THE SOUTHERN CONTINENTS
AND
NORTH AMERICA

EVA D. BIRDSEYE

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THE SOUTHERN CONTINENTS
AND
NORTH AMERICA

(INTRODUCTORY, AUSTRALIA, AFRICA, SOUTH AMERICA, NORTH AMERICA)

BY
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CHAPTER I.

THE WORLD AS A GLOBE.

This year we are going to learn something of the geography of the Southern Continents. Why are they so called? Let us look at a globe and find out exactly what we mean by this expression. Take the largest globe which you can get and find, first of all, the Equator. You know that this line divides the globe into two equal parts. Now look at the land and sea north of the Equator and compare it with the land and sea south of it. Which hemisphere has more land? The southern one has much less than the northern one, has it not? Now find Australia, South America and Africa. These three are called the Southern Continents. Find out how much of each lies south of the Equator. The whole of Australia, the greater part of South America and less than half of Africa.

Does it make any difference to our daily life if we live north or south of the Equator? Yes, it does. We all live north of it and we expect our hottest weather in May and June and our coldest in December and January. If we lived in Australia, we should find that our hottest weather was in December and our

coldest in June. It is easy to remember if you think that the children in Australia get their long summer holiday when we get our short Christmas one.

There are some other differences in the lives of the people who live south of the Equator, but the most important one is the change round of the seasons. You know that the earth travels round the sun once a year. Take a lamp and put it in the centre of your table. Now take a globe and turn it round until Australia is facing the lamp. Notice that as you move the globe round the lamp, sometimes the light falls more directly on Australia and sometimes it falls more directly on India. Notice too that this happens when the globe is on exactly opposite sides of the lamp. When the light is falling most directly on a country it has its hottest weather. What causes this change in the seasons? Look again at your globe and see that it is set on its stand in such a way that the axis, or line joining the North Pole to the South Pole, is never at right angles to the table. As you move your globe around the lamp you must be sure to see that the axis always points in the same direction because as the earth goes round the sun, its axis always does so. It is because the earth's axis is always tilted at an angle of $23\frac{1}{2}^\circ$ to the vertical that for part of the year the northern hemisphere is turned towards the sun

and for part of the year the southern hemisphere is turned towards the sun. Try this experiment with the globe and the lamp and make sure that you understand why India and Australia have their hot weather at opposite times of the year.

Look once more at South America and Africa, and see that the people who live in Egypt have their hot weather at the same time that we do, but that those who live in Cape Town have it at the same time as the people in Australia. In South America most people have their hot weather at the same time as the people of Australia. You can see why this is so by looking at the globe. There is only a small part of S. America north of the Equator. Remember that the nearer you live to the Equator the less cold weather you get, as a general rule. There is not much difference between the hot season and the cold one, close to the Equator.

SUGGESTIONS FOR PRACTICAL WORK.

1. Do the experiment with the lamp and the globe suggested in the text. If you can darken the room it will be easier to see.

2. Draw a graph for the average temperatures of Madras, Algiers, Cape Town, Melbourne, George Town (British Guiana), Buenos Aires. The figures are given below.

	Jan.	Feb.	Mar.	Apr.	May	June	Jly.	Aug.	Sep.	Oct.	Nov.	Dec.
Madras	75	77	80	84	89	88	86	85	84	81	78	76
Algiers	49	50	53	56	61	68	73	75	70	64	57	52
Cape Town	70	70	68	63	59	56	55	56	58	61	64	68
Melbourne	68	67	65	60	54	50	49	51	54	58	61	65
George Town	79	79	80	81	81	80	81	81	82	82	82	80
Buenos Aires	74	73	69	61	55	50	49	51	55	60	66	71

3. Find each of the above towns on your globe and answer the following questions, using your graphs to help you to answer the questions.

Which towns are north of the Equator ?

Which towns are south of the Equator ?

Which town is nearest to the Equator ?

Which town has the least difference between its hot weather and its cool ?

Which town has the greatest difference between its hot weather and its cool ?

Which town lies furthest from the Equator ?

Which are the hottest months north of the Equator ?

Which are the hottest months south of the Equator ?

CHAPTER II.

RELIEF AND RIVERS OF AUSTRALIA.

This year, we are going to learn something of the geography of Australia first, so get

your globe once more and find this continent. Notice that it is an island and see how far it is away from our own country. Do you think that any part of the continent will be like India? Find the Tropic of Capricorn and notice how much of Australia lies within the Tropics. Which part of the continent is this? Now find the Tropic of Cancer and see where it crosses India. How much of our country lies within the Tropics? Which part of the country is this? Which part of Australia is likely to resemble which part of India? Think this out now and as we learn more see how far your ideas are correct.

The Relief of Australia.

Now take a good physical map of Australia, and find the highest land. Where is it? On the eastern side of the continent, quite close to the sea. This is important to remember, for it has made a great difference to the life of the people of Australia that their highest land lies so close to the east coast. These mountains have various names. You can find some of them in your map. They are often called the Great Dividing Range. Can you think how they got this name?

Now look at the western half of the continent and notice that it consists of highland, but not nearly so high as the Eastern Highlands.

This is a plateau-land rather like the plateau-land of the Deccan in our own country. Most

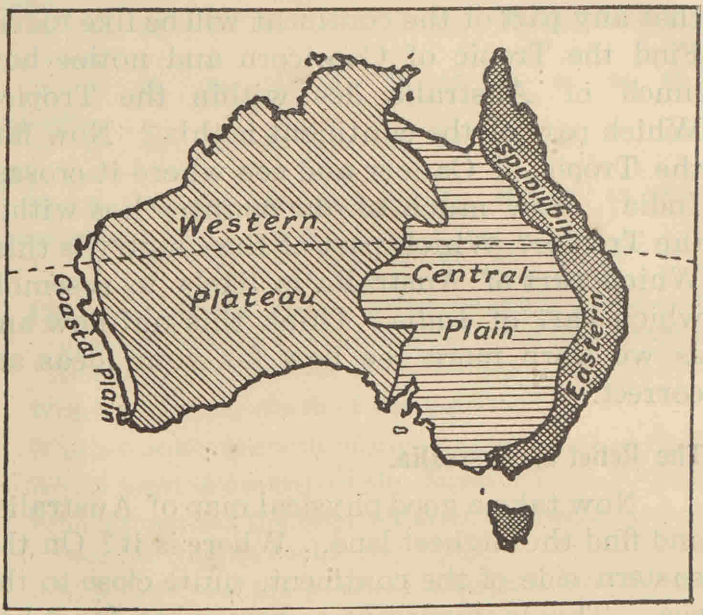


Fig. 1. The Structural sub-divisions of Australia.

of it is between 500 and 2000 ft. high with a few ranges over 5000 ft. crossing the tableland.

Between the Eastern Highlands and the Western Plateau you will see the great lowland basins of Australia. Find Lake Eyre, notice that there are some rivers which flow into it. This lake is below sea-level. The rivers cannot reach the sea, so we say that this is a region of inland drainage. To the south-east of the Lake

Eyre Basin, find the river Murray and the river Darling and their tributaries. This forms the Murray-Darling Basin and is very important in the life of the people of Australia. North of the Lake Eyre Basin you will see another lowland in which all the rivers drain to the Gulf of Carpentaria.

The Rivers of Australia.

We have mentioned some of the rivers which are important in the life of the people of Australia. The Murray, Darling, Murrumbidge and their tributaries all rise in the Eastern Highlands and flow across the central plain to a common mouth on the south coast. We shall see later that these rivers can be used for navigation along part of their course and that they are of even greater use for irrigation.

Look again at your map and notice the other long rivers which flow across the lowland. They look much more important than they really are. Can you see why? They flow into an inland lake instead of to the sea and so do not connect the central plain with the coast. Very often there is little, or no water in them so that they cannot be used for irrigation.

Now look at the rivers of the east coast. They are very short because the plain between the mountains and the sea is so narrow. Do

you know of any part of India where this is true? The Eastern Highlands are rather like the Western Ghats. They have a steep edge to the east and a gentle slope to the west and the narrow eastern coastal plain is like the narrow west coastal plain of India. Do you think that these short, swift rivers are of much use to the country?

If you look at the map of Australia again you will see that there are many short rivers flowing to the coast along the north and western coasts. None of these is of very great importance. Now look at the south coast. West of the mouth of the Murray-Darling there is no river for many, many miles. Do you know of any country in the world which has a stretch of coast like this? Can you think of any reason why such a large part of Australia should be without rivers? Rivers are formed from the rain which falls on the land and if there are no rivers we can be fairly sure that there is very little rain. A very large part of Western Australia is desert.

SUGGESTIONS FOR PRACTICAL WORK.

1. Trace an outline of the map of Australia. Trace the contours of 500, 2000, 5000 ft. Cut these out in cardboard. Allow one thickness of cardboard for every 100 ft. if the board is thin. Build up a model of the continent by pasting the thicknesses

of cardboard together and then pasting them on to their right place on the outline map. Cover the whole with a thin layer of clay or plasticine.

N.B. If you can use a fret saw do this in thick cardboard and allow one thickness of cardboard to each 500 a ft.

2. Find the names of all the different highlands in Australia and print them neatly on small labels. Put these labels on the highlands in your model.

3. Trace a map of the Murray-Darling and all their tributaries. Keep this for use later.

CHAPTER III.

THE CLIMATE OF AUSTRALIA.

Temperature.

Look back at the diagrams which you drew in the first set of exercises. Compare the temperature of Madras with that of Melbourne. Which has the hotter summer? Which has the cooler winter? On the whole Madras is hotter all the year round than Melbourne, is it not? Can you see a reason for this? Melbourne is further from the Equator than Madras. Now look at the map of Australia and find the Tropic of Capricorn. All the country to the north of this line is said to be within the Tropics. If you look at the map of India you will see that the Tropic of Cancer crosses it. All the country to the south of this line lies within the

Tropics. This means that the northern part of Australia will be something like the southern part of India. This gives us some idea of the average temperature conditions of Australia, but we shall have to take each part of the continent in turn to see the special conditions arising in them.

Winds.

You all know that the winds which blow over a country are important because very often the rainfall is dependent upon the winds. In Australia nearly all the winds blow from the east. During the hottest weather the sun is vertically overhead at the Tropic of Capricorn. The central part of the continent gets very hot and a monsoon wind blows in from the sea. This comes from the north-west on the northern coast and from the north-east on the north-eastern coast. You will remember the direction if you think that winds always blow towards a region of Low Pressure. The pressure is always low over very hot lands.

At this season of the year the winds are always blowing from the south-east over the country south of the Tropic of Capricorn, in Australia. Look at your map again and at the map in Fig. 2 which shows you the direction of the winds and notice that except in the north-western corner of the continent all the winds

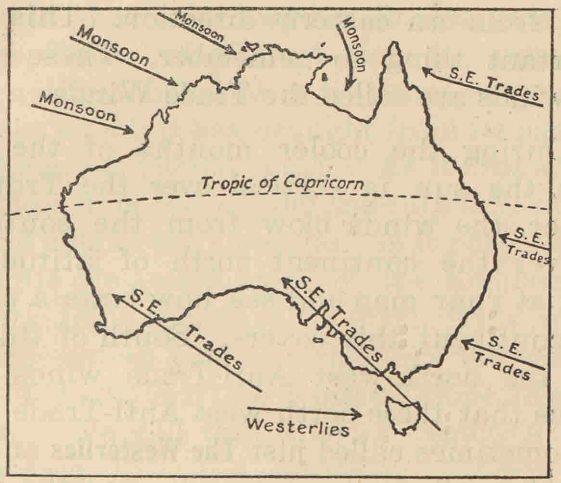


Fig. 2. Winds in the Southern Summer.

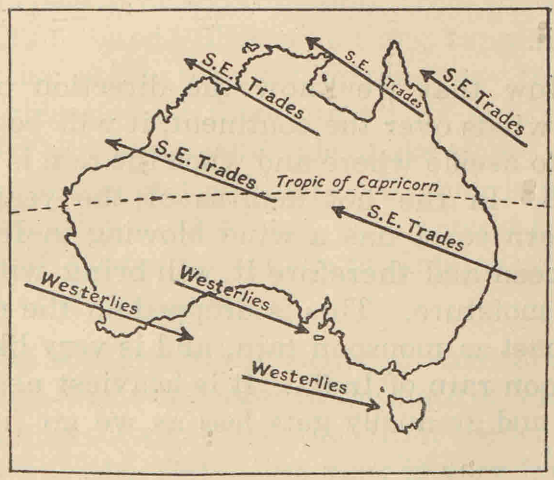


Fig. 3. Winds in the Southern Winter.

come from an easterly direction. This is an important thing to remember. These south-east winds are called the Trade Winds.

During the cooler months of the year, when the sun is vertical over the Tropic of Cancer, the winds blow from the south-east all over the continent north of latitude 33°. Look at your map and see how large a part of the continent this covers. South of this latitude the north-west Anti-Trade winds blow. Notice that these north-west Anti-Trade winds are sometimes called just **The Westerlies** and that they blow all the year round, over the island of Tasmania.

Rainfall.

Now that we know the direction of the chief winds over the continent, it will be quite easy to decide where and when the rain is likely to fall. In the hot months of the year, the northern coast has a wind blowing in from a hot ocean and therefore it will bring with it a lot of moisture. This is dropped on the northern coast as monsoon rain, and is very like the monsoon rain of India. It is heaviest near the coast and gradually gets less as we go further inland.

Along the east coast, the northern part gets rain in the hot weather from the monsoon

wind. In the cooler weather it also gets rain, for the Trade wind must rise to cross the Eastern Highlands and so it drops some of its moisture which it has brought from its passage over the great Pacific ocean. As it crosses the highlands it is cooled and the rain falls on the seaward side of the slope, but as it passes down the gentle westward slope of the highlands it has very little moisture to give. This means that the eastern side is rather like the western coast of India and the western slope like the Deccan. We call this kind of region a **Rain-Shadow** area.

The southern part of the east coast gets rain all the year too, but only from the south-east Trade wind. The same thing happens here as further north, for the wind must rise to cross the highlands and therefore all its moisture is dropped on the seaward side of the slope. Now do you see why the Murray-Darling is needed for irrigation? It is very unfortunate for the people of Australia that the mountains come so close to the east coast.

The south-western corner of Australia and the south-western corner of the state of Victoria has rain in the cooler weather from the westerly winds but the rest of the year is very hot and dry. Why is this? Look at your map and the diagrams in this chapter and answer this question

for yourselves. The island of Tasmania has rain all the year round from the Westerlies.

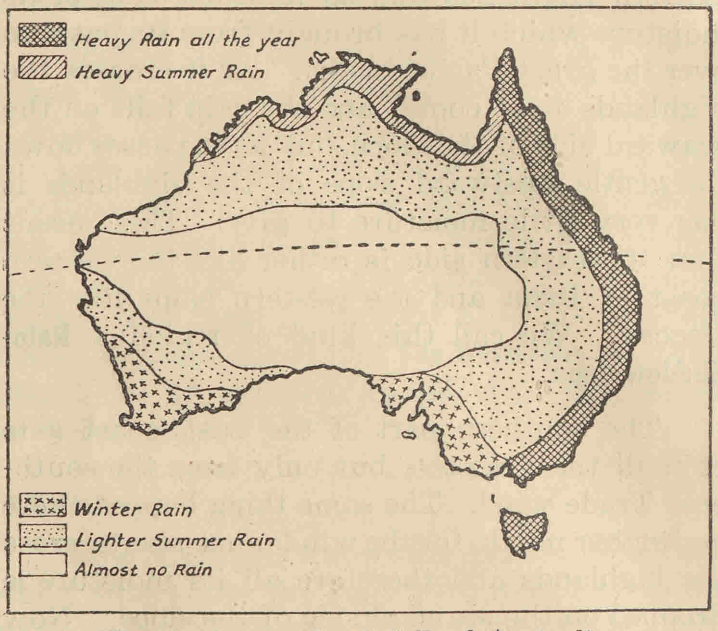


Fig. 4. Seasonal rainfall of Australia.

All the rest of Australia has very little rain indeed. There is a very large area which is desert and round it there is an area which is almost desert. You can see where this is from the map in Fig. 4.

The Climatic Sub-Divisions of Australia.

We have talked about the temperature, winds and rainfall separately. Now let us see

how we can divide the country climatically, taking all these factors into account.

The northern and north-eastern coast has a high temperature all the year for it lies within the Tropics. It gets rain in the hot season from a monsoon wind, and has a comparatively dry, cool weather. It is rather like our own west coast climate.

The Queensland coast is very like this first region, for it is hot all the year, but it gets a little more rain as it has a rain-bearing wind blowing in the cooler weather as well as in the hot.

The south-eastern coast is another region for it is further away from the Equator and therefore its temperature is lower. The difference between its hot weather and its cold weather is greater than in Queensland or the Northern Territory. It has rain all the year round.

The Murray-Darling basin has a similar climate to the last named region for it is in the same latitude, but its summers are hotter and its winters cooler because it is further away from the sea. It has very much less rain as we saw above, for it lies in the rain-shadow of the Eastern Highlands. Most of this rain comes in the beginning of the hot weather.

Find the Darling Downs in Queensland. This area is very like the last one except that its average temperatures will be higher as it lies nearer to the Equator. All the country north of lat. 20° and west of the Eastern Highlands has a similar climate to this. See the map in Fig. 5.

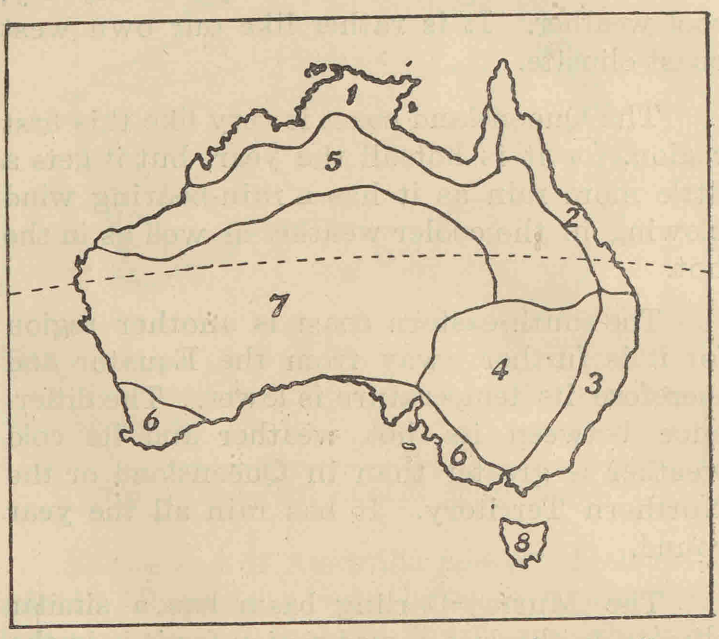


Fig. 5. The Climatic sub-divisions of Australia.

1. Hot with wet summers.
2. Hot and wet all the year.
3. Cooler and wet all the year.
4. Cooler, small summer rain.
5. Hot, small summer rain.
6. Cooler, winter rain.
7. Hot and dry all the year.
8. Cooler.

The south-western corner of Western Australia and of Victoria has what is known as

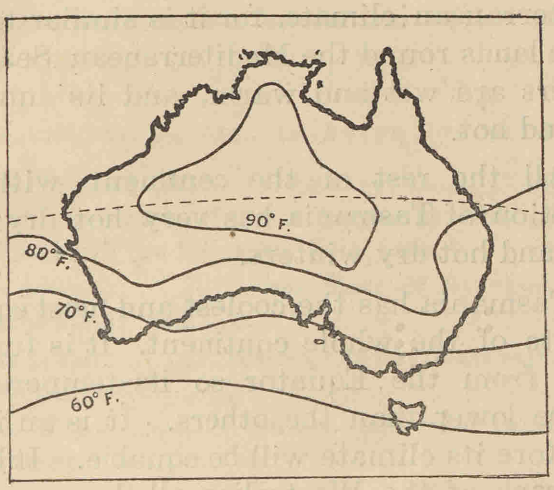


Fig. 6. Southern Summer Isotherms—January.

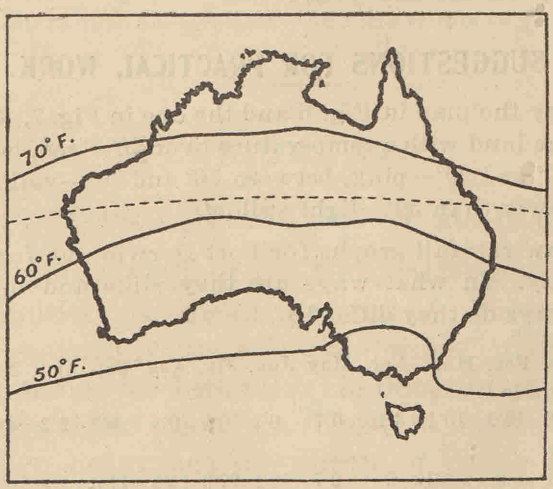


Fig. 7. Southern Winter Isotherms—June.

Mediterranean climate, for it is similar to that of the lands round the Mediterranean Sea. Its winters are wet and warm, and its summers dry and hot.

All the rest of the continent with the exception of Tasmania has very hot dry summers and hot dry winters.

Tasmania has the coolest and most equable climate of the whole continent. It is furthest away from the Equator so its temperatures will be lower than the others. It is an island therefore its climate will be equable. It lies in the track of the Westerlies all the year so its rainfall will be sufficient for farming to be carried on all the year.

SUGGESTIONS FOR PRACTICAL WORK.

1. Copy the map in Fig. 6 and the one in Fig. 7. Colour the land with a temperature over 90°—red, between 70° and 90°—pink, between 50° and 70°—yellow and lower than 50°—light yellow.
2. Draw rainfall graphs for Port Darwin and for Bombay. In what ways are they alike and in what ways do they differ?

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jly.	Aug.	Sep.	Oct.	Nov.	Dec.
Port Darwin	15·9	13·0	10·1	4·1	0·7	0·1	0·1	0·1	0·5	2·2	4·8	10·3
Bombay	0·1	0	0·1	0	0·7	20·6	27·3	16·0	11 8	2·4	0·4	0
Sydney	3·7	4·2	4·8	5·6	5·1	4·8	4·8	3·0	2·9	3·2	2·8	2·9

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jly.	Aug.	Sep.	Oct.	Nov.	Dec.
Perth	0·3	0·3	0·7	1·7	4·9	6·6	6·4	5·6	3·3	2·1	0·8	0·6
Coolgardie	0·4	0·7	0·6	0·6	1·3	1·2	0·9	0·9	0·6	0·7	0·5	0·6

3. Draw rainfall graphs for Sydney, Perth, Coolgardie. Describe each of your graphs by filling in the blanks in the following sentences.

   The town of ..... has most of its rain in the months of .....

   This is the ..... season. It has least rain in the months of .....

   This is the ..... season. The total rainfall for the year is .....

4. Copy the map in Fig. 4 into your note books. Colour the area which has rain all the year—green. Rain in the hot weather—blue. Rain in the winter—red. No rain at all—yellow. Add the winds to your map.

CHAPTER IV.

THE NATURAL VEGETATION OF AUSTRALIA.

When we talk of the Natural Vegetation of any country we mean the kind of plants which grow naturally there. Sometimes man uses these plants for himself. He does this when he cuts down the trees in a forest to build houses, or when he grazes his sheep or cattle on the grass of the grasslands. At other times he removes all the natural vegetation and sows his

crops on the land as he has done in the Ganges Valley in India. If he does this, he can sometimes alter the conditions in such a way as to cause things to grow which would not grow there without his help. There are many parts of our own Presidency where man has made rice to grow by bringing water to the fields, where no rice would grow without this help. In this chapter we are going to talk about the Natural Vegetation and we can only take into consideration those conditions which nature supplies.

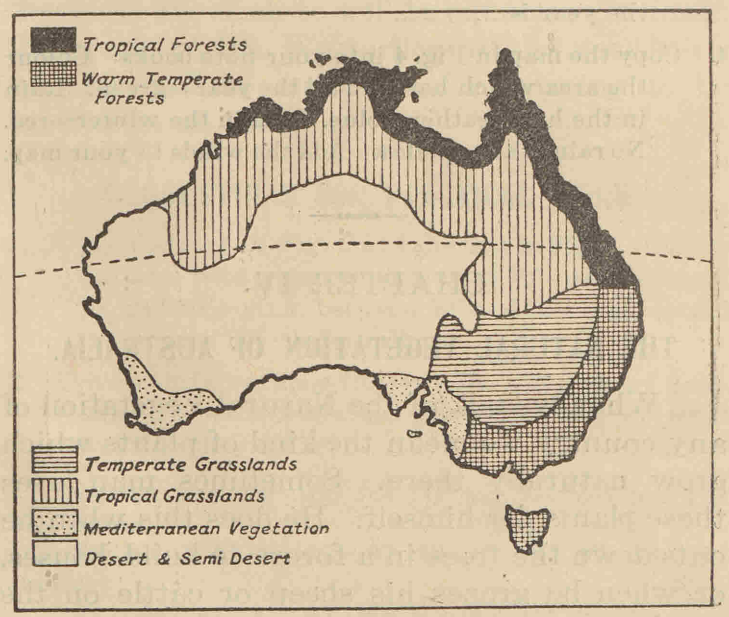


Fig. 8. Natural Vegetation of Australia.

The Tropical Forests.

Look at the map (Fig. 8). This shows you where the Tropical forests grow. You will see that all along the north and north-east coasts these forests are found. If you compare this map with the rainfall and temperature maps you will see that this area is both hot and wet, and so we should expect to find the same kind of trees that we get on our own Western Ghats. Very few people live along the northern coast so that very little of the forest has been cleared. In Queensland there are more people and some of the forest has been cut down and man has sown his own crops in its place. There is still plenty of forest left even here.

The Warm Temperate Forests.

Look again at the map and find the warm Temperate forests. These, you see, are found on the south-eastern coastlands and the seaward slope of the Western Highlands. If you look at the temperature and rainfall maps you will notice that this part of Australia has a cooler climate than the Monsoon forest area but almost as much rain. Here the trees are not so close together and are of a different kind. It is in these forests that the Blue Gums or Eucalyptus trees and the Wattles are found. These trees belong to Australia and are not found growing wild in any other continent.

Some have been brought to India and grow on our hills. They grow very straight and tall and some of them give a very hard wood which is used for building and for paving streets. You see that the trees of this forest are more useful to man and he has cut down many large areas of forest, used the wood, and now has planted crops in their place. Much more of this forest has been cleared than of the Tropical forest but there is still plenty left, especially on the slopes of the hills.

The Tropical Grasslands.

If you compare the vegetation and the temperature and rainfall maps again you will see that where the temperature is high and the rainfall fairly good, Tropical grasslands are found. These stretch from east to west across the continent on the landward side of the Tropical forest. The most important part of these grasslands is the Darling Downs on the western slope of the Highlands of Queensland. It is here that man uses the grass which nature provides to feed his cattle. We sometimes call this Savannah land.

The Temperate Grasslands.

Look once more at your three maps and find the grasslands of the Murray-Darling Basin. Here the rainfall is not very high but the temperature is lower than that of the north so that

it is possible for grass to grow. It is not such good grass as the Tropical or Savannah type of grass but is excellent for sheep. This is the great sheep-rearing area of Australia. We shall be hearing more about this country in a later chapter.

The Mediterranean Regions.

We said that there were two areas of Mediterranean climate in Australia. In these areas the summers are very dry and very hot so that any plants which grow there must find some way of living through the season of drought. The Eucalyptus tree grows well there, for its leaves are narrow and leathery. They hang down parallel to the trunk of the tree so that not so much water is evaporated from their surface. The Jarrah and the Karri trees also belong to this part of Australia. These give a very good, hard wood. They all grow fairly near to the sea where the rainfall is good, but further inland there is not enough rain for trees of any kind to grow and the ground is covered for miles with mallee scrub. This is a small kind of eucalyptus bush. Other parts are covered with a small, spiny acacia, like we get in the drier parts of our Deccan. This, the Australians call mulga scrub. There are a good many people living on the wetter side of the Mediterranean regions so that a good deal of the

natural vegetation has been cleared and man has used the land to grow mediterranean crops, such as vines and oranges.

Desert and Scrubland.

Look at your map and notice how large an area of Australia is of no value to man; for it consists of desert or semi-desert where there is not enough water for plants to grow. In the centre of the continent almost nothing will grow at all, but on the outskirts of the desert the scrub bushes are found and these gradually pass into grassland as the rainfall increases nearer the coast.

The Animals of Australia.

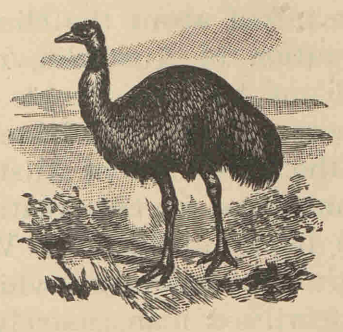
In Australia we find some animals which are not found in any other country in the world. You will have seen pictures of the Kangaroo but if you get a chance to see one at a Zoological Garden be sure to do so. Men of Science tell us that these strange animals and several others something like them, only found in Australia, belong to an earlier age of the Earth's history. They have died out in other parts of the world. Australia has none of the ordinary animals found in Asia or Africa; such as the lion or tiger. The horses and sheep which are found in large numbers were brought to Australia from Europe.



Kangaroo.



Opossum.



Emu.

There were none of them before Europeans went to the country.

SUGGESTIONS FOR PRACTICAL WORK.

1. Copy the Vegetation Map in Fig. 8. Colour the Monsoon forests—dark green. The Warm Temperate forests—light green. Tropical grasslands—dark yellow, Temperate grasslands—light yellow, Mediterranean lands—red, Desert—orange.
2. Spread out your Temperature maps, Rainfall and Natural Vegetation maps in front of you and write a description of them all.

3. Pay a visit to the nearest Zoological Garden, look at and draw the Australian animals and birds. Look out for a Kangaroo, and opossum, a duck-billed platypus, an emu and a cassowary.

CHAPTER V.

THE EAST COAST REGION.

We have talked about the climate and the natural vegetation of Australia, now we are going to find out how the people live in this great continent. You will have found out already that the coastlands of Australia are the most important areas, for the greater part of the interior is too dry for man to live. We will begin with that part of the country which was first occupied by civilised man, namely the south-eastern coastlands.

The South-Eastern Coastlands.

Look at your map and find the State of New South Wales. How do you think this state got its name? For many centuries after the rest of the world was known to men, Australia was shut off and no ships had touched on her shores. The only people living there were a few Bushmen, who had no alphabet and so no means of putting their thoughts on paper. They lived on the food which they could find around them— roots and

fruits and the animals which they could kill. They did not cultivate the land or enter into trade with anyone outside their own land. It was only about 150 years ago that the island of Australia was first inhabited by any civilised man. People sailed from England and settled where Sydney now stands. This south-eastern corner of the continent was therefore the first to be colonised. When people come from another country and settle in a new land, making it their home and bringing up their children there, we say that they colonise the new land. One reason why this part of Australia is important is that it was the first to be settled and therefore the towns of this corner are older than in any other part of the continent. Look at the State of New South Wales and see how many names you can find which are the same as the names of towns in England. People who came out from the "old country" often called the new one by the name of their old home.

Look at the population map of Australia shown in Fig. 9. You will see that most people live in New South Wales and Victoria. On the seaward slope of the Eastern Highlands in both these states the climate is pleasant, never too hot, nor too cold and with a good rainfall. A good many people get their living by dairy-farming. That means that they keep cows, milk them twice a day, sell their milk partly to people

in the towns who want fresh milk to drink, and partly to factories where it is turned into butter, cheese or cream. There are still not a great

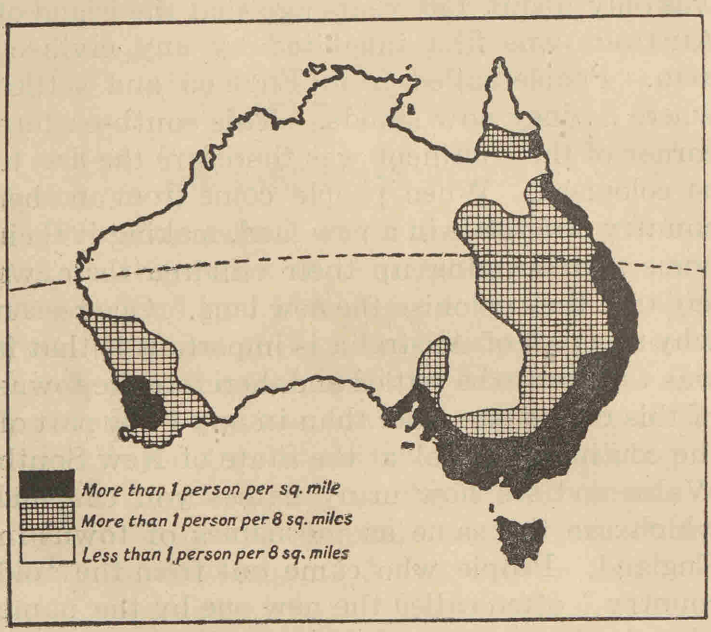
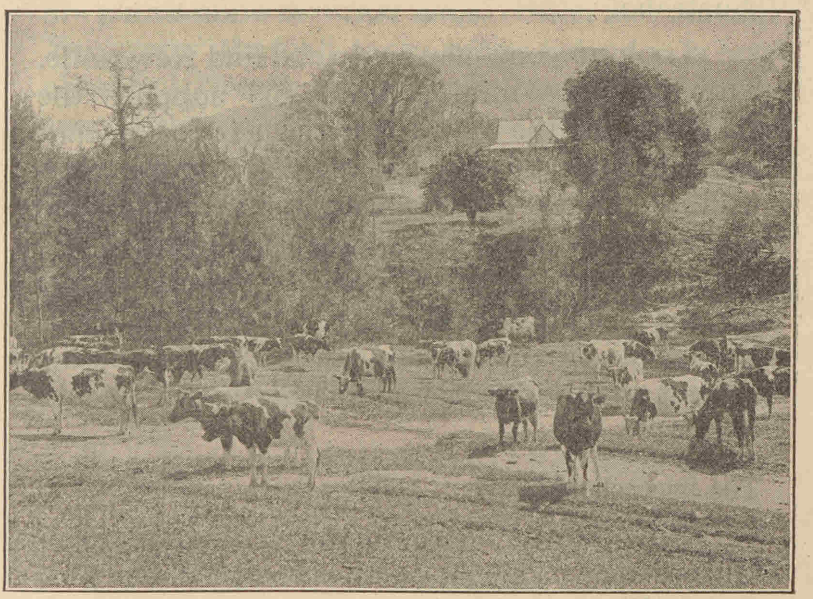


Fig. 9. Population map of Australia.

many people living here and so there is enough dairy-produce left over for export and you can buy Australian butter and cheese in Madras.

Other people who live in this corner of Australia get their living in the towns. What do you think they make? The factories which make the butter and cheese employ a good many men. Then, where there are a good many cattle

kept, there is usually a leather trade and it is this part of Australia which turns the hides into



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Dairy Cattle in Australia.

boots and shoes for the people of the whole country. Why do you think that they do not export a great many of them ? Australia is a long way from the rest of the world and it would not be worth while to pay the freight charges on boots and shoes. We shall be hearing about the sheep-rearing regions in another chapter. A good many people who live in the towns of New

South Wales are employed in turning some of the wool from these sheep into clothing and blankets and rugs for the people of the rest of Australia.

Look at your map again and find Newcastle. This is a coal-mining town and supplies the factories and the railways with their coal so that some people you see, get their living by coal-mining. Others are engineers and builders, some make furniture from the trees cut down in the forest, but nearly all of them are making things for use in their own country. A great many of the people of Australia live in the towns, and the largest towns are found in this south-eastern corner.

The Queensland Coast.

Now let us look at the coastal plain of Queensland. This is further north than New South Wales and so it is hotter. We said that there were still a good many forests along this coastal strip. This is especially true in the north, but people have gradually spread northwards from Sydney and the southern part of Queensland is fairly well populated. Remember that these people came at first from England and that this part of the world is hotter than their homeland. At the beginning they were not used to this climate and found it difficult to work in the fields. But they are getting more

used to it each year and now they find that they can grow many of the things which we grow in India. Where the forest has been cleared there are plantations of sugar cane, cotton and maize. You know that all these crops belong to a hot climate. Nearly all the people of Queensland are planters or workers on plantations and their crops go to feed the people in the towns further south.

SUGGESTIONS FOR PRACTICAL WORK.

1. Trace a map of the east coast of Australia. Put in the Highlands. In it write the following products in the places where they are found. Timber (used for building), dairy cattle, coal, sugar, cotton, maize.

2. In another map put the towns of New South Wales, Victoria and Queensland. Put in also the railways connecting them. How many of these towns are ports? Try to think out a reason for the large percentage of ports in Australia.

3. Copy the population map of Australia. Colour the map in shades of purple and red. Remember that the densest population must have the darkest colour. Give a reason for the fact that most of the people of Australia live around the coast.

CHAPTER VI.

THE MURRAY–DARLING BASIN.

Turn to the map of the Murray-Darling Basin which you made as an exercise after reading

Chapter II. Look at the rainfall map which you made also. Notice that the rivers all rise on the Eastern Highlands and notice too, that there is quite a good rainfall at their source. This means that the rivers are not very likely to dry up, especially as the highlands get rain all the year round. Now look at your vegetation map and notice that the whole Murray-Darling Basin is coloured for temperate grassland. There is not enough rain for trees to grow, but if the grass dies off in the very hot weather the seeds have ripened before the old plants die and as soon as the rain comes again they sprout and soon the ground is green again. It is on this short grass that sheep are fed.

The Sheep Farms.

There are many sheep farmers in this part of Australia. When the first settlers came they landed near Sydney. For a long time they made their homes on the wet, east coast because they had not found a road through the Great Dividing Range. When at last they did find a way through the highland they saw a gently rolling country stretching away to the west, covered with grass. Soon sheep were sent out from home and the first sheep farms were started. At first these farms were very large indeed and even to-day the farmhouses may be as far as 50 miles apart. On the farm there lives the farmer and his family

and a number of young men who are learning the work of sheep-farming. It is often a lonely

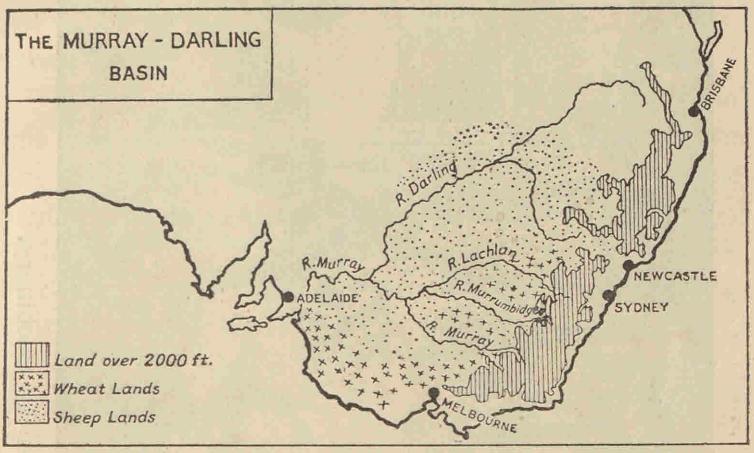


Fig. 10.

life, for their neighbours are so far away. Why are the farms so large? In India our sheep are taken out to graze each day and brought back to the village each night, but that is not how the sheep of Australia live. The flocks are allowed to wander where they will over the farm, which may be many square miles in area. As they eat up the grass in one place they move on to another. At certain seasons of the year the men round them up and bring them back to the farm buildings to have their wool cut off. We call this shearing the sheep. On the large farms this is done by machinery. A man holds the sheep



Shearing sheep by machinery.

under the machine and in a very short time all its wool is removed. It then passes on to the dipping tank, where each sheep is held in a bath of disinfectant. It is then allowed to pass out to the pasture lands.

The men who live on the farms must be able to ride a horse easily, for when the sheep have to be collected for shearing, branding or dipping they must be fetched in from many miles away. The men ride round the farm driving the flocks in front of them. They must also be able to pick out the weak ones and know how to doctor them. They must also be able to count the huge numbers of sheep accurately. You see that the life of an Australia sheep farmer is not an easy one. To-day the farms tend to be smaller and closer together so that the life is not quite so lonely.

The wool is sent down to the coast and shipped away to other countries to be woven into cloth. Some of it is sent to Sydney and the towns of the east coast, but Australia has so small a population that it cannot use more than a small part of the huge quantities of wool produced on her farms.

The Wheat Farms.

Although there are a great many sheep farms in the Murray-Darling Basin some people do not get their living in this way. Some of them grow wheat. Wheat is a cultivated grass and

therefore it is generally true that where grass will grow naturally, wheat can be cultivated as a crop. In the wetter regions, of the Murray-Darling Basin there are many wheat farms. Sheep will flourish on country which is too dry for wheat so that most of the wheat farms are on the eastern side of the basin. To-day the rivers are used for irrigation, especially the Murrumbidge and this means that still more land can be used for wheat.

Artesian Wells.

Wheat will grow wherever there is sufficient water and sheep can be reared wherever grass will grow all over the Murray-Darling Basin. But there are many parts where the rainfall is so uncertain that sheep have been known to be

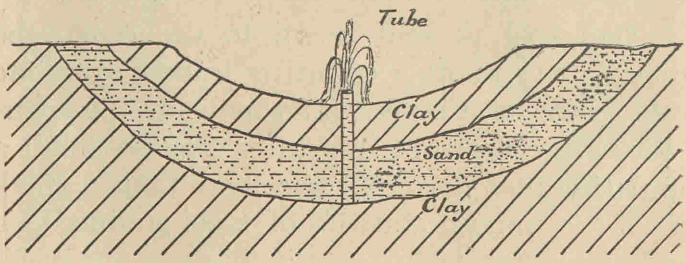


Fig. 11. Diagram of Artesian Basin.

reared successfully for 10 years and then a bad year has come, when the rainfall is too small and thousands of sheep have died and acres of wheat have withered before it has ripened. The rivers

always have water in them, as we saw at the beginning of this chapter. This means that where the water can be stored and used in times of difficulty the land will always be productive. If this water is to be used it must be carried from the river, in canals, to the farms. It is clear that if the farm is a great distance from the river it will be too expensive to make the canal. In those parts of the Basin which cannot get water from the rivers, artesian wells are used. Look at the diagram in Fig. 11 and you will see how such a well is formed. The rain falls on the hills and sinks into the ground until it reaches the layer of impervious rock clay. That is a long word but it only means a rock which will not let water pass through it. The water then flows along underground on the top of the impervious layer. When it reaches the lowest part of the bed it collects. If the farmer bores a hole anywhere over this area the water will flow out over the surface of the ground. Many sheep farmers water their flocks by means of artesian wells. It is very fortunate that in this dry part of Australia the beds of rock are arranged in such a way that it is possible to bore a hole and get water by this means.

SUGGESTIONS FOR PRACTICAL WORK.

1. In the map which you have already made colour the sheep lands—green and wheat lands—yellow. Remember that there are some sheep farms amongst

the wheat lands and some wheat farmers amongst the sheep lands, but the map in Fig. 10 shows you where **MOST** of the wheat and sheep farmers live.

2. Collect all the pictures which you can find showing you the life on an Australia sheep farm.

3. Make a model of an artesian well. Do this in different coloured plasticine.

CHAPTER VII.

THE MEDITERRANEAN LANDS.

Look at the vegetation map of Australia which you made as an exercise after reading Chapter IV and find the Mediterranean lands. You will remember that here the winters are the wet season and that the summers are very hot and dry. What do the people here do for a living? A good many of them grow wheat for the climate is quite suitable for this crop. It is sown in the autumn as soon as the rain has begun. The grain springs up readily with the winter rains and by the time that the hot weather begins the crop is ready for ripening. The dry, sunshiny early summer ripens it well and the farmer is able to cut his wheat without fear of its being spoilt by rain.

The Fruit Growers.

This same kind of climate is good for certain fruits. A great many of the people of Western

Australia and of Victoria get their livelihood by growing grapes, oranges, peaches, apricots and grape-fruits. We usually find that people who live in countries with a Mediterranean climate grow these kinds of fruit. They are all plants which can withstand drought.

Some people get their living by preparing these fruits for the market. If you go into any large store in Madras you will find that you can buy Australian raisins, sultanas, tinned peaches or apricots. The sun is very hot in this part of Australia in the summer months and when the fruit is gathered it is spread out in trays in the sun to dry. Some kinds of black grapes are dried in this way to make muscatels, some kinds of white grapes to make raisins and another kind of white grape to make sultanas. Australia is able to dry far more fruit than she can use herself and so she sends it to the more densely populated countries of the world. Now we said that the seasons in Australia were different from those north of the Equator. This means that while England and India are getting their winter, Australia is getting its summer. We buy a good deal of our dried fruit from the Mediterranean lands of Europe, but Australia is now able to send us her fruit just when the European fruit season has finished. This is a great advantage to her.

Some of the people of West Australia and Victoria get their living by tinning the apricots



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Fruit growing in Victoria.

and peaches which the fruit farmer grows. This work must be done in the towns and not on the farm. The farmer sells his fruit to the factory and the merchant there has it put into tins because it would not keep fresh on a long sea voyage. You must always remember that Australia is a long way from the great markets of the world.

The Gold Miners.

The parents of a good many of the people who now get their living by fruit farming first came to Australia to look for gold. This was first discovered in Victoria and great numbers of people came to the country. Later it was found right on the edge of the desert of Western Australia, [only 55 years ago] and there was another great rush of people to this difficult desert country. The desire for gold was great enough to make men overcome many hardships. Find Kalgoorlie and Coolgardie. These are still two of the chief gold mining centres of Australia.

Gold is a very heavy metal and sometimes when a river cuts its way through rock in which gold is found, some of the gold is carried down by the stream. As it is heavy it soon sinks to the bottom of the bed of the stream. When men first found gold in Australia it was in small fragments in the beds of dried upstreams. By washing the sand of the river-bed it was easy to separate out

the heavy metal from the comparatively light sand. The first men to arrive often became rich with very little trouble. Then more and more men came, hoping to get rich too. After a short time all this river-bed gold was washed out and many of the later comers got little or nothing. They turned to some other way of getting their living and many of them began growing fruit and so the western part of Australia was colonised. To-day, men have carried a pipe-line with water right into the desert from the coast, and the gold is being obtained from the rock. This means that expensive machinery must be used and men no longer hope to get rich suddenly by finding a great lump of gold in a river-bed. The gold mines of Coolgardie and Kalgoorlie are like the mines at Kolar.

SUGGESTIONS FOR PRACTICAL WORK.

1. Go to some large store in your nearest town and count the number of things which come from Australia. When you come home make a list of these things and write their names in a map of Australia in the places where they were produced.
2. Read all that you can about wheat and how it is grown.
3. Read the story of the discovery of Australia in your library period. You will find many interesting things in this story. Try to understand the hardships which the first explorers had to face.

CHAPTER VIII.

THE STRUCTURE AND RELIEF OF AFRICA.

Let us look at the map of Africa. Always use the best physical map which you can get. Notice that a very large part of the continent is plateau-land. See how many plains you can find. There is a narrow fringe of coastal plain on the east coast and another along the coast of the Gulf of Guinea. Find both these on your map. The whole of the rest of the country consists of plateau-land. This is like the plateau of Western Australia and also of the Deccan. Some people believe that at one time Africa and India and Australia were all part of a great continent, called Gondwanaland, parts of which have now sunk below the waters of the Indian Ocean.

Some parts of the plateau are higher than others, as you can see by looking at the map, the east and the south are higher than the west and the north. But the whole of the continent suffers from one great disadvantage due to the plateau formation. When rivers cross a plateau-land to reach the sea they must pass from the plateau to the plain over waterfalls. In our own country this is true. The Cauvery crosses the edge of the Mysore plateau by the Sivasamudram Falls. These falls are more than 400 ft. high and no ships could possibly pass up

or down the river over them. This is true of all the rivers of Africa. In the north, the plateau is not so high, so the waterfalls are not very big, but those on the Nile are large enough to prevent steamers using the river from Khartoum to Wadi Halfa. Find these places on your map. There are important falls on the Congo, and the Zambesi. Neither of these rivers can be used for navigation because of the falls. The smaller rivers of South Africa have the same difficulty. If rivers cannot be used for navigation it means that one easy means of travel is lost to the people of that country. In Africa it has meant that men from outside the continent have not been able to travel far inland from the coast until quite recent years. Many parts of Africa were quite unknown to the rest of the world until men learnt to build railways during the last century. There are several reasons for this, but remember that one of them is the structure of the country.

There is one other important and interesting fact about the structure of Africa about which you must learn. Look again at your map and find the following lakes. Lake Nyasa, Lake Tanganyika, Lake Edward, Lake Albert, Lake Rudolf. Notice that all these lakes are long and narrow in shape. They lie at the bottom of what we call a **Rift Valley**. Look at the map in Fig. 12 and you will see that there are two branches to this Rift and that the Red Sea lies in it as well

as the African Lakes. Let us try to see what we mean by the term Rift Valley.

Sometimes we talk about fold mountains, like the great Himalayas of our own country. These have been formed by the crumbling of the earth's crust by pressure from within. This folding can only take place when the rocks are young and soft. In North Africa you can find the Atlas Mountains. These are fold mountains formed when the young soft rock was pressed up against the old, hard rock of the plateau. Most of Africa consists of very old, hard rock, like our Deccan. When this is acted on by pressure it is too hard to fold, and it breaks along some line of weakness. We call these cracks **Faults.** When a fault occurs the rocks on one side of it drop down lower than those



Fig. 12.
The Great Rift Valley.

on the other. Sometimes there are two faults, parallel to each other. When this happens the rock between the two sinks down, leaving a deep trough. This trough is called a Rift

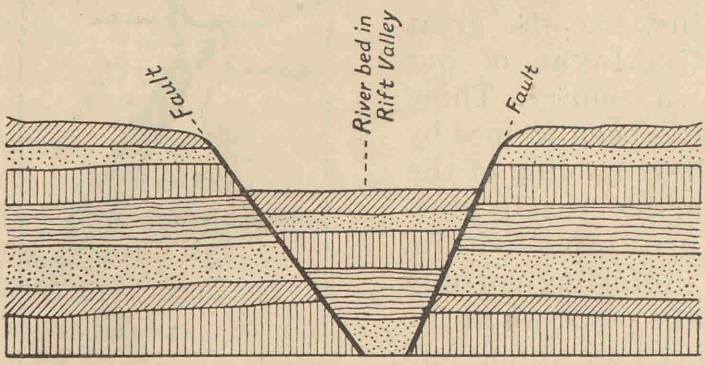


Fig. 13. Diagram of a Rift Valley.

Valley. What you need to remember is that such a valley is not caused by the work of a river, but by movements of the earth's crust. It is very often filled with water because we know that water always flows into low-lying places. That is why this valley has the Red Sea and the long narrow lakes in it. Notice the difference in the shape of Lake Victoria and Lake Tanganyika. Lake Victoria lies on the top of the plateau, while Lake Tanganyika lies at the bottom of the Rift Valley.

The Relief of Africa.

Look once more at the physical map of Africa. We said before that the highest part

of the plateau was in the south and east. Find the mountains of Abyssinia, the Highlands of

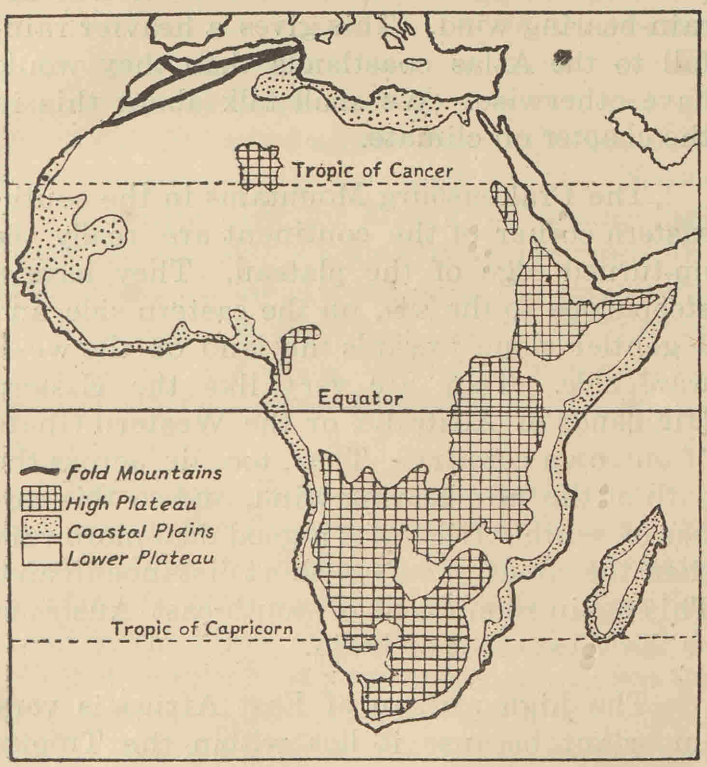


Fig. 14. Structural sub-divisions of Africa.

Kenya and the Drakensburg Mountains. These are all over 5000 ft. high, while the whole of the continent south of the Congo Basin is over 2000 ft. high, with the exception of the narrow eastern coastal plain.

In the north-west we find the folded Atlas Mountains, over 5000 ft. high. These are important for they lie across the direction of the rain-bearing wind. This gives a heavier rainfall to the Atlas coastlands than they would have otherwise. We shall talk about this in the chapter on climate.

The Drakensburg Mountains in the south-eastern corner of the continent are really the up-turned edge of the plateau. They have a steep slope to the sea, on the eastern side and a gentler slope towards the land on the westward side. They are very like the Eastern Highlands of Australia or the Western Ghats of our own country. They, too, lie across the path of the rain-bearing wind, and so this corner of south Africa gets a good deal more rain than the country only a short distance inland. This again reminds us of south-east Australia or the West coast of India.

The high plateau of East Africa is very important because it lies within the Tropics but is so high above sea-level that European farmers can live and work in Kenya and Tanganyika Territory. Why is this? Because the temperature is so much lower than it would be at sea-level; it is almost like that of their own countries. We shall hear more of this in a later chapter.

The Rivers of Africa.

There are many long and important rivers in Africa. The Nile has been known in the lower part of its course since very early times. This is a river which is in some ways very like our Indus. It flows through a desert and yet has water in its bed all the year. The people of Egypt depend on it for their living. Notice that it begins near the Equator, flows through Lake Victoria and is joined by two streams, the Blue Nile and the Atbara from the mountains of Abyssinia. After this it gets no more tributaries for it is flowing through the desert. It ends in a delta, which has been cultivated for many centuries.

The Congo flows through central Africa and crosses the Equator twice. This is an important river, for it always has plenty of water in it and is very useful as a means of getting about in the forest through which it flows. If you look carefully at your map you will see the falls marked quite close to the coast. This means that ships from the ocean cannot get very far up its course, though smaller boats can be used above the Falls.

The Niger is another long river which flows in tropical Africa. For a long time people only knew it in parts. It was because men were trying to find out where the Nile and the Congo

and the Niger had their source that a great deal of this part of Africa was explored. You should read any stories of exploration that you can find in the library.

In the southern part of Africa the most important river is the Zambesi. This river, also, was the cause of a good deal of exploration, and in trying to follow it up to its source men learnt much about this part of Africa.

Notice that south of the Zambesi the rivers are short and not very important. They flow through the drier part of S. Africa and very often there is no water in them in the hot season, though they may come down in flood when the rains begin.

The Coastline of Africa.

Look carefully at your map of Africa and try to find any good harbours or large ports. There are very few, are there not? Can you see a reason for this? Generally the best harbours are found at the mouths of large rivers which flow to the sea through estuaries. There is one in Africa which does this. The Congo has so much water in it that its current is strong enough to carry the silt away out to sea, and so ships can come up its estuary to Matadi. Find this port in your map. The Nile and the Niger flow to the sea through deltas, and so no good port can grow up at their mouths. The Zambesi forms a

delta too. We said that there was little coastal plain, and we have seen that where there is a narrow one, the rivers are building up more and more land by deltas both on the East and the West coast. In the rest of Africa the plateau comes so close down to the sea that it is impossible to find a good harbour. This is a great disadvantage to the country, and is one of the reasons why it was so long before it was explored.

SUGGESTIONS FOR PRACTICAL WORK.

1. Make a model of Africa as you did for Australia.
2. Label your highlands as you did in the model of Australia.
3. Trace a map of the basin of each of the following rivers, the Nile, the Congo, the Niger and the Zambesi. Remember that the basin includes the main river, all its tributaries and the highlands in which all the rivers rise.
4. Make a model of a rift valley. Look at the diagram in Fig. 13. Make your model in layers of different coloured plasticine.
5. Put a cloth on a table and on one side of it put a heavy book. Let the cloth represent the layers of soft, young rock and the book the old hard rock. Now press the cloth slowly up towards the book, which you must keep in its place by holding firmly. What happens to the cloth? Draw what you see. This shows you in a very simple way how the Atlas Mountains were formed by being pushed up against the old plateau of North Africa.

CHAPTER IX.

THE CLIMATE OF AFRICA.

The climate of Africa is more interesting than that of most other continents. Look at your map and notice where the Equator crosses it. Now find the latitude of the most northerly and the most southerly points of Africa. What do you find? The Equator is almost exactly half way from the north and south coasts, is it not? This means that it is likely that there will be places with the same kind of climate north and south of the Equator. We shall see how far this is true as we read this chapter.

Temperature.

Let us look at the climate of Africa in the same way as we looked at the climate of Australia. We will talk about the temperature, winds and rainfall separately and then divide the country into climatic regions, taking all three into account.

We have said that the Equator crosses the country, now find the two Tropics. This shows you how much of the continent lies within the Tropics. Now turn to the map of India and find latitude 35° N. It passes through Kashmir. This shows us that no part of Africa lies further away from the Equator than does Kashmir. This tells us something of the temperatures

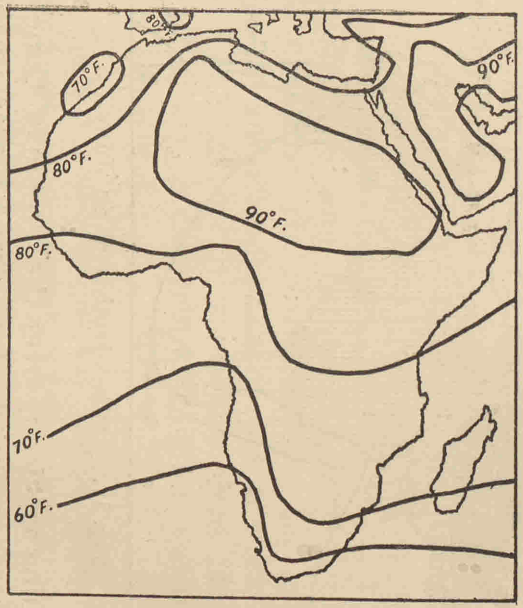


Fig. 15. Isotherm Map of Africa.
Northern Summer—July.

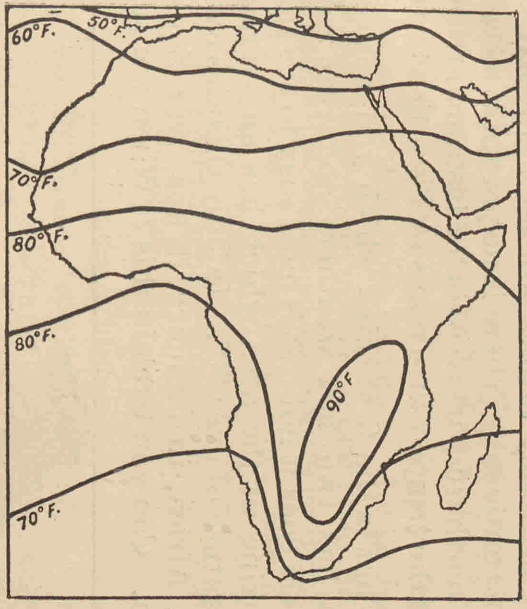


Fig. 16. Isotherm Map of Africa.
Southern Summer—January.

that we are likely to get. On the whole Africa is a hot continent. There is no part of it so cold as the northern part of Asia for instance. Now look at the temperature maps in Figs. 15 and 16.

What is the first thing which you notice? Africa has two hot weathers and two cold weathers does it not? It is most easy to see this by looking at the area which has an average temperature of over 90°. In July this lies over North Africa, in January it lies over South Africa. Can you explain this? When the sun

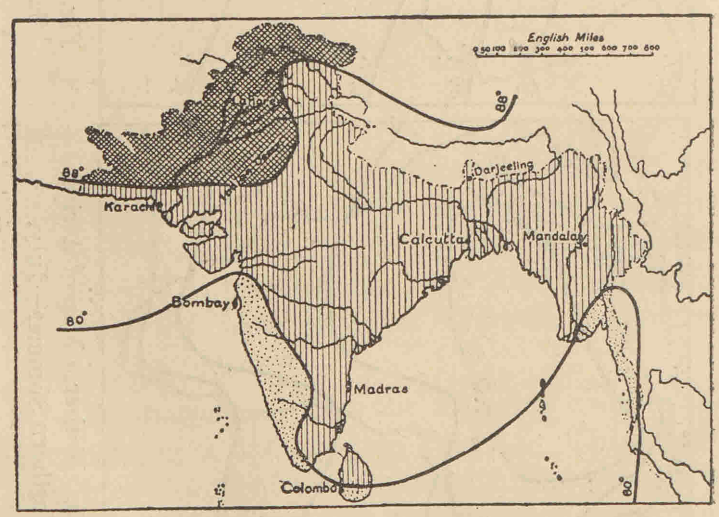


Fig. 17. India—Isotherms in June.

is shining vertically over the Tropic of Cancer, the Northern part of the world gets its hot weather, does it not? This is the time of year

when we get our hot weather. Look at the map in Fig. 17 and see how our hot-weather temperatures compare with those of Africa. We generally call the months of June, July and August the Northern summer. But in January the sun is shining vertically overhead near the Tropic of Capricorn so the southern part of the world gets its hot-weather then. The months of December, January and February are often called the Southern summer. Try to remember these two seasons.

There is another thing which you can learn by looking at the temperature maps. Notice that the very hottest area, both north and south of the Equator does not reach the sea coast. In the north it stretches from east to west and in the south from north to south. Can you explain this? The sea always keeps the land cool in summer and so the "Isotherm", that is the line showing the temperature, is always parallel to the coastline. In North Africa, the greatest area of land stretches from east to west, while in South Africa it stretches from north to south. Try to understand this, for it is true all over the world.

When you look at the temperature maps you must always remember that they are drawn as if all the land were at sea level. The temperature drops for every 300 feet of height 1° F.

What difference will this make to the temperatures of Africa as shown on these maps?

It will not make a great deal of difference in the northern part, for that is not so high, but in South Africa there is no land which is as hot as the Sahara, for it is all much higher therefore the actual temperature will be lower. This is important, for Europeans have settled in this part of Africa because the climate is not so very different from their own. It would be impossible for them to bring up their families there if the temperatures were as high as they seem to be from the Isotherm map.

There is one more thing for you to notice from the Temperature map. We sometimes say that the nearer a place is to the Equator the hotter it is. This is not quite true. You can see from the map that the land along the Equator is never as hot as the Sahara desert. Its temperature is always about 80°. So you see that what we ought to say is, that the nearer we get to the Equator the less cold weather we get. There is never a cool season at sea-level, along the Equator. We shall find a reason for the fact that the hottest regions lie along the Tropics and not along the Equator, soon.

SUGGESTIONS FOR PRACTICAL WORK.

1. Copy the maps in Figs. 15 and 16 and colour them in the same way as those of Australia. Over 90° red,

70° to 90° pink, 50 to 70° dark yellow, below 50° light yellow. Compare these maps with the temperature map of Australia and write down any differences which you notice.

2. Draw graphs of the temperature of the following towns.

Luluaburg. A town in the Congo Basin.

Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
76	76	76	77	77	76	77	76	76	76	77	77

El Obeid. A town on the southern edge of the Sahara desert.

70	75	82	89	90	88	83	82	84	85	79	72

Alexandria. A town on the north coast.

56	57	60	64	69	73	77	78	76	73	66	59

Cape Town. A town on the south coast.

70	70	68	63	59	56	55	56	58	61	64	68

Windhoek. A town near the Kalahari desert.

74	72	70	66	60	56	56	59	66	70	72	74

Salisbury. A town on the eastern plateau.

70	69	68	66	61	57	56	60	66	71	71	70

3. When you have drawn all six graphs spread them out in front of you and write a description of them by filling in the blanks in the following sentences.

..... has nearly the same temperature all through the year. It lies near to the ..... .

At El Obeid the highest temperatures come in the months of ..... and ..... There is a second rise in temperature in ..... This town lies near to the Tropic of ..... The sun is vertically overhead at this tropic in ..... .

In Alexandria the highest temperatures are found in the months of ..... and ..... This town has the ..... summer.

In Cape Town the highest temperatures come in the months of ..... and ..... This town has

the ..... summer. The shape of this graph is the same as the shape of the graph of Alexandria but upside down. This is because the seasons are ..... .

The highest temperatures at Windhoek come in the months of ..... and ..... This town lies near the Tropic of ..... The sun is vertically overhead at this tropic in .....

Salisbury has the ..... summer. Its temperatures are ..... than those shown on the Isotherm map because it lies on the ..... 3000 ft. above ..... .

CHAPTER X.

THE CLIMATE OF AFRICA. WINDS AND RAINFALL.

Winds.

The winds of Africa are very interesting because if we can understand them we shall be able to understand most of the winds of the world. The important things to remember are, that air always flows towards regions of low pressure and that hot or very wet regions are usually regions of low pressure.

In the last chapter we saw that the hottest belt of Africa is in the north at one time of the year, and in the south six months later. If air flows towards regions of low pressure we should expect the winds to blow towards these

areas of heated land. This is what does happen. Look at the map in Fig. 18 which shows you the directions of the winds in the southern

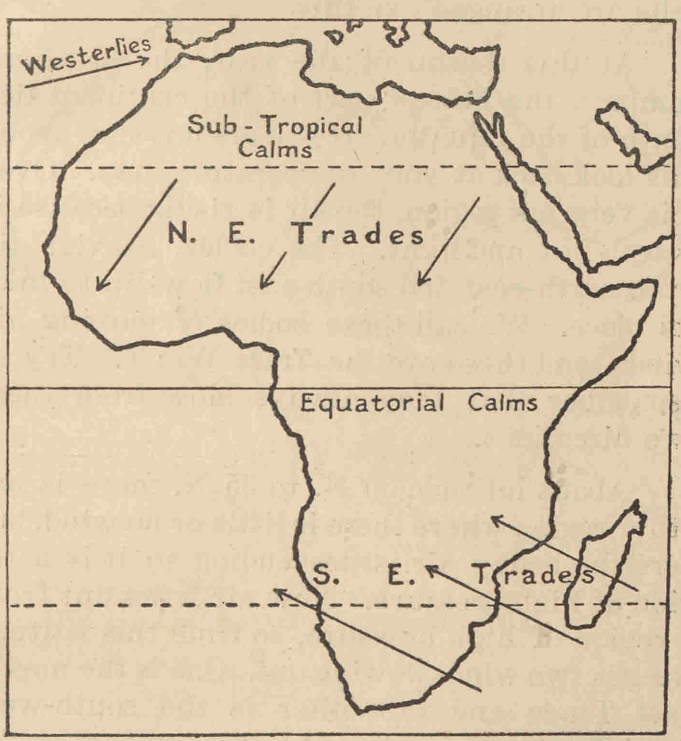


Fig. 18. Winds of Africa—Southern Summer.

summer. You will see that all over the continent north of the Equator, the north-east Trade winds are blowing. From about the Equator to latitude 10° S. no winds are shown at all and south of this latitude the south-east Trade

winds are blowing. In the north-western corner of Africa you can see a westerly wind shown. Now let us try to see why the wind belts are arranged like this.

At this season of the year, the southern summer, the hottest part of the continent lies south of the Equator. If you are not sure about this look back at your temperature map. Over this very hot region, the air is rising because it is both hot and light. The cooler, heavier air from north-east and south-east flows in to take its place. We call these bodies of moving air winds, and these are the **Trade** Winds. Try to remember that they always blow from these two directions.

About latitude 30°N. to 35°N. there is another region where there is little or no wind, but here the heavy air is descending so it is a region of high pressure. Now air flows out from a region of high pressure, so from this latitude we get two winds flowing out. One is the north-east Trade and the other is the south-west Anti-Trade Westerly. At this season of the year this south-west wind just reaches Africa. It is important, for as you can see it crosses the Atlantic ocean and so brings rain to the north coast of Africa.

Now turn to the other wind map, the one for the northern summer. You can see at once

that the region of low pressure and no winds has moved northwards. The north-east Trades

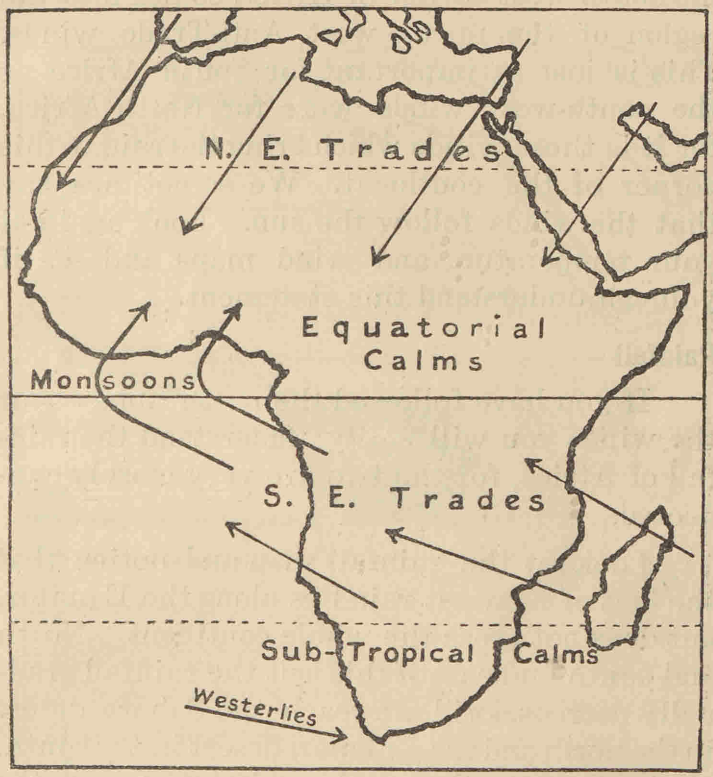


Fig. 19. Winds of Africa—Northern Summer.

now blow over the northern part of Africa right up to the coast. Some of the south-east Trade winds have crossed the Equator and have changed their direction from south-east to south-west. This always happens when winds

cross the Equator. The region of High Pressure is now from lat. 30° S. to lat. 35° S., so now the south-west corner of Africa comes into the region of the north-west Anti-Trade winds. This is just as important for South Africa as the south-west winds were for North Africa, for it is these winds which bring the rain to this corner of the continent. We sometimes say that the winds follow the sun. Look again at your temperature and wind maps and see if you can understand this statement.

Rainfall

If you have followed the paragraphs about the winds you will easily understand the rainfall of Africa, for the two are very closely connected.

Look at the rainfall map and notice that the belt of heaviest rain lies along the Equator, but does not cross the whole continent. North and south and east of this belt the rainfall gradually decreases till we reach the Sahara desert in the north and the Kalahari desert in the south. Notice too, that the northern desert crosses the whole continent but that the southern one only appears on the western side of it. North of the Sahara and south of the Kalahari the rainfall increases again. The island of Madagascar has more rain on the east than on the west and there is slightly more rain on the Abyssinian

Highlands than on the surrounding country Now let us try to explain why the rain is distributed in this way.

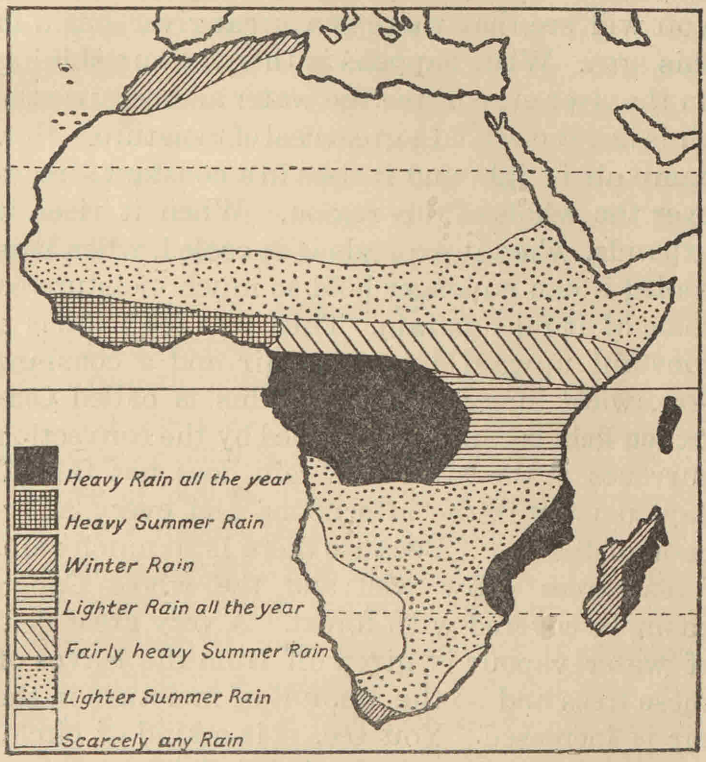


Fig. 20. Rainfall Map.

Turn to your wind maps and compare them with the rainfall map. The area of greatest rainfall comes into the Equatorial belt of calms during the southern summer and during the northern

summer too. This rain cannot therefore be brought by the winds. If you look at your temperature map you will see that this region is always hot and if you look at your physical map you will see that there is a great river basin in this area. What happens is this, the sun shining on the river evaporates the water and because the air is hot it can hold a great deal of moisture. Hot, damp air is light and it rises in a constant stream over the whole of this region. When it rises it expands, when it expands it is cooled, when it is cooled it can no longer hold so much moisture so some of it falls as rain. Thus you see there is a constant upward stream of air and a constant downward stream of rain. This is called **Convection Rain** because it is caused by the convection currents in the air. This rain does not fall all day, usually in the afternoons and every afternoon of the year. Because there is so much rain, forest trees grow well and the whole Congo basin is covered with forest. A very great deal of water vapour is given off from the leaves of these trees and so the amount of moisture in the air is increased. You see, it is a kind of circle. Because there is a good rainfall there are many trees, because there are many trees the amount of water vapour is increased, because the water vapour is increased there is more rain.

In the wind map for the northern summer you can see that a south west wind blows over

the Guinea coast. This wind is sometimes called a monsoon wind because it only blows during the hot season and because it blows towards a very heated land. You can see that it blows over a hot ocean and therefore it is likely to bring with it much moisture, so the Guinea coast gets more rain during the northern summer. It is on the edge of the convection rain belt so it gets some rain during the rest of the year too. Most of its rain is monsoon rain, like ours in India and comes at the same time.

Why does the belt of heaviest rainfall not stretch right across Africa? To find the answer to this question we must look at the physical map. On the east of the Congo Basin the land rises to over 5000 ft. Now we know that with each rise of 300 ft. there is a drop in temperature. This means that the eastern plateau is a good deal cooler than the Congo Basin. Cool air cannot hold so much moisture as hot air and therefore when it rises and expands it cannot drop so much rain, because it has not got so much moisture. The rain falls every afternoon but not in such heavy showers. The coastal plain gets some rain from the south-east Trade wind as well as the convection rain.

North and south of this central belt of convection rains all the year round, we have a belt which gets its rain in the summer only. In the

northern summer the northern part gets hot and we get a belt of convection rain about in lat. 10°N. to 15°N. This is explained in exactly the same way as the rainfall of the Congo Basin, but because the hot season is shorter than in the Congo, the total amount of rain is less. In the southern summer the land south of the Equator is hottest and we get a belt of convection rain in lat. 10° S. to 15° S.

Now let us try to see why we get deserts in Africa. Look again at your wind map and notice that the Trade winds blow over the deserts all the year. Look too at your maps of Australia and notice that the south-east Trade wind blows, over the Australian desert all the year. These deserts are sometimes called the Trade Wind Deserts. Now notice that a Trade wind always blows from a cold region towards a hot one, because it blows from the high latitudes towards the low ones. This means that it is getting hotter all the time. Will it be likely to bring rain? No, for rain only falls if the air is cooled. Remember that a Trade wind, wherever it blows, will not bring rain unless it is cooled in some way first.

Now look at the winds blowing over the Sahara desert. Will they be cooled? Before they reach Africa they have blown over Persia, a hot, dry country; over Arabia, a hot dry country;

over the narrow Red Sea, too narrow to cool the wind and then over the whole of North Africa. As they blow they get hotter and hotter and instead of dropping their moisture as rain they tend to pick it up. That is why there is a desert over the whole of North Africa.

In South Africa the south-east Trade wind blows all the year. Is this cooled in its passage? Yes. Instead of blowing over hot, dry lands before it reaches Africa it blows over the Indian Ocean and picks up more and more moisture as it gets warmer and warmer. When it reaches the high, south-east coast of the African plateau, it rises to cross it. When it rises it expands, when it expands it is cooled, when it is cooled it can no longer hold all its moisture so it drops it on the seaward slopes of the plateau. By the time it reaches the west coast it is a dry wind, so we get the desert of the Kalahari, on the western side of Africa, south of the Equator. If you compare the map of Australia with that of South Africa, you will see that the Kalahari desert lies in the same relative position as the Great Australian desert and that the same causes act in both cases.

In the north-western corner of Africa we have a region of slightly increased rainfall. If you look at your wind maps again you will see that in the northern summer this region is in the

path of the Trade winds. It does not get rain in this season. In the winter it comes into the path of the Westerlies and as these have travelled across the Atlantic ocean, they bring with them plenty of moisture and drop it as they rise to cross the Atlas Mountains. We call this part Mediterranean Africa.

In the same way the south-western corner of the continent comes within the Trade winds in the southern summer and that is a hot, dry season. In the winter this region comes within the Westerly belt and so gets winter rain. It is also sometimes called the Mediterranean region of South Africa because it has the same kind of climate as that of the region around the Mediterranean Sea.

You see now that we have in Africa a central belt of convection rains, two belts of summer rainfall, two regions of desert and two regions of winter rains. In addition we have an east coast region with rain all the year like the east coast region of Australia.

SUGGESTIONS FOR PRACTICAL WORK.

1. Copy the wind maps in Fig. 18 and 19 on to one map. Colour the area which has trade winds red, the area which has Westerly winds blue and leave blank the area which has no winds at all. If you do the northern summer map first and then repeat the colouring on the same map for the southern

summer, you will find that you have two purple areas, two dark areas (where you have used your red chalk twice) two pink areas, (where you have only used it once) and a blank area. This map should help you to understand the duplication of the climatic belts north and south of the equator.

2. Draw graphs for the rainfall of the following towns.

Luluaburg. A town with convection rain all the year.

Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
7·2	5·4	7·9	6·1	3·1	0·2	0·1	2·5	6·5	6·6	9·1	6·6

El Obeid. A town with summer rain (northern summer).

0	0	0	0	0	1	4	5	4	1	0	0

Alexandria. A town with winter rain (northern winter).

2·1	0·9	0·5	0·2	0	0	0	0	0	0·3	1·3	2·6

Cape Town. A town with winter rain (southern winter).

0·7	0·6	0·9	1·9	3·8	4·5	3·7	3·4	2·3	1·6	1·1	0·8

Salisbury. A town on the Eastern plateau with rain from the south-east Trades.

7·5	7·4	4·5	1·0	0·5	0·1	0	0·1	0·3	1·1	3·7	5·8

Kimberley. A town in the rain shadow of the Drakensburg.

2·5	2·9	2·9	1·4	0·8	0·2	0·3	0·2	0·6	1·0	1·5	1·9

3. Copy the rainfall map and colour it in the same way that you coloured the rainfall map of Australia. The area with rain all the year green, rain in the hot weather blue, rain in the cold weather red, no rain at all yellow.

CHAPTER XI.

THE CLIMATIC REGIONS AND THE NATURAL VEGETATION OF AFRICA.

As we said about Australia, the climate and natural vegetation are very closely linked so we shall take them together in one chapter.

The Equatorial Forest Lands.

If you look at the vegetation map and the rainfall map together you will see that the Congo

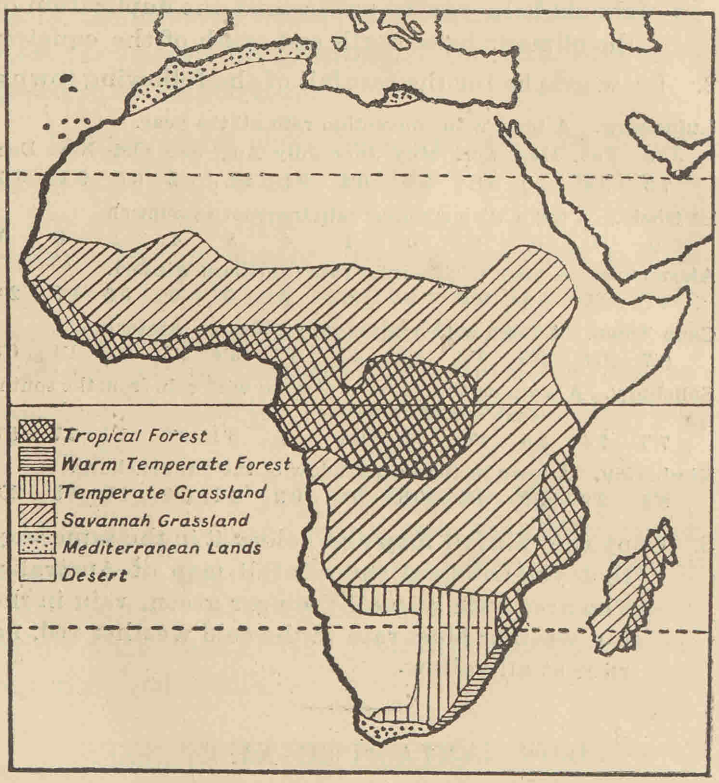


Fig. 21. Vegetation Map of Africa.

Basin and the Guinea coastlands are marked as having the heaviest rainfall and also as being clothed with dense forest. You will remember that in this region there is very little difference

in temperature through out the year; the rainfall is heavy and evenly distributed throughout the year in the Congo basin and that on the Guinea coast there is a specially heavy rainfall in the summer months from the monsoon wind. This is the kind of climate in which trees are likely to grow. They are very like the ones we get on the west coast of India, rubber, mahogony, ebony and oil palms are the most important. In the Congo forest there are some clearings, especially on the highland border, where copper and other important minerals have been found. In most of this area the forest is very dense and it is impossible to make roads. The river can be used for carrying passengers and goods, but because of the falls near the mouth all goods have to be changed from river boats to railway and from the train to ocean-going steamers before they can be exported.

The Guinea coastland forest has been cleared much more, because it is so much easier to reach from the sea. The palm oil tree gives a very important substance, for the palm oil can be sold in Europe for a good price. Some people collect the oil from the wild trees in the forest, but now plantations are being made like the rubber plantations of Ceylon and large quantities of the oil are exported from Lagos and the other ports of this coast. In other places cocoa, cotton and ground nuts are grown. The cocoa

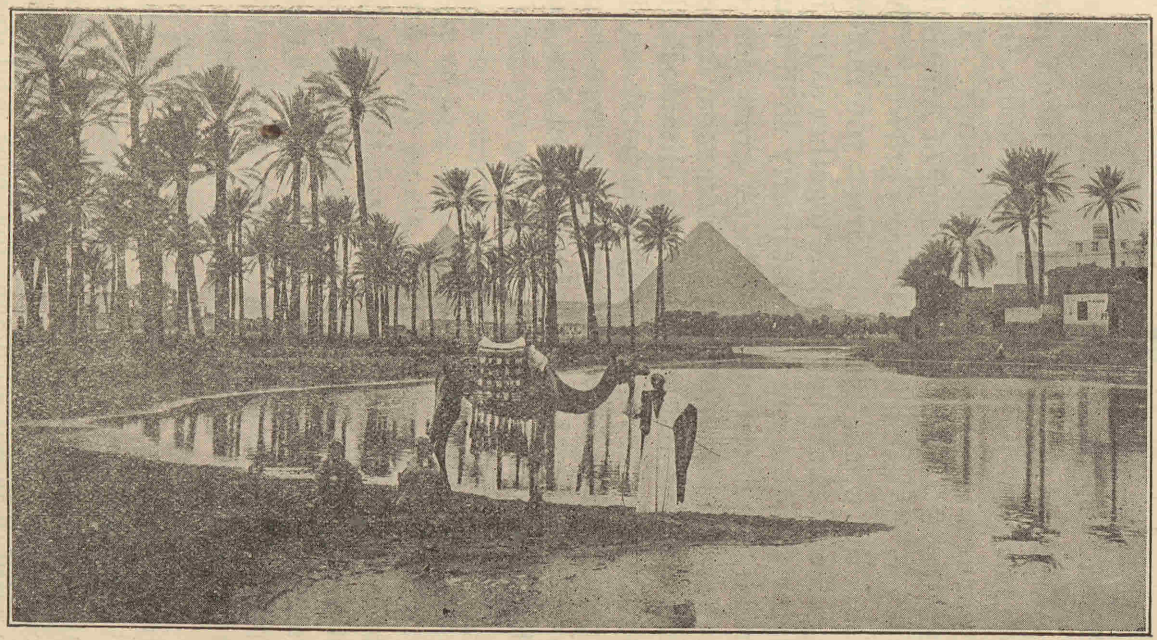
is for export but most of the ground nuts and the cotton are used in the country.

The Savannah Grasslands.

We said that north and south of the Equatorial forest belt, the rainfall decreased gradually. This is the region of the summer rains and east of the forest belt there is a region of constant rainfall, but the total amount is less than in the Congo basin and the Guinea coast. In all these areas the natural vegetation is long, rich grass. This is the Savannah land of Africa. It is the land of the cattle farmer and the big game hunter, for it is here that all the large wild animals are found like the lion and the giraffe.

The Desert Lands.

We have already explained why there is no rain in these lands. The days are very hot and the nights seem very cold, there is no running water and only a few "water holes" where underground water is to be found. The few men who cross the deserts must do so along routes where such springs are to be found or they will die of thirst. Wherever there is a little water from an underground spring there is an **Oasis** where a few date palms will grow and where perhaps a village may spring up round the well.



An Oasis.

The Warm Temperate Forests.

Along the south-east coast there is an area which has a fairly high temperature and rain all the year from the south-east Trade winds. This is very like the south-eastern corner of Australia and it has the same kind of forest growth. We call this the warm temperate forest, you remember. The trees are not so close together as in the Equatorial forest and it is not nearly so difficult to make roads through them. A great deal of this forest has been cleared to make room for tea, sugar and plantains, so you see the climate is like parts of our own country. Further north, as the temperature increases the forest gets more dense and on the coastal belt we have forest like that of the Congo Basin.

The Temperate Grasslands.

When we were talking about the south-eastern corner of Australia we said that on the western side of the mountains there was an area of rainshadow. In South Africa the same thing happens. The south-east Trade winds drop most of their moisture on the seaward slope of the Drakensburg. As they rise to cross the mountains they leave their moisture and blow over the western slope as comparatively dry winds. This area is higher than the Murray-Darling basin and so the temperature is lower. The rainfall is not sufficient for trees, and grass

is the usual covering of the ground. This country is called the High Veldt. We shall hear more about it in a later chapter. This is the Temperate grassland of South Africa. There is no Temperate grassland in North Africa for the desert stretches right across the country in these latitudes.

The Mediterranean Lands.

If you look at your rainfall map you will see that there are two regions with winter rains, one north of the Equator and one south of it. These have a Mediterranean climate with hot dry summers and warm wet winters. The natural vegetation is evergreen forest, with trees having thick leaves so that not too much water is lost in the dry summers. In the northern area there is still a good deal of forest on the Atlas Mountain, but along the coastal plain most of it has been removed to make way for crops of vines and oranges and other Mediterranean plants. The same thing has taken place in the south-west corner of Cape Colony where the South African oranges, which we can buy in the fruit market of Madras, are grown.

SUGGESTIONS FOR PRACTICAL WORK.

1. Copy the map in Fig. 21. Colour it in the same way as the map of Australia. Equatorial forests—dark green. Warm temperate forests—light green.

Tropical grasslands—dark yellow. Temperate grasslands—light yellow. Mediterranean lands—red. Deserts—orange.

2. Write a description of your temperature, rainfall and vegetation maps. Be sure to mention the two sets of similar regions, north and south of the equator.

3. Pay a visit to the nearest Zoological Gardens and look at the animals of the grasslands of Africa. Try to see how they are adapted to life in the grasslands.

CHAPTER XII

THE NILE LANDS.

Look at your map of Africa and find the river Nile. You have already made a map of this river and you know that it flows from the Eastern Highlands, near the Equator, to the Mediterranean Sea. If you look at the rainfall map and the vegetation map you will see that it passes from a region of constant and heavy rains through a region of summer rains to a region of pure desert. Just before it reaches its mouth it passes through a region with a very small winter rainfall. Its two chief tributaries flow from the Abyssinian Highlands a region of summer rains. The river passes from Tropical grassland with a good many trees, through poorer grassland to desert. It has always been important in the life of the people of northern Africa. Part of

it can be used for navigation, and for centuries the ivory and other products of equatorial Africa have found their way to the rest of the world along this route. Its chief importance lies in the fact that its waters have been used to make crops grow in the desert since history began.

We shall begin our study of this great river in Egypt and work backwards to its source. A great many people live in Egypt and almost all of them get their living by cultivating the soil. They can grow most of the crops which we grow in India, for the temperature is high, the sun is always shining in a country where there is no rain, water can be had easily from the river and there is a fresh supply of good soil every year when the river is in flood.

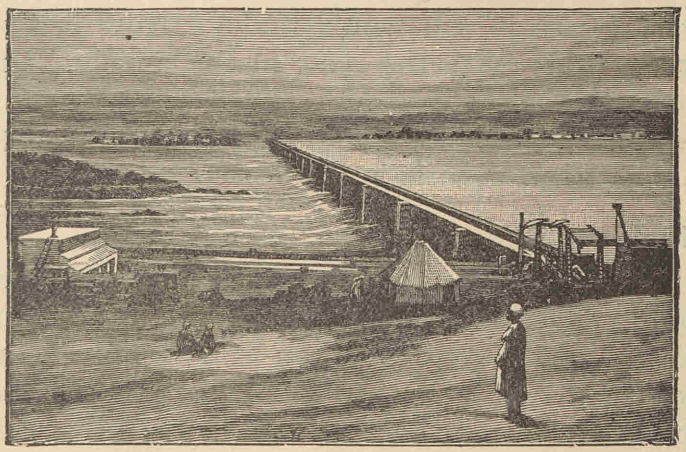
Before we can really understand the life of the people of Egypt we must know something of the Nile and its floods. The river begins in the region of constant rains near the Equator. This means that there is water in it all the year. After it leaves Lake Victoria it passes through a marshy region where a great many water plants grow in the river itself. This thick vegetation is called "sudd". It is often so thick that it has to be cut through before any boat can pass up the river. In this part of its course the river loses a great deal of water by evaporation but all the year round there is a constant stream of

water passing down the river bed from the central plateau. This is important because it means that even if the summer rains are poor the people of Egypt never starve.

The greater part of the water used in Egypt comes from the two tributaries, the Blue Nile and the Atbara. Find these on your map and notice that they rise in the region of summer rains. This means that they have much more water in them in July to October than during the rest of the year. It must have seemed a wonderful thing for the people of Egypt in the far off days before anyone knew about the summer rainfall on the Abyssinian Highlands, to see the waters rising year after year in the summer and falling again till they reached their lowest point in May. They never saw rain, they could not understand why the river became more full of water during the hottest months of the year, but they learned to use water so regularly provided for them by the Nile. When the flood water began to leave their fields they planted their crops of wheat or rice or sugar in the rich, fresh mud left by the river. These crops grew and ripened easily in the bright sunshine. Water was taken to them in short canals from the river when it was needed. Before the Nile reached its lowest point in the hot months of May and June, the crops were ready to be reaped. Many farmers still do this to-day but others are

able to use the water which has been stored up for them behind the great dam at Aswan. They do not have to wait for the flood water, so that they are able to get a winter crop as well as a summer one.

Look at your map and find Aswan. It is a town on the river and here a great dam has been built across the Nile. The flood waters are stored up behind the dam and then they are



Aswan Dam.

allowed to flow down the river during the dry season. This means that the people are able to get enough water to irrigate their crops not only during the floods of summer but during the dry winter months as well. During the summer the old crops of cotton, sugar, rice, millet and maize

are grown. Nowadays another crop can be sown on the same land. As soon as the first crop is reaped, a second one is put into the ground and watered by the irrigation waters sent down from Aswan. This second crop is usually wheat or barley.

The Nile delta is the most densely populated part of Africa, because it is easy to get a living from the soil. All along the river to Aswan the land is cultivated in a narrow strip, so that if you went to see it you would find a narrow belt of green fields with the river in the middle. On each side the sandy desert stretches away as far as you can see. It is a strange country, really a long, narrow oasis in the desert.

The Soudan.

Now let us go further up the river to Khartoum. This town is the capital of the Soudan, find it on your map and then look at the vegetation map and find out what kind of country the river flows through here. It is the savannah land of tall grasses and summer rains, is it not? Here some people are farmers but not so many as in Egypt. They use the water of the river to grow cotton. Find Sennar if you can, here another great dam has been built and the farmers of the Soudan can use the water to irrigate their cotton fields when the rainfall is not sufficient. Much of this cotton is sent away to Europe for

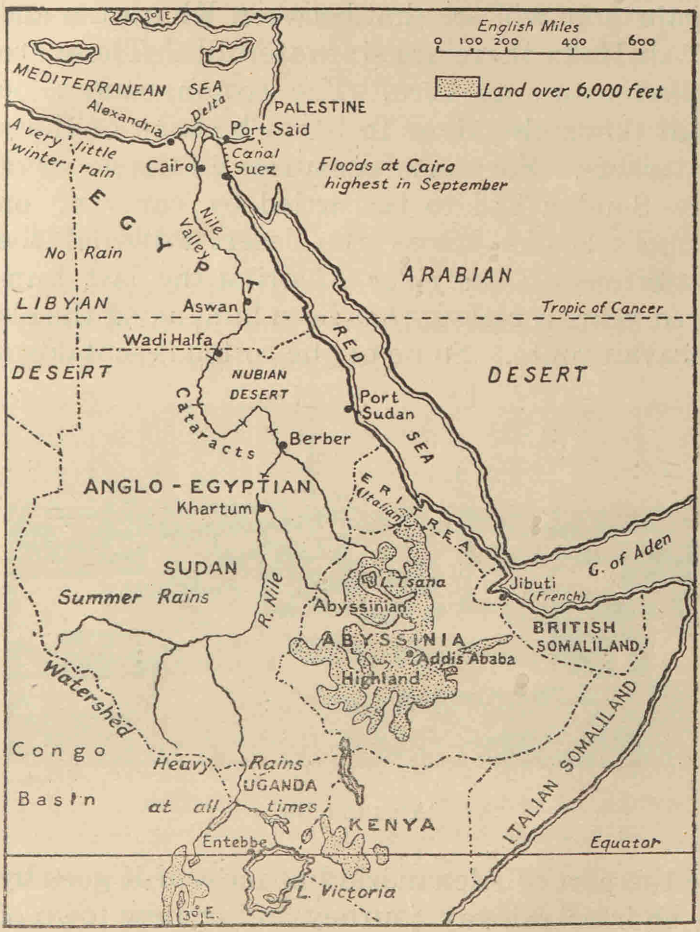
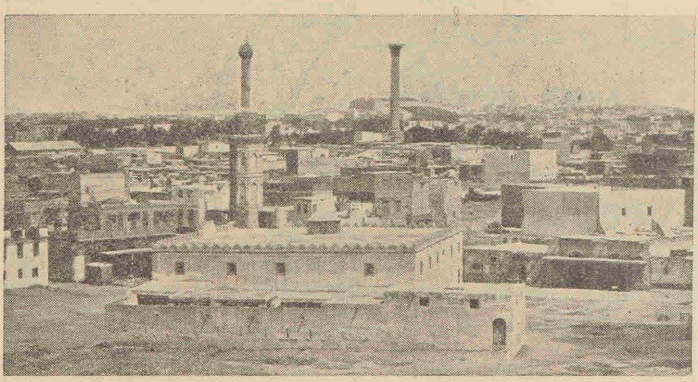


Fig. 22. The Nile Valley.

manufacturing into cloth. How does it reach the coast? If you look at the map of the river again you will see that between Khartoum and Wadi Halfa there are six waterfalls. These are called cataracts here. The cotton cannot be sent down the river in boats because of these cataracts. For many centuries all the goods of the Soudan had to be carried by caravan, on camel's backs across the desert to avoid the waterfalls on the river. During the last hundred years a railway has been built along the old caravan route. Some of the cotton is sent down



Alexandria.

to the port of Alexandria but most of it goes by a shorter railway journey to the new town of Port Sudan on the Red Sea. Find these two ports for they do almost all the export trade of the Nile Valley.

Some of the people of the Soudan get their living by keeping cattle. You will remember we said that in Australia the savannah grasslands were good for cattle rearing. Which part of the Soudan will be better suited to cattle, the north or the south? The south will it not, for the rainfall increases as we go southwards.

The Upper Nile Valley.

As we go still further south we come to the swampy lands of heavy rainfall where the river splits up into many parallel streams and is often choked by vegetation called "sudd". There are not many people living here for life is too uncomfortable in such swampy country. Further south still, we reach the plateau of the lakes and we shall hear about this country in the next chapter.

SUGGESTIONS FOR PRACTICAL WORK.

1. Copy the map of the river Nile shown in Fig. 22. Colour green the portion which is irrigated from the Aswan dam. Colour yellow the part which has a sufficient rainfall for crops to be grown without irrigation. Colour red the railway lines.
2. Make a population map of the Nile Valley. Explain why the population is distributed in this way.

CHAPTER XIII.

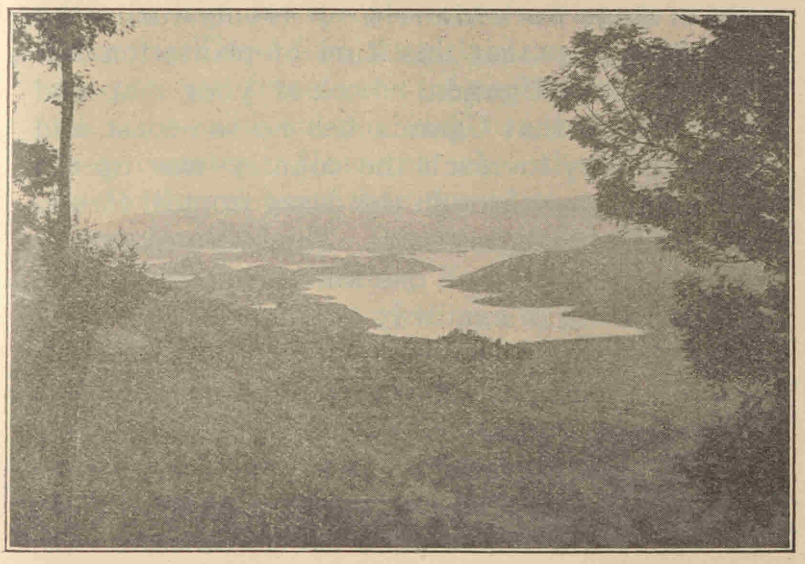
THE EQUATORIAL HIGHLANDS.

We said in chapter VIII that the high plateau of East Africa was important, because although it lies within the Tropics, it is so high above sea-level that it is cool enough for European farmers to live and work. In this chapter we are going to talk about these highlands. Find Uganda, Kenya and Tanganyika Territory, all of which lie within 10° of the Equator and yet many European farmers live and work in each of them. If you look at your vegetation map, you will see that all these countries belong to the savannah lands of Africa. Let us try to see what the people do for a living there.

Uganda.

This country is part of the Upper Nile Valley. It is not so high as the other countries we have mentioned before, so as you would expect, it is rather hot. There is a good rainfall and there are many African farmers who are able to grow cotton, maize, ground-nuts and to rear cattle for their own use. It is easy to get a living in this part of the Nile Valley, for we have reached the region of constant rains and yet they are not heavy enough to cause such dense forests that it is difficult to clear a place to live.

There are not a great many European farmers living here, for it is comparatively hot.



[*Photo*—E. N. A.

A scene in Uganda.

Some of them have settled here and grow coffee and rubber in plantations in much the same way as the European planters of Ceylon do. Most of the hot, out of doors work is done by African men who are paid by the European planter. He lives in the country, keeps the accounts, does the office work of arranging for the sale of the coffee or rubber, shows his African workers where to plant the trees and how to do it, arranges for the collecting of the rubber or the picking

of the coffee. He sees that the goods are well packed and sent off to the coast in the most economical way, but he is not able to do the actual out of doors work himself. It is only during the last fifty years that this kind of plantation has been made in Uganda. Look at your map and you will see that Uganda has no sea-coast and the only way to reach the country was up the Nile Valley or through the dense tropical forests of the Kenya coastlands. The journey up the Nile is still a difficult one and a very long one. To-day there is a railway through the forests of Kenya on to the plateau which ends at Kisumu on Lake Victoria. It was only after this railway had been built that it was worth while for planters to settle in Uganda. Their crops are always sent away to the more densely populated parts of the world where such things as coffee and rubber cannot grow. The Uganda planters are mostly Englishmen and they send their crops to their home country.

Kenya.

This country, too, has only been opened up to the rest of the world during the last fifty years. If you look at your map you will see that it has a coastal plain, which is densely forested, like the Congo Basin. This was very difficult to get through. The first explorers had to have all their goods carried on the heads of

porters because the paths through the forest are too narrow for a bandy to go. This made a journey inland a very expensive and long affair and only a very few people were willing to undertake it. These few often had to face fever in the hot, wet forests and they sometimes met hostile tribes who did not wish strangers to get into their country. However, when they did get up on to the plateau they found themselves in a very pleasant land. It was higher than Uganda, therefore it was cooler. The rainfall was sufficient to allow plenty of things to grow well, but not so heavy as to cause dense forests to cover the land. They found many men living there as farmers, but very large stretches of country in which the only inhabitants were the lion and giraffe, the zebra and the antelope. They saw at once that if only an easier way of reaching the country were found, this would make a wonderful land for European farmers to live. There was plenty of room for them as well as for the African and they could send some of the products of this country to the crowded towns of their home countries where they needed them so badly. As soon as the railway was built, men came in and began to settle.

The African peoples of Kenya and Tanganyika are nearly all cattle farmers and they have one great difficulty. The rainfall is sufficient to give good grass for grazing but there is an insect

called a tsetse fly which attacks the cattle and causes the men to become ill also. No one can make his home in the " fly belt " so some parts of the country have very few people.

The European planter grows coffee in Kenya and rubber, cotton and tobacco further south. Nairobi is the chief town of Kenya and in it many Europeans live. There are offices and banks as well as government departments in which many European clerks are employed. Most of their goods are exported through the port of Mombasa in Kenya or Dar-es-salaam in Tanganyika Territory.

You may have heard of the Big Game Hunter, the man who gets his pleasure by stalking great animals like lions and antelopes. You have probably seen a film of these animals. It is in this part of Africa that big game hunting is carried on.

SUGGESTIONS FOR PRACTICAL WORK.

1. Draw a map of these three countries putting in the chief towns and the railways connecting the plateau with the coast.
2. Visit the cinema the next time that an Africa travel film is being shown. This is the best way to get a real idea of the kind of country to be found on the African plateau.

CHAPTER XIV.

BRITISH SOUTH AFRICA.

Northern Rhodesia.

As we travel further south we come to Northern and Southern Rhodesia. These countries are like the Equatorial Highlands about which we were speaking in the last chapter. They lie further from the Equator so that on the whole they are cooler and therefore more suited to Europeans. The African peoples, mainly, live by cattle rearing but to-day many of them are leaving their kraals, as their villages are called, and going to work in the mines. The important thing to remember about Northern Rhodesia is that copper, lead and zinc are all found in this country. Broken Hill is the most important centre for lead and zinc, and copper is found on the edge of the Congo Basin. Nowadays there is a railway from Elizabethville in the Belgian Congo right over the highland to Bulawayo in Southern Rhodesia and so through to Cape Town. This was a very long railway to build, but it was the only easy way of getting the rich and valuable ores out to the places where they were needed.

There are not a great many people living in Northern Rhodesia, except near the mines, and many of them are beginning to be troubled about

the mine workers. Most African people who live in their own kraals live in tribes. They all give obedience to the head of the tribe and all have to keep the tribal laws and customs. When a man leaves his tribe and goes to work in a mine his way of life is completely changed. The laws which governed his life as a cattle farmer do not help him at all in his work in the mine and he does not understand any others. He gets far more money than he ever did at home but he does not know where to spend it or how to spend it wisely. You can see that his life is often not a happy one and this is one of the great problems of the new industrial and mining areas of Africa.

Southern Rhodesia.

In this country the African people are cattle farmers too, but there are many more European farmers here than in Northern Rhodesia. There are two reasons for this. It lies further south and therefore it has a cooler climate, and the men who went to settle in it came from the older colonies of the south. Here the European farmer has brought new stock to improve the cattle and he rears large herds. Some men have found that it is possible to grow wheat and oranges, the typical Mediterranean crops, in the dry season. Why is this not possible in Northern Rhodesia? If you think carefully you will see that the further we get away from the Equator the

greater is the difference between the hot and the cold season. The rain comes with the hot weather. If there is a long time between this and the cold weather there will be a longer dry season. Both wheat and oranges will grow only in a place which has a definite dry season.

Natal.

Find this small country on the south-east coastlands. It lies on the seaward slope of the Drakensburg and is very like the south-east corner of New South Wales in Australia. The rainfall is good and comes at all seasons of the year. It is forested on the upper slopes, but along the coast all the forest has been cleared to make room for sugar, tea, plantains and pineapples.

This is a part of Africa where a good many people from India have settled, for, as you can see, the climate must be rather like that of our own country for the same kind of crops are grown.

Further inland on the plateau, cattle are reared and maize is grown. The upper slopes of the Drakensburg are covered with forest and few people live there. It is in the central belt that coal is found; this is important, for it means that Durban can get coal easily. Durban is a port on the coast of Natal. Why should it need coal? If you were travelling from Madras to South Africa the ship would certainly put into

Durban to get a fresh supply of coal. The ships from Australia do the same thing and those passing the other way, from Europe round the Cape, often call at Durban for coal.

The Transvaal and The Orange Free State.

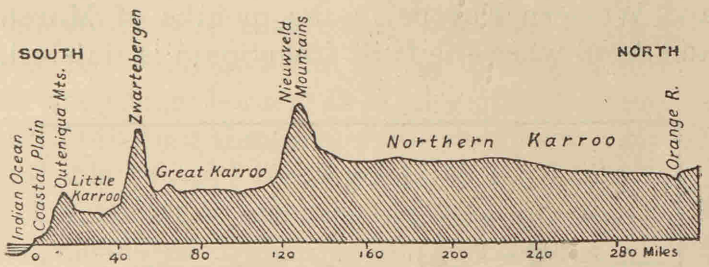
We are now going to pass from the coast up on to the plateau and over the Drakensburg to the temperate grasslands that are called the Veldt. We have already said that here the temperature is like that of Europe and the rainfall too poor for good rich grass. It is in these two states that the Dutch farmers, called the Boers in South Africa, live. Most of them are sheep farmers. The sheep are not so numerous as in Australia, for the grassland is poorer. This is not a rich country for farmers.

Find Johannesburg. This is the centre of the gold-mining of the **Rand**. This is the name given to a ridge of rather barren rock in which much gold has been found. Johannesburg is a large town but not a very beautiful one. It is about 6000 ft. above sea-level so the nights are cold and the rainfall is too small for much vegetation. The whole country looks bare and uninteresting. Why should people wish to live in such a place? Because the gold is such a valuable product. It is almost the same story as the founding of Kalgoorlie in Australia. You must

read the story of the Transvaal in your history books if you can.

The Cape of Good Hope.

You know how this most southerly province of Africa got its name, from the men who had tried so hard to find a way to India round the south of Africa. Now its name is given to the whole province. This is the part of Africa where



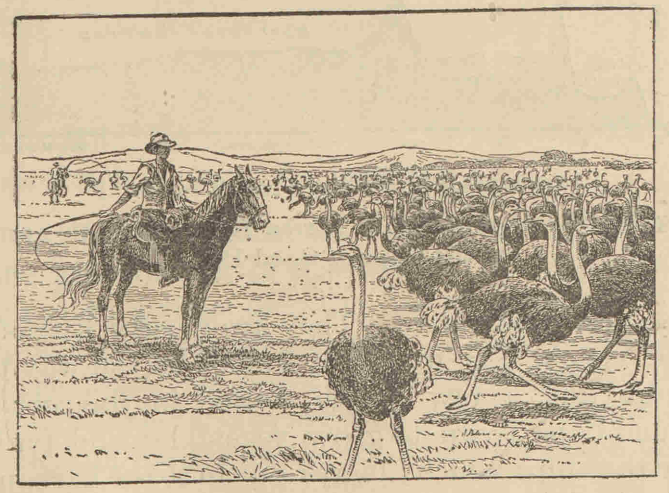
(*Vertical height is exaggerated fifty times.*)

Fig. 23. Section of South Africa from south to north of the Cape of Good Hope.

most Europeans live. They are mostly English and Dutch. At first they landed on the way to India and a few people settled in the corner round Cape Town to grow vegetables and fruit for the ships which always put in to the harbour for water on the long voyage. Later they explored further inland and discovered the good sheep lands of the Karroos. These are steps up to the plateau top and being near to the sea they get a

better rainfall than the higher land further away. There are many ostrich farms on the Karroos. See Fig. 23.

Near the south-west corner of the continent we get a mediterranean climate do we not? This means that all kinds of Mediterranean fruits grow well. Many farmers grow oranges, grapefruits and vines. Many of their boxes of fruit reach us in Madras and still more go to England and Western Europe in the months of March and April when the fruit from Spain is finished.



A South African Ostrich Farm.

Find Kimberley. This is the greatest diamond mining town in the world.

Cape Town is the port through which most people enter South Africa. From it most of the products of the whole of the Union of South Africa are sent home to the markets of Europe. Wool from the sheep farms of the veldt, fruit from the fruit farms of the Mediterranean region, feathers from the ostrich farms of the Karroos, gold from Johannesburg and the Rand, diamonds from Kimberley; all these go to make the trade of Cape Town very rich. You can see from your maps that there is a good railway from Rhodesia and the copper mining country near the Congo border. It is only since railways were built that the farmers of the interior have been able to send their goods to the European market, before it came the old ox-wagon was the only means of transport and that took a very long time to carry the goods over the many miles of the veldt to the coast.

SUGGESTIONS FOR PRACTICAL WORK.

1. Make a map of South Africa putting in the political boundaries. In each province write the names of the chief products. Put in the railways and the ports.
2. Read some stories of the opening up of this part of Africa in the "Stories of Discovery" in your school library.

CHAPTER XV.

THE STRUCTURE, RELIEF AND RIVERS OF SOUTH AMERICA.

Turn now to your map of South America. Find the Equator and notice that it crosses the continent through the Amazon Valley. Find out how much of the land lies north of this line and how much south. From this you can tell how many of the climatic and vegetation belts will be duplicated. Not so many as in Africa but we do get tropical grasslands both north and south of the Equator; desert, temperate grasslands and mediterranean lands south of it only. The southernmost point of the continent stretches so far towards the Pole that we also get a region like Tasmania, in Australia.

Now look at a good physical map and find the Andes Mountains. These are very high; they are fold mountains which run in parallel ranges all down the west coast. If you look carefully you can see some of these ranges. Look at the northern end of the mountains and notice how three separate ranges stretch out like fingers into the State of Colombia. Further south, in Peru and Bolivia, the ranges are separated by very high plateau and men have made their homes 12,000 ft. above the sea on its surface. Further south still the most western

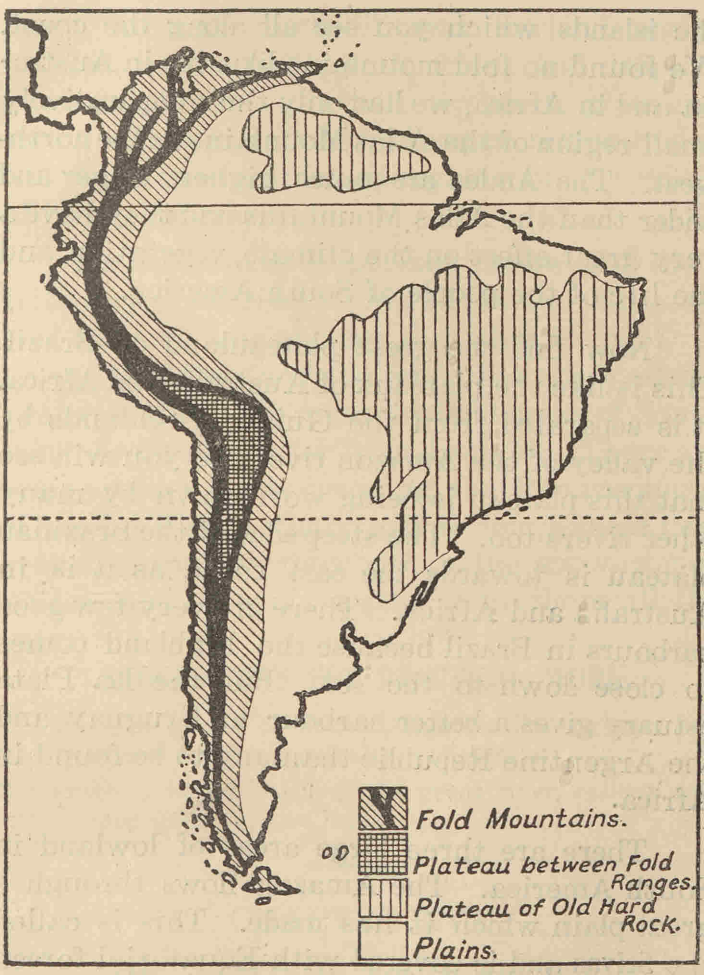


Fig. 24. Structural sub-divisions of South America.

range has been drowned beneath the waters of the Pacific Ocean and only the tops of the highest mountains are left. These mountain tops form

the islands which you see all along the coast. We found no fold mountains like this in Australia and in Africa, we had only the comparatively small region of the Atlas Mountains in the north-west. The Andes are much higher, longer and wider than the Atlas Mountains and they have a very great effect on the climate, vegetation and the life of the people of South America.

Now find the great plateauland of Brazil. This is like the plateaux of Australia and Africa. It is separated from the Guiana Highlands by the valley of the Amazon river and you will see that this plateau is being worn down by many other rivers too. The steep edge of the Brazilian plateau is towards the east coast, as it is in Australia and Africa. There are very few good harbours in Brazil because the highland comes so close down to the sea. But the La Plata estuary gives a better harbour to Uruguay and the Argentine Republic than any to be found in Africa.

There are three large areas of lowland in South America. The Amazon flows through a great plain which it has made. This is called the **Selvas** and is covered with Equatorial forest, like the forest of the Congo in Africa. The Orinoco flows through a smaller lowland covered with tropical grass or savannah. This area is called the **Llanos**. The Uruguay-Paraguay

flows through another great lowland region covered in the north with forest and tropical grass and in the south with temperate grass and scrub. This is called the **Pampas** region and is one of the most important regions in the whole of South America.

The three most important rivers and their tributaries all rise within 15° of the Equator; look on your map and see that this is true. It means that they have water in their beds all the year round and the great lowland areas of South America do not suffer from drought. There are some smaller rivers crossing the Pampas south of the La Plata estuary and although these flow over dry country, they rise in the snow-capped Andes, and so carry water with them all the year.

SUGGESTIONS FOR PRACTICAL WORK.

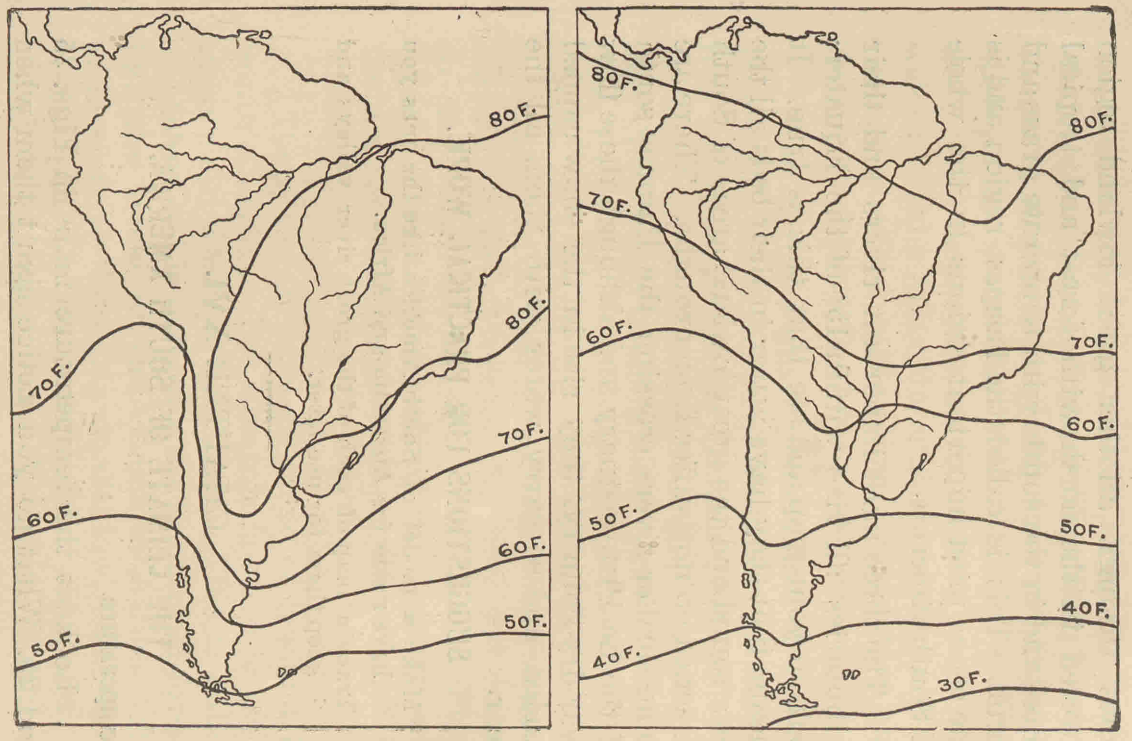
1. Make a model of South America like the ones you have made for Australia and Africa.
2. Trace a map of each of the great river valleys and keep them for use later.

CHAPTER XVI.

THE CLIMATE OF SOUTH AMERICA.

Temperature.

Look at the temperature maps in Figs. 25 and 26. What do you notice about them when



Isotherm Maps of South America.

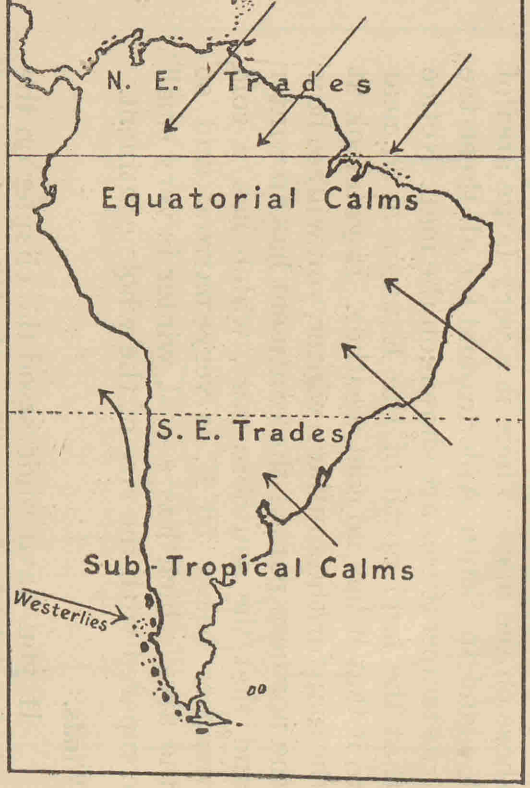
Fig. 25. Southern Summer—January.

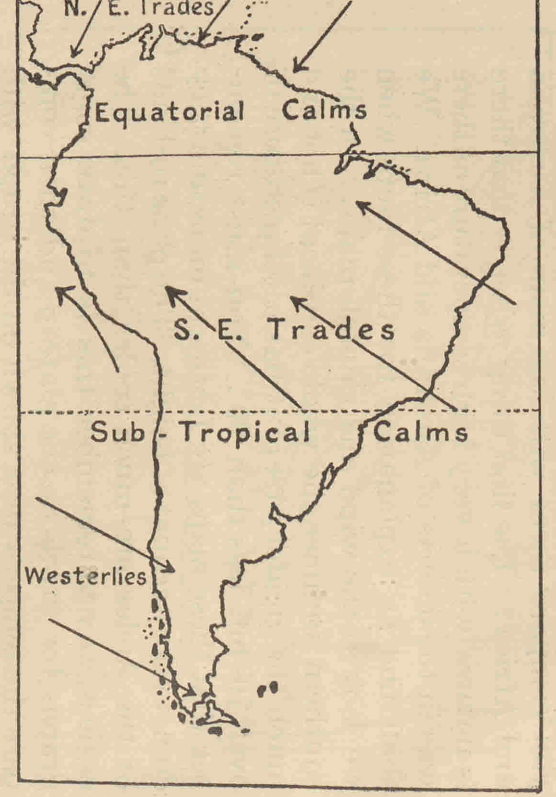
Fig. 26. Northern Summer—July.

you compare them with the maps of Australia and Africa? The first thing to see is that there is no area with a very high temperature as there was in the deserts of Australia and Africa. We shall find an explanation for these facts when we look at the wind and rainfall maps. In the southern summer the whole continent is hot and much the greater part of it has a temperature of over 70° but less than 90°. You must remember that these maps are Isotherm maps and they do not take account of height. The plateau-lands of the Andes are much cooler than this. The easiest way to remember this is to draw some graphs for towns on the plateau and then compare the temperatures shown on the graph with those on the map. There is a very large area of lowland in South America and for all these the true temperatures are shown on the map. Notice that the land north of the Equator is so near to it that it has no cold weather. If you look at the map for the southern winter, you will see how the northern part of the continent has no winter and that the southern part, which has a cold weather below 50° F. is very narrow and so the area which has a real winter is very small compared with the size of the whole continent.

Winds.

If you have understood the chapter on the winds of Africa you will easily follow the wind





Winds of South America.

Fig. 27. Southern Summer. Fig. 28. Northern Summer.

maps of South America. The Equatorial region of low pressure lies over the Amazon Basin in the southern summer and the north-east Trades blow over the northern part of the continent. The south-east Trades blow over the Brazilian Highlands but do not cross the Andes. These are so high that the winds do not cross them. On the western coast the south-east Trade wind blows almost parallel to the coast and south of latitude 40° S. the westerlies blow all the year.

In the northern summer the equatorial belt of low pressure lies over the basin of the Orinoco and the south-east Trade winds blow over the Brazilian Highlands and the Amazon Basin. Westerlies are now blowing further north and the central part of Chile gets the rain which they bring.

Rainfall.

Now let us look at the rainfall map. The lowlands of the Amazon Basin get convection rains like the basin of the Congo. The Brazilian and the Guiana Highlands get summer rain. The first in the southern summer and the second in the northern summer. This is partly convection rain and on the coast, rain brought by the Trade winds.

We have said that the south-east Trade winds blow all the year on the east coast between

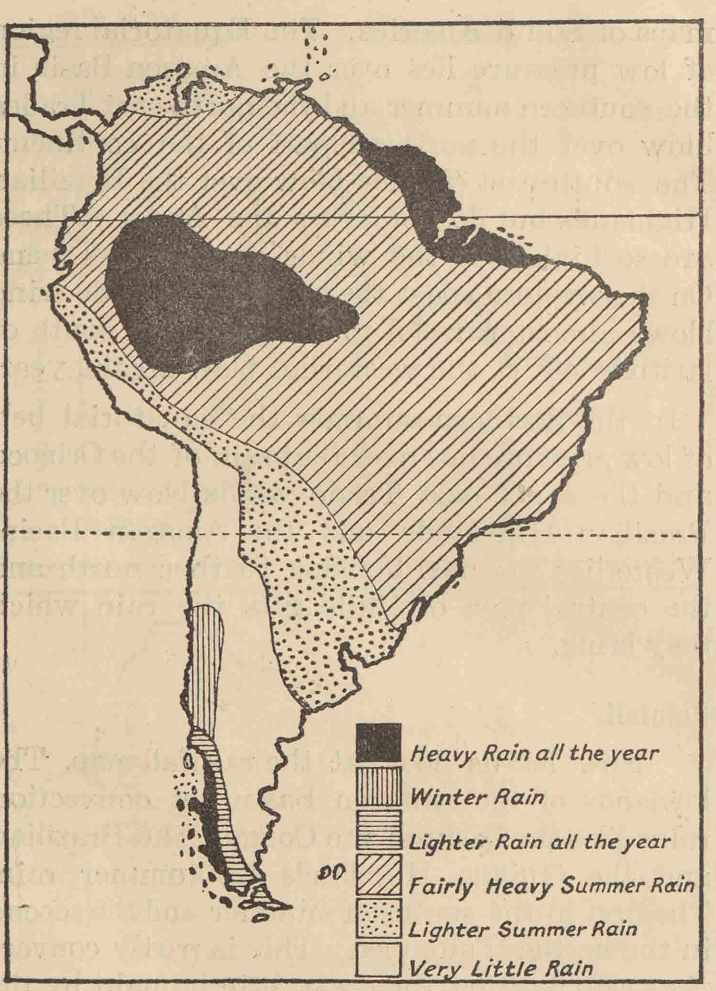


Fig. 29. Seasonal Rainfall Map of South America.

latitude 10° S. and 30° S. The eastern edge of the Brazilian Highlands will get plenty of rain from

this wind, like the east coast of Australia and of Africa. When this wind rises to cross the plateau it loses some of its moisture, but the highlands are not too high for a good deal of the rain to be left, so that the plains of the Pampas get a good rainfall. This amount decreases as the winds cross the continent until when they reach the Andes they are practically dry. There is therefore a long narrow dry belt close to the mountains. On the western side of the mountains the south-east Trade wind blows parallel to the coast and therefore it brings no rain at all. There is a long narrow desert strip, called the Atacama Desert between the Andes and the sea. The shape of this desert has been caused by the Andes being so close to the coast and it is fortunate for South America that she has so much less waste land than either Australia or Africa.

South of the rainless strip we come to the Mediterranean latitudes. In the summer, central Chile is in the Trade wind belt and gets no rain. In the winter it gets rain from the westerlies. This gives it the hot dry summer of the Mediterranean climate and the warm wet winter. Notice that the area is long and narrow in South America. The Andes are so high that the rain-bearing winds do not cross them.

South of latitude 40° S. we come to the region which gets rain all the year because the

north-west wind blows all the year round. The rainfall is very heavy on the west coast but the eastern side of the Andes is desert. This is the first time that we have found a temperate desert. It is caused by the Andes. The rain-bearing wind is dry by the time it has crossed the mountains and so we get the temperate desert of Patagonia.

SUGGESTIONS FOR PRACTICAL WORK.

1. Copy all the climatic maps in this chapter and colour them in the same way that you coloured the maps of Australia and Africa.

2. Draw temperature graphs for each of the following towns.

Para.

Jan.	Feb.	Mar.	Apr.	May	Jun.	Jly.	Aug.	Sep.	Oct.	Nov.	Dec.
78	77	78	78	78	78	78	78	79	79	80	79

Buenos Aires.

74	73	69	61	55	50	49	50	55	60	66	71

Quito.

55	55	55	55	55	55	55	55	55	55	54	55

La Paz.

52	51	51	49	47	44	45	46	48	50	53	53

Valparaiso.

64	63	61	58	56	52	52	53	54	56	60	62

Santa Cruz.

59	58	55	48	41	35	35	38	44	49	53	56

3. Draw rainfall graphs for the same towns.

Para.

7·6	13·3	17·0	17·8	11·8	9·1	2·3	2·8	0·5	0·6	0·6	2·6

Buenos Aires.

3·1	2·7	4·4	3·5	2·9	2·6	2·9	2·5	3·0	3·5	3·1	3·9

Quito.

Jan.	Feb.	Mar.	Apr.	May	Jun.	Jly.	Aug.	Sep.	Oct.	Nov.	Dec.
4·2	4·3	5·2	7·4	5·0	1·5	0·9	1·5	3·0	3·7	3·8	3·8

La Paz.

4·4	4·4	2·9	1·4	0·5	0·3	0·4	0·6	1·1	1·7	1·9	3·6

Valparaiso.

0	0	0·9	0·1	2·7	6·0	5·3	3·4	0·4	0·3	0·3	0

Evangelist's Island.

12·8	8·9	12·3	11·6	8·8	8·5	8·9	8·6	7·7	9·0	10·3	9·6

4. Answer the following questions from your atlas and your graphs.

   (*a*) Why does Quito have much cooler weather than Para although they are both within a few miles of the Equator ?

   (*b*) Valparaiso and Buenos Aires are in almost the same latitude. Why does Valparaiso get a dry summer and Buenos Aires a wet one ?

   (*c*) Which two towns of South America whose rainfall graphs you have drawn have rain all the year round ? Explain why these two towns get their constant rain.

   (*d*) Quito and La Paz both lie on the high plateau of the Andes but there is more difference between summer and winter at La Paz than at Quito. Why is this ?

CHAPTER XVII.

THE CLIMATIC REGION AND THE NATURAL VEGETATION OF SOUTH AMERICA.

Look at your vegetation and rainfall maps together and notice that the Amazon Basin and

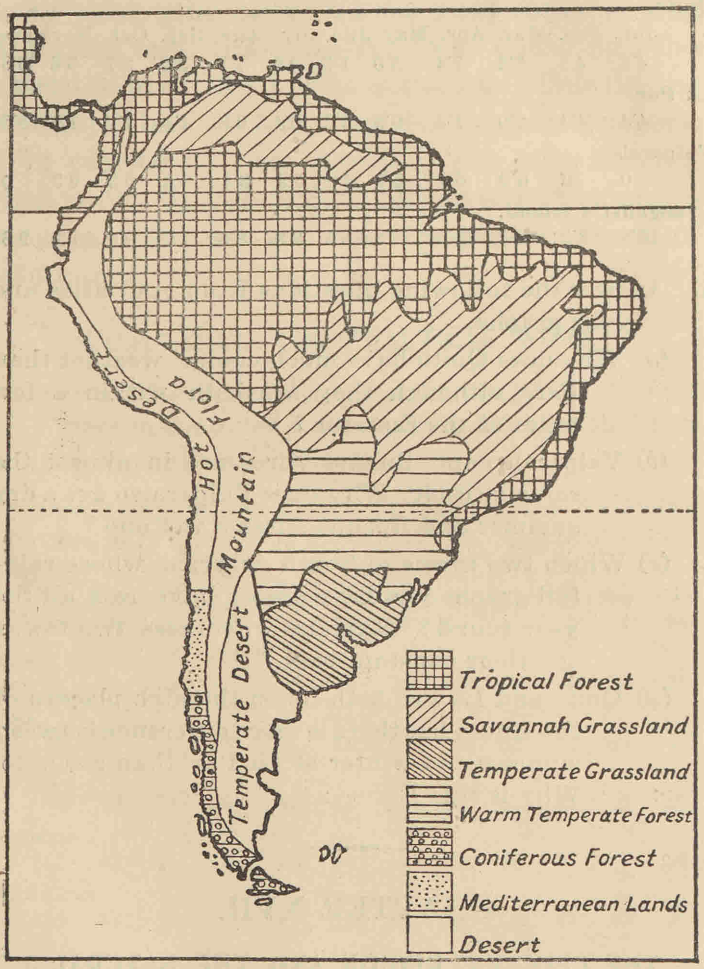


Fig. 30. Natural Vegetation of South America.

the coastlands of Brazil and Venezuela all have heavy rainfall and are covered with the same

kind of thick Equatorial forest that is found in the Congo Basin of Africa. Only a very few people live in the Amazon Basin for the forest is too dense for people to be able to make roads or build houses. The few people who do live there use the river as their best means of travelling from place to place. The temperature is high all the year and the rainfall is heavy so that the climate is very uncomfortable for man. Monkeys and birds live in the trees and all kinds of water animals in the rivers, and there are still a number of places which have never been explored by man. Near the coast the forest has been cleared and plantations made of sugar, tobacco and other tropical plants. This is especially true of the coastlands of Venezuela and Eastern Brazil, but some of the Amazon forest around Para has been cleared too. At one time most of the rubber of the world came from the Amazon Basin and was exported from Para. To-day the rubber of Ceylon and Java has taken the place of the wild rubber collected in the forests of South America.

If you compare the vegetation maps of Africa and South America you will see that in both of them there is an area of savannah land north and south of the Equator. In South America, the Guiana Highlands and the plateau of Brazil are regions of summer rain and thick tropical grass. On the top of the plateau the grass is poorer, for the rainfall is less. In the

upper part of the Uruguay-Paraguay river we find that the rainfall is heavy and the grassland



Scene on the Amazon River.

has a good number of trees, so that it is more like the warm temperate forest of the eastern shorelands of Australia and South Africa. As we come southwards the rainfall decreases and the temperate grasslands of the Pampas are found. These cover a wide area and are most important.

Further south still the temperate desert of Patagonia takes the place of the grasslands as the rainfall decreases still more. This is a barren region covered with sand where few people live. The winters are long and cold and only a few sheep can be reared on the scanty grass

which is found in the better part of the country near to the foot of the Andes.

On the western side of the mountains we get four distinct regions. In the north the Equatorial forests cover the narrow coastal plain. South of this the Atacama Desert is found. This desert has a few important towns situated in it. Look and you will see the ports of Iquique and Antofagasta. We do not usually expect to find towns in deserts, do we? These are ports which export the nitrates which are found in large quantities in the desert. The nitrates are used as artificial manure by the farmers of all the countries in the world. Copper is also taken from this region and men have found that it is possible to live here, although there is no rain. They can use the water of the short streams coming down from the Andes to irrigate their fields and supply water to their towns.

South of the desert the Mediterranean lands of Central Chile are found. We have already explained why they are found here and why the belt is so narrow. We shall hear more of this country in another chapter.

The most southerly belt on the west coast is the temperate forest belt of constant rainfall from the westerly winds. This belt of forest covers the slopes of the mountains with coniferous trees. We have not found anything like this in

our study of the southern continents because there is no land in Australia or in Africa which stretches so far south. The climate is different from that of any other part of the continent and is more like that of Western Europe. We shall hear more of this kind of climate and this kind of forest when we are talking about North America.

SUGGESTIONS FOR PRACTICAL WORK.

1. Copy the map in Fig. 30 and colour it in the same way as the maps of Australia and Africa which you have made. You will need an extra colour for the coniferous forest of the south. Colour these forests purple.
2. Write an account of the temperature, rainfall and vegetation maps of South America.
3. Spread the vegetation maps of Australia, Africa and South America in front of you and compare them. Try to account for the differences which you find.

CHAPTER XVIII.

THE TEMPERATE COUNTRIES.

Argentina.

Find this country on your political map. Now look on your other maps and see what kind of country this is. The northern part of the Argentine as it is often called, is covered with

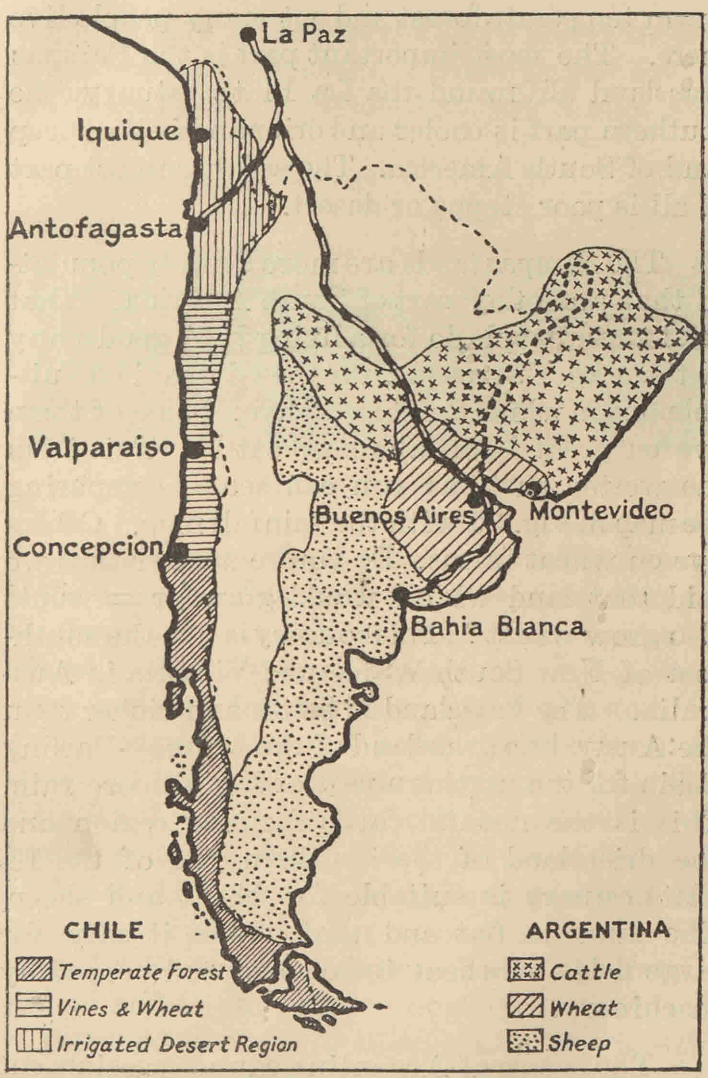


Fig. 31. Argentina and Chile.

warm temperate forest and not many people live there. The most important part is the Pampas grassland all round the La Plata estuary, the southern part is cooler and drier and is the sheep land of South America. The southernmost part of all is poor steppe or desert.

The Pampas lands are more densely populated than any other part of South America. What do all these people do for a living? A good many of them are Europeans, for the climate is a suitable one in which for them to live. Some of them live on great farms and keep cattle. This is in the wetter parts as you can see by comparing the map in Fig. 30 with the rainfall map. Others live on wheat farms. Do you remember that we said that land which would grow grass would also grow wheat? This country is like the south-east of New South Wales and Victoria in Australia. The grassland is better and richer than the Australian grassland of the Murray-Darling Basin for the northern part of it gets more rain. This is the natural cattle farming region and the drier land of the southern side of the La Plata estuary is suitable for wheat and sheep. The land is flat and that makes it easy for large fields of wheat to be sown and reaped by machinery.

The people of Argentina cannot possibly eat all the food that they grow. They send it to

the countries of Western Europe where there is a very dense population. These people live in towns and work in factories so they cannot grow



Argentine Cattle.

their own food even if there were space enough in the crowded European countries. In Argentina there were wide spaces of land covered with grass with scarcely any people living on them. Men came in from Europe and began to breed cattle and grow wheat to send to their home countries. If you look at your map you will see that it is much easier to get into the grasslands of South America than it is to get on to the veldt of South Africa. It is also much easier to send away the food which is produced on them. The wide La Plata estuary allows ships to come far inland and to-day many people live in the towns of Buenos Aires and Montevideo. These are the men who do the business connected with the sending out of the wool, hides, meat, wheat and flour

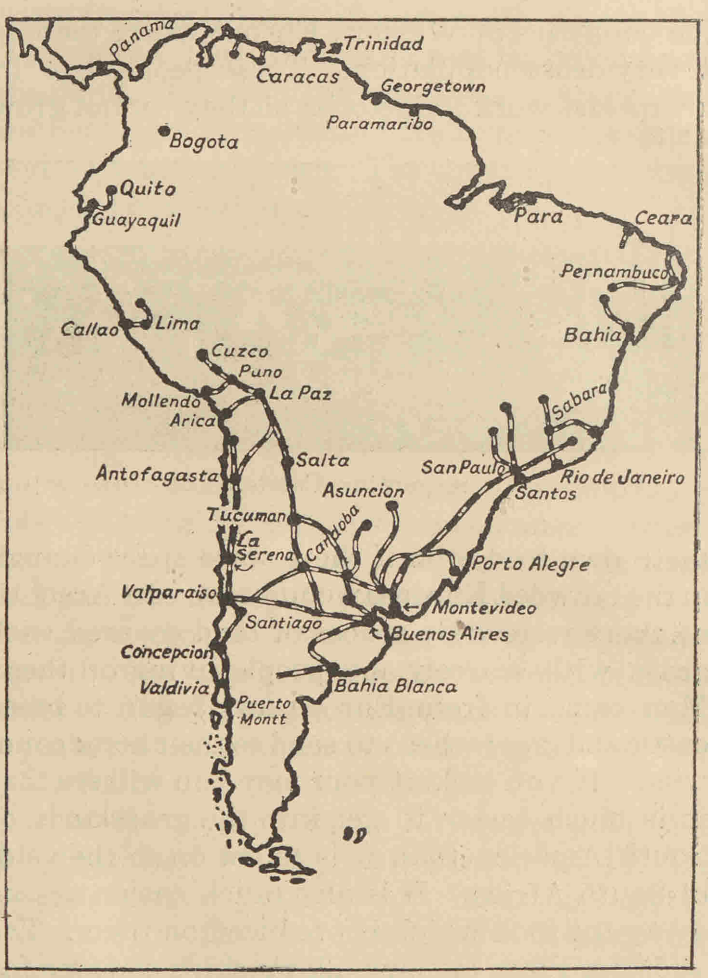


Fig. 32. Principal Railways of South America.

from the Pampas farms. Some of them work in offices, others in banks, some work on the wharves putting the bales of wool and the bags of

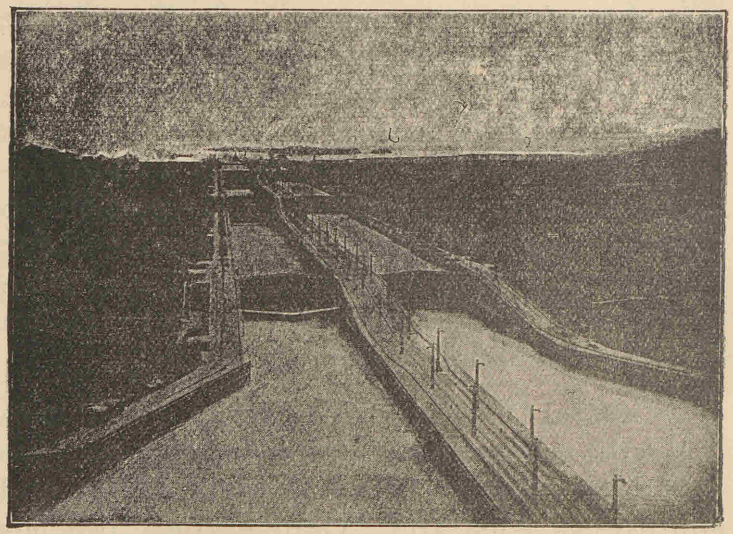
wheat into the holds of ships which will carry them in about three weeks to London or Hamburg.

Chile.

On the western side of the Andes there is another land where a good many Europeans live. Chile can be divided into three parts. The northern one with a hot desert climate. We have already talked about the nitrates and the copper of this part of the Atacama desert. How do the people who live in the towns get their food? Some of it comes by train or boat from Central Chile, but nowadays the water from the streams which begin in the snows of the Andes is used to irrigate farmlands. This water is very precious so the people do not grow more than they need for themselves but vegetables and fruit, and some cotton and sugar are now grown by irrigation in the desert lands of Northern Chile.

Central Chile has a Mediterranean climate and so it grows all the things which we have learnt are grown in south-west Africa and south-west Australia. Orange vines, peaches and wheat and maize. In this part of Chile there is a long narrow valley between two of the ranges of the Andes. It has an opening to the sea at Valparaiso, another at Concepcion and another at Valdivia. It is in this central valley that most of the farms are found. The

capital of Chile is Santiago and many of the people who live in this town are rich landowners, who leave the work of their farms to the manager who lives in the country and sends the fruit and other products to the town for market. There is more fruit grown than can be used by the people living in Chile and so some of it is sent away from the ports, chiefly Valparaiso, to the North American market. Can you see



[*By courtesy of the R. M. S. P. Co.*
Locks on the Panama Canal.

why the people of Chile trade with the people of North America and the people of Argentina with the people of Europe? The goods which the people of Chile send away are mostly fruit

and vegetables. These are better sold as soon after picking as possible. They are sent in a refrigerator vessel and kept cold all the time but the shorter the voyage the better. Look at your map and the Panama Canal. Since this has been opened it has made the trade with New York much easier. Remember that Chile is south of the Equator and therefore its fruits are ripe just at the time when the people of the northern countries need them most. Notice the railway across the Andes from Valparaiso to Buenos Aires.

Southern Chile is forested with coniferous trees. These would be very valuable if there were more people to cut them down and if they did not have to travel such a long way to a market. The countries which need wood of this kind are all found in the Northern Hemisphere and at present they have enough wood of their own. We shall hear more about this kind of wood in North America. Perhaps in the years to come when the coniferous forests of Europe and Asia and North America have all been used up, it will be worth while for men to settle in this part of Chile, but at present there are very few people living here.

SUGGESTIONS FOR PRACTICAL WORK.

1. Copy the map in Fig. 31, colour the cattle lands green the wheat lands yellow and the sheep lands orange. Compare this map with the rainfall map.

2. Copy the map in Fig. 31 and colour the irrigated lands yellow; the fruit and wheat lands red and the forested lands green. Compare this map with the rainfall map.

3. Copy the railway map in Fig. 32. How high does the trans-Andean line have to climb? Why are there so many more lines in the grasslands of South America than in the grasslands of South Africa or Australia?

CHAPTER XIX.

BRAZIL.

We have talked about two temperate countries and now we are going to talk about the largest of the tropical ones. Notice first that the whole of Brazil lies within the Tropics. Part of it is lowland and forested, part of it is plateauland and covered with savannah grass. There is also a strip of coastland on the eastern side which has rain all the year from the Trade winds. This last is the most important part of Brazil.

We have talked about the forests of the Amazon Basin. Although they cover such a large part of Brazil they contain very few people. They form the least important part of the country.

On the plateauland we find cattle farmers again. These cattle are not so good as the cattle of the Argentine. Can you see why? Those

which are bred in the Argentine have been improved by having stock from Europe sent out to the farms. Why did they go to the Argentine and not to Brazil? Because the Argentine consists of lowland, very easily reached from the sea coast through the La Plata estuary. To get to the plateau of Brazil is a much more difficult thing. European farmers settled in the Argentine, partly because it was a pleasanter climate and partly because it was easier to reach.

The most important part of Brazil is the land sloping towards the Atlantic Ocean. It is hotter in the north than in the south so the kind of things which the people grow differ slightly. Most of the people of Brazil live on the narrow coastal plain or on the slopes of the plateau just behind the plain. They have cleared the tropical forest in a good many places and grow sugar, cocoa and rice. Some of this is exported but most of it is used by the people themselves. Further south the greater number of the people live on coffee plantations. This plant needs a hot climate and plenty of rain but the water must not stand round the roots. It is therefore grown on the slopes of the hills. You may have seen it growing in the hills of Coorg. Nearly all the coffee exported to Europe and North America is grown in Brazil. Some cotton is also grown and some people get their living by making it into cloth in the town of Rio de Janeiro. This is the

capital of Brazil and as you see it is a port. The coffee is sent out from Santos.

SUGGESTIONS FOR PRACTICAL WORK.

1. Make a map of Brazil and put in the occupations of the people.
2. Read all that you can about the growing of coffee and the drying of the coffee bean.
3. If you can see a picture of the Amazon forest at the cinema, do so.

CHAPTER XX.

THE ANDEAN STATES.

We have talked about the lowland countries and the plateau country and now we are going to talk about the high Andean plateau states. We shall try to find out why people should wish to live so high up above the plains, in a country which is so difficult to reach.

Find the states of Ecuador, Bolivia and Peru. Look at the names of the towns in these states. Do they seem strange to you? A good many of them came from Spain. I wonder how much of the story of the Spaniards in South America you know. You will remember that when Christopher Colombus left Spain, seeking a way to India, he sailed west and was the first European to find the islands which we

now call the West Indies. Later on other Spaniards came across the ocean looking for treasure. Some of them landed in South America and found men who told them that they could get gold and silver and precious stones, if they would cross the forests and climb into the high mountains. We have seen before how men will endure great hardships for the sake of gold. In the high Andean plateau the Spaniards found gold and silver and precious stones. They thought it was quite worth while to travel for months over the Atlantic in a small sailing ship and then on foot through hot forest paths and up steep and rocky roads to the mines on the plateau, to get this wealth. It is one of the most interesting stories in history and you should read it in your library periods.

To-day men still live in the towns which the Spaniards founded. When they reached the top of the plateau they discovered that it was quite a comfortable place in which to live, for although they built Quito almost on the Equator, the temperatures were very like those of their Spanish spring all the year round. Ever since the days of Colombus the mines of the high Andes plateau have given their wealth to the world. To-day the silver is not sent down on mule back because the railway has been built from Quito to the port of Guayaquil

and from La Paz to Arica and Antofagasta on the coast of Chile. In the days of the Spaniards



[*Photo*—E. N. A.

A typical pass in the Andes.

the silver and gold were sent the same way to the coast on the backs of mules. At the west coast ports ships were waiting to take them to Europe. They could not take them all the way because it would have meant going all round Cape Horn, which was a long and stormy voyage. The ships carried the treasure to Panama and there it was taken out and loaded on to the

backs of mules again and so carried across the isthmus to the Atlantic Ocean where it was loaded on to other ships. To-day it is carried in the same vessel through the Panama Canal. This has shortened the distance between all the western states of South America and the markets of Europe and North America by a great many miles.

Find Bolivia again and notice that it has no coastline. The people all live on the plateau and get their living by tin-mining. Tin does not seem to us very precious does it? It is, however, for so much is needed in the world and there are only a few places in which it is found. One of these is the Malay States near our own country and the second richest country in the world as far as tin is concerned is Bolivia. The tin mine owners must send their goods out through the ports of Chile and so we have the railways made from the Bolivian mining towns to the Chilean ports.

In Peru the most important mineral is copper and many people get their living in the copper mines. You must not think that everyone is a miner, a mine owner or a railway official dealing with the ores from the mines. Some people are farmers. They can grow most of the things which live in temperate climates, such as wheat and barley, but of course they cannot grow

rice or sugar on the plateau. If you look at Ecuador and Peru you will see that they have a coastal plain as well as a high plateau area and so they can grow their tropical products on the plain and send them up to the people who live on the plateau top. They grow enough cocoa to export it to the United States of America, on the coastal strip of Ecuador. In Peru, the coastal plain is very dry but they can grow cotton and some other things by irrigation from the streams coming down from the Andes.



[*Photo*—E. N. A.

Bolivia—Indian with Llama.

On the top of the plateau some men keep cattle and it is in these states that the llama

and the alpaca are found. These are animals with woolly coats that are not found in any other part of the world. The wool is used to make special kinds of material which people in Europe and North America buy.

SUGGESTIONS FOR PRACTICAL WORK.

1. Read all the stories about the Spaniards in South America which you can find in your school library.
2. Make a map of the Andean States putting in the chief towns and the railways connecting them with their ports. Notice specially the trans-Andean line connecting La Paz with both east and west coast.
3. Measure the distance between Callao and Cadiz (in Spain) by Cape Horn and by the Panama Canal. How much is saved by the cutting of the Canal ?

CHAPTER XXI.

THE STRUCTURE AND RELIEF OF NORTH AMERICA.

We are now turning from the southern continents and spending the rest of the year in the northern hemisphere. Look at the map of North America and notice that its structure is not unlike that of South America. They are both triangular in shape and the broad side of the triangle is to the north. In both of them the western part of the continent consists of very high, folded mountain ranges with high

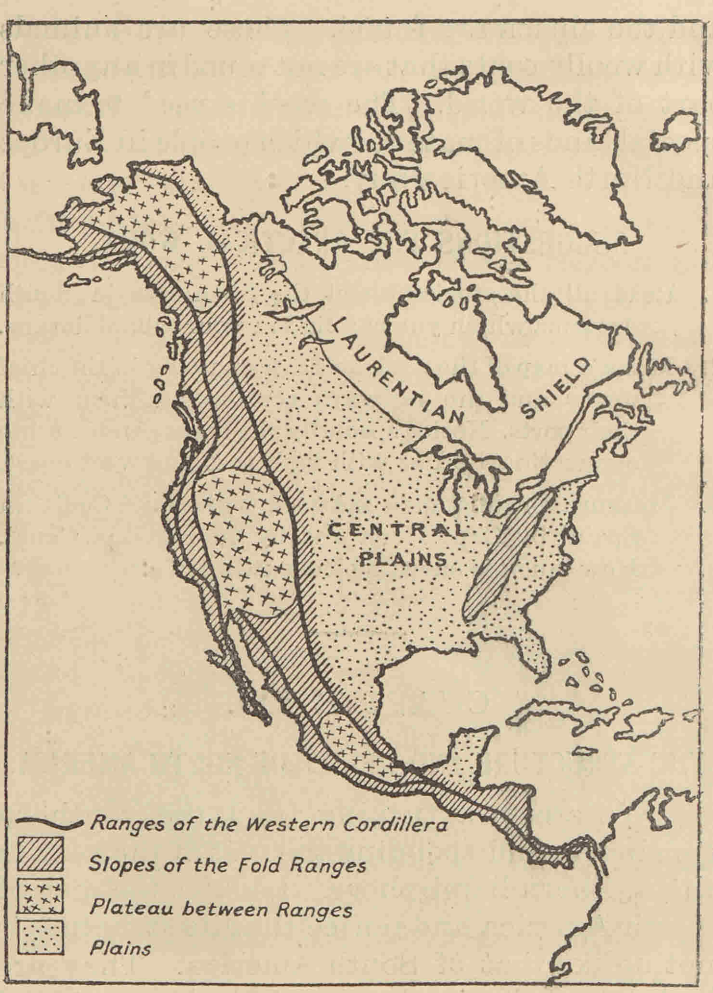


Fig. 33. Structure of North America.

plateaux between. In the eastern part of each there is an old, worn down plateau and between

the western folded mountains and the eastern plateau there is a great plain. Let us take each of these divisions in turn.

The fold mountains of the west stretch from the extreme north to the extreme south of the continent. Look at your map and find the Rocky Mountains. This is the name given to the eastern range. On its eastern side it slopes down through the foot-hills to the great central plain. On its other side it only drops to the high plateau of the Great Basin in the centre. Further north, it is separated from the next range only by the deep valleys of the Snake and Columbia rivers. Now find the Sierra Nevada and the Cascade ranges. These form the western rim of the plateau of Colorado and the Great Basin and stretch north into Canada parallel to the Rocky Mountains. Here the plateau between is much narrower. Look again and find the Sierra Madre stretching south into Mexico, and the coast range of Lower California. This is separated from the Sierra Madre by the Gulf of California. Further north it is separated from the Sierra Nevada by the Valley of California and from the Cascade range by the Puget Sound Basin and the Willamette Valley. North of Puget Sound there is no coast range but a number of islands. Can you see what has happened? The coast range has been drowned and only the tops of the mountains have been left as islands.

Where did we find this had happened before? The western fold mountains are sometimes called the Cordillera and they form a very large portion of the continent. Which do you think are the most valuable parts to the people of America? The fertile valleys of California, the Puget Sound Basin and the Willamette Valley. Look at the map in Fig. 33 and see that you understand how the folds are arranged.

In the east of North America we find a very old plateau land surrounding Hudson Bay. It is sometimes called the Laurentian Shield because of its shape and because the river St. Lawrence cuts through it. South of the St. Lawrence there is a slightly younger highland called the Appalachian Highland. Once this was a region of fold mountains like the Western Cordillera is to-day. Now it is very old and the rain and rivers have cut it down so much that only the roots of the old ranges are left. Notice how much lower the Appalachians are than the Rockies. It is their age which has lowered them.

In North America we have, (*a*) a young, high, folded cordillera with high plateau between the ranges; (*b*) an old plateau that has been worn down by ice, rain and rivers till it is almost a plain. We call this a *peneplain*; and (*c*) an old, low folded highland which still

shows its folded nature by its parallel ranges and deep valleys in between. This is very much lower than the western fold ranges, but it was high enough to make it very difficult for the first settlers in America to find a way across them before the days of railways.

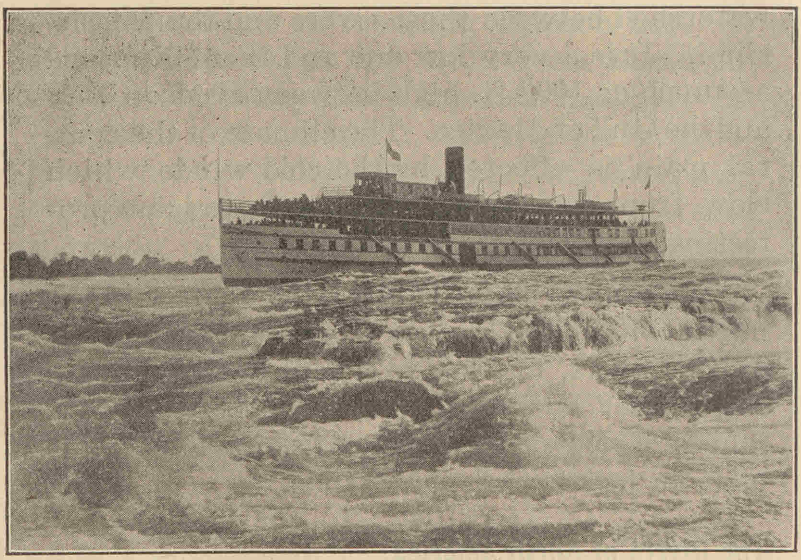
The central plain of North America stretches from the Arctic Ocean to the Gulf of Mexico. Notice that in the north the rivers drain to the Arctic through Hudson Bay, so there must be a watershed between these rivers and the Mississippi. It is a very low one and there is no land as much as 1000 ft. high between Hudson Bay and the Gulf of Mexico. The climate of the central plain is affected by the cold winds which blow from the Arctic because there is no protecting highland.

The coastal plain of the east is narrow in the north, where the sea has drowned the mouths of the rivers, making excellent harbours with deep water and good protection from storms. South of New York the plain broadens and is used for farming of many kinds.

The Rivers of North America.

There are several very important river systems in North America. The St. Lawrence formed one great gateway into the country in the early days of its discovery. To-day it is still

one of the most important highways of trade in the world. Look at the map and notice that it rises to the west of Lake Superior. It flows through this great lake, as large as an inland sea, then over the Sault Ste. Marie falls into Lake Huron, on through Lake Clair into Lake Erie, over the Niagara Falls into Lake Ontario and so on to its wide estuary. Now that canals have been built to carry ships round the falls, it is possible for farmers of the central plains to



Rapids on the river St. Lawrence.

put their wheat on to ships at the west end of Lake Superior and send it all the way by water to Europe. The larger ocean-going vessels do

not go up beyond Montreal. Find this town in your map and measure how far it is from the open ocean. A very great deal of traffic passes through the lakes and the canals, especially iron ore, coal and food for the towns of Eastern Canada and the United States. It is much cheaper to carry heavy goods like these by water, so the St. Lawrence and its lakes has brought many advantages to the people living in the eastern part of the continent. It has one serious disadvantage. During the five winter months, November to March, it is frozen over and no ships can use it. We shall hear more of this later.

The Mississippi and its tributary, the Missouri, drains the whole of the central plain south of the Lakes. This river also acted as a gateway into the country in the early days of exploration. You can see that it flows over a very flat plain. I expect you know that rivers which do this wind about from side to side of their valleys and often overflow their banks in times of flood. These two rivers have brought much sorrow to people living in the central plain. They change their course and leave sandbanks in their beds so that only very expert pilots can take a boat safely through the many miles of navigable waterway. When the rains are specially heavy in the upper parts of their course, the rivers flood so badly in the lower part, that many villages have been washed away.

The rivers of the Western Cordillera are important not for themselves, but because they have cut deep valleys through the mountains. These mountains are high and very difficult to cross. The only ways through them have been made by the rivers and now man has cut a road and a railway along the side of the river, and so found a way from the east coast to the west.

Another thing which these rivers of the west have done is to expose at the surface some of the rich minerals which were at one time hidden deep down in the rocks. It was in the river valleys that man first found the gold which drew him to British Columbia and the Klondike. Now other minerals are mined in different parts of the western mountains and men have turned from gold mining to fruit farming in California, but the first settlers were attracted by the lure of gold.

SUGGESTIONS FOR PRACTICAL WORK.

1. Make a model of North America as you did for the Southern Continents.
2. Copy Fig. 33 into your note books.
3. Trace a map of each of the following river basins. The St. Lawrence and the Great Lakes. The Mississippi-Missouri. The Snake. The Columbia. The Colorado.

CHAPTER XXII.

THE CLIMATE OF NORTH AMERICA.

Temperature.

The first thing to notice about the climate of North America is that because the whole continent lies north of the Equator there is only one set of seasons. If you look at the temperature maps you will see this quite clearly. Another thing to notice is that the winter temperatures are far lower than any which we have met south of the Equator. Can you see a reason for this? Look at the lattitude of North America and see that its north coast is only about 20 degrees from the North Pole. In South America, the narrow part of the country is nearest the Pole; while in North America it is the broad part which is nearest. This makes a great difference to the vegetation of the two continents.

Now let us look at the summer isotherm map in detail. Notice first that there is an area with temperatures over 90° F. This tells us at once that there is likely to be a desert in North America. Notice that it lies on the western side of the continent, as in South Africa and in Australia. Now look at the 60° F. line. On the west it cuts the coast in California, then passes north almost into Alaska and crosses the

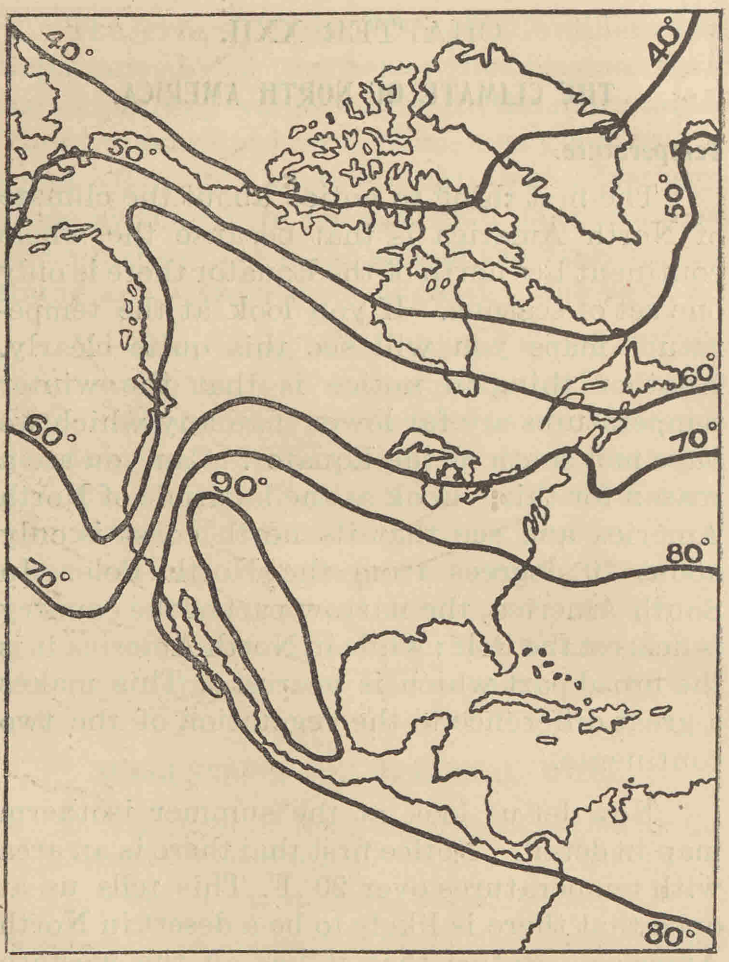


Fig. 34. Isotherms in the Northern Summer—July.

country about the latitude of the south end of Hudson Bay. What does this mean? That in the summer Alaska is as warm as the coast of

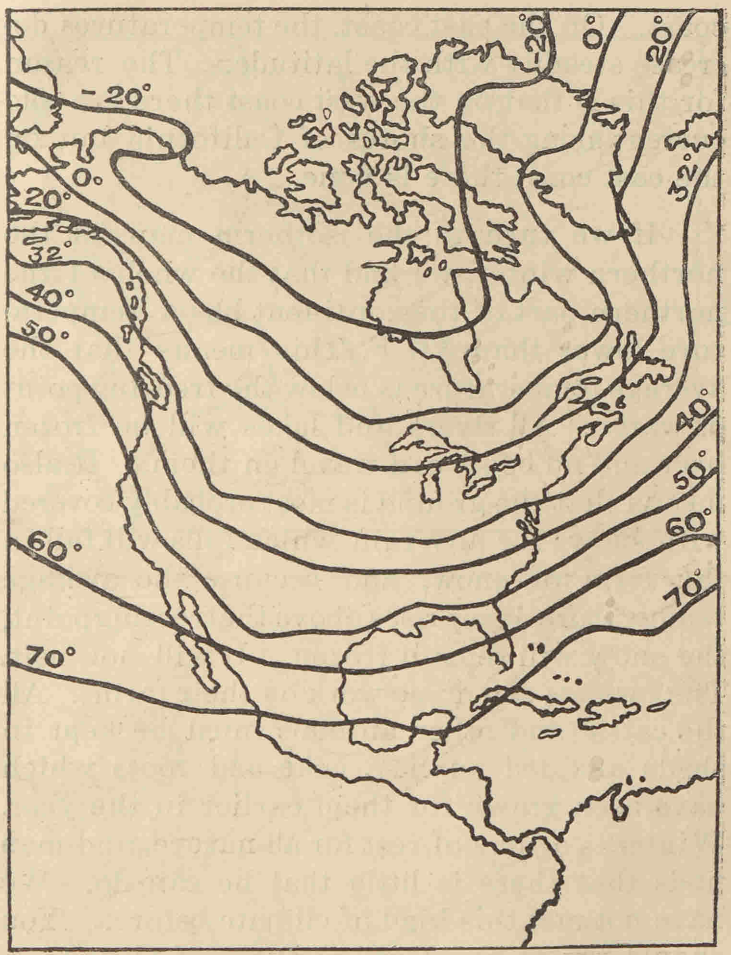


Fig. 35. Isotherms in the Northern Winter—January

California. Does this surprise you? Can you see any reason for it? It is caused by the cooling influence of the Pacific Ocean on the west

coast. On the east coast, the temperatures decrease steadily with the latitude. The reason for this is that on the west coast there is a cold current along the shores of California but on the east coast there is none.

If we turn to the isotherm map for the northern winter, we find that the whole of the northern part of the continent has a temperature lower than 32° F. This means that the average temperature is below the freezing point of water. All rivers and lakes will be frozen over and no boats can travel on them. It also means that the ground is most probably covered with snow; for any rain which falls will fall in the form of snow, and because the average temperature never rises above the freezing point, the snow will remain frozen. It will not melt. The farmers can do no work on their farms. All the cattle and other animals must be kept in sheds and fed on hay, cake and roots which have been grown for them earlier in the year. Winter is a time of rest for all nature, and man finds that there is little that he can do. We have not met this kind of climate before. You should try to see some pictures of Canada in winter and to read all that you can about it, for it makes the life of the people of North America very different from anything which we know in the Tropics.

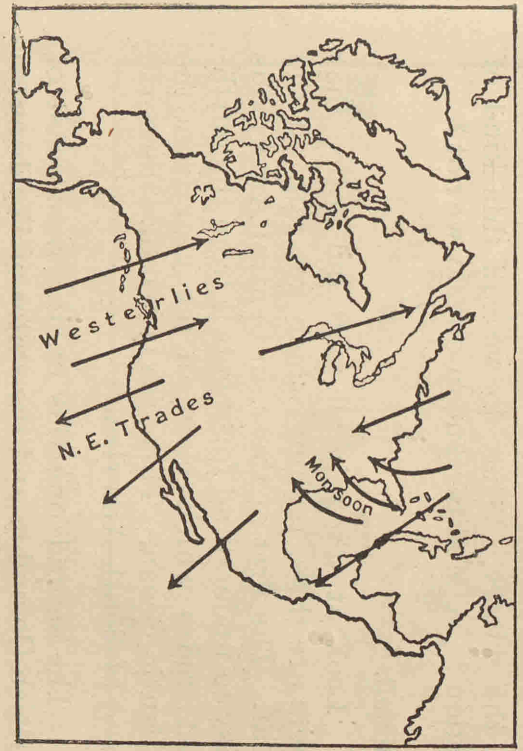


Fig. 36.
Winds of North America—Summer.

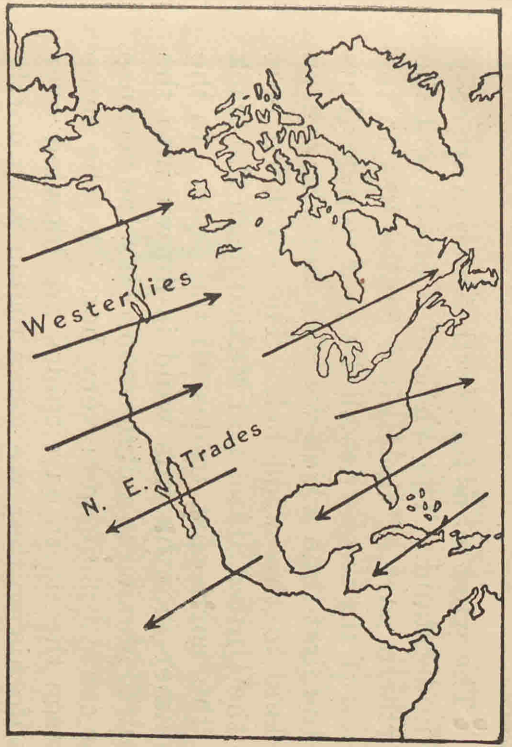


Fig. 37.
Winds of North America—Winter.

Winds.

The wind maps for North America are easy to understand. The whole of Canada and the northern part of the United States lies in the track of the westerlies all the year round. This is the first time which we have met a large area of land in this wind belt. The southern part of the United States and Mexico lie in the track of the north-east trades all the year. In the summer months this wind is drawn into the Gulf of Mexico as a slight monsoon wind because the central plain gets very hot. At the same season the north-east trades are blowing over California so that we get a region with north-east trade winds in the summer and westerlies in the winter. What do we call this kind of region? A Mediterranean one do we not?

Rainfall.

Look at the rainfall map and notice that there are three regions which get rain all the year. The first of these, in Central America is easy to understand for it gets it from the north-east trades which blow all the year from the Atlantic Ocean. This area is just like the north coast of South America.

The second one lies on the west coast of British Columbia and the states of Washington and Oregon in the United States of America.

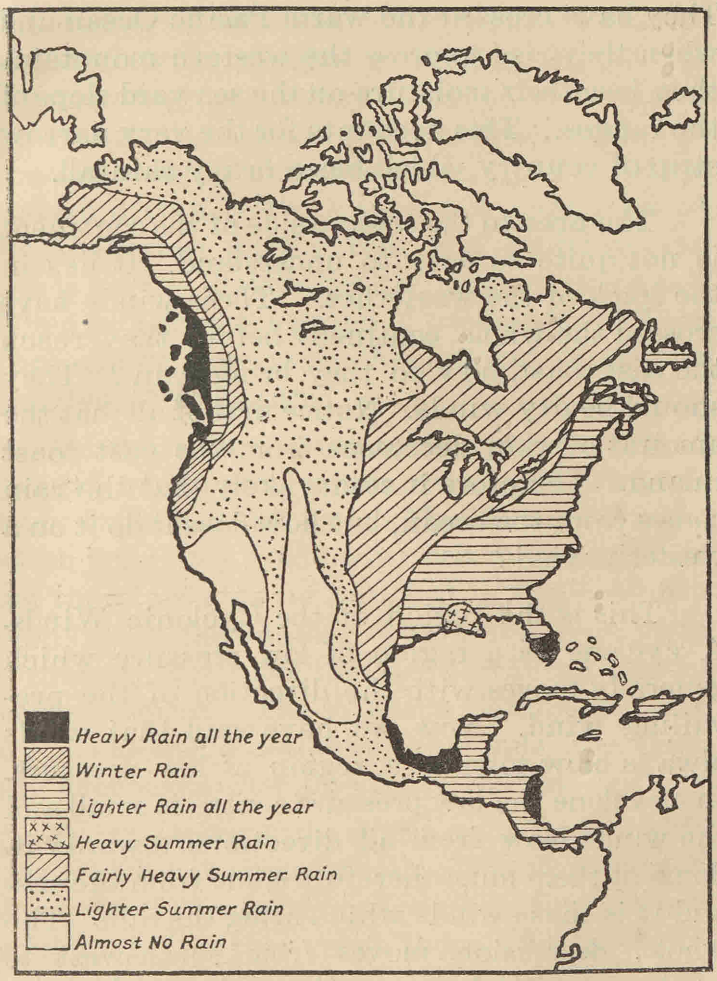


Fig. 38. Seasonal Rainfall of North America.

This is also easy to understand for this coast lies in the track of the westerlies all the year.

They have crossed the warm Pacific Ocean and when they rise to cross the western mountains they lose their moisture on the seaward slope of the ranges. This accounts for the very narrow strip of country which has a heavy rainfall.

The area in the eastern side of the continent is not quite so easy to understand. It lies in the track of the westerlies. These winds have crossed the whole continent before they reach the east coast, how do they bring rain? They should be dry winds. Notice first of all that the amount of rain decreases from the east coast inland. Therefore it seems likely that the rain comes from the ocean, but how does it do it on a westerly wind?

This is the region of the Cyclonic Winds. A cyclone is a region of low pressure which generally moves with the direction of the prevailing wind. Now we have said that winds always blow towards a region of low pressure. In a cyclone the low pressure centre is small and the winds blow from all directions towards it. Some of them must therefore come from the east and it is these winds which bring the rain. The whole. depression moves from south-west to north-east with the westerlies and therefore the weather changes quickly in a region of cyclonic winds. People who live in this part of the world do not have our steady winds, blowing for weeks

from the same direction. Nor do they know beforehand what weather to expect, as we do. The morning may be fine, the afternoon wet and the evening fine again. This is because the cyclone is passing over the place quickly. This eastern part of North America is in the track of the westerlies all the year and therefore the rain is evenly distributed throughout the year. When you draw the graph of the rainfall of New York notice how even the amount of rain is from month to month.

On the west coast there is a narrow belt of country which gets winter rain. We have already explained this as the Mediterranean area, which lies in the trade wind belt in the summer and therefore gets no rain, but in the westerly wind belt in the winter. This is a narrow strip of country, very like the Mediterranean land in South America. The Western Cordillera come so close to the coast that the winds lose their rain very soon after they leave the sea.

In the centre of the continent there is a wide area which has summer rain. The winds which blow over the great plains have lost most of their moisture before they reach them. In the summer the land gets very hot. You can see this by looking at the isotherm maps.

Hot air rises and expands. When it expands it cools and can no longer hold the moisture that

it could when it was hot, so it loses it as rain. What do we call this kind of rain? Convection rain. Remember that we get convection rain all the year round along the Equator, because it is hot all the year there, but in the centre of great land masses we get a small quantity of rain formed in the same way, during the summer months, when the land is hot. In America the amount of the rain decreases westwards. We shall see that this makes a difference to the kind of work which people do in different parts of the central plain.

The high plateau lands of the Western Cordillera are on the whole dry. They lie behind the coast ranges and so the winds have lost most of their moisture before they reach the plateau. The plateau is high and cold, and therefore receives little convection rain in the summer. In the southern part in the basin of the Colerado, the trade winds blow all the year and so we get a desert region.

SUGGESTIONS FOR PRACTICAL WORK.

1. Draw temperature graphs for the following towns. On the same diagram draw rainfall graphs.

Victoria Bt. Columbia.

Jan.	Feb.	Mar.	Apr.	May	Jun.	Jly.	Aug.	Sep.	Oct.	Nov.	Dec.
39	40	43	48	53	57	60	60	56	50	45	41
4·5	3·2	2·5	1·6	1·2	0·9	0·4	0·6	1·8	2·5	5·7	5·8

Temperature in° F. Rainfall in inches.

New Orleans.

Jan.	Feb.	Mar.	Apr.	May	Jun.	Jly.	Aug	Sep.	Oct.	Nov.	Dec.
54	57	63	69	75	80	82	81	78	69	61	55
4·5	4·1	4·5	4·7	4·2	5·5	6·6	5·7	4·6	3·5	3·7	4·7

Temperature in° F. Rainfall in inches.

St. Johns. Newfoundland.

23	22	28	35	43	51	59	59	54	45	37	29
5·4	5·1	4·5	4·2	3·6	3·5	3·7	3·6	3·8	5·4	6·1	4·9

Temperature in° F. Rainfall in inches.

New York.

31	31	38	49	59	69	74	72	66	56	44	34
3·3	3·3	3·4	3·3	3·3	2·5	4·4	4·4	4·5	3·4	3·4	3·3

Temperature in° F. Rainfall in inches.

San Francisco.

49	51	55	54	56	57	57	58	60	59	56	51
4·8	3·6	3·1	1·6	0·7	0·1	0	0	0·3	0·9	2·4	4·5

Temperature in° F. Rainfall in inches.

Winnipeg.

4	0	15	38	52	62	66	64	54	41	21	6
0·9	0·7	1·2	1·4	2·0	3·1	3·1	2·2	2·2	1·4	1·1	0·9

Temperature in° F. Rainfall in inches.

St. Louis.

32	34	44	56	66	75	79	77	70	58	45	36
2·3	2·6	3·5	3·8	4·5	4·6	3·6	3·5	3·2	2·8	2·9	2·5

Temperature in° F. Rainfall in inches.

Omaha.

22	25	37	51	63	72	77	75	66	54	39	27
0·7	0·9	1·3	2·8	4·1	4·7	4·0	3·2	3·0	2·3	1·1	0·9

Temperature in° F. Rainfall in inches.

Kamloops.

23	26	38	50	58	64	70	68	58	48	35	28
1·0	0·7	0·3	0·4	0·9	1·2	1·1	1·1	0·8	0·6	1·0	0·9

Temperature in° F. Rainfall in inches.

Yuma.

55	59	65	70	77	85	91	90	84	72	61	56
0·5	0·4	0·3	0·1	0	0	0·2	0·6	0·3	0·2	0·3	0·4

Temperature in° F. Rainfall in inches.

2. Write a description of the climate of each town by answering the following questions.
   (*a*) Has this town got a long or a short winter ?
   (*b*) Has it any time when snow lies on the ground If so for how long ?
   (*c*) Is there a great or a small range of temperature (This means the difference between the summer and winter temperatures.)
   (*d*) Are the summers hot, warm or cool ?
   (*e*) Does it have much or little rain ?
   (*f*) Does this rainfall come in the summer or the winter or all the year ?
3. Trace a map of North America and put each of these towns in it. Keep this map for the next chapter.
4. Copy all the climatic maps in this chapter. Colour them in the same way that you coloured the maps for the Southern Continents.

CHAPTER XXIII.

CLIMATIC REGIONS AND NATURAL VEGETATION OF NORTH AMERICA.

Look at the map in Fig. 39 and find the tropical forest area of North America. As you can see it is very much smaller than the same area in South America, because there is so much less land within the tropics in North America. The climate is the same as in South America. The temperatures are high all the year and there is a good rainfall from the north east trades.



Fig. 39. Natural Vegetation of North America.

North of this area we get a region of warm temperate forests on the east, and scrub and

desert on the west. We have found the same thing in Australia and South Africa. Can you see any difference in North America? Turn back to your vegetation maps and try to see for yourselves that in the southern continents the deserts are wide from east to west and the forests only occupy a very small area on the east coast. In North America the desert stretches from north to south. Why is this? Because the western mountains run from north to south and form a barrier to the rain-bearing winds. The warm temperate forests on the eastern side of the continent are much wider than in Australia or South Africa, because the rain bearing winds are able to enter the country by the central plain, from the Gulf of Mexico. This is a great advantage to North America.

As we travel northwards we come to the region of rain all the year from the westerlies but because the land lies on the eastern side of the continent the winters are very cold. The summers are hot compared with those of the west coast in the same latitude. Compare the summer temperatures of New York and San Francisco, and you will see that this is true. Remember that it is always the case where a continent is wide. We shall see an even better example of this truth when we come to study Eurasia. As we travel further and further north we get colder and colder winters, and the natural vegetation

changes from warm temperate forest to cool temperate forest and then to coniferous forest. There is always enough rain on the eastern side of the continent for trees to grow, though the kind of tree varies with the temperature.

Now look at the centre of the continent. Here we get hot summers, cold winters and a small amount of summer rain. Except in the north, no trees will grow for the rainfall is not sufficient. This is the great area of temperate grassland of North America. Notice first that it is larger than in any of the continents which we have studied so far. This is the important farming region. In the east the rainfall is better than in the west, so the occupations of the people vary. One of the difficulties of this central grassland is that it is open to the cold winds from the north. We said in Chapter XXI that there was not a rise of 1000 ft. from the Arctic to the Gulf of Mexico, therefore there is no barrier to prevent the cold winds from coming far south over the plains. This cold wind sometimes has a very serious effect on crops.

Right across the country north of the Great Lakes you will see that there is a coniferous forest belt. These trees have small leaves which lose very little water from their surface by evaporation. They can therefore grow in cold, rather dry regions and they still cover huge areas of

country. In some places they have been cleared for the growing of wheat and in others they have been cut down as timber and used in building houses and ships. In other places they are being cut down to be made into pulp for paper.

North of the forest we come to the Tundra region. This is a kind of vegetation which we have not met before. It belongs to a climate which is intensely cold in winter, so cold that the ground is frozen and only thaws for a foot or two down in the summer. The winters are long and the summers short. Only very short, stunted bushes will grow and in the extreme north even these will not be found. All the winter months the ground is covered with snow, but when the summer sun melts it, the ground is covered with small flowering plants. These are soon over and snow covers the ground once more. Only a very few people live in this part of North America and they find it extremely difficult to get a living.

The Mediterranean region lies on the west coast and is narrow like it is in South America. The most important part is the valley of California. Here it is even drier than most Mediterranean regions for the coast range lies in the path of the rain-bearing westerlies.

SUGGESTIONS FOR PRACTICAL WORK.

1. Divide the map made after reading chapter XXII into climatic regions. Write in each the following statements according as you think they fit.

(*a*) Very cold winters. Short summers. Little rain.

(*b*) Cold winters. Short summers. Rain all the year.

(*c*) Cold winters. Hot summers. Summer Rain.

(*d*) Warm winters. Cool summers. Heavy rain all the year.

(*e*) Warm winters. Hot summers. Rain only in winter.

(*f*) Warm winters. Very hot summers. No rain.

(*g*) Warm winters. Hot summers. Heavy summer rain.

(*h*) Warm winters. Hot summers. Rain all the year.

(*i*) Hot all the year. Rain all the year.

2. Copy the map in Fig. 39. Colour it as you did the maps for the Southern Continents.

CHAPTER XXIV.

THE POPULATION AND POLITICAL DIVISIONS OF NORTH AMERICA.

Look at the population map in Fig. 40. You will see that there are two very meagrely populated areas. The one in the north of Canada has so few people in it because it is too cold and difficult for people to get food. The one in the south-west is the desert region of the Colorado plateau. This region stretches north of the desert proper because the mountains are so high that few people can live in them.

The most densely populated part is in the east. We shall be talking about this later. It

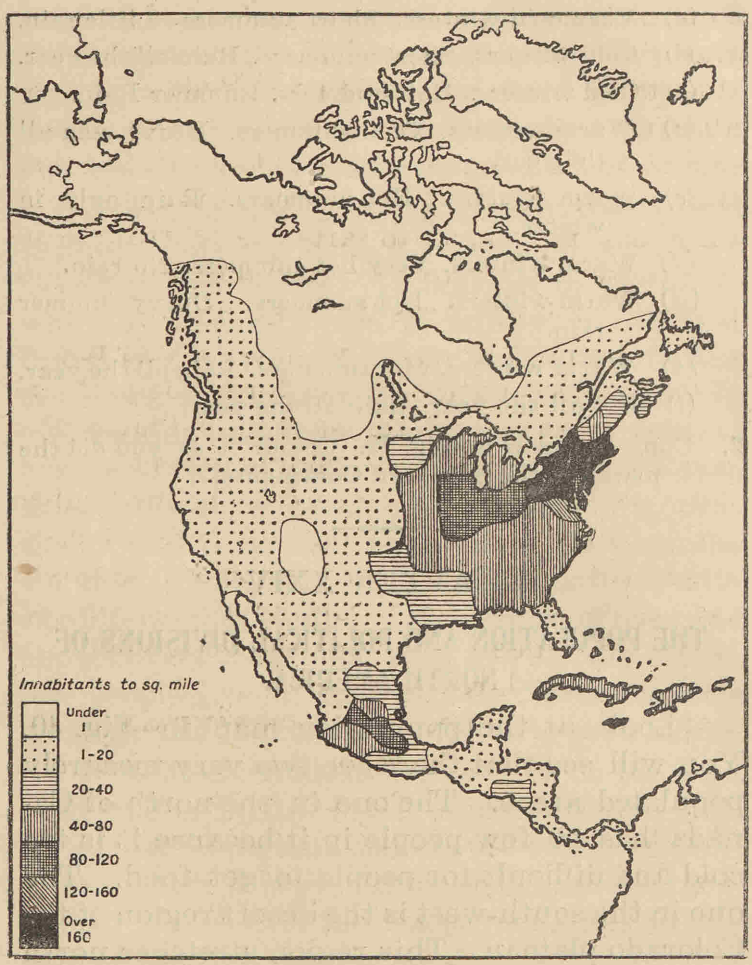


Fig. 40. North America—Population.

is the great manufacturing district of North America. Almost all the people who live in

this continent came from the countries of Europe in the first place. First the Spaniards, then the French and Dutch and British. These all came from the east and therefore we should expect to find more people settled in the east than in the west. It was only in the last century that men began to farm the central plain. For these two reasons we should expect to find the population decreasing westwards.

In Central America we find another region of meagre population in the forest belt of the coastal plain. This forest is like that of the Amazon Basin and so we should expect to find very few people living there. On the higher ground of the Mexican plateau the population is greater. The highlands are cooler, the forest is less dense and minerals have been mined there ever since the days of the Spaniards. Today there is a large number of oil wells so that many people are needed to look after them.

The northern part of North America is chiefly composed of the Dominion of Canada. The people came originally from Great Britain and France. They came in along the St. Lawrence valley and this is the most densely populated part. The first comers were Frenchmen and there are still a good many in the province of Quebec.

The central part of North America belongs to the United States. This is a region which

was first colonised by a mixture of people from different parts of Europe. In the eighteenth century they cut themselves off from the Mother Country and began to govern themselves. At that time there were only a few states along the east coast and the central plain. Since then they have spread all over the continent, from the Atlantic to the Pacific. When we speak of "Americans" we mean people who are citizens of the United States of America, often called the U. S. A. They are a new nation. Many of their people came from Europe in the last century, when they were spreading westwards across the plains of the central prairies. Some of them came from Norway and Germany and some from Italy and Eastern Europe, but now all are members of one new nation, the American. There is no other nation in the world which is quite like this. Alaska in the north-western corner of the continent belongs to the United States of America. It seems to us a very cold, barren country but it contains valuable gold mines.

The southern part of North America belongs to the Republic of Mexico. This was the part to which the Spanish people came in the early days of the discovery of the New World. Many of the people have Spanish blood in their veins but they have cut themselves off from their Mother Country and are ruled as a Republic.

In Central America there are a number of small republics, which were originally Spanish, while the West Indies are divided amongst several European nations and some independent republics. You can find all this from your political map in the atlas, but you must read some history to find out why these nations have their interests in the American lands.

SUGGESTIONS FOR PRACTICAL WORK.

1. Copy the political map from your atlas.
2. Read all you can find about the North American Colonies of Great Britain in your history books.
3. Read about the French in Canada and the Spaniards in Mexico.

CHAPTER XXV.

THE NORTH-EASTERN INDUSTRIAL & COMMERCIAL REGION OF THE UNITED STATES OF AMERICA.

We said in the last chapter that this was the most important industrial region of North America. There are several reasons for this. In the early days when people had to cross the Atlantic Ocean in sailing vessels they found the good harbours of this coast and settled along the waterside. Find Connecticut and Rhode Island in your atlas. You will see that these are two of the smallest of the States.

They are also two of the oldest and two of the most densely populated. Look at the coastline from Chesapeake Bay northwards. You will see that there are a great many openings and bays. All the river mouths have been drowned and so there are beautiful, deep-water harbours in which the early sailing vessels could find safe shelter. Look once more at your map and notice that the highland comes very close to the coast in this part of the United States of America. The rivers coming down to the sea at the head of the numerous inlets had to drop over the edge of the plateau in a waterfall. Very often this waterfall was actually at the coast itself, because the lower part of the river had been drowned. See what this meant to the early settlers. They had a safe anchorage for their vessels. They had a small waterfall close to the harbour which could be used to turn the machinery in their small mill. At first this would be only a flour mill, but later they began to spin and weave their cloth by machinery, and so the waterfall could be made to work the spinning or weaving mill too. They soon found that they could make more than they required at home. They got their raw cotton from the warmer lands of the south. Their ships could go south to fetch the bales of cotton, bring them right up to the factory door, and then when the cloth had been made it could be loaded on to

the waiting vessel and carried away to the southern states, where they could grow the cotton but not manufacture it. This was the beginning of the manufacturing region of the United States of America.

Another advantage which this corner of the United States of America had was the forests. If you look at the vegetation map you will see that all this region was forested. A large part of it is still forested. It is very poor farming soil. The farmer has a very difficult life, but that does not matter so much to-day for he can get his food from the central plains. In the early days he had to cut down the forest to make way for the plough. He used the wood to make the ships which brought the raw cotton, sugar and the other things which he could not grow for himself. In this way the ship-building trade of the North-Eastern States began. The deep-water, sheltered harbours helped in this trade too.

To-day, although men no longer use the water of the little falls to turn their machinery, nor the wood of the forests to build their ships, this is still the manufacturing region of the United States of America. Look at your maps and find Pittsburg. This town lies on the Appalachian plateau and is the centre of the great coal mining district of the North-Eastern

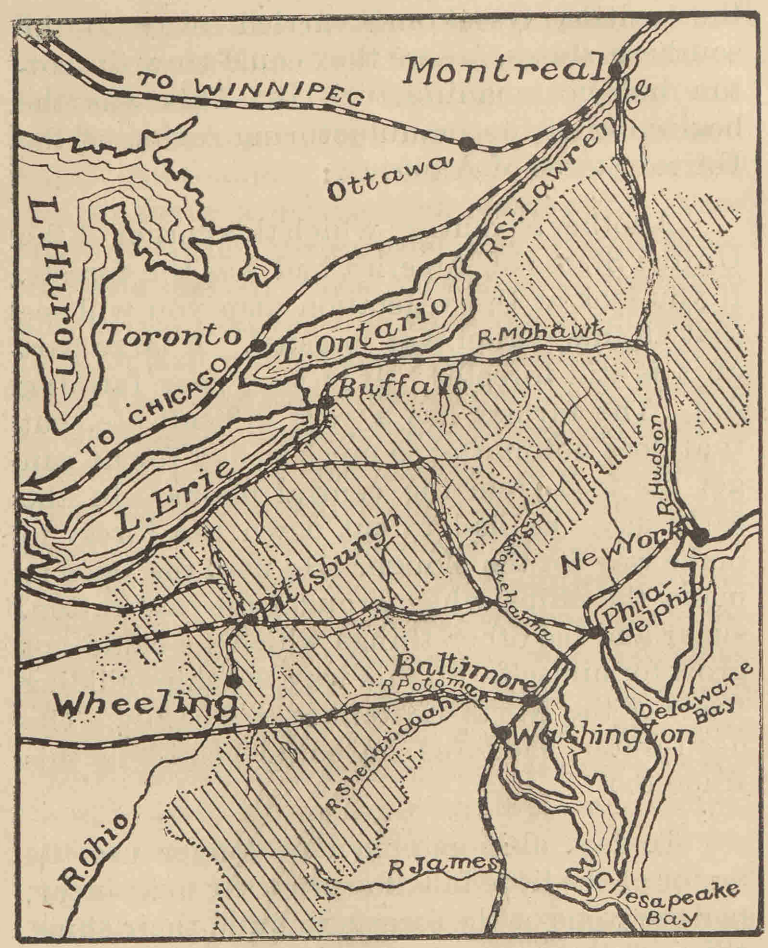


Fig. 41. Rivers and Routes of Northern Appalachians.

States. In the early days it was difficult to get from the east coast towns across the Appalachian highland to the Great Lakes. Nowadays

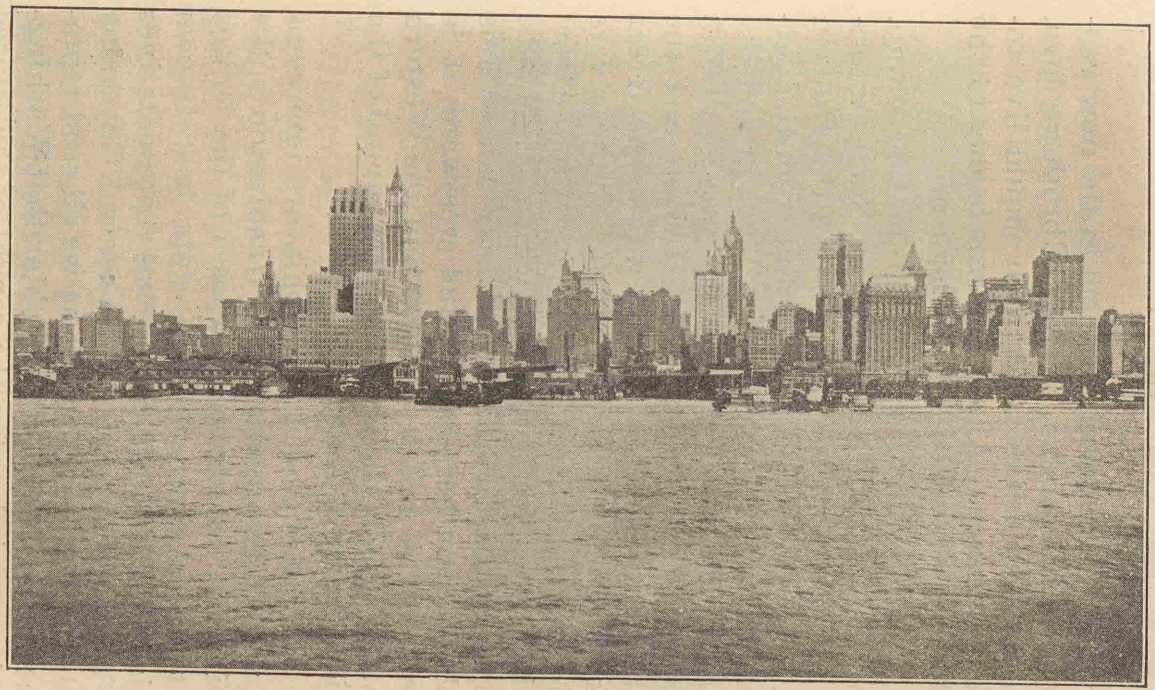
men have found ways through the hills up one river valley and down the opposite one. If you look at the map in Fig. 41 you will see some of these routes. Notice the river Hudson and the Mohawk. This is the best route from New York to the Lakes. It is so level that a canal has been built so that heavy goods like coal and machinery can be sent all the way by water. Pittsburg uses the Susquehanna valley to reach the coastal plain at Philadelphia and then the road follows the coast northwards to New York. Since these roads were built the coal of the Northern Appalachians has been used in the manufacturing towns of New England and the Middle Atlantic States. They still make cotton goods from the raw cotton of the south in the towns of Massachusetts and Rhode Island, but they use the coal from the plateau instead of the water power of the falls. Ships are still built on the shores of Chesapeake and Delawar Bay but it is the iron of the Great Lakes that is used rather than the trees of the forest.

Along the shores of Lake Superior some of the best iron ore in the world is found. Coal is near at hand on the Pittsburg coalfield. The iron ore is heavy and would be expensive to move by rail, but it can be carried all the way by water from the west end of Lake Superior to the towns on the southern shore of Lake Erie

which lie nearest to the coalfield. Here it is smelted and made into steel. Find the towns of Detroit, where motor cars are made in great numbers; Toledo, the great steel manufacturing town; Cleveland, Buffalo and Rochester, all make machinery of various kinds.

Another industry of this part of North America depends on the forests. We said that the New England States were very poor farming country. The land is still covered with forest to a large extent. This is being cut down now and the wood turned into wood-pulp to make paper for newspapers and other purposes. This is a new use for the forest trees, now that they are no longer needed for ship-building.

We have mentioned several towns. First there is the group of New England towns. Some of them have rather peculiar names. Boston is an important port and one of the oldest towns of the United States of America. The first settlers came from Lincolnshire in England and named their new home from the town of Boston in England. Providence and Philadelphia got their strange names from the kind of people who first settled there. They came from England, being driven out by religious persecution. They called their new town by the names which meant most to them. Providence, because they believed that God's



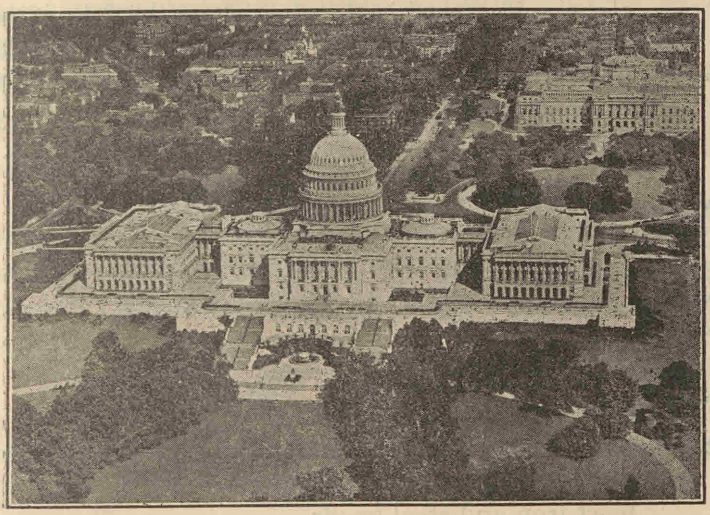
New York. [*Photo* – E. N. A.

providence had protected them in the new venture and Philadelphia, the city of brotherly love, because they believed that men should live together in peace. All these towns belong to the first states colonised by the English.

Further south we come to another group. New York is the greatest town in North America. It has a splendid position on the Hudson river, protected by Long Island from the Atlantic storms. By the river Hudson and the Champlain Lake it has a water-way to the St. Lawrence river, and by the Hudson and the Mohawk rivers it has a water-way to the Great Lakes. To-day the railways follow the rivers and canals, and also connect it with the coal fields of the Northern Appalachian Highlands. Along the coastal plain it has easy connections with the southern states and westward it is connected by rail to Chicago and the Western States. This is the great business capital of the United States of America.

Baltimore and Philadelphia are important manufacturing towns while Washington is the capital for Government purposes of the United States of America. Each state has its own legislature, but each state sends representatives to Washington to sit on the central Governing Body of the Republic, just as we all send representatives to Delhi. Doyou think that Washington is a good place for the capital of the United

States of America? No, it is too far east. Men from California have too great a distance



Washington.

to travel and the people of the east are not likely to have much understanding of the problems of the people of the west. In the early days of the United States of America, Washington was fairly central, for all the states were found along the east coast and none of them was west of the Mississippi river. You can see that for a very long time this part of the United States of America was by far the more important and also the wealthiest part of the country.

SUGGESTIONS FOR PRACTICAL WORK.

1. Trace four maps of the North-Eastern States and colour them according to the amount of each article manufactured in the state, from the following figures. Less than 10 % light yellow. 10 to 20% Dark yellow. 21 to 30% Orange. 31 to 40% Light red. Over 40% Dark red.

	Iron & Steel Goods.	Cotton Goods.	Woollen Goods.	Paper.
Massachusetts	—	38%	35 %	16 %
Connecticut	—	6	8	—
Rhode Island	—	8	9	—
New Hampshire	—	6	8	—
New York	—	—	—	21
Pennsylvania	53%	—	18	—
New Jersey	—	—	10	—

2. Explain why the New England States make the most cotton. The state of Pennsylvania makes the most iron and steel goods.

3. Put all the towns mentioned in this chapter into a map.

4. Draw a map to show the position and importance of New York.

CHAPTER XXVI.

THE SOUTH-EASTERN PLANTATION REGION.

Look at the vegetation map in Fig. 39 and notice where the warm temperate forests are marked. We have seen in South Africa and in Australia, that where the natural vegetation

is of this kind man has often cut down the forest and grown his own crops on plantations. This is true in America also. The most important crop in the South Atlantic States and those bordering the Gulf of Mexico is cotton. This crop needs at least seven months free of frost. We saw that the east coast of North America gets really cold winters so that the cotton cannot be grown north of the two Carolinas. Find these states in your atlas. The states which grow most cotton are:—North and South Carolina, Georgia, Alabama and Mississippi.

The people who live in these states do not live, like those of the north-eastern industrial region, in large manufacturing towns. Nearly everyone lives in the country. The owner of the plantation is a white man but the temperature is too high for him to do much of the out-door work so it is done by negros. You may wonder how negros from Africa can be living in North America. When the white settler first came to this part of America he found that tropical crops like cotton and tobacco could be grown and that he could make a good profit from the sale of them. He could not do the actual field work so he imported slaves from the west coast of Africa to do it for him. He built houses for his men and took care of them well, but they were his property and could not

move freely from one place to another to look for work. Nowadays there are no slaves but the descendents of the first slaves still live and work on the plantations. They live much as their fathers did, but now they get paid for their work and can choose which master they will serve.

The cotton is sent away to the New England States to be made into cloth. A very great deal goes to Lancashire and some of it even comes to India, for it is the long-stapled kind which makes the finer types of cloth. We cannot grow this variety in our own country and so we import it from America when we wish to make the better kinds of cloth. The chief ports which send it out are Charleston, Savannah and New Orleans.

Nowadays some of the cotton is made into cloth in the southern states. There are a few manufacturing towns growing up on the coalfield of the Southern Appalachians. Birmingham, Atlanta and Columbia are all becoming important for this kind of work.

North of the cotton states we find most of the people growing tobacco. Virginia and Maryland are the states where this is the important crop. You have seen advertisements for Virginia cigarettes. The tobacco for these is grown in this part of North America.

Along the Gulf coast, especially in the delta of the Mississippi, there are some paddy fields where the rice is grown for the large negro population. Notice that all these crops are those which we can grow in our own country and it shows you that the climate of this part of the United States of America must be very like that of parts of India.

SUGGESTIONS FOR PRACTICAL WORK.

1. In a map of the United States of America colour the states where cotton grows yellow and the states where tobacco is important green.

2. Make a map showing the percentage of negros to the total population from the following figures.

Georgia	45 per cent.
Alabama	38 „
North Carolina	29 „
South Carolina	51 „
Virginia	30 „
Tennessee	19 „
Florida	34 „
Kentucky	9 „
Maryland	16 „
Pennsylvania	3 „

Colour states with less than 10 per cent yellow. 10 to 20 per cent dark yellow. 21 to 30 per cent orange. 31 to 40 per cent light red. 41 to 50 per cent dark red. Over 50 per cent purple.

3. Write an explanation of this map.

CHAPTER XXVII.

THE CENTRAL FARMING REGION OF THE UNITED STATES OF AMERICA.

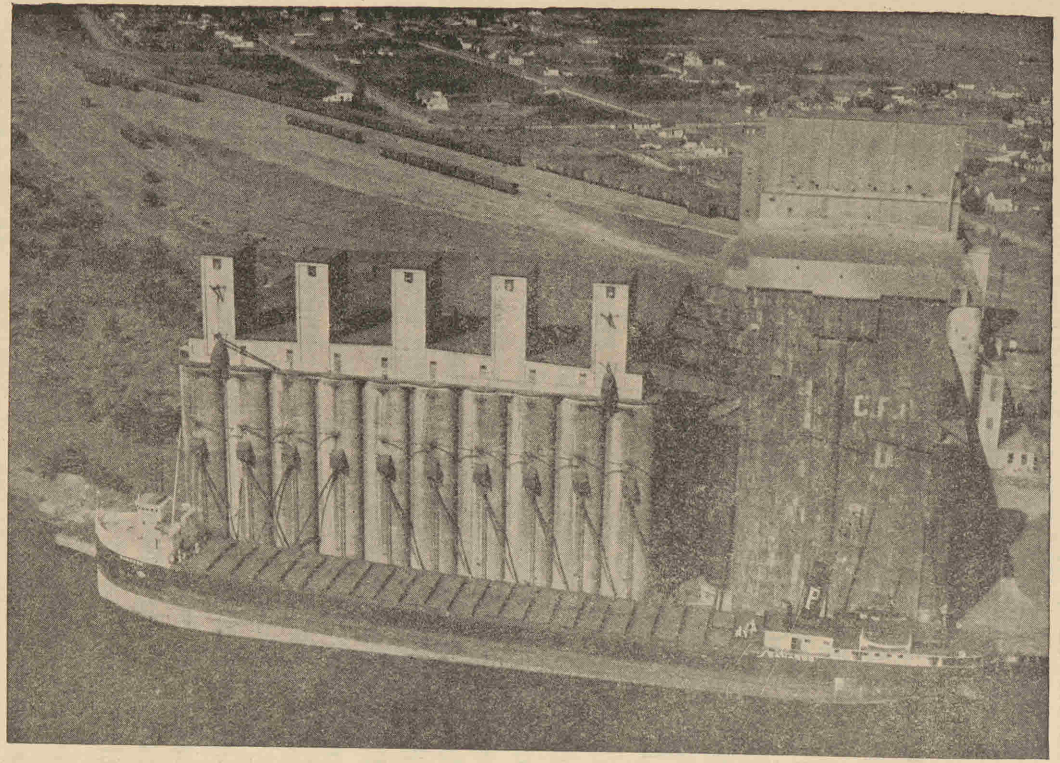
We are going to talk about the great central plain of the United States of America. This is the most important farming region of the continent. Men found their way slowly to this great grassland for they had to find a route across the Appalachian Highlands before they could reach it. When it was found it was very quickly settled. It was an empty land and so farmers could have large farms. These would need many men to cultivate, but there were not many men there. It was here that the first farming machinery was invented. One plough will cut several furrows. One reaping machine will cut, bind and stack the wheat ready for the thresher. The threshing machine not only threshes the wheat, but packs it into bags and piles the bags up ready for the motor lorry to take to the station. You can see that the work of a very large farm can thus be done by very few people. The central grasslands are level for many miles and so it is easy to use machinery on the fields.

Before man began to cultivate the central plain it was covered with grass. We call these grasslands the Prairies. If you look at your

climatic maps you will see that the winters are cold and that in the northern part snow lies on the ground for a good many months. When this melts in the Spring, the grass comes up quickly and scatters its seeds by the end of the hot summer. The early summer rains helps the plants to grow and the dry, late summer ripens the seed. Wheat needs just these conditions. Plenty of level land, a cold spring, with rain to make the new seedlings sprout and a hot summer to ripen the grain. The northern part of the Praries is one great wheatfield.

The grain is sent to the manufacturing towns of the industrial north-east where it is made into bread for the many workers in the factories. Some of it is sent to Europe but America is using more and more of her own food now that her population is growing so fast. The Great Lakes form a very easy means of transport for sending the wheat from the farmer to the townsman. The ports on Lake Superior are fitted with elevators. These are tall buildings into which the wheat from the train is stored until it is needed. The ships come alongside and the grain is shot down into their holds and carried away to the east.

Further south it is too hot for wheat to grow successfully. Here maize is the most important crop. This is not usually made into



[*Reproduced by courtesy of Canada House.*

Loading wheat from a lake-side elevator.

food for men. It is generally fed to pigs or cattle. These animals are then sent to the towns and turned into meat for men to eat. The most important town for this trade is Chicago. Find it on your map and notice that it is on one of the Great Lakes and so has easy communication with the east. It is on the borders of the wheat and maize country and also of the grazing lands of the west.

If you will look at your rainfall map again, you will notice that the country to the west of the Mississippi river has less rain than that to the east of it. The most important wheat and maize lands lie on the wetter side. The land to the west of the river is largely given up to cattle ranching. Here there is not enough rain for ordinary farming. The cattle are allowed to wander where they will, like the sheep of the Murray-Darling Basin. The winters are cold but there is little snow on the ground because the rainfall is so small. The cattle are able to get food for themselves throughout the winter and only when they are needed for branding and sending to market are they collected up and brought back to the farm house. It is these cattle which are fattened on the maize grown in the maize belt. They are sent to Chicago to market.

You will see that there are three main farming regions, the wheat and maize on the east,

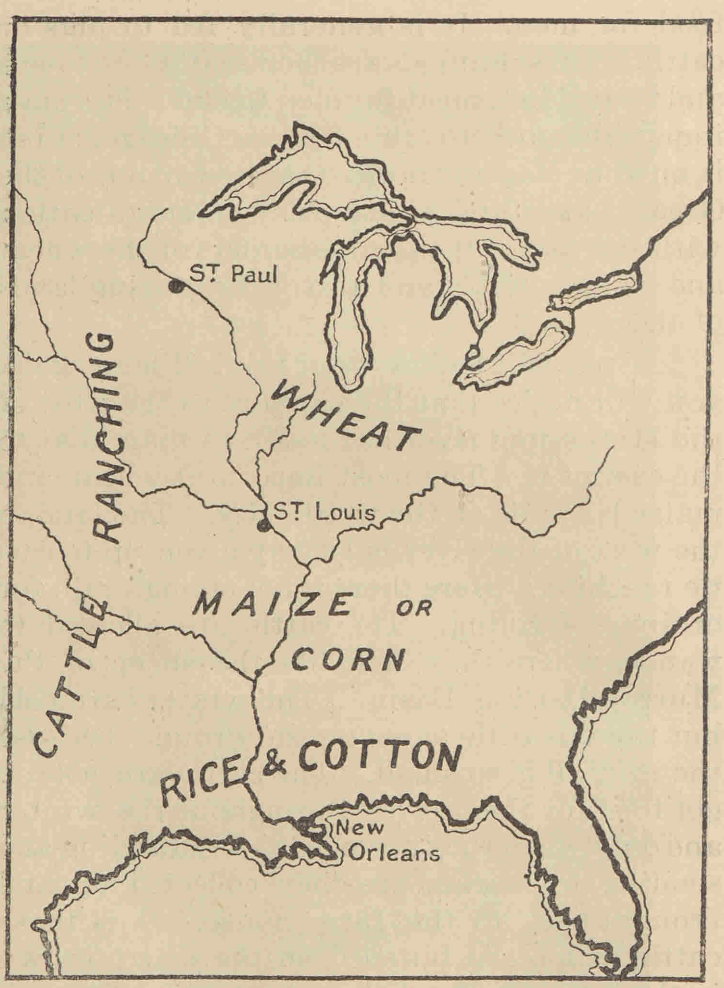


Fig. 42. Crops of the Central Plain of the U. S. A.

and the cattle ranching region on the west. In the south we come to the cotton and rice lands,

of which we spoke in the last chapter. If you look at the map you will see many towns in the Central plain, but nearly all of them are connected in some way with farming occupations. St. Louis and St. Paul are flour milling towns as well as river ports. Other towns make agricultural machinery while others are large market towns where the produce of the farms is bought and sold.

SUGGESTIONS FOR PRACTICAL WORK.

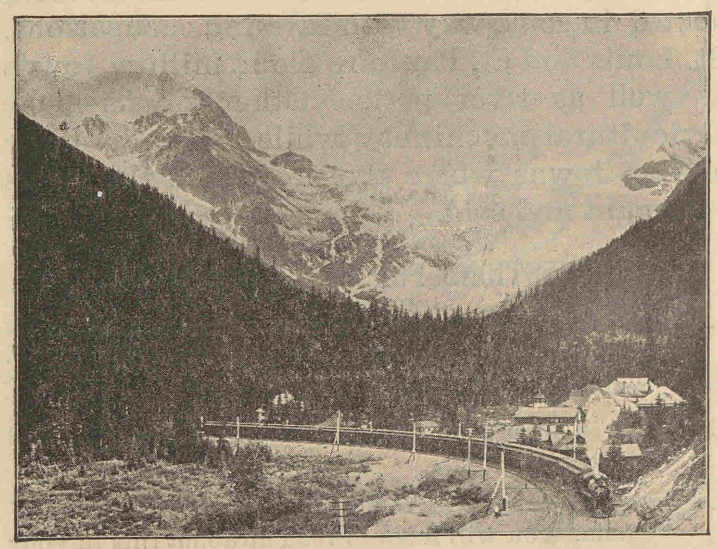
1. Copy the map in Fig. 42. Colour the wheat lands yellow, the maize lands orange and the cattle-ranching lands green.
2. Make a map of Chicago to show its position and importance.
3. Compare American farming methods with those of India. You will have to read up about this in your encyclopaedia.

CHAPTER XXVIII.

THE MINING REGION OF THE ROCKIES AND THE PACIFIC SHORELANDS.

We have said that it was the finding of gold in the western mountains which first brought men to the west. In those days there were no railways across the country and travelling was very difficult. Some men came all round the southern end of South America by sea to

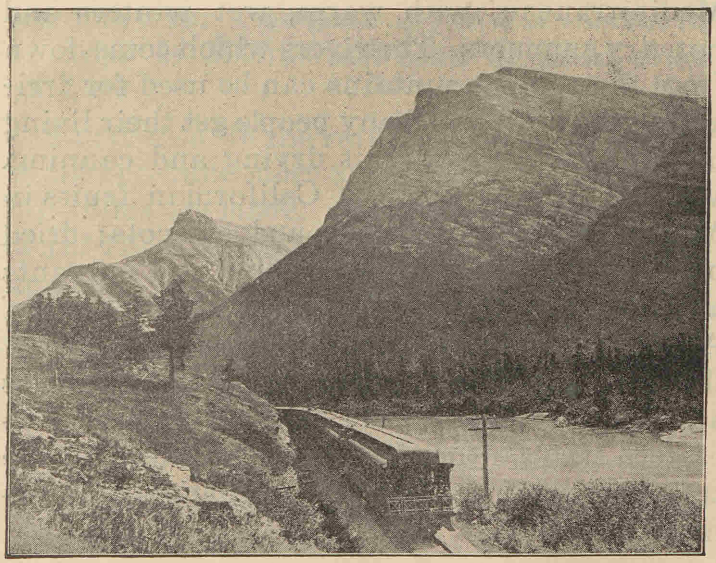
San Francisco in order to reach the gold mining lands.



Mountain, river and railway station in the Rocky Mountains.

To-day gold is not the only metal which is found in the Rockies. Silver and copper are important, while oil is pumped in large quantities and carried to the towns by pipe lines just as it is done in Burma. Find the towns of Cripple Creek where gold is mined; Butte where silver and lead are mined; Utah and Arizona where copper is the most important mineral; Nevada and Colorado where silver is mined. Notice that all these mines are found in the

high plateau of the south-west and that they are in the drier region of the continent. There are only a few people living in this part of the country, because it is both high and dry, but the wealth of the mines is sufficient to make it worth while. Notice too, that all the mineral wealth must be taken out of the country by railways which have been built at great expense over the mountain passes.



[*By courtesy of the C. P. R.*

A train passing through a valley in the Rocky Mountains.

Although the first explorers were searching for gold as in Australia, some of them decided

to settle in the pleasant valleys of California and Willamette. Here they found a good climate which was excellent for fruit farming. The only difficulty was the great distance from any market where they could sell their fruit. When the railways were built across the country and still more when the Panama Canal was cut this difficulty was solved.

In the Californian valley the climate is Mediterranean, with warm, wet winters and hot, dry summers. The rivers which come down from the snow-mountains can be used for irrigating the fields and many people get their living by fruit farming or fruit drying and canning. We can buy all kinds of Californian fruits in Madras. Tinned peaches and apricots; dried plums, apricots, peaches, raisins and currants all come from this part of the United States of America, for the summers are so dry and hot that all the fruit can be dried in the sun. Oranges and grapefruits go to the markets of the north-eastern states either by refrigerator cars on the trains or in refrigerator ships through the Panama Canal.

The more northerly valleys of the states of Washington and Oregon grow much fruit too, but it is of a different kind, for here they do not get the dry summers of California. Apples are the chief fruit exported and wheat is grown on

the level fields of the Puget Sound lowlands. These states do not consist of valleys entirely and they are therefore able to export different kinds of products. On the slopes of the mountains there are found great trees, called Douglas Firs. These are cut down and exported as timber from the ports of Seattle and Tacoma.

The rivers are full of salmon and these are caught in traps and tinned at Portland on the Columbia river. We get many tins of salmon in the shops of Madras and some of them come from here.

Further south the rainfall gets less and less and the sunshine more and more. It is here that all the films are made. Hollywood is near to the town of Los Angeles which you can find on your maps. Notice that it is near to the desert belt and the people have taken advantage of the clear skies and bright sunshine to build up a great industry in film-making.

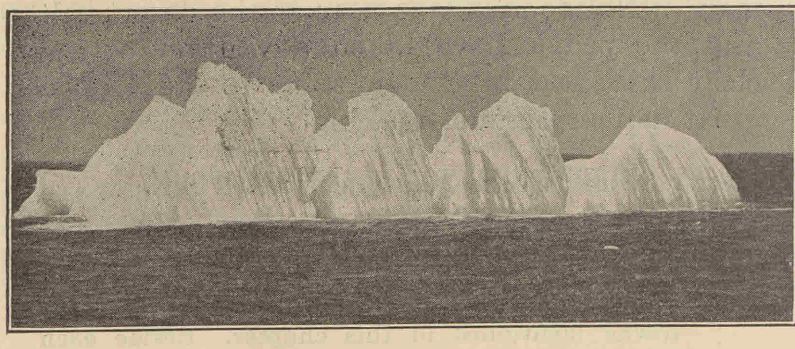
SUGGESTIONS FOR PRACTICAL WORK.

1. Make a map to show the position and importance of San Francisco.
2. Make a map of the western states and put in all the towns mentioned in this chapter. Beside each write the thing for which it is noted.
3. Make an expedition to your nearest large shop and count the things which come from California.

CHAPTER XXIX.

EASTERN CANADA AND NEWFOUNDLAND.

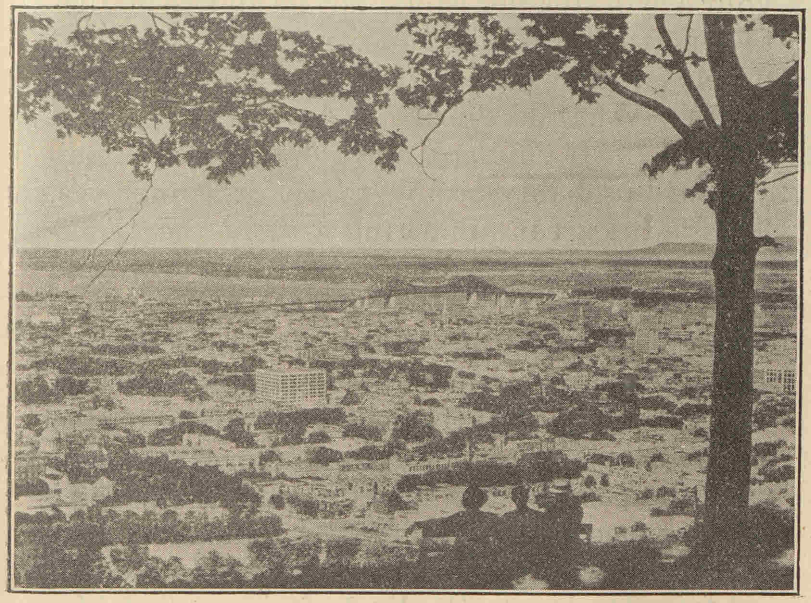
Look at your map and find the island of Newfoundland. Can you guess how it got its name? This is the part of North America which was first discovered by the fishermen of Europe. On the Grand Banks, just south of the island, large quantities of fish are found. Here the warm Gulf Stream Drift meets the cold Arctic Current. Ice-bergs brought down by the Arctic Current melt. They bring with them quantities of sand and silt, and this is dropped forming the sand banks which make the sea shallow at this point. They also bring much food for the fish so that this is the breeding ground of cod and



Ice-bergs off Newfoundland.

other fish. For centuries, fishing boats of all nations have caught fish on these banks. It is

a terribly hard life and a dangerous one. The meeting of the warm and the cold currents cause thick fogs and many ships have been lost. It is very cold and the ice-bergs add to the danger, but the value of the fish is so great that men are willing to risk their lives to get them. Newfoundland itself is a cold, barren island where most of the people get their living by drying and packing the fish brought in by the trawlers.



Montreal.

Some people now make a living by paper-making from the wood pulp from the forest.

Take your maps and find Quebec and Montreal on the St. Lawrence river. These were some of the first towns to be built in this part of North America. They were both French towns and to this day there are many French people living in them. If you were to make the journey to Canada you would most probably sail up the St. Lawrence to Quebec and on to Montreal. There you would have to land for your ocean steamer would not be able to go further up the river, but you would have travelled nearly a thousand miles from the Atlantic ocean. What do the people do in this part of Canada ? If you look at your vegetation map you will probably be able to see for yourselves. This is the great lumbering area of the Dominion. The trees of the forest are cut down and brought to the saw mills of Ottawa, Montreal and Quebec by water. Here they are cut into logs and planks by machinery which is driven by electricity. This is made by the water-power of the many falls where the smaller rivers drop over the plateau edge into the main river. Some of the wood is turned into wood pulp to make paper and large quantities of paper are exported from Quebec to England.

Another important trade of this part of Canada is dependent on the forest. Ever since the St. Lawrence was first found men have trapped

animals in the forest for their furs. Both Montreal and Quebec are great fur-trading towns.



Lumberers at work.

Trappers go into the forest at the beginning of the winter, when the wild animals get their thickest coats and often they do not come back to the towns for months. They bring with them the skins which they have collected and sell them to the merchants who have them dressed and prepared for sale to make coats and other clothes which the women of the large towns of Europe and America wear.

This is the oldest part of Canada and all along the river there are small farms. These

are mostly dairy farms, for there is plenty of good pasture for the cattle near the river. The milk is turned into butter and cheese and sold in the towns. A good deal is exported to Europe for the population is too small to use all that is made.

Look now at the Great Lakes and find the Lake Peninsula. This lies between Lake Huron and Lakes Erie and Ontario. Here the climate is not nearly so extreme as it is in the rest of Canada. The lakes are so large that the water is sufficient to make the summers cooler and the winters warmer so that fruits like peaches and grapes can be grown.

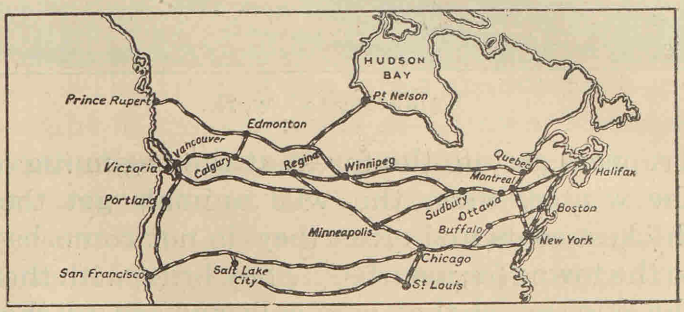


Fig. 43. Principal Canadian Railways.

On the northern side of the river in the Province of Ontario we find the forest and very few people, but to-day many different kinds of minerals have been discovered and the railway has been built through the forest to the mining

towns of Sudbury and Cobalt. These mines are very rich and gold, silver, nickel and iron are all mined. Find these places on your map and notice the railway connecting these towns with the ports of Montreal and Quebec.

SUGGESTIONS FOR PRACTICAL WORK.

1. Make a map of Eastern Canada putting in the provinces of Quebec and Ontario and the island of Newfoundland. Write in Quebec, lumbering and trapping. In Northern Ontario, mining and in the Lake Peninsula, fruit-farming. Along the river, dairy farming and in Newfoundland fish curing. This will remind you of the occupations of the people.
2. Make a map to show the position and importance of the town of Montreal.

CHAPTER XXX.

THE PRAIRIE PROVINCES OF CANADA.

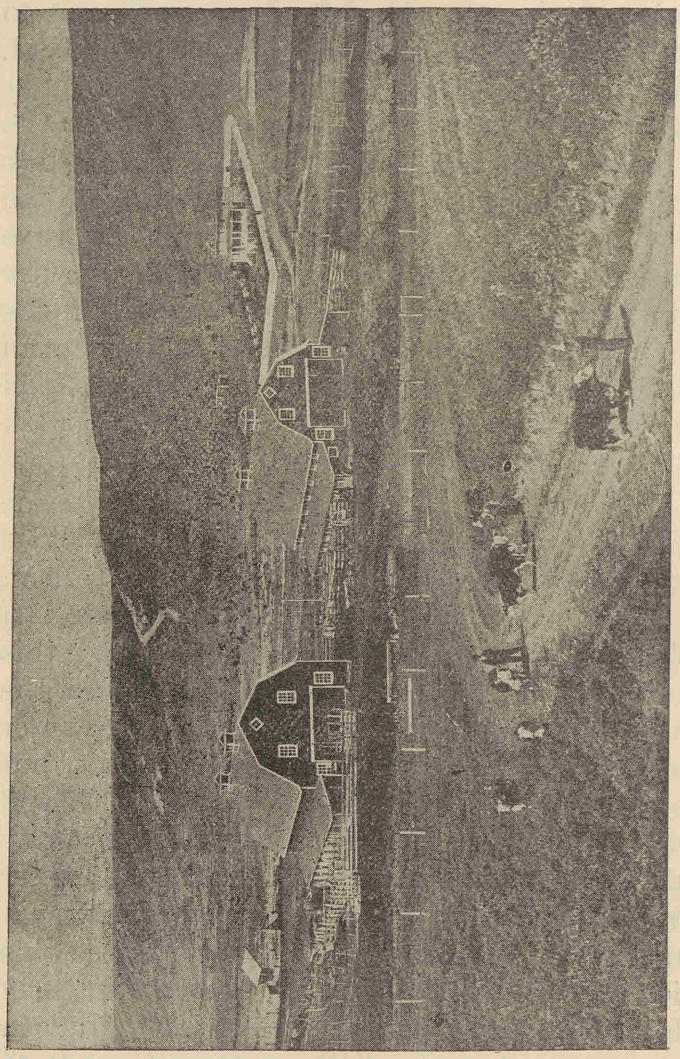
Look at your maps and find the provinces of Manitoba, Saskatchewan and Alberta. These are known as the Prairie Provinces. They are like the central grasslands of the United States of America. For centuries they were covered with grass and were the home of the buffalo and the American Indian. It was only in the middle of the last century that white men began to settle on them and to grow wheat and raise cattle in large numbers.

Find Winnipeg in the Province of Manitoba. This is a town which has grown very quickly as the centre of the wheat trade. The land to the west of it is very fertile, especially the land in the valley of the Red River and it was found that wheat would grow very well after the snow of the winter had melted. If you look at the temperature graph for this town you will see how cold the winters are, the average temperature for January is well below zero, but the summers are comparatively high. In June, July and August the average is over 60° F. This hot summer, with the long hours of sunlight which come so far north, ripen the grain easily.

The great difficulty which the early farmers had to overcome was the long distance from the towns where the wheat would be needed for food. Find the Canadian Pacific Railway. It crosses the Dominion not far from the boundary of the United States of America. It was the building of this railway which made it possible for the farmers of the Prairie Provinces to send their grain to market. As the railway was pushed further and further west, so more and more land was ploughed for wheat and the population moved westwards too. Most of the grain is sent by water from Port Arthur on Lake Superior. A great deal of the wheat is sent to Great Britain. It is reaped in during September and

the farmer wishes to get it to the ports before the ice blocks the river St. Lawrence and so prevents ships from sailing up to Montreal. This happens about the middle of November and so there is only about six weeks for the grain to be collected and sent off. If you look at your maps and see the great area of the wheat fields you will see how busy the railways and the ships on the lakes and canals must be at this time of the year. The farmers' life is very hard and full during the summer and autumn months, but when the snow comes and the ground is frozen he has five months in which he can do almost nothing.

One interesting experiment has been made to try to get the grain away more quickly. Look at your maps again and find Port Nelson on Hudson Bay. You will see that there is a railway line from the Prairies direct to this point. This has been built just to try to get the grain out of country more quickly. The winter comes earlier here for it is further north, but the summer days are longer in the north and so the number of hours of sunshine each day makes up for the shorter number of summer days. Men have experimented in growing wheat which ripens in a shorter time and planted this quick-ripening wheat in the more northerly fields. The great advantage of the Hudson Bay route is that the distance from Canada to



Ranch scene in Alberta on the foothills of the Rocky Mountains.

Liverpool is shortened by several hundred miles if this is used instead of the Montreal—St. Lawrence route.

The Province of Alberta is among the foothills of the Rockies and it lies in the rain-shadow of these mountains. There is not enough rain for wheat and so this is the great cattle ranching province of Canada.

SUGGESTIONS FOR PRACTICAL WORK.

1. Draw a railway map of Canada. Put in the Prairie towns and the ports to which the grain is sent on the Lakes.
2. Think out the answer to the following questions :—
   (*a*) Why does most of the wheat of the Canadian Prairies go to Europe, while a large proportion of the wheat of the United States of America is used at home?
   (*b*) Why did the towns of Canada grow up after the railway was built, while the railways of India were built to reach the towns?

CHAPTER XXXI.

BRITISH COLUMBIA.

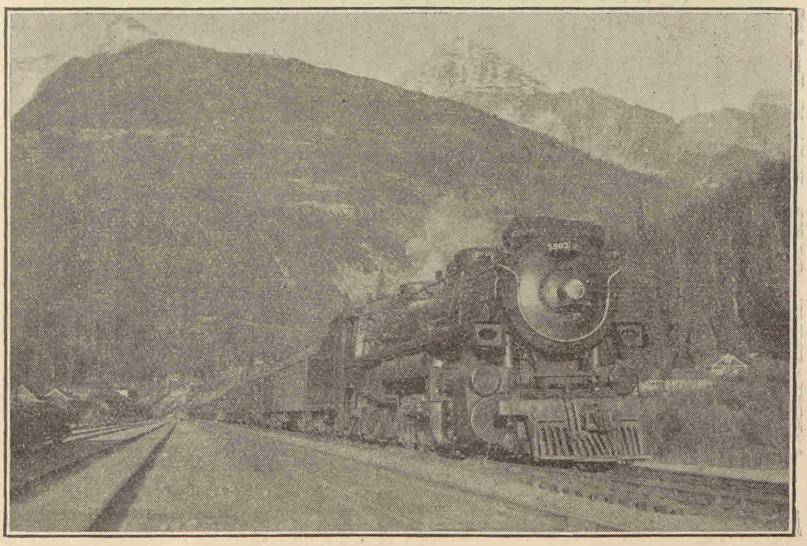
Look at your maps and find British Columbia. This is the most westerly province of Canada. You will see from your maps that it lies in the Western Cordillera and that most of it consists of mountain ranges and deep valleys in between. The climate is pleasanter than that of the Prairie Provinces. Look at the temperature

and rainfall graph for Victoria and compare it with the ones for Winnipeg. Notice that the winters are much warmer and the difference between summer and winter is not very great. The rainfall on the coast is good and mountain slopes are covered with good forest trees. This is therefore another lumbering province. The wood is floated down the rivers and cut in the saw-mills of the towns

Another occupation of the people of the valley lands is fruit farming. We have seen how the people of Washington and Oregon, just over the American border, grow fruit in their lowlands and the apples of British Columbia are sent all over the world from the port of Vancouver.

Further inland the climate is not so pleasant. Look at the graphs for Kamloops and notice that the temperatures are lower in winter, higher in summer and the rainfall is much less than that of Victoria. Can you see any reason for this? The wind, which rises over the coast range, loses a good deal of its moisture and there is little left a few miles from the coast. People live in this drier region for they find many kinds of minerals in the rocks which have been laid bare in the river beds. It was the search for gold which first brought people to this far country. Before the railway across the Rockies was built British Columbia was cut off from

the rest of the continent. There were very few people living in the Prairie Provinces and the roads across the mountains were only rough tracks. People thought it was worth while to



[*By courtesy of the C. P. R.*

A "C. P. R." Train at Glacier, B. C.

come this long journey because the gold was so valuable. When the river gold was no longer to be found some of the early miners settled down to fruit farming as they had done in California. It was these people who were so anxious for the Canadian Pacific Railway to be finished and the story of the building of the line through the mountains is one of the most interesting of engineering stories.

In the rivers many salmon are caught, as they are in Oregon. These are put into tins and sent all over the world. The chief port is Vancouver and this sends out some of the wheat of the Prairies, fruit, gold, tinned salmon and timber. This part of Canada looks towards Asia and a good deal of the trade is with Japan and China, and with New Zealand and Australia.

SUGGESTIONS FOR PRACTICAL WORK.

1. Read the story of the building of the Canadian Pacific Railway.
2. Collect pictures of the mountains of British Columbia. Compare them with pictures of the Himalayas. Why are they so much alike ?
3. Read about the Royal Canadian Mounted Police. Why are they mounted ?

CHAPTER XXXII.

MEXICO, CENTRAL AMERICA AND THE WEST INDIES.

We are now turning to the tropical part of North America. This is a very interesting region historically, for it was the first part of the continent to be seen by travellers from the east. The Spaniards were the first to conquer Mexico and you will find many Spanish names in the map. Many of the people have Spanish blood in their veins and Spanish is the common language spoken.

You can see from the map that this country consists of a high plateau with a narrow



[*Photo*—E. N. A.

A scene in Mexico.

coastal plain. On the plateau most of the people live, can you see why? Look back to what we said about the plateau states of South America and you will see that Mexico is very like them. It is cooler on the plateau and on it are found the minerals for which the Spaniards fought in the sixteenth century. They are still the most important export of the country. To-day the oil wells are a very important source of wealth. The oil is pumped up and carried to

the ports by pipe lines many miles long. The town of Mexico is the capital and the chief port is Tampico.

The Central American States are largely covered with tropical forest and are not very well populated or important.

The West Indies are islands lying off the coast of Florida and stretching to the north coast of South America. The climate is pleasant, for the sea keeps them cool in summer and warm in winter. They have had a troubled history ever since they were first discovered by Columbus. The chief export was sugar for many years. The white people who owned the plantations were not able to work out of doors and so they employed negro slaves. These are no longer slaves and many of them own land for themselves. The sugar trade is not so prosperous now as it was and there is more fruit, especially plantains grown for the European market. Refrigerator ships carry it to England and Western Europe in a very short time.

SUGGESTIONS FOR PRACTICAL WORK.

1. Read all that you can about the conquest of Mexico.
2. Make a map of the West Indian Islands and colour them according to their political connections. Why do you think they are important to the countries to which they belong?

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