account there is practically no limit to his distribution over the earth.

**The Antiquity of Man.**—The written history of man goes back five or six thousand years before the Christian era, but his geological history far antedates this.\* "The evidence derived from the Swiss lake dwellings and from deposits found in river beds and caverns in France and England proves that long before iron was known in Western Europe, there were ages when man's weapons were made of bronze, and still earlier, of flint."

In the gravels of the Seine, and of the Great Ouse and of the Thames are found these stone implements mingled with the bones of the elephant, hippopotamus, rhinoceros, and other large animals now extinct. In caves in the south of France stone implements are found along with the horns and bones of reindeer. The climatic conditions required by these animals—long winters and short summers—point to a very remote period in the history of the earth. But man even then had made great advancement, for from some of these bones he had already shaped domestic implements, while on others he had artistically carved figures of the mammoth with which he was evidently familiar.

**Classification of Mankind.**—Mankind may be conveniently divided into four types, viz.—the Ethiopian or black; the Mongolian or yellow; the American or red; and the Caucasian or white.† To the Ethiopian variety belong the least civilized of the human race. Their original home was Australasia, and that part of Africa south of the Sahara Desert. The Mongolian or yellow type embraces about one-third of the human family. Its original home was probably the Thibetan plateau; but it is now widely spread, and occupies most of Asia, Japan, and Formosa, and appears in large numbers in parts of Europe and America. The Red or Indian type of America is no doubt a derivative from the Mongolian. It is fast becoming extinct before the advance of the white race. In North America where once existed vast tribes there are now but a few bands confined, in most cases, to reserves set apart for them by the Governments of Canada and the United States. In parts of South America they still retain their semi-civilized tribal life and customs. The Caucasian or white type includes the most enlightened and advanced of the human race. Their original home was Africa north of the Soudan; but it has migrated in all directions, and now largely preponderates in Europe, North and South America, Australia, New Zealand, Egypt and South Africa.

### The Heavens.

A glance at the heavens on a cloudless night reveals a vast number of shining bodies called stars. Careful and continuous observation shows that some of these, while maintaining their positions relative to one another, rise above the eastern horizon, pass across the sky, and sink beneath the western horizon. It will also be noticed in our northern hemisphere that some stars never sink below the horizon, but make the revolution about a fixed centre, called the **north pole of the heavens**, which is closely marked out by the North Pole Star. This phenomenon is well exhibited in a group of seven stars, termed the

\* Lawson's Physical Geography.

† Public School Geography, page 18.

**Big Dipper**, which, as a body, circulates about this fixed point, while its component parts always maintain the same position with reference to each other. This constellation is readily perceived in our hemisphere by the arrangement of its stars in the form of a dipper. The two brilliants forming the side opposite the handle always point towards the North Pole Star, on which account they are called the pointers.

All these bright objects, which form the constellations or groups having a circumpolar revolution, and which maintain constantly the same relative position with reference to each other, are called fixed stars, and they form by far the greatest number of bright objects seen in the heavens.

But in addition to these and the sun and the moon, there are a small number of heavenly bodies which, to the naked eye, appear quite similar to the fixed stars. They rise and set daily, but are constantly changing their position with reference to the other stars, through an independent motion of their own. These are called **Planets**, or wanderers, and are readily distinguished by their greater brilliancy.

**Distance of the Stars.**—The enormous distance of the fixed stars from the earth does not lend itself easily to measurement by means of our ordinary units. An appreciation of the great distance is gained however from considering the fact that, though light travels at the rate of about 12,000,000 miles a minute, it requires over fifty years for it to travel to the earth from the average star of the first magnitude, while to travel from a star of the twelfth magnitude it requires 2400 years.

These fixed stars are supposed to be suns in various stages of development—some of them in the condensing stage with an increasing temperature; others, like our sun, giving forth an intense heat and surrounded by a photosphere; while still

by planets which, on account of the enormous distance from the earth, cannot be detected even by the most powerful telescope.

**The Celestial Sphere.**—The heavenly bodies all appear to have their position on the celestial sphere and, just as lines of reference are required on the earth for convenience in locating places, so on the celestial sphere imaginary lines corresponding to those on the earth are marked out for convenience in locating any of the celestial bodies.

In Fig. 32 O represents the earth. Its axis extended both ways represents the **axis** of the celestial sphere, terminating in the celestial poles—N.P. and S.P. The circle—E S W N—represents the plane of the rational horizon, which always passes through the centre of the earth. The point Z directly above the observer's head is the **Zenith**, and the point N is the **Nadir**. QEQ is the **Celestial Equator**, and is the plane of the earth's equator extended to

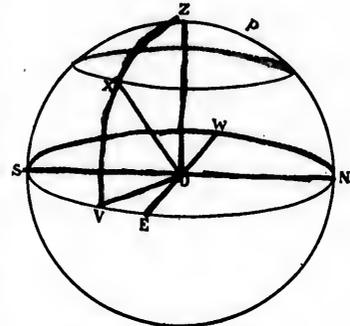


FIG. 32. Altitude and Azimuth.

to the heavens. The circle S Z N N' which passes through the zenith and the poles, and which cuts the horizon at the north and south points, is the **celestial meridian**.

**Location of a Star on the Celestial Sphere.**—To locate a star on the celestial sphere two things are required, viz:—its **altitude** or its distance above the horizon, and its **azimuth** or distance east or west of the meridian which passes through the south point of the horizon. A star due south has an azimuth of  $0^\circ$ , one due east or west an azimuth of  $90^\circ$ . In Fig. 33 O represents the point of the observer on the earth, and E N W S the plane of the horizon. The altitude of the star X will be the number of degrees in the angle V O X. All stars on the circle V X Z have the same azimuth, and all stars on the same circle as X parallel to the plane of the horizon have the same altitude.

### The Solar System.

The solar system consists of the sun, which is one of the fixed heavenly bodies; eight primary planets, viz:—Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune; four or five hundred smaller planets called Asteroids; a large number of comets; and myriads of meteors. The planets as named above are in the order of their distance from the sun, the nearest being first. With the exception of Mercury and Venus each of the primary planets is accompanied by one or more satellites or moons which revolve around it.

**The Planets.**—The planets are spherical bodies revolving in elliptical orbits about the sun which is always at one of the common foci of the ellipses. When, in its orbit, a planet is nearest the sun it is said to be in **perihelion**, and when in that

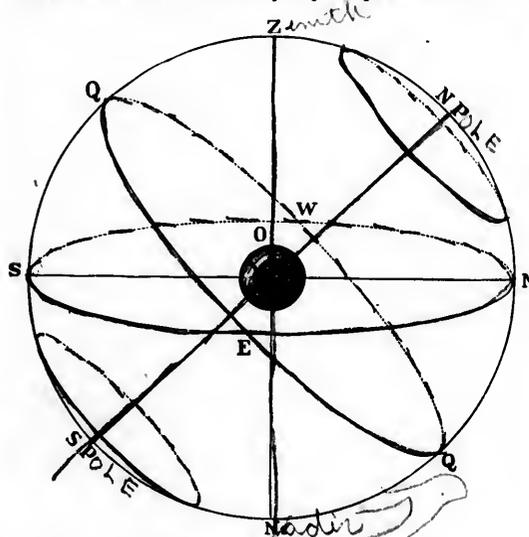


FIG. 33. The celestial sphere at the latitude of Toronto.

others have long passed the highest temperature stage and are gradually cooling and contracting. Doubtless many of these which have reached the condition of our sun are accompanied

part of its orbit furthest from the sun it is said to be in **aphelion**. These planets all revolve about the sun in the same direction, and the planes of their orbits almost coincide with the plane of the earth's orbit. If the planes of these planetary orbits be projected to meet the celestial sphere, a belt about sixteen degrees wide will be formed in the heavens bounded by the extreme circumferences of these planes. Along the belt and separated by intervals of about 30 degrees there are twelve constellations which, from their fancied resemblance to animals, have given to it the name of **Zodiac**.

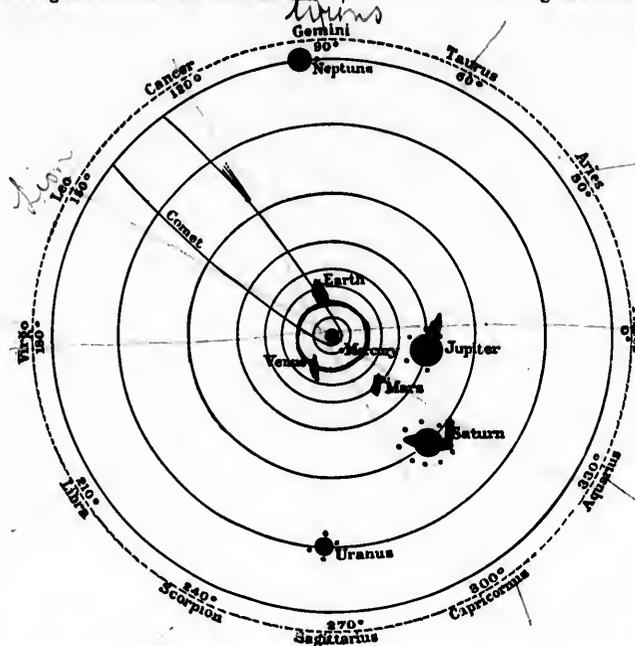


FIG. 34. Relative directions of planets from the sun, Jan. 1st, 1904. The outer circle represents the Zodiac; the inner circles the orbit of the different planets, etc.

The following table gives in a concise form other facts concerning the planets:—

Names of Planets.	Diam. in English Miles.	Distance from Sun in Miles.	Revolution in years or days.	Rotation in days and hours.	Number of Satellites.
Mercury ..	2,992	36,000,000	88 dys.	24 hrs.	0
Venus ....	7,660	66,134,000	225 dys.	24 hrs.	0
Earth ....	7,918	92,750,000	365½ dys.	24 hrs.	1
Mars .....	4,200	141,000,000	687 dys.	24½ hrs.	2
Jupiter ...	90,000	483,000,000	12 yrs.	10 hrs.	6
Saturn ....	73,700	886,000,000	29½ yrs.	10½ hrs.	9
Uranus ...	32,000	1,782,000,000	84 yrs.	....	4
Neptune ..	37,000	2,790,000,000	165 yrs.	....	1

NOTE.—The above figures are in some cases only approximately correct.

**The Earth as a Planet.**

**Shape of the Earth.**—The earth in shape approximates the sphere. That this is the case is well attested by the following:—

1. When a view is taken of a portion of the earth's surface, from any elevation above it, the horizon or sky-line is always the arc of a circle with the observer at its centre. If the observer's elevation be increased, the horizon becomes an arc of a greater circle—that is, the higher the elevation the greater the distance seen on the earth's surface. This fact is compatible only with the earth's being spherical or nearly so.

2. The shape of the earth's shadow on the moon during a lunar eclipse is always circular no matter in what position the earth may be with regard to the sun. Only a sphere under these conditions could cast such a shadow.

3. To an observer at the equator the north pole star appears at the horizon, but as he travels northward this star gradually ascends the heavens till at the north pole it appears directly overhead.

4. The sun does not rise or set at the same time for all places situated in the same latitude. When it is 8 a.m. in Halifax it is 12 noon in London, England, and 4 a.m. at Vancouver. If the earth's surface were a plane this difference of time could not occur.

5. By means of railway and steamship one can go around the earth. Starting from Montreal and holding generally in either an eastwardly or westwardly direction, one will return again to the same place. This could not occur if the earth were not spherical.

As has been stated above, the earth is not a perfect sphere. The lengths of the equatorial and polar diameters of the earth are not the same, the polar diameter being the shorter. This indicates a flattening of the planet at the poles. On this account the earth is said to be an **oblate spheroid**. That the earth is flattened at the poles is fully attested by the following facts:—

1. As one approaches either pole from the equator continuously along any meridian it is found that the length of a degree in the polar regions is greater than the length of a degree in equatorial regions. This can be accounted for only on the assumption that the degree in polar regions is there the arc of a greater circle, and hence the curve is more gradual and the surface consequently flatter.



FIG. 35. Effect of rotation on a plastic body.

2. If the polar diameter of the earth be less than the equatorial diameter then the force of gravity should increase from the equator to the poles. This has been found to be the case, for a body weighs more within the arctic circle than at the equator.

By actual measurement the length of a degree at the equator has been found to be 68.69 miles, and near the pole 69.38 miles, from which the length of the equatorial and polar diameters are found to be respectively 7920.6 miles, and 7899.6 miles. The equatorial diameter is thus 27 miles longer than the polar diameter.

The flattening of the earth's surface in polar regions, and the bulging out in the equatorial are evidently due to the earth's rotation on its axis when in a plastic state. This process is easily illustrated by means of apparatus represented in Figure 34. This consists of a number of elastic hoops of steel joined at the top and bottom to rings free to move up and down the rod which forms their axis. When these hoops are made to rotate very fast, the rings approach each other, and the rapidly rotating hoops assume the form of an ellipsoid.

**LATITUDE AND LONGITUDE.**—For convenience in locating places on the earth, imaginary lines and points are given position on its surface. The earth rotates about its polar diameter. This is therefore called its axis. The ends of this axis are called respectively the North Pole and the South Pole. Midway between the poles a circle is drawn passing around the earth. This is termed the **Equator**, and all places situated on this circle are midway between the Poles. Circles north and south of the equator and parallel with it are called **Parallels of Latitude**, and are used for reckoning distances north or south of the equator. These circles are gradually smaller as they approach the poles at which they become mere points. The equator or longest parallel of latitude is marked  $0^\circ$ , and those which pass through the poles  $90^\circ$ .

Now if only the latitude of a place is given we know its distance north or south of the equator; but we cannot tell at what point in this latitude the place may be. In order to determine this, other lines are drawn from pole to pole, cutting the equator at right angles. These are called **Lines of Longitude** or **Meridians**. They pass around the earth through the poles, and are used for calculating distances east or west of a certain line called the **First Meridian**. Any country may have its own first meridian. That for the whole of the British Empire is the meridian which passes through Greenwich, England. On maps this is always marked  $0^\circ$ . Other meridians east and west of this are marked from  $0^\circ$  to  $180^\circ$ . Degrees of latitude may be taken as equal to 69 miles in any longitude; but the degrees of latitude decrease in length as they approach the pole, till at the poles they become nothing. A degree of longitude at the equator is about 69 miles, but at the latitude of Toronto it is only 50.114 miles.

**Rotation of the Earth.**—The rising in the east of the sun, and the moon and the planets, their setting in the west, and the daily motion of the stars about the celestial poles point to one of two things. Either these bodies, separated widely, and at various distances from the earth, move around in unison, and in the same time—24 hours—or the earth rotates on its axis in a direction opposite to that in which the heavenly bodies appear to move.

There are several strong reasons for inclining to the latter

view. (1) It is only by assuming that the earth rotates on its axis that we are enabled to explain the fact that the earth is an oblate spheroid. (2) If a small weight be dropped into a very deep shaft or from a high eminence, it is found from numerous experiments that it will always fall a little east of perpendicular from the top to the bottom. In order that this may take place the point from which the weight falls must move faster than the point perpendicularly under it. This must be the case if the earth rotates on its axis from west to east.

**Day and Night.**—If the earth remained still, the hemisphere turned towards the sun would be always lighted up while the other one would be in constant darkness. But we have shown that the earth rotates on its axis once every twenty-four hours. The result of this is, that in each rotation each hemisphere receives the sunlight and passes on into darkness. In this way, we have day and night.

**Revolution of the Earth about the Sun.**—If at a certain time the sun is observed, by means of a telescope, to be in conjunction with a fixed star, it is found that at the end of twenty-four hours it will appear one degree to the east of this star, and at the end of another twenty-four hours two degrees to the east and so on, each twenty-four hours bringing it one degree farther east of the star, till at the end of a year it will have completed the circle in the heavens. This may be accounted for in two ways, either by supposing that the sun moves about the earth or that the earth moves about the sun. Astronomers have proved conclusively that the latter is the case. Thus the earth has a motion around the sun which requires about 365½ days for its completion.

The path which the earth takes in its annual motion around the sun, is nearly but not quite a circle. It is really an ellipse with the sun occupying one of the foci. This being the case it will readily be seen that, in its motion, the earth will be nearer the sun at some times than at others. When nearest the sun the earth is said to be in **perihelion**, and when farthest away in **aphelion**. The earth is in perihelion on January 1st, and in aphelion on July 1st.

**Inclination of the Earth's Axis.**—Instead of the earth's axis being upright during the revolution about the sun it is inclined at an angle of  $23\frac{1}{2}$  degrees to a line which is perpendicular to the plane of the earth's orbit. And since the axis always points to the same point in the heavens, very near the Pole Star, its direction at any one time is always parallel to its direction at every other time.

**The Seasons: Length of Day and Night.**—If the earth's axis were perpendicular to the plane of its orbit, then the sun's rays would strike vertically on some part of the equator at all times, with equal day and night as a result all over the globe. Besides, since the amount of heat received by any one part of the earth would be constant, there could be no variations in the seasons for that part. But in consequence of the inclination of the earth's axis, the sun's heat is more unequally distributed and, for all places, varies at different times of the year, giving rise to the seasons.

**Autumnal Equinox.**—Fig. 36 shows the earth in various positions with reference to the sun throughout one revolution. It will be seen that one half the earth's surface, at all times, is turned towards the sun. In 1 of this Figure the sun's rays fall perpendicularly on the equator, thus giving equal day and

night all over the earth. This period is called the **Autumnal Equinox**. It occurs on September 23rd. This is the season of



FIG. 36. Illustrating the seasons and the different lengths of day and night.

autumn for the Northern Hemisphere. The sun then appears projected on the celestial sphere in the zodiacal sign, Libra.

**Winter Solstice.**—Number 2 represents the position of the earth after three months have passed. In this position the sun's rays shine perpendicularly on a circle of latitude  $23\frac{1}{2}$  degrees south of the equator, called the Tropic of Capricorn, from the sign of the Zodiac which the sun enters at this time. This is the farthest point south at which the sun appears directly overhead, and a line indicating this is called a Tropic because the sun here appears to turn north again. The circle of illumination or the line separating the light from the darkness, falls short of the north pole by  $23\frac{1}{2}$  degrees; but beyond the south pole  $23\frac{1}{2}$  degrees. These limits of illumination are respectively marked by the Arctic Circle and the Antarctic Circle. All places within the Arctic Circle are then in darkness, while all places within the latter circle are in constant sunlight. Since, at this period, more than half the Southern Hemisphere is lighted by the sun, all places between the equator and the Antarctic Circle will have longer days than nights, while because of opposite conditions in the Northern Hemisphere, all places between the equator and the Arctic Circle will have longer nights than days. This is the Winter Solstice, December 21st, when the sun appears to stand still before turning north again. The season is mid-winter for the Northern Hemisphere, and mid-summer for the Southern.

**Vernal Equinox.**—Number 3 represents the position of the earth after another three months have passed. It is now March 21st, and the sun is again vertically over the equator. Equal days and nights are now experienced by all places on the earth. It is the Vernal Equinox. Spring has now begun in the Northern Hemisphere, and Autumn in the Southern.

**Summer Solstice.**—Number 4 represents the position of the earth after still another three months have passed. Now the sun shines perpendicularly on a parallel  $23\frac{1}{2}$  degrees north of the equator. This parallel is called the Tropic of Cancer, because at this time the sun enters the sign known by that name. This tropic represents the furthest point north at which the sun appears directly overhead. In this position the circle of illumination falls beyond the north pole  $23\frac{1}{2}$  degrees, while it

falls short of the south pole the same distance. All places within the Arctic Circle are then in continuous sunlight, while all points within the Antarctic Circle are in constant darkness.

At this period all places north of the equator will have longer days than nights, while south of the equator all places will have longer nights than days. This is the Summer Solstice, June 21st, when it will be mid-winter in the Southern Hemisphere, and mid-summer in the Northern Hemisphere.

**Kinds of Years.**—The Sidereal Year is the interval elapsing between the time of the sun appearing in a direct line between the earth and a fixed star, and its return to the same position relative to these two bodies. Its length, which is the exact time required for the earth to revolve around the sun, is 365 days 6 hrs. 9 min. and 9 sec. The Tropical or Equinoctial Year is the time required for the sun to pass from one vernal equinox to the next succeeding one. But the Tropical Year is shorter than the Sidereal Year by 20 minutes. This is owing to the gradual shifting of the Equatorial Plane and the consequent advance of the Vernal Equinox, each year, along the Ecliptic to meet the sun. Its length is about 365 days. The Civil year consists of 365 days, the fractional part of the tropical year being dropped because of the inconvenience attendant on its use in the ordinary affairs of life. The difference between these years is made up by setting apart every fourth year as a Leap Year, consisting of 366 days. But since the difference in the lengths of the Tropical and the Civil year does not amount to quite a quarter of a day, this adding of one day in every four years is a little too much. To rectify this excess the century years that are not divisible by 400 are not considered leap years. Thus the years 1000 and 1900 are not leap years, but the years 2000 and 2400 will be leap years.

**ZONES OF CLIMATE.**—The amount of heat received at any place on the earth's surface is determined mainly by two factors, the altitude of the sun at that place, and the length of the day. The heat of the sun's rays when they strike perpendicularly is much greater than when they strike obliquely. When the days are long the amount of heat absorbed by the earth is greater than that given off during the short nights, and the general temperature will be higher; but when the days are short and the nights long the amount of heat radiated at night will be greater than the amount received during the day, and there will be a general lowering of the temperature. This seasonal variation in temperature will be greatest between the tropics and the poles.

In conformity with this unequal distribution of heat from these causes, geographers have divided the earth's surface into five Zones or belts. The **Torrid Zone** is bounded by the Tropic of Cancer on the north and the Tropic of Capricorn on the south. The sun's rays are always vertical somewhere within this, and consequently the temperature will be high throughout the year. The **North Frigid** and the **South Frigid Zones** are respectively within the Arctic and Antarctic Circles. The temperature in both of these zones is generally very low. The belts between the polar circles and the tropics are called respectively the **North Temperate** and **South Temperate Zones** (pp. 23-25).

**MEASUREMENT OF TIME.**—The fundamental unit for the measurement of time is the day. Subdivisions of this unit are

hours, minutes, or seconds, and its multiples the week, the month, and the year.

**The Solar Day.**—The Solar Day is the length of time elapsing between the instant the sun appears on any meridian and the instant it returns to the same meridian. The length of the Solar Day, however, is not constant, for the earth when in perihelion moves faster in its orbit than when in aphelion. This renders the solar day shorter at or near perihelion, and longer at or near aphelion. Therefore, to obtain a satisfactory measure of time, the average of all the solar days in the year is taken, and this is called the **Mean Solar Day**. It is divided into 24 hours. Our clocks and watches keep mean solar time. Accordingly, they will not always represent the true noon, but will generally be a little too fast or too slow. This difference between true solar time and mean solar time, or clock time, is called the **equation of time**. This equation of time is calculated by astronomers for every day in the year, and published in *The Nautical Almanac* for the use of mariners.

To find the mean solar noon of any place the true noon is found by means of the transit telescope, and this time, with the equation of time added to it or subtracted from it, will give the local noon.

**Standard Time.**—Some countries have adopted what is called Standard Time. In such cases the country is marked off into regions fifteen degrees wide from east to west, and the time for all places within each succeeding western region is one hour later than the time for the region immediately to the east of it. In Canada and the United States there are five such time belts and therefore five such Standard times.

When it is 12 noon, Greenwich or 1st Meridian time			
it is 8 a.m., Atlantic	"	60th	" "
it is 7 a.m., Eastern	"	75th	" "
it is 6 a.m., Central	"	90th	" "
it is 5 a.m., Mountain	"	105th	" "
it is 4 a.m., Pacific	"	120th	" "

A glance at the map on pages 40-41 will show these time belts. It will also be seen that the boundaries of these belts are not parallel with the meridians; but they take a zig-zag course because of the location of cities or to suit the convenience of railroads.

**To Find the Latitude of any Place.**—If a person standing at the equator looks due north he will see the North Star just on the horizon. If he travels northwards 30 degrees the North Star will appear at an angle of 30 degrees above the horizon. At 45 degrees north of the Equator, the North Star will appear at an angle of 45 degrees above the horizon. At the Pole the North Star will appear just overhead or at an angle of 90 degrees above the horizon. Now if these distances in degrees from the Equator be compared with the respective angular distances of the North Star above the horizon they will be found to be identical. Hence, to find the latitude of any place we have only to measure the angle which a line from the observer to the North Star makes with the horizon, and the measure of this angle will be the measure of the distance, in degrees, of the place from the Equator.

**To Find the Longitude of a Place.**—Longitude is the distance east or west of a selected First Meridian, and is measured in degrees. As the earth rotates through 360 degrees in 24 hours, it will turn through 15 degrees in one hour. Therefore a

difference of 15 degrees between two places on the earth will cause a difference of one hour in their times. The first meridian, adopted by most countries, is that which passes through the Observatory at Greenwich, England. To find the longitude of any place we must know the difference between the mean solar time of Greenwich, and that of the place whose longitude we wish to determine. For each hour's difference in time there is a difference of 15 degrees in longitude. If the local time be faster than Greenwich time then the place is in east longitude; but, if the time be slower, it is in west longitude. Suppose Greenwich time is 1 p.m., and local time is 6.20 a.m., then the time of the place being slower than that of Greenwich by six hours and forty minutes shows it to be situated in west longitude 100°.

At sea Greenwich time is kept by the ship's chronometer. Local time is ascertained by observing the sun's meridian passage, which will give true solar noon; then by using the equation of time mean noon is observed. Thus having now both Greenwich mean solar time and that of the place whose position is required, the longitude can readily be determined.

**Adding and Dropping a Day.**—It is evident that, in sailing westward around the world, mariners lose a day in making the circumnavigation; while in sailing eastward they gain a day. In order to correct this error in their time, in the former case they must at some point add a day to their reckoning, making the date twenty-four hours later, and in the latter case drop a day.

### The Moon.

The moon is a satellite accompanying the earth in its revolution about the sun. It is spherical in shape, and is 240,000 miles distant from the earth. It is small in comparison with the earth, being only 2,150 miles in diameter.

**Revolution of the Moon.**—Each month the moon makes a complete circuit about the earth. At sundown, at a certain time of the month, the moon appears as a small, crescent-shaped body near the western horizon; on each succeeding evening at the same time it appears farther east, or higher in the heavens and with a larger portion of its surface illuminated, till at the end of the half month its whole hemisphere in the direction of the earth is lighted up. This is the full moon. It still continues on its eastern journey, rising later to our view, and gradually waning, till it appears as new moon in the position first mentioned above. The time required for this complete revolution from new moon to new moon is 29½ days.

The orbit of the moon's revolution is an ellipse. This being the case the moon is at some points in its course nearer the earth than at others. When in that part of its orbit nearest the earth it is said to be in **perigee**, and when farthest from the earth in **apogee**.

**Kinds of Months.**—The time required for the moon to complete its revolution about the earth, relative to a fixed star, is 27½ days; but the time required for it to revolve from a position relative to the earth and the sun to that same relative position is 29½ days. This difference is accounted for by the fact that during the time that the moon is revolving about the earth, the earth is also moving forward in its orbit about the sun, so that in order for the moon to occupy the same relative position to sun and earth, it must revolve some distance farther, thus requiring nearly two days extra.

on the earth  
times. The first  
at which passes  
nd. To find the  
fference between  
the place whose  
ur's difference in  
ngitude. If the  
a the place is in  
n west longitude.  
cal time is 6.20  
er than that of  
we it to be situ-

's chronometer.  
's meridian pas-  
using the equa-  
aving now both  
lace whose posi-  
etermined.

t, in sailing west-  
in making the  
hey gain a day.  
the former case  
ckoning, making  
latter case drop

th in its revolu-  
, and is 240,000  
parison with the

on makes a com-  
a certain time of  
ent-shaped body  
evening at the  
the heavens and  
, till at the end  
direction of the  
t still continues  
v, and gradually  
sition first men-  
plete revolution

ee. This being  
nearer the earth  
nearest the earth  
om the earth in

moon to com-  
a fixed star, is  
ve from a posi-  
ne relative posi-  
for by the fact  
about the earth,  
about the sun,  
ne relative posi-  
istance farther,

The time required for the moon to move from a position relative to a star to the same position again is called the **sidereal month**. This is equal to 27.32 days. The time between new moon and new moon, or the time occupied by the moon in revolving from a position relative to the sun to the same position again, is a **synodic month**. This latter month varies in its length on account of the varying speed of the earth about the sun; the average length of the synodic month is 29.53 days. This average synodic month is called the **Lunar month**. The **Calendar month** is the one recognized in ordinary life, and varies in its number of days, some calendar months containing 30 days, others containing 31 days, and one 28.

**Phases of the Moon.**—In its revolution about the earth the moon assumes various appearances, as the crescent shape, the half



FIG. 37. Phases of the moon. The sun shines from the right.

moon and the full moon. These various appearances are called its **phases**. The moon is an opaque body reflecting the light of the sun. It is evident that one-half of its surface will be illuminated at all times, but not all of this illuminated half is turned towards the earth. At new moon but the smallest rim of the hemisphere reflecting the sun's light is visible to the earth, while at full moon there is visible the whole of its illuminated hemisphere. Fig. 37 will assist to an understanding of the various phases of the moon. The earth is represented in the centre of the circle with one-half of its surface lighted by the sun to the right. The line marked by arrows shows the orbit of the moon about the earth. On the orbit line at various points is shown the moon with that hemisphere which is turned towards the sun illuminated, while outside each of these is represented the moon with only that portion of the illuminated hemisphere marked light, which is towards the earth. At A the moon is nearly between the sun and the earth, its lighted hemisphere being turned wholly from the earth. This is **new moon**. At E about one-fourth of the illuminated surface is visible. At C one-half of its lighted surface is visible, and the moon here is in its **first quarter**. At B all of its illuminated surface is visible, and the moon is said to be at its full. At D it is in its **third quarter**.

**Rotation of the Moon.**—Like the earth the moon has two motions. Besides revolving about the earth it also rotates on

its axis. That the latter is the case is evidenced by the fact that throughout its varying phases, and throughout the years its visible surface markings are always the same. This fact can be accounted for only on the assumption that the moon rotates on its axis in the same time and in the same direction as the earth, thus keeping the same face of the moon towards the earth.

**Eclipses.**—The source of light for the members of the solar system is the sun, from which the light radiates in straight lines. An opaque body like the moon or the earth, intercepts some of these light rays, and casts into space a long conical shadow. When another body enters this shadow it is said to be eclipsed.

The eclipse of the moon is caused by the passage of the earth, in its orbit, between the sun and the moon. The eclipse of the sun is caused by the moon, in its orbit, coming between the sun and the earth. In the eclipse of the moon the shadow of the earth is thrown on the surface of the moon; in the eclipse of the sun the shadow of the moon is cast on the earth.

The only time an eclipse can occur is when the plane of the moon's orbit coincides with the plane of the earth's orbit. If these coincidences were continuous then there would be an eclipse at every new moon, and at every full moon. But this is not the case. The plane of the moon's orbit is inclined to that of the earth's orbit at an angle of five degrees, and therefore one-half of the moon's revolution is performed above the plane of the earth's orbit, and the other half below it. This being true there are but two points in the moon's revolution where these planes intersect. These points are called **nodes**. If new or full moon occurs at these nodes there will be in the first case an eclipse of the sun, and in the second an eclipse of the moon.

In Figure 38 S represents the sun; M and M<sub>1</sub> the moon; E the earth; and the dotted lines from the sun represent the rays of light. The dark cone-shaped shadow, U, which the moon or earth casts, and where no light falls, is called the **umbra**, while the fainter shadow, P, where some light is received, is called the **penumbra**.

**Eclipse of the Moon.**—The eclipse of the moon may be either total or partial. In the total eclipse the whole of the moon passes into the umbra; but its surface is never wholly obscured. It presents a dark reddish appearance, due to the sun's light reflected to it from the earth. The partial eclipse of the moon takes place when the moon is not quite at the node

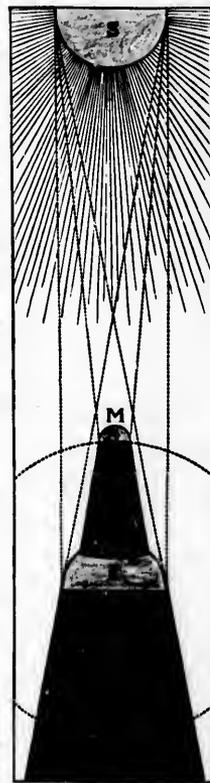


FIG. 38. Eclipses of the sun and moon.

during new or full moon. In this case all the moon's surface does not pass into the umbra of the earth. The extent of the eclipse will depend on the distance the moon is from the node.

**Eclipse of the Sun.**—This eclipse is caused by the moon coming directly between the sun and the earth. By reference to Fig. 38 it will be seen that the length of the umbra cone depends on the distance the moon is from the earth. When, at solar eclipse time, the moon is in perigee, its shadow cone reaches the earth and causes a total eclipse of the sun. In this case the area of the earth's surface under the umbra cannot be large, but that under the penumbra, where the eclipse is necessarily only partial, is considerably larger. Since the moon's shadow passes over the earth at a great speed the period of total eclipse at any point on the earth is very short, varying from a few seconds to seven minutes.

When the moon is in apogee at the period of solar eclipse the shadow cast is not sufficiently long to reach the earth, and as a result the sun is only partially eclipsed, the moon appearing as a dark body within the disk of the sun.

**Physical Features of the Moon.**—To the unaided eye the moon presents the appearance of light and dark patches. Through the aid of the telescope these dark patches are shown to be dark plains or dried-up sea bottoms, while the lighter portions are mountain ridges which reflect the light so much better than the plains, which are lower and somewhat in the shadow. There are many depressions over the moon's surface. These are extinct volcanic craters of prodigious size, some of them measuring as much as 60 miles across, and having walls as high as some of our tallest mountains. When the moon passes between the earth and a star, the star disappears instantly, showing quite conclusively that there is no atmospheric medium to refract the light rays as they pass to us from the star. There is also an entire absence of clouds of any kind. From these facts the conclusion that there is no water on the moon's surface is quite warranted, for if water were present then an atmosphere of water vapor would result.

**Temperature of the Moon's Surface.**—Since the moon, in its rotation, moves very slowly, its illuminated and darkened hemispheres must present very wide differences in temperature, and since there is no atmosphere to prevent or modify the rapid radiation of heat from its surface, the hemisphere turned from the sun must experience a temperature much lower than we can experience on the earth.

### The Sun.

The sun is by far the most conspicuous body in the heavens. It is 93,000,000 miles distant from us. The diameter is 110 times the diameter of the earth. Its composition is somewhat similar to that of the earth, but its density, owing to its superheated condition, is less than that of the earth.

The very dazzling white surface is called its **Photosphere**. The telescope reveals it as granulated or fleecy-like, probably caused by clouds of incandescent vapors. Around the edge of the photosphere are seen during a total eclipse of the sun, red-colored projections resembling tongues of flame. These originate in a shallow outer envelope called the **Chromosphere**. Outside the chromosphere, and seen only during a total eclipse, is an envelope appearing like a halo of soft light. This is called the

**Corona**. Scientists suppose it to be composed of exceedingly small particles of matter thrown off from the sun with sufficient

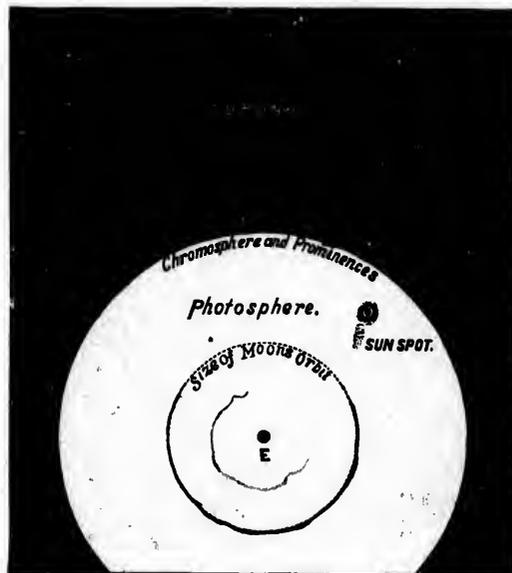


FIG. 39. The Sun.

velocity to carry them immense distances from the sun's photosphere.

**Sun Spots.**—Periodically there appear numbers of great rents or chasms in the incandescent matter of the photosphere. These are called **sun spots**, and they may often be seen by looking at the sun through a piece of smoked glass. They seem to change both in size and form within the space of a few days. Some of these spots are of enormous size, the umbra or dark centre measuring as much as 50,000 miles across.

These sun spots when they occur in great numbers are usually paralleled by great disturbances in our atmosphere, particularly of a magnetic nature, but any other relationship between them than that of coincidence has not yet been established.

**Solar Heat and its Source.**—The sun has been for long ages the source of light and heat to the other bodies of the solar system, and yet the supply of its energy seems exhaustless. Several theories have been propounded to account for this. The theory that combustion is the source of this great energy has been discarded on the ground that no fire could last so long. Another theory, viz:—that this energy is due to the "cooling of the sun's mass from an original state of incandescence" is also discarded on the ground that such a source as this would have been exhausted long ago. The theory propounded by Helmholtz is now the one generally accepted. Lord Kelvin expresses it as follows:—"At some period of time, long past, the sun's initial heat was generated by the collision of pieces of matter gravitationally attracted together from distant space, to build up his present mass; and shrinkage, due to cooling, gives through the work done by mutual gravitation of all parts of the shrinking

mass, the vast heat storage capacity, in virtue of which the cooling has been and continues to be, so slow."

### Comets and Meteors.

In addition to the members of the solar system thus far considered, there are other bodies known as **Comets and Meteors**.

**Comets.**—Comets are believed to be masses of finely-divided meteoric matter. Their density is very low, for stars are sometimes seen through them without suffering much diminution in the intensity of their light. A comet has two distinct parts, known as the head and the tail. In some the latter is not visible, while in others it is millions of miles in length. This tail is always turned from the sun, and seems to increase in length as the velocity of the comet increases.

The orbits of comets are quite different from those of other

brightly for a second or two. But if the mass of the meteor be such as to be not altogether vaporized, then the remainder falls to the earth in the solid form known as a **meteorite**.

Meteors move in orbits somewhat similar to those of the comets, with the sun as a focus. Sometimes these meteors move in their orbits in swarms, and when the earth's orbit intersects the orbit of such a group **meteoric showers** result. These occur quite frequently.

**Nebulae.**—In addition to the various classes of heavenly bodies thus far spoken of, the telescope reveals the presence of vast patches of luminous matter in a very diffused form. Because of their resemblance to faint clouds they are called **Nebulae**. Their nature is not definitely understood. By some they are regarded as masses of elementary gases at high temperature; by others as swarms of meteorites at a low temperature, the heat generated through their colliding with one another being sufficient to vaporize portions of them, and thereby render them luminous.

### Nebular Hypothesis.

There are very remarkable features in the solar system which point unmistakably to a common origin of the different bodies which it contains. The planets, large and small, to the number of more than two hundred, perform their revolution about the sun in the same direction; all the great planets and many of the smaller ones have their orbits very nearly in the same plane and nearly circular in form; and these planets, as far as can be observed, rotate on their axis in the same manner.

The Nebular theory steps in and offers an explanation of this remarkable uniformity. Towards the end of the eighteenth century the French astronomer, **La Place**, gave to the world his great nebular hypothesis, by which he attempted to account for the origin of the Solar System. He supposed that in the distant past the sun and the planets existed as a vast nebulous mass of intensely heated gases, filling all the space now occupied by the system.

A cooling and contraction of the mass set in, and the whole took on a whirling motion. Owing to gravitation among the particles, contraction towards the centre continued, and the velocity of rotation increased until the centrifugal force, becoming greater than that of gravity, gaseous rings were thrown off from the outer portion of the mass. These rings in course of time condensed and formed the planets, while the central mass formed the sun. Some of the planets, owing to their rapid whirling motion, also threw off rings, which through condensation formed secondary planets or satellites. In the case of the planet Saturn some of these rings still persist. According to this theory the planets farthest removed from the sun are the oldest. The different physical conditions of the planets depend upon the extent to which cooling and contraction have gone on. Jupiter and Saturn are probably but little removed from a state of incandescence; the Earth, and probably Mars, give out but a small quantity of heat; while the Moon is a body in which the cooling process is in the most advanced stage.



FIG. 40. Donati's Comet 1858.

members of the solar system. The orbit of the earth is almost a circle, as are those of the more important planets; but the orbits of comets are very elongated. They are either elliptical or parabolic. In either case when once they have compassed the sun in their circuit, or approached nearest to it, they are carried in their orbits far away from the path of the earth to return, if ever, only after long periods.

**Meteors.**—Meteors are more frequently known as Shooting Stars. They may be seen on any cloudless night when the moon is not visible. They are small masses of matter very similar in composition to our earth. They sweep through space at an enormous speed, and when they chance to come into contact with our atmosphere, their velocity is retarded by friction with the particles of air, and as a result they are heated to an intensity which is sufficient to vaporize them. This frequently accounts for their sudden disappearance after glowing

# SIZE AND POPULATION.

AREA AND POPULATION.		ASIA.—Con.		BRITISH EMPIRE.—Con.				
	Area in Sq. Miles	Population.	Area in Sq. Miles.	Population.	Area in Sq. Miles.	Population.		
Pacific Ocean	71,000,000		Siam	200,000	6,320,000	Hong Kong	30	259,310
Atlantic "	34,000,000		Nepal	54,000	3,000,000	Labuan	30	5,853
Indian "	28,000,000		Baluchistan	130,000	500,000	Straits Settlements	1,543	604,916
Antarctic	7,500,000		Afghanistan	215,000	4,000,000			
Arctic	4,000,000		Persia	628,000	9,000,000			
North America	8,800,000	100,000,000	Turkey in Asia	650,000	16,800,000			
South America	7,000,000	40,000,000	Oman	82,000	1,500,000			
Europe	3,800,000	374,000,000						
Asia	17,000,000	831,000,000	<b>AFRICA—</b>					
Africa	11,500,000	170,000,000	Morocco	219,000	8,000,000	Ascension	35	430
Australia	3,000,000	4,604,000	Algeria	184,000	4,824,000	Basutoland	10,293	250,000
			Tunis	50,840	1,906,000	Cape Colony	279,800	2,265,500
			Tripoli	398,000	1,300,000	B. Central Africa	251,000	650,000
			Egypt	400,000	9,734,000	B. South Africa	174,000	450,000
			British-Egyptian Sudan	950,000	10,000,000	Mauritius	705	377,850
			Sahara	1,750,000	2,800,000	Natal	34,700	828,500
			French West Africa	650,000	5,000,000	Gambia	2,700	96,400
			Niger Territories	500,000	20,000,000	Gold Coast	40,000	1,500,000
			Liberia	14,360	1,000,000	Lagos, Yorouba	1,560	3,000,000
			Kamerun	191,130	3,500,000	Sierra Leone	30,000	127,000
			French Congo	496,000	10,000,000			
			Congo Free State	900,000	14,000,000	<b>Total, African</b>	<b>821,733</b>	<b>9,539,680</b>
			Portuguese West Africa	484,000	4,000,000			
			German South-West Africa	322,000	200,000	<b>AMERICA—</b>		
			Transvaal Colony	113,139	867,000	Burmudas	20	17,500
			Orange River Colony	48,326	207,000	Canada	3,653,946	5,371,046
			British East Africa	1,000,000	3,000,000	Falkland Islands, etc	7,500	2,060
			German East Africa	384,000	6,100,000	British Guiana	109,000	294,000
			Abyssinia	150,000	3,500,000	British Honduras	7,562	37,400
			Madagascar	227,000	2,244,000	Newfoundland and Labrador	162,200	224,000
						Bahamas	4,466	53,735
						Jamaica	4,193	742,942
						Turk's Island	166	5,355
						Barbados	166	191,000
						Leeward Islands	701	127,800
						Windward Islands	784	158,000
						Trinidad and Tobago	1,868	270,000
						<b>Total American</b>	<b>3,952,672</b>	<b>7,494,828</b>
						<b>AUSTRALASIA.—</b>		
						New South Wales	310,700	1,366,408
						Queensland	668,497	498,249
						South Australia	903,690	362,604
						Tasmania	26,385	172,475
						Victoria	87,884	1,200,914
						Western Australia	975,920	187,680
						New Zealand	104,471	815,820
						Islands, Fiji, etc.	22,467	325,190
						<b>Total, Australasia</b>	<b>3,100,014</b>	<b>4,929,320</b>
						<b>PROTECTORATES—</b>		
						Asia	120,400	1,200,000
						Africa	1,695,000	34,000,000
						Pacific		10,000
						<b>Total Protectorates</b>	<b>1,815,400</b>	<b>35,210,000</b>
						<b>Approximate Total, British Empire</b>	<b>11,740,000</b>	<b>396,105,700</b>

SIZE AND POPULATION.

AREA AND POPULATION OF CANADA.

Subdivisions.	Area in Sq. Miles.	Population in 1901.
<b>PROVINCES—</b>		
Ontario.....	222,000	2,182,942
Quebec.....	347,350	1,648,898
Nova Scotia...	20,600	459,574
New Brunswick	28,200	331,120
Prince Edward Island.....	2,000	103,259
Manitoba.....	73,956	254,947
British Columbia	383,300	178,657

<b>NORTH-WEST TERRITORIES—</b>		
Assiniboia Dis.	90,340	67,385
Saskatchewan "	114,000	25,879
Alberta "	100,000	65,876
Yukon "	198,300	27,219
Athabaska "	251,300	6,615
Mackenzie "	583,200	5,216
Ungava "	456,000	5,113
Keewatin Dis....	756,000	8,546
Franklin Dis....	Unknown	
Great Lakes and Rivers.....	47,400	
<b>Total for Canada..</b>	<b>3,653,946</b>	<b>5,371,046</b>

POPULATION OF CITIES.

Aberdeen, Scotland.....	153,000
Adelaide, Australia.....	160,000
Albany, N.Y., U.S.....	100,000
Alexandria, Egypt.....	320,000
Algiers, Algeria.....	92,000
Amsterdam, Netherlands.....	503,000
Antwerp, Belgium.....	271,000
Athens, Greece.....	112,000
Auckland, New Zealand.....	58,000
Bagdad, Turkey.....	145,000
Bahia, Brazil.....	175,000
Baltimore, Md., U.S.....	541,000
Bangkok, Siam.....	250,000
Barcelona, Spain.....	275,000
Batavia, Java.....	114,000
Belfast, Ireland.....	349,000
Belgrade, Servia.....	72,000
Berlin, Germany.....	1,884,000
Birmingham, England.....	522,000
Bloemfontein.....	6,000
Bogota, Colombia.....	120,000
Bombay, India.....	822,000
Bordeau, France.....	256,000
Boston, Mass., U.S.....	582,000
Breslau, Germany.....	373,000
Brisbane, Australia.....	93,000
Brussels, Belgium.....	551,000
Budapest, Austria-Hungary.....	648,000
Buenos Ayres, Argentina.....	753,000
Buffalo, N.Y., U.S.....	400,000
Bukharest, Rumania.....	232,000
Cairo, Egypt.....	570,000
Calcutta, India.....	1,121,000
Canton, China.....	2,000,000
Capetown, Cape Colony.....	83,000
Caracas, Venezuela.....	73,000
Cardiff, Wales.....	170,000
Charleston, S.C., U.S.....	68,000
Chicago, Ill., U.S.....	1,700,000
Christiana, Norway.....	151,000
Cincinnati, O., U.S.....	325,000
Cleveland, O., U.S.....	380,000
Cologne, Germany.....	321,000
Colombo, Ceylon.....	154,000
Constantinople, Turkey.....	800,000
Copenhagen, Denmark.....	375,000

Cork, Ireland.....	75,000
Damascus, Turkey.....	150,000
Delhi, India.....	193,000
Denver, Col., U.S.....	170,000
Detroit, Mich., U.S.....	350,000
Dresden, Germany.....	336,000
Dublin, Ireland.....	240,000
Edinburgh, Scotland.....	295,000
Fez, Morocco.....	140,000
Florence, Italy.....	210,000
Geneva, Switzerland.....	87,000
Genoa, Italy.....	228,000
Georgetown, British Guiana.....	53,000
Ghent, Belgium.....	161,000
Glasgow, Scotland.....	760,000
Greater London, England.....	6,400,000
Hague, Netherlands.....	198,000
Hamburg, Germany.....	625,000
Havana, Cuba.....	200,000
Hobart, Tasmania.....	35,000
Honolulu, Hawaii Islands.....	30,000
Hull, England.....	220,000
Jerusalem, Turkey.....	41,000
Johannesburg, South Africa.....	103,000
Kabul, Afghanistan.....	60,000
Kimberley, Cape Colony.....	29,000
London, England.....	4,536,000
Leeds, England.....	409,000
Leipzig, Germany.....	400,000
Lima, Peru.....	150,000
Lisbon, Portugal.....	301,000
Liverpool, England.....	685,000
Louisville, Ky., U.S.....	205,000
Lucknow, India.....	273,000
Lyons, France.....	466,000
Madras, India.....	453,000
Madrid, Spain.....	480,000
Manchester, England.....	544,000
Manila, Philippine Islands.....	154,000
Marseilles, France.....	442,000
Mecca, Turkey.....	60,000
Melbourne, Australia.....	494,000
Mexico, Mexico.....	344,000
Milan, Italy.....	470,000
Milwaukee, Wis., U.S.....	285,000
Minneapolis, Minn., U.S.....	203,000
Montevideo, Uruguay.....	250,000
Moscow, Russia.....	1,024,000
Munich, Germany.....	407,000
Naples, Italy.....	536,000
Newark, N.J., U.S.....	275,000
New Orleans, La., U.S.....	285,000
New York, N.Y., U.S.....	3,500,000
Nottingham, England.....	230,000
Odessa, Russia.....	405,000
Omaha, Neb., U.S.....	168,000
Oporto, Portugal.....	199,000
Osaka, Japan.....	1,311,000
Paris, France.....	2,537,000
Pekin, China.....	1,000,000
Philadelphia, Pa., U.S.....	1,294,000
Pittsburg, Pa., U.S.....	321,000
Portsmouth, England.....	179,000
Prague, Austria.....	184,000
Pretoria.....	14,000
Providence, R.I., U.S.....	166,000
Quito, Equador.....	80,000
Rangoon, Burma.....	180,000
Richmond, Va., U.S.....	105,000
Rio de Janeiro, Brazil.....	675,000
Rochester, N.Y., U.S.....	163,000
Rome, Italy.....	487,000
Rotterdam, Netherlands.....	298,000
St. Petersburg, Russia.....	1,267,000
St. Louis, Mo., U.S.....	576,000
St. Paul, Minn., U.S.....	163,000

POPULATION OF CITIES OF CANADA (1901).

<b>ONTARIO—</b>		
Belleville.....	9,117	
Brantford.....	16,619	
Chatham.....	9,068	
Guelph.....	11,496	
Hamilton.....	52,634	
Kingston.....	17,961	
London.....	37,981	
Ottawa.....	58,928	
St. Catharines.....	9,946	
St. Thomas.....	11,485	
Stratford.....	9,959	
Toronto.....	208,040	
Windsor.....	12,163	
<b>QUEBEC—</b>		
Hull.....	13,993	
Montreal.....	287,730	
Quebec.....	68,840	
St. Henri.....	21,192	
St. Hyacinthe.....	9,210	
Sherbrooke.....	11,765	
Three Rivers.....	9,981	
<b>NEW BRUNSWICK—</b>		
Fredericton.....	7,117	
Moncton.....	9,026	
St. John.....	40,711	
<b>NOVA SCOTIA—</b>		
Halifax.....	40,832	
<b>PRINCE EDWARD ISLAND—</b>		
Charlottetown.....	12,080	
<b>MANITOBA—</b>		
Winnipeg.....	42,340	
Brandon.....	5,380	
<b>BRITISH COLUMBIA—</b>		
Nanaimo.....	6,130	
Nelson.....	5,273	
New Westminster.....	6,499	
Rosland.....	6,159	
Vancouver.....	26,133	
Victoria.....	20,816	
<b>NORTH-WEST TERRITORIES—</b>		
Regina.....	2,645	
Calgary.....	4,163	
Edmonton.....	2,626	
<b>YUKON—</b>		
Dawson.....	9,142	

Population.  
259,310  
5,853  
604,916  
365,238,239

430  
250,000  
2,265,500  
650,000  
450,000  
377,850  
828,500  
90,400  
1,500,000  
3,000,000  
127,000  
9,539,680

17,500  
5,371,046  
2,060  
294,000  
37,400  
224,000  
53,735  
742,942  
5,355  
191,000  
127,800  
158,000  
270,000  
7,494,828

1,366,408  
498,249  
362,604  
172,475  
1,200,914  
187,660  
815,820  
325,180  
4,929,320

1,200,000  
4,000,000  
10,000  
5,210,000  
3,105,700

## SIZE AND POPULATION.

## TOWNS OF ONTARIO.

Barrie	5,949
Berlin	9,747
Brockville	8,940
Cobourg	4,239
Cornwall	6,704
Collingwood	5,755
Galt	7,866
Goderich	4,158
Ingersoll	4,573
Lindsay	7,003
Orillia	4,907
Oshawa	4,394
Owen Sound	8,776
Pembroke	5,156
Petrolia	4,135
Port Hope	4,188
Peterborough	11,239
Rat Portage	5,202
Sarnia	8,176
Sault Ste. Marie	7,169
Toronto Junction	6,091
Woodstock	8,833

## RIVERS AND RIVER BASINS.

River.	Area of Basin in Sq. Miles.	Length in Miles.
Amazon	2,500,000	4,000
Columbia	300,000	1,400
Danube	300,000	2,000
Ganges	450,000	1,800
Hoang	380,000	2,400
Indus	360,000	1,900
Kongo	1,500,000	3,000
Mackenzie	600,000	2,100
Mississippi	1,250,000	4,200
Nelson-Saskatchewan	470,000	2,000
Niger	1,000,000	2,600
Nile	1,300,000	4,000
Chi	1,100,000	3,000
Orinoco	300,000	1,500
Plata	1,200,000	2,400
St. Lawrence	350,000	2,000
Volga	590,000	2,300
Yangtse	790,000	3,100
Yenisei	1,500,000	3,000

## HEIGHTS OF MOUNTAINS AND PLATEAUS.

	Feet.
Abyssinian Highland	6,500
Aconcagua, Chile	23,000
Alps, Switzerland	8,500
Andes, South America	13,000
Appalachian Mts., U.S.	2,500
Atlas Mts., Africa	9,000
Australian Alps	5,000
Blanc, Mont	15,780
Bolivian Plateau	12,000
Brazilian Plateau	2,000
Caucasus Mts., Russia	10,000
Chimborazo Vol., Ecuador	21,000
Cotopaxi Vol., Ecuador	16,200
Etna Vol., Sicily	10,800
Everest Mt., Nepal	29,002
Hecla Vol., Iceland	5,000
Himalaya Mts., Asia	19,000
Hindu Kush Mts., Afghanistan	18,000
Iran Plateau, Persia	5,000
Kenia Mt., Africa	18,000
Kilimanjaro Mt., Africa	20,000
Kuenlun Mts., China	18,000
Logan Mt., Canada	19,500

Mauna Loa Vol., Hawaii	13,600
Mexican Plateau	7,500
Pike's Peak, U.S.	14,147
Popocatepetl, Mexico	17,784
Pyrenees Mts., Spain	8,000
Rocky Mts.	10,000
Sahama Vol., Bolivia	22,800
Sorata Mt., Bolivia	21,200
St. Elias Mt., Alaska	18,010
Thian Shan Mts., Asia	18,000
Tibet Plateau	15,000
Ural Mts., Russia	3,500
Vesuvius Vol., Italy	4,200
Washington Mt., N.H., U.S.	6,200

Length of earth's axis	7,900 miles.
Equatorial diameter	7,925 "
Length of equator	24,900 "
Length of a degree of latitude	69.4 "
Length of a degree of longitude at equator	69.4 "
Length of a degree of longitude in 10 degrees of latitude	68.4 "
Length of a degree of longitude in 20 degrees of latitude	65.2 "
Length of a degree of longitude in 30 degrees of latitude	60.1 "
Length of a degree of longitude in 40 degrees of latitude	53.2 "
Length of a degree of longitude in 45 degrees of latitude	49.1 "
Length of a degree of longitude in 50 degrees of latitude	44.6 "

## AGRICULTURAL PRODUCTS OF CANADA.

	Exported 1901.
Apples	\$ 1,674,120
Barley	1,123,055
Beans	418,161
Buckwheat	227,717
Hay	2,097,882
Oats	2,490,521
Peas	2,674,712
Rye	424,877
Wheat	6,871,939
Flour (wheat)	4,015,226
Total agricultural products	24,781,486

## ANIMALS OF CANADA AND THEIR PRODUCTS.

	Exported 1901.
Bacon	\$11,493,868
Butter	9,064,562
Eggs	20,696,951
Furs	3,295,663
Hams	1,691,640
Horses	1,645,831
Sheep	284,578
Wool	910,273
Total animals and their products	1,625,702
	186,540
	55,495,311

## PRODUCE OF CANADIAN MINES, 1901.

Asbestos	\$ 1,186,434
Coal	14,671,122
Copper	6,600,104
Gold	24,462,222
Gypsum	340,148
Iron Ore	1,212,113
Lead	2,199,787
Nickel	4,594,523
Silver	2,993,668

## PRODUCE OF CANADIAN FISHERIES, 1900.

Codfish	\$ 3,599,515
Herring	1,853,237
Lobsters	3,055,350
Salmon	3,993,217
Total of all kinds	21,557,639
Total exported	10,720,352

## PRODUCE OF FOREST.

	Exported in 1901.
Bark and Logs	\$ 1,235,962
Lumber	23,378,650
Square Timber	1,929,945
Total, Forest	30,009,857

## MANUFACTURED ARTICLES.

Total value exported in 1901	\$16,012,208
------------------------------	--------------

## TOTAL IMPORTS AND EXPORTS BY PROVINCES, 1901.

	Imports.	Exports.
Ontario	\$73,490,379	\$36,490,026
Quebec	76,716,290	93,540,609
Nova Scotia	12,148,882	12,720,343
New Brunswick	6,741,848	14,896,454
Prince Ed. Island	526,617	681,403
Manitoba	5,396,169	1,084,992
British Columbia	11,137,438	21,648,191
N. W. Territories	1,436,249	1,520,996
Yukon	2,823,633	13,914,676

## CANADA'S TRADE WITH DIFFERENT COUNTRIES, 1901.

Countries.	Imports from.	Exports to.
Great Britain	\$ 43,164,297	\$105,328,956
United States	119,306,775	72,382,230
Germany	6,679,264	2,141,562
France	5,503,405	1,581,331
Japan	1,620,868	188,683
Belgium	3,783,919	2,806,142
British West Indies	1,280,798	1,925,047

## TOTAL FOREIGN COMMERCE OF DIFFERENT COUNTRIES, 1900.

Countries.	Imports.	Exports.
Great Britain	\$2,545,633,460	\$1,724,618,396
Canada, 1901	181,237,988	177,431,386
Australia	336,371,255	353,614,230
New Zealand	51,811,001	64,464,650
India	312,369,161	379,729,485
Russia, 1899	334,155,067	322,085,733
German Empire, 1899	1,334,221,000	1,023,703,333
Holland, 1899	777,245,600	641,850,067
Belgium, 1899	439,995,333	379,463,733
France, 1899	879,562,400	808,372,800
United States, 1901	822,673,016	1,460,453,809
Argentina, '90	113,734,000	179,988,800

Pronunciation of some of the more difficult Geographical Names.

NOTE.—In the re-spelling of the names the following phonographical expedients are used:—a, as in *fate*, is represented by ay; a, as in *far*, by ah; a, as in *fat*, by a (unmarked); a, as in *fall*, by aw; e, as in *me*, by ee; e, as in *met*, and also e, as in *her*, by e (unmarked); mute e, as in *golden*, by e; i, as in *pine*, by ei; i, as in *pin*, by i (unmarked); o, as in *note*, by oh; o, as in *not*, by o (unmarked); o, as in *move*, by oo; u, as in *tube*, by ew; u, as in *tu*, by u (unmarked); y, as in *bull*, by uh. OI, ou, ch, g, j, s, and y, represent the same sounds as in *oil*, *pound*, *chain*, *go*, *job*, *so* and *pass*, and *yes*, respectively; zh represents the sound of a in *azure*; the French n (nearly like the sound of ng in *song*) is represented by n; and the Scotch and German ch (as in *loch*) is represented by ch; th as in *this* by th; th as in *this* by dh.

1891.  
\$ 1,186,434  
14,671,122  
5,600,104  
24,462,222  
340,148  
1,212,113  
2,199,787  
4,594,523  
2,993,668

1900.  
\$ 3,599,515  
1,853,237  
3,055,350  
3,893,217  
21,557,639  
10,720,352

ed in 1901.  
1,235,962  
23,378,650  
1,929,945  
30,009,357

Exports.  
36,490,026  
93,540,609  
12,720,343  
14,886,454  
681,403  
1,084,992  
21,648,191  
1,520,936  
13,914,676

Exports to.  
5,328,856  
2,382,230  
2,141,562  
1,581,331  
188,683  
2,806,142

OF 1900.  
Exports.  
1,618,396  
7,431,366  
3,614,230  
4,464,650  
729,485  
5,085,733

703,333  
850,067  
463,733  
372,800

453,809  
988,800

- Abyssinia, ab-is-sin'l-a.  
Aconagua, ak-on-ah'gwah.  
Acre, ay'ker.  
Aden, ay'den.  
Afghanistan, af-gan'is-tan'.  
Aguilas, a-gool'yas.  
Aix, ayks.  
Ajaccio, a-yah't'choh.  
Aland, ah'land.  
Albany, aw'l'ba-ni.  
Alderney, aw'l'der-ni.  
Aloutian, al-lew'shan.  
Algiers, al-jeerz'.  
Alleghany, al'le-gay'ni.  
Alsace, al-sahs'.  
Altai, ah'l-tai'.  
Amir, a-meer'.  
Anam, a-nam'.  
Antigua, an-tee'gah.  
Antilles, an-till' or an-teelz'.  
Apennines, ap'en-neinz.  
Appalachian, ap-pa-lay'chi-an.  
Aral, ar'al.  
Archipelago, ah'r'kee-pel'a-goh.  
Aretic, ark'tik.  
Ardennes, ah'r-den'.  
Argentina, ah'r-jen-tai'na.  
Arkansas, ah'r-kan-saw'.  
Ashanti, ash-an-tee'.  
Asia, ay-shi-a.  
Asiatic, as-sin'i-bof'ya.  
Asuncion, a-soon'shi-ohn.  
Atbara, ah't-bah'rah.  
atoll, a-toll'.  
Australia, aws-tray'li-a.  
Avon, ay-ven.  
Ayr.  
Azores, a-zohrz'.  
Babelmandeb, bab-el-mahn'deb.  
Bahamas, ba-hay'mas.  
Bahia, bah-ee'a.  
Balkal, bay'kal.  
Baku, ba-koo'.  
Balearic, bal-e-ar'ik.  
Balmoral, bal-mor'al.  
Baltimore, baw'l'ti-mohr.  
Baluchistan, ba-loo'ehis-tahn'.  
Barbados, bahr-bay'doz.  
Barranquilla, bar-rah'n-keel'yah.  
Batam, ba-toom'.  
Belfast, bel-fahst'.  
Belgium, bel'ji-um.  
Bellze, bel-eez'.  
Benares, ben-ah'rez.  
Benin, ben-een'.  
Bering, bee'ring.  
Berwick, ber'rik.  
Bloemfontein, bloom-fon'tein.  
Bohrs, boorz.  
Bogoto, boh'gro-tah.  
Bokhara, bo-kah'rah.  
Bologna, bo-lohn'yah.  
Bonifacio, bon-i-fah'choh.  
Bordeaux, bor-doh'.  
Borneo, bor'ni-oh.  
Bosphorus, bos'pho-rus, or bos'po-rus.  
Boulogne, boh-lohn'.  
Brahmaputra, brah-ma-poo'-trah.  
Bras d'Or, bra-dohr'.  
Bra-zil'.  
Bremen, bray'men.  
Breslau, bres'lou.  
Bukharest, boo-ka-rest'.  
Buenos Ayres, boh'nus ay'rez.  
Butte, bewt'.  
Cables, kah'bes.  
Cairo, kai'roh.  
Calais, kal'is.  
Cambridge, kaym'brij.  
Canues, kahn.  
Canton, kan-ton'.  
Caracacas, ka-rak'kas.  
Caribbean, kar-ib-bee'an.  
Carpathian, kar-pay'thi-an.  
Carlisle, kah'r-leil'.  
Castile, kas-teil'.  
Cayenne, kai-en'.  
Celebes, sel'e-beez.  
Cenia, sen'is, or sen-nee'.  
Cethnje, chay-teen'yay.  
Cevennes, say-ven'.  
Ceylon, see-lon'.  
Chaleur, shah-loor'.  
Chalons, sha-lohng'.  
Champlain, sham-playn'.  
Chaudiere, shoh-di-ayr'.  
Chataqua, sha-taw'kwa.  
Cheviot, chiv'i-ut.  
Cheyenne, shay-en'.  
Chicago, shi-kaw'goh.  
Chile, chee'li.  
Chimborazo, chim-boh-rah-zoh.  
Cincinnati, sin-sin-nah'ti.  
Cologne, ko-lohn'.  
Colombia, ko-lom'bi-a.  
Colorado, kol-o-rah'doh.  
Counaught, kon-naw't'.  
Connecticut, kon-net'ti-ent.  
Cordilleras, kor-dil'le-raz.  
Costa Rica, kos'ta ree'kah.  
Cotopaxi, kos-to-pax'i.  
Couchiching, koo'chi-ching.  
Cronstadt, kron-stat.  
Cyclone, sei'klohn.  
Cyprus, sei'prus.  
Dalhousie, dal-hou'zi.  
Damascus, da-mas'kus.  
Danish, day'nish.  
Dardenelles, dahr-da-nelz'.  
Darlen, dah'ree-en.  
Deccan, dek'kan.  
Delagoa, del-a-goh'a.  
Delhi, del'i.  
Des Moines, day moln'.  
Demerara, dem-e-rah'rah.  
Dieppe, dee-ep'.  
Dnieper, nee-per.  
Dniester, nee'ster.  
Donegal, don'e-gawl.  
Douro, doo'roh.  
Drontheim, dron'teim.  
Dunedin, dun-ed'in.  
Duquesne, doo-kayn'.  
Ebro, es'broh.  
Ecuador, ek-wa-dohr'.  
Edinburgh, ed-in-bur'ro.  
Elbe, elb.  
Egin, el'gin.  
England, ing'gland.  
Eekimos, es'kee-mohs.  
Esquimalt, es-kee'malt.  
Essequibo, es-se-kee'boh.  
Euphrates, yew-fray'teez.  
Falkland, faw'kland.  
Faroe, fay'roh.  
Fezzan, fez-zan'.  
Fije, fee'jee.  
Finisterre, fin-is-ter'.  
Fiord, fyord.  
Formosa, for-moh'sah.  
Funen, foo'nen.  
Galapagos, ga-lap'a-gohz.  
Ganges, gan'jez.  
Garonne, ga-ron'.  
Genis, ge-nee'va.  
Geyser, gei'ser.  
Ghats, gawts.  
Ghent, gent.  
Gibraltar, jib-rawl'ter.  
Glacier, glas'i-er.  
Gloucester, glos'ter.  
Gobi, goh'bi.  
Gothenburg, got'en-burg.  
Granada, gra-nah'dah.  
Greenwich, gren'ij.  
Guadalquivir, gaw-dal-quiv'er or gah'dal-kee-veer'.  
Guadiana, gah-di-ah'nah.  
Guardafui, gahr-daf-wee'.  
Guatemala, gah-te-mah'lah.  
Guayaquil, gei-ah-keel'.  
Guiana, gee-ah'nah.  
Guienne, ges-en'.  
Guinea, gin'ee.  
Guise, geez.  
Hague, hayg.  
Haiti, hay'te.  
Havre, hahvr.  
Hawaii, hah-we'i-ee.  
Hebrides, heb'ri-deez.  
Cyprus, sei'prus.  
Dalhousie, dal-hou'zi.  
Damascus, da-mas'kus.  
Danish, day'nish.  
Dardenelles, dahr-da-nelz'.  
Darlen, dah'ree-en.  
Deccan, dek'kan.  
Delagoa, del-a-goh'a.  
Delhi, del'i.  
Des Moines, day moln'.  
Demerara, dem-e-rah'rah.  
Dieppe, dee-ep'.  
Dnieper, nee-per.  
Iroquois, ir-oh-kwaw'.  
Iser, ee'zer.  
Jaffa, jaffa, or yahf'fah.  
Jamaica, ja-may'ca.  
Javeiro, ja-nay'roh.  
Java, jah'va.  
Jena, jee'na, or yay'nah.  
Jungfrau, yong'frou.  
Kabul, kah-bool'.  
Kalahari, kah-la-hah'ri.  
Kamelatka, kam-ehat'ka.  
Kaministiquia, kahm-tu-is'ti-kwi-a.  
Kandahar, kan-da-hahr'.  
Kansas, kan'sas.  
Karakoram, kah-ra-koh'ram.  
Kelat, ke-lat'.  
Kennebec, ken-ne-bek'.  
Kewatin, kee-wah'tin.  
kheidi, kee-deev'.  
Khartum, kah'r-toom'.  
Khiva, kee'vah.  
Kiel, keel.  
Killmanjarro, kil-ee-man'ja-roh.  
Kilansa, ki-low-ay'ah.  
Kiolen, kyel'en.  
Kirghiz, kir-gee'z'.  
Kiushu, kee-shoo'.  
Kuenlun, ken-loon'.  
Kurles, kur-eez'.  
Laaland, lah'land.  
Lachine, lah-sheen'.  
La Guaira, lah ge'ra.  
La Paz, lah pah'dh.  
La Plata, lah plah'tah.  
Leicester, lee'ster.  
Leinster, lee'n'ster.  
Leipsig, leip'sik.  
Levee, lee'vee.  
Levant, le-vant'.  
Leyden, lei'den.  
Liege, lee'je, or lee-ayzh'.  
Lima, lee mah.  
Limoges, lim-ohzh'.  
Lipari, lip'a-ri.  
Lisle, leel'.  
Llanos, lah'nohz.  
Loch Lomond, loch loh'mond.  
Lofoden, lo-foh'den.  
Loire, lwawr.  
Los Angeles, lohs an'je-les.  
Lough Neagh, lok nee'.  
Louisiana, loo-is'i-ah'na.  
Louisville, loo'is-vil, or loo'e-vil.  
Lowell, loh'el.  
Lucknow, luk'now.  
Lyons, lei'onz'.  
Macao, ma-kah'oh.  
Macassar, ma-kah'ssar.  
Mackinnac, mack-i-naw'.  
Madagascar, mad-a-gas'kar.  
Madeira, ma-day'rah.  
Madras, ma-dras'.  
Madrid, ma-drid'.

Maelstrom, may'l'strum.  
 Magellan, ma-jel'lan.  
 mahdi, mah'dee.  
 Maggiori, ma-joh'ray.  
 Malaga, mal'a-ga.  
 Malay, ma-lay'.  
 Malplaquet, mal-pla-kay'.  
 Malta, maw'ta.  
 Mansar, ma-nahr'.  
 Manchuria, man-choo'ri-a.  
 Manohus, man-chooz'.  
 Manitoba, man-i-toh'bah.  
 Maoris, mah'o-reez.  
 Maracaibo, mahr-a-kei'boh.  
 Marmora, mahr'mo-ra.  
 Marquessa, mahr-kay'saz.  
 Marselles, mahr-saylz'.  
 Martinique, mahr-ti-neek'.  
 Mauritius, maw-rish'i-us.  
 Melbourne, mel'burn.  
 Menai, me-nay'.  
 Michigan, mish'i-gau.  
 Milan, mil'an.  
 Miquelon, mik-e-lon'.  
 Miramichi, mir'a-mi-shee'.  
 Mobile, moh-beel'.  
 Mocha, moh'ka.  
 Moluccas, moh-luk'kaz.  
 Mout Blanc, mong blahng.  
 Montevideo, mohn-tay-vee-day'oh.  
 Montmagny, mon-mahn'yee.  
 Moscow, mos'koh.  
 Mozambique, moh-zam-beek'.  
 Munich, mew'nik.  
 Nankin, nan-keen'.  
 Nantes, nanta.  
 Naasau, nas'saw, or nee'sow.  
 Natal, nay'tal, or na-tal'.  
 Navarino, nav-a-ree'noh.  
 Navarre, na-vahr'.  
 Nepal, ne-pawl'.  
 Nevada, ne-vah'da.  
 Ngami, 'n-gah'mee.  
 Nicaragua, nik-a-rah'gwah.  
 Nice, nees.  
 Nicolet, ni-co-lay'.  
 Niger, nel'jer.  
 Nijni, niz'ni.  
 Norwich, nor'rij.  
 Notre Dame, nohtr-dahm'.  
 Nyassa, nee-ah'ssa.  
 Ob, ohb.  
 Okhotsk, o-koh'tek'.  
 Oklahoma, ohk-lah-ho'ma.

Orinoco, oh-rin-oh'koh.  
 Orontes, o-ron'tees.  
 Osaka, o-sah'kah.  
 Ouse, ooz.  
 Pamir, pah-meer'.  
 pampas, pam'pas.  
 Panama, pah-na-mah'.  
 Para, pah-rah'.  
 Paraguay, par-a-gay'.  
 Paramaribo, par-a-mar'i-boh.  
 Parana, pa-ra-nah'.  
 Pechili, pee'che-lee.  
 Pelho, pel'ho.  
 Pekin, pee-kin'.  
 Pennine, pen'nin.  
 Pernambuco, per-nam-boo'-kqh.  
 Persia, per'shi-a.  
 Peru, pe-roo'.  
 Philippines, fil'ip-in.  
 Pietou, pik too'.  
 Piedmont, peed'mont.  
 Pileomayo, pil-oo-h-my'oh.  
 Plymouth, plim'uth.  
 Poitiers, poi-teerz', or pwah-te-ay'.  
 Poitou, poi-too', or pwah-too'.  
 Pompeii, pom-pay'yee.  
 Pontefract, pom'fret.  
 Port Said, port sah-ee'd'.  
 Potomac, poh-toh'mak.  
 Potosi, po-toh'see.  
 Presque Isle, presk-ee'l'.  
 Pribilof, pree-bee-lov'.  
 Puerto Rico, poo-er'toh ree'-koh.  
 Punjab, pun-jab'.  
 Qu'Appelle, kah-pel'.  
 Quarte Bras, kah'tr-brah.  
 Quinte, kwint'tee.  
 Quito, kee'toh.  
 Racine, ra seen'.  
 Raleigh, raw'le.  
 Ravenna, ra-ven'na.  
 Restigouche, ris'ti-goosh.  
 Ridesau, ree-doh'.  
 Riga, ree'ga.  
 Rio, ree'oh.  
 Rochelle, roh-shel'.  
 Rouen, roo-ang'.  
 Ryswick, riz'wik.  
 Sahara, sa-hah'ra.  
 Saigon, sah'ee-gon.  
 St. Augustine, st aug'us-teen.  
 St. Croix, st kroi.

St. Pierre, san pee-ayr'.  
 Salado, sa-lah'doh.  
 Salisbury, sawlz'ber-re.  
 Saloniki, sah-loh-nee'kee.  
 Salvador, sahl-vah-dohr'.  
 San Joaquin, sahn hoh-ah-keen'.  
 San Jose, sahn hoh-say'.  
 San Juan, sahn hoo ahn'.  
 Santa Fé, san'ta fay'.  
 Santiago, san-ti-ah'goh.  
 Sault St. Mary, soo saint may'ri.  
 Savigny, sa-veen'ya.  
 Scheldt, skelt, or shelt.  
 Schenectady, sken-ek'ta-dy'.  
 Schuykill, skool'kil.  
 Scilly, sil'y.  
 Scinde, sind.  
 Scutari, skoo'ta-ree.  
 Sedan, se-dahn'.  
 Seine, sen.  
 Senegal, sen'e-gawl.  
 Seoul, say-ool'.  
 Seville, sev'll.  
 Seychelles, say-shelz'.  
 ahah, shah.  
 Shanghai, shang-hah'l'.  
 Siam, sei-am'.  
 Sierra Leone, see-er'ra lee-oh'ne.  
 Sinope, sin'oh-pee.  
 Sioux, see-oo'.  
 Sluya, slooa.  
 Socotra, so-koh'trah.  
 Sofala, so-fah'lah.  
 Solferino, sol-fe-ree'noh.  
 Somme, som.  
 Spitzbergen, spitz-ber'gen.  
 Spokane, spoh-kan'.  
 Staten, stat'en.  
 Stikine, stik-ee'n'.  
 Stockholm, stok'hohlm.  
 Stromboli, strom'boh-lee.  
 Sumatra, soo-mah'trah.  
 Syracuse, sir'a-kews.  
 Tabriz, ta-breez'.  
 Tacoma, ta-koh'ma.  
 Tadoussac, tad-oo-sak'.  
 Tahiti, ta-hee'ti.  
 Talavera, tal-a-vay'ra.  
 Tananarivo, ta-nah'nah-ree-voh'.  
 Tangier, tan-jeer'.  
 Tanganyika, tahn-gahn-yee'ka.

Tapajos, ta-pah'yohs.  
 Teheran, te-rahn'.  
 Teviot, tev'lot, or tiv'i-ot.  
 Thames, temz.  
 Tibet, ti-be't'.  
 Tientsin, tee-en-seen'.  
 Tierra del Fuego, ti-er'ra del i'wag'gon.  
 Tigris, tei'gris.  
 Timor, tee-mohr'.  
 Titicaca, tit-ee-cah'cah.  
 Tocantius, toh-kau-teenz'.  
 Tokio, toh'kee-oh.  
 Tonkin, ton-keen'.  
 Torquay, tor-kee'.  
 Torres Vedras, tor-res vay'dras.  
 Toulon, too-lohng'.  
 Toulouse, too-looa'.  
 Trafalgar, tra-faw'gar.  
 Trebizond, treb'i-zond.  
 Trieste, tree-est'.  
 Tripoli, trip'o-li.  
 Tunis, too'nis.  
 Turin, too'rin, or too-tin'.  
 Tyrol, tir'ol.  
 Uist, wist.  
 Ural, oo'ral.  
 Uruguay, oo-ru-gway'.  
 Valdai, val'dei.  
 Valparaiso, vahl-pah-rei'so.  
 Vaudreuil, voh-drool'.  
 Vendee, vahn-day'.  
 Venezuela, ven-e-zway'la.  
 Venise, ven'is.  
 Vera Cruz, vay'ra croos'.  
 Versailles, ver-saylz'.  
 Vienna, vee-on'a.  
 Vikings, vik'ings.  
 Vladivostok, vlah-dee-vois-tohk'.  
 Vosges, vohzh.  
 Wabash, waw'bash.  
 Wallachia, wal-lay'ki-a.  
 Warwick, wor'rik.  
 Welmar, wei'mar.  
 Woolwich, wuhl'ij.  
 Worcester, woos'ter.  
 Xingu, shin goo'.  
 Yenisei, yen-i-say'ee.  
 Yokohama, yoh-koh-hah'mah.  
 Yosemite, yoh-sem'i-tee.  
 Zambezi, zahm-bay'zi.  
 Zenith, zen'ith.  
 Zurich, tsoo'rik.  
 Zuyder Zee, zoi'der zay.



s.

v'i-ot.

on'.  
i-er'ra del

cah.  
teenz'.

vay'dras.

gar.  
nd.

-tin'.

y'.

-rel'so.  
f.

vay'la.

oos'.

ee-vols-

-a.

hah'mah.  
tee.

i.

y.

