EUROPE

Dutch Children with their Dogcart

EUROPE

by

Nellie B. Allen

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PREFACE

The aim of this volume is to depict graphically yet simply the life of Europe; to help children to see in imagination the lofty mountains, the fertile valleys, the clustering villages, the broad plains, the crowded cities, the busy seaports, the farms, the vineyards, the olive orchards, the flax fields, the castles and palaces, and the toiling peasants. These things make Europe as it is today. It is through the life of the people that one learns of the character of the nation.

Children are interested, primarily, in life. Maps and names of rivers, mountains, and cities have little significance unless they bring to mind the real places of which they are the symbols. Teachers should aim to help pupils form clear mental pictures of the life and conditions which underlie all map symbols.

The prosperity of the United States is closely bound up with the life, and especially with the industrial life, of other nations, with whom our relations will be closer in the future than in the past. For this reason our future citizens, who are at present pupils in our schools, should become as intimately acquainted as possible with our commerical neighbors across the Atlantic. This is the practical twentieth-century geography.

Locational geography should not be neglected. The maps included in this book are intended to be used with the text in order that the pupils may fix the location of a place at the time when he becomes acquainted with its life. Children should be encouraged to keep a list of the places which in their opinion are important, and to arrange games and review exercises based on them. This has been suggested at the close of each chapter.

Problems are given in the Appendix in connection with all the important countries, thus making it possible to base the entire study of Europe on problem work.

NELLIE B. ALLEN

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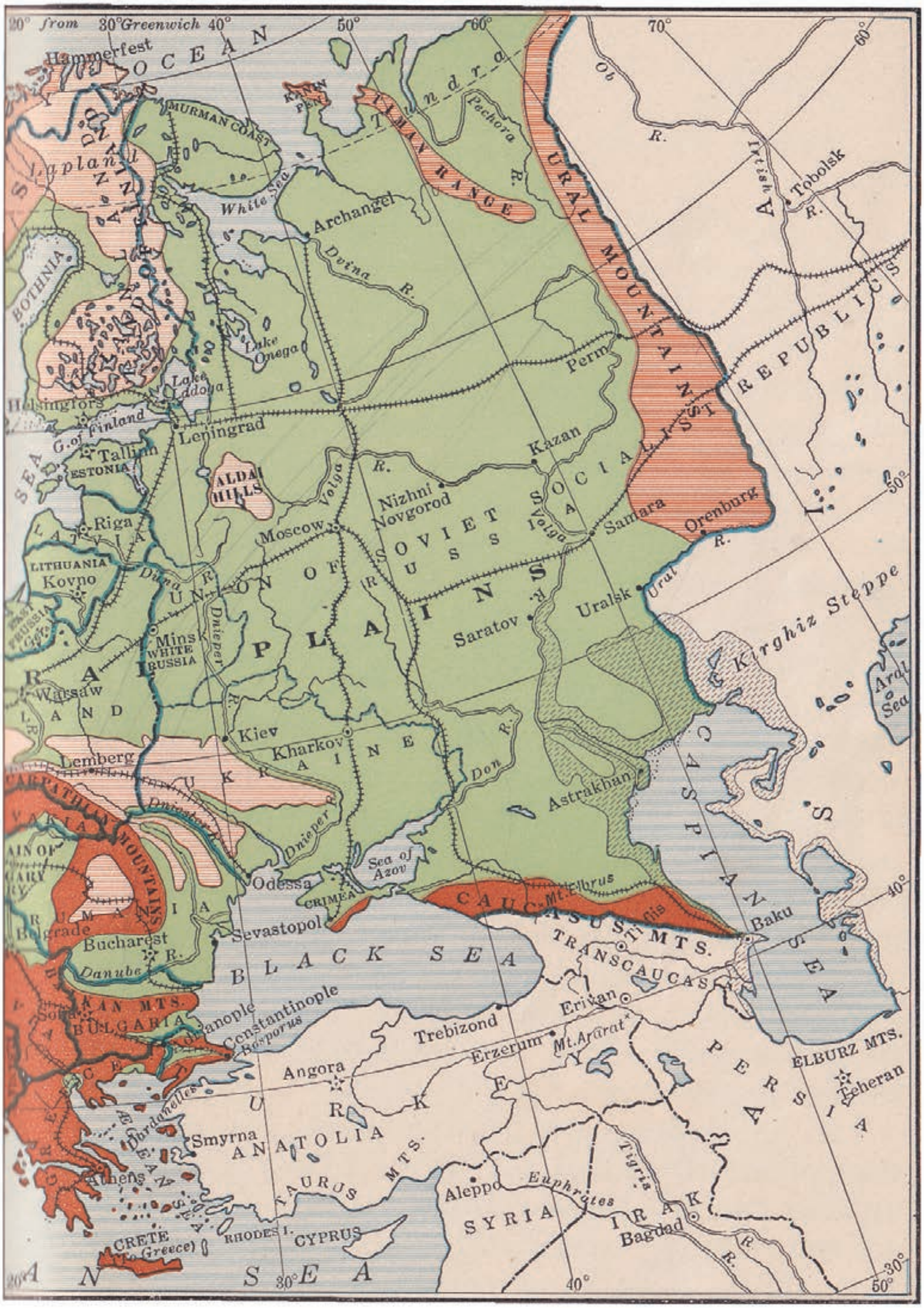

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50°
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Sevastopol
BLACK SEA
TRANSCAUCASIA
Erivan
Sofia
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Bosporus
Trebizond
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Erzerum
PERSIA
ELBURZ MTS.
Teheran
Angora
TURKEY
Dardanelles
Smyrna
ANATOLIA
TAURUS MTS.
Athens
Aleppo
Euphrates
Tigris
SYRIA
IRAK
Bagdad
R.
CRETE (to Greece)
RHODES I.
CYPRUS
SEA
40°
30°
50°

CHAPTER I

INTRODUCTION

Across the Atlantic Ocean, three thousand miles from the United States, lies the continent of Europe, which we are to study. In many respects it is very different from North America, and one of the best ways in which to become better acquainted with it is to notice some of the differences and to contrast it with our own continent and country.

Because of the industry of the people and the advantages which Mother Nature has bestowed so liberally upon it, Europe is very important both in manufacturing and commerce. Its importance is not due to its size, however, for, excepting Australia, it is the smallest of the continents. It is less than half the size of all North America, its area being about equal to that of the United States and Mexico. Imagine these two countries divided among twenty or more nations, differing in government, laws, language, and customs, and you have some idea of the conditions in the continent of Europe.

The people of each European country are continually rubbing shoulders with people who speak other languages and have other customs. Nowhere in the world can one find people who learn foreign languages as readily as do the Europeans. It is not uncommon for the more educated classes to converse in five or six languages, while the working classes can often use one or two besides their native tongue.

The situation of Europe favors a high degree of civilization. Contrast her position with that of North America. We are in the midst of a great ocean area, three thousand miles from Europe on the one hand, and nearly twice that distance from Asia on the other, while our continent is so long from north to south that our nearest neighbor, South America, is a great distance away from our northern ports.

Europe, on the contrary, is a part of the greatest land mass in the world, where all the oldest civilizations have developed. Long before America was discovered, overland journeys to China and India were made. Only the inland waters of the Mediterranean lay between southern Europe and the civilization of Egypt. At the eastern end of this long sea stretched Phœnicia, the country of the earliest sailors, and just beyond lay the land where the ancient Babylonians and Persians lived in luxury ages before anything was known of a land beyond the western sea, or indeed before anyone ventured far upon its waters. Civilization surrounded Europe, and the small size of the continent, the navigable rivers, and the deep indentations of the coast line stimulated communication with the countries around.

Europe lies farther north than the United States, but it seems as if Nature had tried in many ways to modify the long, cold winters which are usual in such high latitudes, and which are such a hindrance to the carrying on of commerce and many kinds of manufactures.

Throughout the temperate zone westerly winds prevail. If you were to keep a record of the direction of the wind every day for several years, you would find out in summing up your results that, for the greater part of the time, it blows from some quarter of the west. These westerly winds blow across the Atlantic Ocean toward Europe. The ocean has a much more even temperature than the land; it is warmer in winter and cooler in summer. People like to spend their summers near the water because it is cooler there. In the winter the low temperatures which we hear of in the northern interior states of our country are seldom heard of in the shore states in the same latitude. The winds that blow over the Atlantic Ocean toward Europe carry this even temperature to the western shores of that continent. Thus the winters of western Europe are much less cold than they would be if the direction of the wind were reversed, and the summers are not nearly so hot.

Doubtless you have read of that warm ocean current, the Gulf Stream, and have traced its course from the Gulf of Mexico out across the Atlantic Otean in a northeasterly direction. The warm air from over this current makes the westerly winds even warmer than they otherwise would be, and their effect on European countries is very marked. England, in the latitude of southern Labrador with its short summers and long, cold winters, seldom sees snow. Norway, as far north as Greenland, has no icebound ports on its western coast. As the winds blow farther and farther over the land they lose their modifying effects, and in the eastern half of the continent we find greater extremes of heat and cold. The Neva River and the canal from Leningrad (Petrograd) to Kronstadt are frozen for many weeks in the winter, while the port of Bergen on the west coast of Norway is never closed by ice. In southern England, nearly surrounded by water, the grass usually remains green during the winter. In the same latitude in Russia far from the modifying influence of the ocean, the temperature often falls to several degrees below zero. The summers of Russia are correspondingly hot, and the thermometer often registers more than one hundred degrees.

The ocean winds also have another beneficial effect upon Europe in the abundant rainfall which they bring. The winds which blow from the Pacific Ocean upon the western coast of the United States do not affect either the temperature or the rainfall of the country far from the coast. This is because the lofty Sierra Nevada extends from north to south across their path, and causes most of the moisture to fall on its western slopes. In Europe there is no great north and south mountain system as in North America. As you can see on the map in the front of the book, the principal highland extends from east to west through the continent. Thus it presents no barrier to the moisture-laden winds, which deposit their life-giving load very liberally through western and central Europe and more sparingly through the regions farther east.

Though the easterly and westerly direction of the chief highland does not greatly affect the rainfall of Europe, it does have a remarkable effect in another way. The warm winds from the Mediterranean Sea cannot easily climb this barrier and spread northward, but are confined to the southern portion of the continent and distribute their heat throughout those countries. In a similar way the great mountain barrier shuts out the cold arctic winds which sweep down over the northern plains. Thus, southern Europe, though much farther north than our Southern States, has a more tropical climate. Naples is in about the same latitude as Pittsburgh, Pennsylvania, but its climate is very different. In the vicinity of Naples, oranges, lemons, and olives are raised, and mulberry trees are cultivated for the silkworms; none of these products can be raised successfully in Pennsylvania. Many of the houses of Naples are built with no provision for heating; the people of Pennsylvania would be very uncomfortable in winter if it were not for their stoves and furnaces.

Besides its influence on the climate, the surface of Europe affects the life of the countries in other important ways. It furnishes one of the chief reasons why the people are divided into so many different nations. The British Isles are entirely separated from the rest of the continent by water. The Spanish peninsula is nearly surrounded by arms of the ocean, its only land boundary being the lofty Pyrenees Mountains, which form a high wall between it and France. Except in the desolate, frozen north the Scandinavian peninsula is cut off from the rest of the continent by water, while the Kiolen Mountains, the backbone of the peninsula, separate Norway from Sweden. Switzerland nestles by itself in the mountains, and Italy is separated from its northern neighbors and the rest of Europe by the snowy ranges of the Alps.

To the people of olden times the high mountains were a more impassable barrier than the water, and so, living by itself, each nation developed its own language and customs. Today mountains are not impassable barriers to communication. Roads over them and tunnels under them bring the people on both sides into close touch with each other.

The longest tunnel in the world, the Simplon, is one of several which extend under the Alps and connect central and southern Europe. For some years the oldest tunnel, the Mont Cenis, eight miles long, furnished a direct route for traffic between England, France, and Italy. Later the St. Gotthard Tunnel, nine miles in length, furnished an easy means of communication between Central Europe and the Mediterranean countries. The Arlberg, six and one-half miles long, came next. Now the Simplon Tunnel, twelve miles in length, extending between the Swiss town of Brieg and the small Italian village of Iselle, furnishes a more direct route than the others. On page 9 you see a picture of the little Italian village which is at the southern end of this wonderful tunnel.

The construction of the Simplon Tunnel was a great undertaking, but it was built more rapidly and at a lower cost per mile than any then existing. One writer

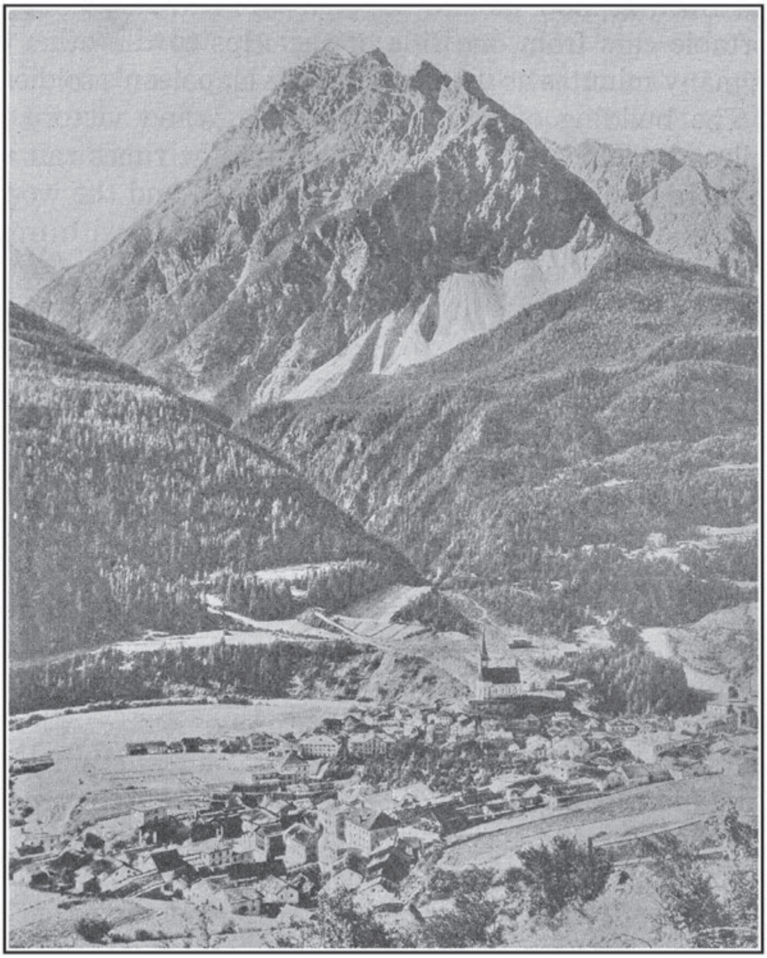

Figure 1. This picture of a little village in Switzerland shows you how the country is protected by its mountains. A few men in one of the narrow mountain passes could hold back a large number. The picture also shows you how towns, cities, and even countries may be separated from one another by mountain ranges. What was said about this on page 6?

describes the building of "this great wormhole under the Alps" in the following words: "Two million charges of dynamite, sixteen million dollars, four thousand Italian laborers, six years of work, and a dozen or so heads of the best engineering brains in Europe."

More than a century ago Napoleon led his army on foot through the Simplon Pass, some seven thousand feet above sea level, over a road which he built at the cost of great suffering and loss of life. Today, through this great hole in the earth, made at a cost of one and one-third million dollars per mile, we can ride in comfortable cars from one side of the Alps to the other in as many minutes as it took hours for Napoleon's soldiers.

The building of this tunnel was a grand victory of railroad engineering. The temperature at times ran up to more than one hundred thirty degrees, and the workmen had to be supplied from overhead pipes with fresh air which was cooled by water from the Rhône glacier.

Beds of soft rock that caved in as fast as dug out hindered the workers, and through this formation, for nearly a year, the tunnel advanced only about six yards a month. At one place an underground lake of boiling water was accidentally tapped, and the men had to flee for their lives before a stream which rushed into the tunnel at the rate of eight thousand gallons a minute. But the work went on in spite of all these obstacles, and on February 24, 1905, the two borings from the Swiss and Italian ends exactly met more than a mile below the summit of the pass, and the gigantic task was accomplished.

Figure 2. This is the village of Iselle at the Italian end of the Simplon Tunnel. Where do you think that the water in the little rushing river may have come from?

The natural advantages which Europe possesses, however, far outweigh the disadvantages of mountain barriers and separated peoples, for these have been largely overcome by the ingenuity of man. The coast line of Europe has helped greatly in the development of the continent. It is so long and so much indented that if you were to follow all its windings for its entire length, you would travel a distance more than twice as great as the circumference of the earth at the equator. This is more—in proportion to its size—than that possessed by any other continent, and this fact has had a tremendous effect on the development of Europe. The inland seas, the gulfs, and the bays extend far into the interior, so that all the countries, with the exception of some parts of Russia, have easy communication with the ocean.

Perhaps none of the physical features of a continent affect the welfare of the people, their occupations, and particularly their commerce more than the rivers. Europe is as fortunate in this respect as in her other natural features, for she has many rivers, and most of them are navigable. The interior of the continent is thus opened, and communication with the coast and with other continents is made easy. Contrast this condition with that of Africa. There all the important rivers except the Nile flow over plateaus near the coast, and the rapids and falls thus formed have made it impossible to explore the interior by means of rivers. This one obstacle delayed the opening of the African continent for many years.

Most of the European rivers are short compared with those of North America, only one being over two thousand miles long, while in our continent more than half a dozen have a greater length. In Europe there are only four rivers of more than one thousand miles, while North America has nearly three times that number.

The regional map in the front of the book shows you the highlands and plains of Europe. How are the plains represented? Is the greater part of Europe made up of highlands or plains? On the level land it is easy to build canals. These furnish thousands of miles of water communication. Some countries have a complete network, which brings all parts into close touch with the rivers and seaports. The Netherlands, Belgium, France, England, and Russia are foremost among the countries having fine canal systems, while the other nations have developed theirs to a less extent. It is said that one can go anywhere in the Netherlands by canal if one only takes time enough, and it is possible to go across the immense area of Russia from north to south and from east to west entirely by water.

Figure 3. This is a canal in the Netherlands. Why do some countries of Europe have so many of these water streets while others have few or none?

Much of the benefit derived from the rivers of Europe is due to the surface of the continent. Notice on the regional map how the eastward and westward trend of the mountains sends many important rivers flowing down the long slopes across the great plain to northern waters, while swifter streams make their way down the short, steep southern slopes to the Mediterranean Sea. The headwaters of some of these rivers, as the Rhine, the Rhône, and the Danube, come very near to each other. These three important streams are connected by canals, and the same is true of other northward and southward flowing rivers. Thus communication of northern countries and seas with southern Europe and the Mediterranean is made easy.

Find on the map the great plain of Russia where there are many long rivers. Trace them as far as you can toward their sources on the regional map. Some of these Russian rivers, however, are of little use, because they are frozen much of the year. Most of them rise in the Valdai Hills, the only elevation in the interior of Russia, the other mountains being on its borders. You will become better acquainted with many of the rivers of Europe when visiting the different countries, so we will not attempt further description of them here.

The people of Europe, no less than the continent itself, are in many ways different from those of North America. Most Europeans have light-colored skin and are the ancestors of many of the people on this side of the Atlantic, but among them we find great differences in conditions of life, in customs, in ideals, and in government.

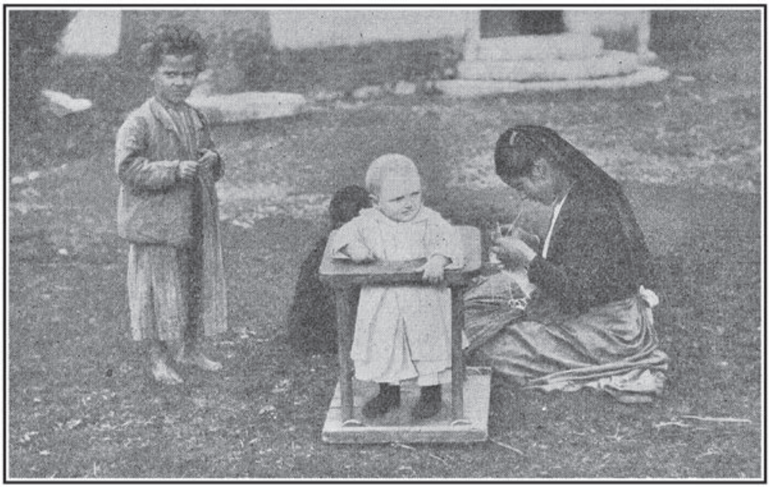

Figure 4. These are some of our European neighbors. They live in Jugoslavia. Find this country on the map. The mother is tending the baby and at the same time doing some of the beautiful handwork for which this part of Europe is famous.

The governments of the nations of the world are divided into monarchies and republics. A monarchy is ruled by a person called a king or queen, an emperor or empress, or some other title. Such rulers usually inherit their position by right of birth, while in a republic the ruler is elected by the people. Monarchies have been of two kinds. An absolute monarchy is so called because the ruler had unlimited, or absolute, power and could do what he pleased with his subjects. If the ruler was kind and intelligent, his people might fare well; if he was cruel and tyrannical, their sufferings might be horrible. There are no absolute monarchies today in Europe, or, indeed, in any other continent of the world.

In a limited monarchy the ruler's power is so limited by a parliament, or some similar body, that he may have no more authority than has the president of the United States.

Before the World War there were only three republics in the whole of Europe,—France, Switzerland, and Portugal. All the other countries were monarchies. In most of these European monarchies the people had less voice in the government and fewer rights and privileges than they would have in a republic. One of the great results of the war was to give more freedom to the people, and to prevent their oppression by tyrannical governments. Out of the terrible sufferings caused by the four years of war several new nations have been born of which you will read in later chapters. Can you tell whether these nations are monarchies or republics?

No other war ever changed the maps of the world so much as did the great conflict of 1914-1918. Not only the map of Europe but the map of Asia and Africa also are different from what they were before the peace treaty was signed. To find out how great these changes are, you must study both the old and new maps. Learn what countries have disappeared from the map of Europe, what ones have grown smaller, what ones larger, from what ones the new nations have been made.

Peasant life in Europe is very different in many respects from that of the poorer people in our country. The peasants in many regions do not dress like the people of higher rank, but have their own typical costumes. Their food, too, is quite different from that of the upper classes. They do not have less expensive foods of the same kind,—cheaper cuts of meat, similar puddings and pastry,—but eat their own simple meals of coarse, nourishing bread, soup, fish, and vegetables. Meat is seldom seen on their tables, but they make wholesome foods out of materials which many of our more wasteful housekeepers would think of no use.

Figure 5. Here is another of our European neighbors. This little Tartar boy lives in Russia. Judging from his clothes, do you think he lives in a warm land or in a region which is cold part of the year?

In our country anyone, even the poorest or the most ignorant, can by hard work, education, and persistence rise from the lowest place in a factory to that of manager, or from office boy to the position of president of some great corporation. In the past such upward climbing has been almost unknown in European countries. In most cases a peasant has followed the same occupation that his father and grandfather before him followed, and lived and dressed in the same way. Often this life was comfortable and happy, often it was not, but it was the way of his class and he followed it without a thought of there being anything else to do. With better government, with more education, and with larger rights and privileges there will be greater opportunity for the common people of Europe, like boys and girls in the United States, to make what they will out of their lives and to occupy those positions for which they are willing by hard work and right living to fit themselves.

In this book we have spoken of the peasants more than we have of the higher classes because industrially they are the more important. They form the greater part of the population in Europe and carry on most of the work there. Their occupations are for the most part much the same as those in our country. They till the soil, raise live stock, and engage in fishing, mining, and manufacturing. Of all these occupations agriculture is the most important, for it is the farmers who supply people with food. So, while mining, manufacturing, and other industries are carried on, the chief occupation in most European countries, as in the United States, is agriculture.

You are anxious to visit this land which is so much older than ours and from which many settlers of our country have come. So with this introduction to the continent across the water, we will go on board our steamer, which is beside the pier in New York harbor.

TOPICS FOR STUDY

I

1. Importance of Europe.
2. Size.
3. Situation.
4. Climate and rainfall.
5. Surface.
6. Tunnels.
7. Drainage and canals.
8. Governments.
9. Map changes.
10. Peasant customs.

II

1. Name the continents in order of size.

2. What cities in the eastern, central, and western parts of the United States are in nearly the same latitude as the tips of the southern peninsulas of Europe? What states of the United States lie in the same latitude as Greece and Italy?

3. Find the area and the population of Belgium, Russia, England, Germany, and the United States. Find the average number of people to a square mile

in each country. How does the United States compare in density of population with the European countries? How does the density of population affect the industries of a country?

4. Make a list of the advantages and disadvantages of the position of the United States; of Europe.

5. Sketch a map showing the eastern coast of North America and the western coast of Europe. Trace in it the course of the Gulf Stream.

6. Write in a column the names of the countries of Europe. In another column write whether they are monarchies or republics. Put a cross beside the new countries formed since the war.

7. Name four great Alpine tunnels.

8. Name the river of Europe which is more than two thousand miles long; those that are more than one thousand miles long. See Table III, page 448. Through what countries does each flow?

9. Name the rivers of North America which are more than two thousand miles in length. See page 449.

III

Make a list of the places mentioned in this chapter. Arrange them by countries, cities, rivers, mountains, etc. From the list select the places which you think are so important that you should always be able to locate them and know something about them. Use these for reviews and games.

IV

QUESTIONS ON THE REGIONAL MAP

1. Does more of Europe consist of mountains or of plains?

2. In what part of the continent is the chief highland? What countries are included in it?

3. Find two boundary ranges separating continents.

4. Find some countries which are separated by mountains. Name these ranges.

5. Describe the surface of Spain; of France; of Russia.

6. What countries lie wholly in the central plain of Europe? What do you think is the chief occupation in these countries?

7. What countries are partly included in the central plain?

8. Find what looks to you like the two longest rivers in Europe. Look on page 448 to see if you are correct.

9. What waters lie between the British Isles and the continent? What waters nearly surround the Spanish peninsula? the Scandinavian peninsula? the Balkan peninsula?

10. Compare this map of Europe with a regional map of North America. (See Allen's "North America.") What differences do you notice?

CHAPTER II

SHIPS AND SHIPBUILDING

At the pier in New York City we find the ocean liner on which we have engaged passage for Europe. A crowd has gathered on the wharf to say goodby to friends who are going, for business or pleasure, across the wide ocean. As the great ship moves slowly away from the wharf her rails are lined with people, all anxious for another parting word with the friends left behind.

The vessel is so large and there are so many decks that we do not at first realize how many people there are on board. It is really a floating town, for the ship accommodates between two and three thousand passengers, besides her crew of eight hundred.

If this floating town were on land instead of on water, the steel contained in it would be sufficient to supply the framework of houses for all the passengers and crew. Her steel plates would surround the town for a distance of eight or ten miles with a wall four or five feet high. The coal with which the vessel is supplied would furnish fuel for the inhabitants for several months. Her electric plant would light the streets and the houses, and her engines would drive enough machinery to employ all the people. Her funnels would be large enough for a tunnel, or subway, in which a double line of trolley cars could run. The grocery and provision stores of the town could be well stocked with the thousands of pounds of meat, vegetables, eggs, flour, butter, and other food necessities stored away on the great liner.

These immense ships are the express trains of the ocean. They cross at high speed and follow schedules as regular as those of railroad trains. The great cargo steamers, carrying much freight and many passengers, might be likened to combination freight and passenger trains. These also follow regular schedules. Besides these there are the tramp steamers, in which the greater part of the world's merchandise is carried. These are like freight cars, which are seen at one time on the tracks of one railroad and at another time on those of some other road. You have doubtless seen at the railroad station long trains made up of cars from a dozen different railroads whose tracks lie many hundred miles away.

Such a tramp steamer may have been built in a British shipyard and may have been on the ocean for many years without reëntering the port from which it started. Could we have accompanied it on its wanderings, we should have entered many a foreign harbor. It might have started originally from Liverpool with a cargo of cotton goods, tools, and machinery bound for Hongkong. There it took on a cargo of rice, tea, and silk, and cleared for San Francisco. It went without cargo from that city to Seattle, and there loaded with lumber for Japan. At Yokohama it took on tea, raw silk, camphor, and fine hand-wrought articles in metal and lacquer ware and started for Marseille, in France. In that port it picked up a cargo of olive oil, olives, silk, and perfumery for New York, and there loaded with machinery for Chile, where a cargo of nitrates was obtained and carried to San Francisco.

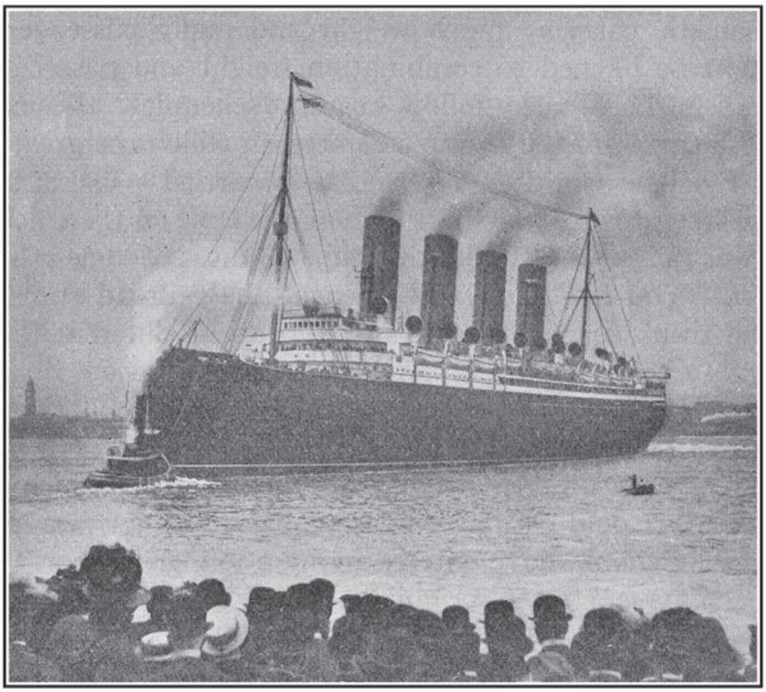

Figure 6. This is a great ocean liner just leaving the wharf for its voyage across the Atlantic. About how many days do you think the trip will take?

Think of the many, many tramp steamers, which make their way from country to country, from island to island, and from far-away, almost unknown harbors to the great seaports of the world; of the powerful battleships, cruisers, submarines, torpedo boats, and


BRITISH ISLES
SCALE OF MILES
0 25 50 75 100 125
SHETLAND IS.
ORKNEY IS
HEBRIDES OR WESTERN IS.
ATLANTIC OCEAN
NORTH SEA
SCOTLAND
Moray Firth
Aberdeen
Highlands
Dundee
Tay R.
Firth of Forth
Leith
L. Katrine
L. Lomond
Ben Lomond
Firth of Lorne
Glasgow
EDINBURGH
Clyde R.
R. Tweed
Lowlands
Firth of Clyde
North Channel
Cheviot Hills
R. Tyne
Newcastle
Wear R.
Solway Firth
NORTHERN IRELAND
BELFAST
Lough Neagh
LAKE DISTRICT
Pennine Mts.
R. Tees
I. OF MAN
LANCASHIRE
YORKSHIRE
Leeds
Aire
Hull
Humber R.
Bradford
Grimsby
Liverpool
Mersey R.
Manchester
Sheffield
Don R.
Trent
Chester
Derby
Nottingham
Leicester
Yarmouth
IRISH FREE STATE
IRELAND
IRISH SEA
DUBLIN
Liffey
KILKENNY
TIPPERARY
LIMERICK
Lakes of Killarney
Lee R.
Cork
Cobh (Queenstown)
St. Georges Chan.
WALES
Eastham
Birmingham
Stratford-on-Avon
Cambridge
Oxford
LONDON
Thames R.
Severn R.
Pembroke
Bristol Channel
Bristol
Chatham
Dover
Dover Strait
Calais
ENGLAND
Southampton
Portsmouth
Cowes
Devonport
Dartmouth
Lands End
Falmouth
ENGLISH CHANNEL
FRANCE

colliers, which every nation possesses in her navy; of the hundreds and thousands of schooners, from the small fishing craft to the large seven-masted vessels capable of carrying heavy cargoes. Yet besides all these there are coast and river steamers, yachts, ferryboats, oil-tank ships, barges, and tugs, to say nothing of the smaller pleasure boats which ply in rivers and lakes all over the world.

Where are they built? Where are the shipyards of the world that supply these ocean carriers, which are as necessary to the world's commerce and intercourse as are the trains, the electric cars, and the motor vans that run on land?

Nations which have a large trade overseas or which maintain large navies are most interested in the building of ships. Such countries as Italy, Germany, France, the Netherlands, and our own United States are all important shipbuilding nations. Some of the largest vessels in the world today were built in German shipyards. Because of water boundaries, colonies in all parts of the world, and dependence on distant lands for raw materials for food, clothing, and other manufactures, the building of ships has long been a very important industry in the British Isles.

In many of the harbors and at the mouths of the principal rivers of the British Isles one can hear the clang of hammers and the noise of machinery, and can see the skeletons of vessels growing into form and beauty. There are shipyards of more or less importance along the entire length of the eastern coast, on the Tay, Forth,

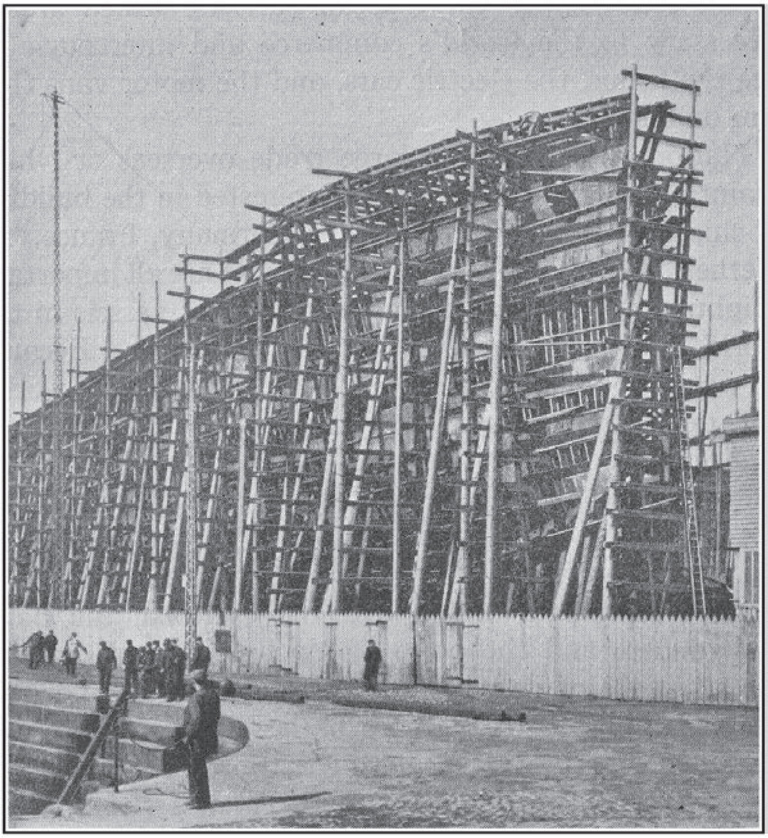

Figure 7. Here you see a big vessel being built in a shipyard in Belfast. Why does it look so much taller than the ship in Figure 6, which is equally large?

Tyne, Wear, Tees, Humber, and Thames rivers, from Aberdeen in the north to the English Channel on the south. On and near the Channel are shipyards at Cowes, Southampton, Dartmouth, Falmouth, Portsmouth, Devonport, Chatham, and Pembroke. At the last four places are the royal dockyards, which do little actual building but a great deal of overhauling, repairing, and refitting of the ships of the navy. Following the western coast we find shipyards on the Bristol Channel, on the Mersey and Solway rivers, across the Irish Sea in the city of Belfast in Ireland, and, last but by no means least, on the Clyde River in southwestern Scotland. Can you find all these places on the map which is opposite page 22?

In these various yards are built all kinds of seagoing craft. One yard may make a specialty of one kind and another yard of another kind, while some yards build a variety. Grim, powerful war vessels; swift, elegant yachts; fishing craft of all kinds; big ocean liners; tramps, barges, tugs, lighters, colliers, torpedo and submarine boats—these and many others are constructed every year in the yards of this great shipbuilding nation. The northeastern coast near the Tyne River, the northwestern region in the Clyde Basin, and the Belfast district are the three most important regions, and the only three which build vessels of over ten thousand tons. With few exceptions the ocean-mail service of the world is carried on by vessels built in one or another of these three places.

Some of the largest ocean liners are constructed at Belfast, Ireland. The giants of the White Star Line—the ill-fated *Titanic* and her sister ship the *Olympic*—were built in the yards of Belfast, on the Lagan River. The *Olympic* is eight hundred eighty-two feet long. Compare this length with that of your schoolhouse and find out how many buildings placed end to end would equal in length this immense liner.

The most famous of all shipbuilding districts, where the greatest number and the largest variety of craft are

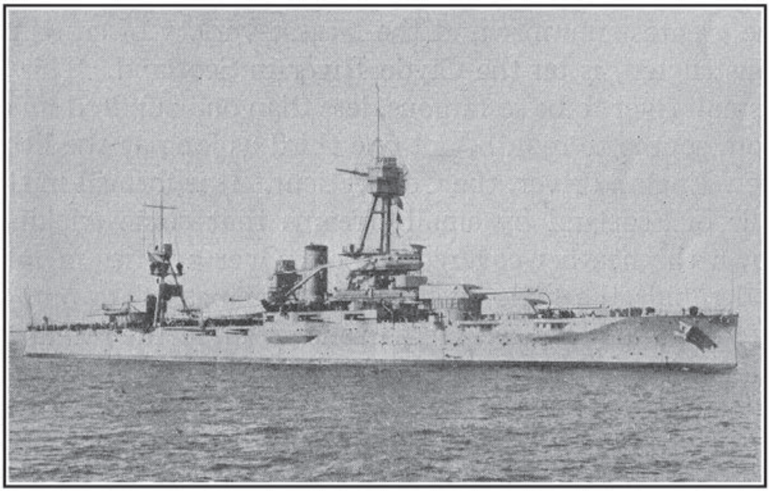

Figure 8. This is the battleship Texas. What differences do you notice between this ship and the liner shown on page 22?

constructed, is on the Clyde River in Scotland. This is a small river to be so famous, less than one hundred miles from source to mouth, not one third as long as the little New England river, the Connecticut. It is formed in the hills of Scotland by small streams that come trickling down the heather-covered slopes. Over a series of falls and rapids the little river leaps and sings in its plunge into the valley below. Here in the green, fertile meadows filled with apple orchards famous for generations, the Clyde, now richer by many small tributaries, flows gently on toward the place where its chief work for mankind begins. At one place it is separated from the Tweed River by only seven miles. Geologists tell us that ages ago it probably bent to the east and joined the Tweed. Had it not been for the slight change of level wrought by the great force of nature, which sent the little river on its course to the west, there would have been no port of Glasgow, no shipyards on the Clyde, no ocean liners and mighty warships built on its banks.

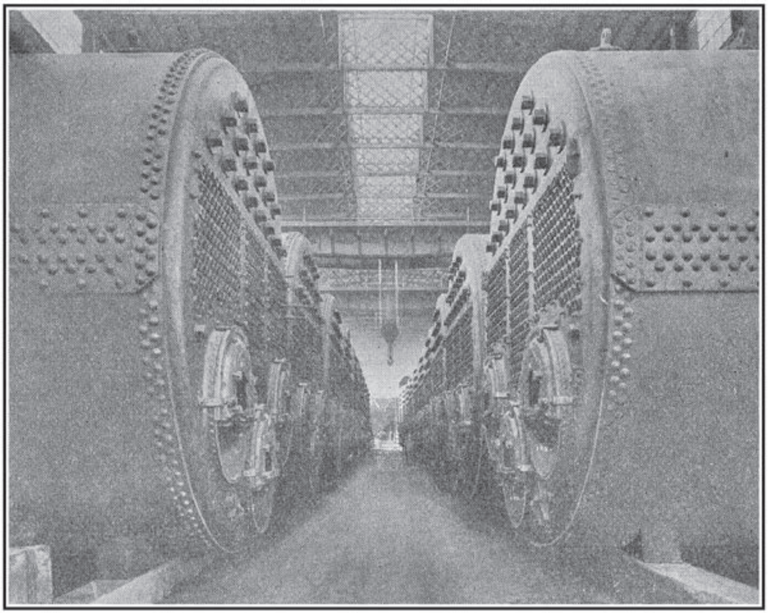

Figure 9. These are the boilers in an ocean liner in which the steam is generated to drive the ship through the water. What do you read on page 41 about the fuels which are used?

As we come down the river toward Glasgow the smoke from a thousand chimneys shuts out the blue sky, and we know we are approaching the coal and iron region of Scotland. These mineral deposits extend across the country in a northeasterly direction from the Clyde Basin on the west to the Firth of Forth on the east. It is due to these rich deposits, to the surface of the country, and to the rivers that this part of Scotland has become such an important industrial and commercial center.

The northern part of Scotland consists largely of low highlands, made beautiful by the blue, misty light that always hangs over them, and by the lakes, or "lochs," as the Scottish people call them, that nestle in every glen. Find these highlands on the regional map.

Near the southern boundary are other highlands, lower and not so beautiful, of which one range, the Cheviot Hills, forms a partial boundary between Scotland and England. Between the two highlands are the lowlands of Scotland, which, though they comprise only one sixth of the area of the country, have made possible her industrial life. Here are the rich deposits of coal and iron, the fertile farms, the great manufacturing cities, and it is in this region that more than half of the people of Scotland live.

The wonderful lake region and the beautiful wooded country known as the Trossachs, which are visited annually by thousands of tourists, together with some of the more famous mountains, skirt the southern edge of the highlands. A trip from Glasgow to Edinburgh takes one through this lovely region, which Sir Walter Scott has so vividly described in "The Lady of the Lake."

No one can pass by or sail on Loch Katrine without appreciating better its beauty and the beauty of the lines in which Scott describes it:

> And thus an airy point he won,
> Where, gleaming with the setting sun,
> One burnished sheet of living gold,
> Loch Katrine lay beneath him rolled.

The lake, once queen of poetry, has now become the servant of industry, for the city of Glasgow has taken it to serve as a water supply and has built an aqueduct more than forty miles long to bring the pure mountain water to the city.

Of all the Scottish lakes Loch Lomond is the most beautiful. It is long and winding and dotted with islands, where deer feed in the shade of the trees. On its shores are beautiful country residences half hidden in green

Figure 10. This is Loch Lomond, Scotland's most beautiful lake. Can you picture it in Nature's colors? What are some of the things which make this lake so beautiful?

foliage. To the north rises Ben Lomond, softened by the gray mists that hang low on the slopes purple with heather.

The wide mouth of the Forth River, with its busy port of Leith and with the city of Edinburgh near by, connects the lowlands of Scotland with the North Sea and the continent of Europe. The deep inlet of the Clyde River is the passageway westward to the ocean and the world beyond. Situated on the Clyde, just where it narrows too much for navigation, lies Glasgow, with great stores of mineral wealth on the east and the waters of river and sea and ocean opening toward the west. No wonder that the city has spent millions of dollars in deepening and improving the Clyde, for on this small river most of her commerce depends. Originally it was but a shallow stream. Today, except at low tide, the largest ocean steamers can ascend to the city.

Glasgow, with its broad, straight streets and massive gray stone buildings, is a typical Scotch city. It impresses one as being grave and dignified like the true Scotchman. Like him, too, it is reserved. One cannot become thoroughly acquainted with it or learn all its secrets in a day or a week. In order to realize its greatness one must have intimate knowledge of this city, which, in commerce and trade, ranks first in Scotland and second in the British Isles.

Its manufactures also are very important. As you may imagine, some of these are connected with iron and steel and many with the shipbuilding industry. The textile manufactures also rank high. There is much spinning and weaving, as well as bleaching, dyeing, and calico printing.

At the busy quay of the city we can take a small steamer for the part of the river known in Glasgow as "Doon the Water." This is where the Clyde widens into the sea and is a maze of peninsulas, sea lochs, and islands. This part of the river, with its green, winding shores, is very beautiful. Long inlets extending in toward the hills are fringed with pleasant villages and towns or decorated with villas and beautiful country houses set deep in the wooded slopes. Many people from Glasgow have summer homes here. Thousands of pleasure seekers crowd the steamers on every summer holiday and weekend for a restful sail and pleasant outing.

Between this lovely river mouth and the city of Glasgow lies the busiest part of the Clyde River; indeed, it is the busiest and most crowded district of river industry to be found anywhere in Europe. On either bank loom the skeletons of great ships in all stages of completion. The factories, engines, shops, gas tanks, warehouses, and giant cranes rise in a confused mass. Engines toot, steamers whistle, foundries roar, bells clang, and tugs shriek. All around are forests of masts, funnels, and chimneys. This is the birthplace of ocean liners and racing yachts, of tugs and tramps, of fishing dories and large schooners, of revenue cutters and river steamers, of excursion boats and grim war vessels.

In the Clyde district there are hundreds of thousands of workmen representing many trades—architects, draftsmen, carpenters and joiners, masons, calkers, steam fitters, engineers, molders, ironworkers, electricians, platers, riveters, painters, pattern makers, plumbers, blacksmiths, and many others.

Here, too, is some of the most wonderful machinery which has ever been invented. See that giant crane lifting a smokestack large enough for a double row of electric cars to stand inside of it without touching each other or the sides of the stack. The great load rises high in the air, hovers a moment like a huge bird poising on the wing, and then descends slowly into the very place made for it in the partially constructed vessel. Another crane grasps a huge engine in its powerful jaws, raises it into the air, and then lowers it into its place as easily as a boy picks up a stone.

What a tremendous task is the building of a big ship! When the order is given, the vessel must first be born in the mind of the master. No ship, no building, no machine is ever made until it exists in the human mind. Then comes the making of the plans, the transferring of the mental dream from brain to paper. This work may take weeks or even months, for the planning of a great ship is no light task.

There must be no guesswork in its construction. The builder must know the exact size of each part, which will give the greatest strength and speed and yet occupy the least room. He cannot build as he would, but must work within certain limits. If he increases the size of the engines so that the ship may make greater speed, there may not be room enough left for fuel to run them, for passengers, and for freight. If the vessel is too wide it will not make speed; if too deep, it will not float in the great harbors of the world. Certain proportions of breadth, length, depth, and weight must be carefully kept throughout the work.

The dream of the master mind must be worked out in accurate, definite plans, down to the smallest detail, before any work on the actual construction of the ship is begun. Every item of space and dimension must be carefully decided upon. Every part of the huge hulk must be adjusted and balanced so that it will ride the waters evenly and plow its long furrow in the ocean with the least resistance.

The making of the plans may take a score of draftsmen several months. When they are finally completed, the lines to show the exact size and shape of the vessel are laid down on the great floor of what is known as the molding loft. Soon carloads of plates and beams begin to arrive from shops and foundries, and are stored in the yard near the slip where the vessel is to be built. Some of the plates on an ocean liner are more than thirty feet long and weigh two or three tons each. To press them into the desired shape they are fed into a gigantic steel roller in much the same way that clothes are fed into a clothes wringer. A machine which cuts the hard steel as easily as a child snips a piece of cloth trims the edges of the plates.

In the meantime the keel has been laid, and the great ribs—the framework which gives the vessel its shape—have been placed in position. The making of

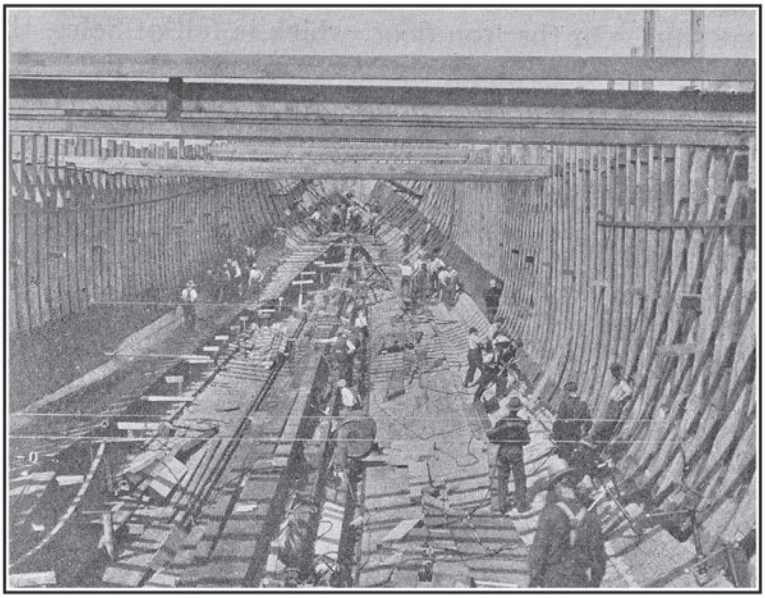

Figure 11. Here is a boat in a shipyard. You can see the upper part of the ribs which give the shape. The men have begun to lay the boards to cover the ribs. What are some of the rooms into which the hull of this boat will later be divided?

the ribs is an interesting process. They come from the foundry in straight beams, which must be heated and bent into the curves of the ship's side. The heating is done in immense furnaces long enough to hold the longest rib of a great ship. On the iron floor, which is full of holes, the workmen have outlined the curve of the rib by fitting strong iron pins into the holes. At the right minute the furnace door is opened and a man, in the blinding glare and intense heat, fastens a strong cable to the white-hot metal. Other workmen with strong cables drag the hot steel timber from the furnace to its place on the floor. The men hammer and pound and strain, drive in new pegs and remove others, until the huge steel beam lies dull and cold in the graceful curves of the ship's rib.

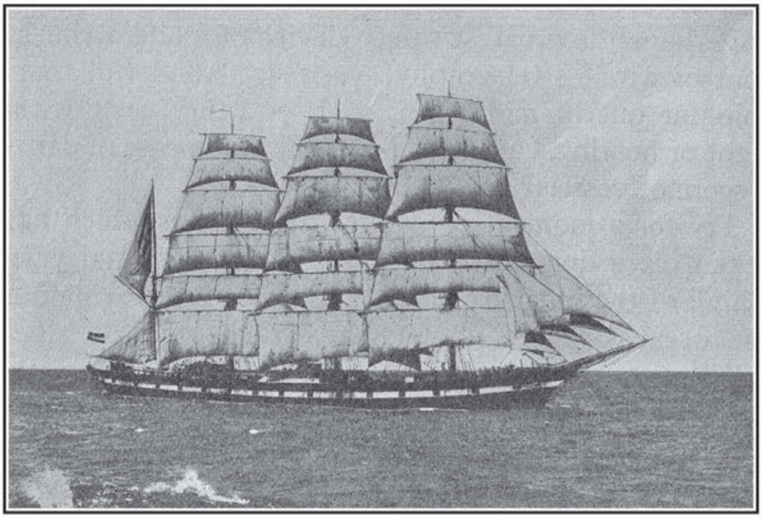

Figure 12. This is an old type vessel with square-rigged sails. How many sails can you count? What are the advantages of steamships over sailing vessels?

After the skeleton frame of the decks and the beams to support them have been laid, the outside sheathing of steel plates is put on. The drawings from which these plates are made must be very accurate, as the plates are finished in the shops, even to the rivet holes, which must fit in exactly the right place when the great steel sheets are fastened upon the ship's side.

In the building of an ocean liner a thousand men may be at work on the huge frame at the same time. Yet so large is the ship and so varied are the occupations that no one interferes with the work of another.

When the ship is nearly completed the launching takes place. It is a wonderful sight to see the monster glide slowly down from her slip into the water, and many and costly preparations have to be made in order that the journey of a few seconds shall be successful.

From this description of the giant steamships and of the labor and material necessary to build one you can imagine that their cost must be very large. From eight to ten million dollars or more are spent on a great ocean liner. Yet great as is the expense of building, this is not the only thing to be thought of in her construction. No building erected on land has the safety of its occupants more carefully looked after than that of the passengers and crew of a big ship.

Most liners today are fitted with two bottoms several feet apart, so that if hidden rocks damage the outer one, the inner one keeps the vessel water-tight. All large, modern ships are divided into compartments by huge steel doors which can be closed at a minute's warning. If several of these compartments are damaged and fill with water, the others, being water-tight, are amply sufficient to keep the vessel afloat. On the captain's bridge right at his hand are devices to enable him, without a second's delay, to stop the vessel, to give the fire alarm, to close the bulkheads between the compartments, and to give other signals to insure the safety of the vessel and the protection of the passengers.

Perhaps the greatest safety device of modern times is that of wireless telegraphy. Is it not wonderful that a ship far out in mid-ocean, with no other craft within sight or hearing, can summon to her aid in case of danger a score of vessels?

Try for a moment to picture the changes which have taken place during the last four or five hundred years. Think of the great freighters and ocean liners which sail the oceans today and compare them with the three small vessels in which Columbus made his memorable voyage across the wide Atlantic Ocean from Europe to America. Perhaps you have seen pictures of these vessels, the *Pinta*, the *Niña*, and the *Santa Maria*, which brought the famous explorer and the adventurous men who accompanied him to the shores of the New World. How odd the little vessels, riding so high in the water, look to us who are familiar with the long, low lines of our ocean carriers. Throughout the slow journey of these early mariners over unknown, untraveled waters, the sailors were dependent on wind and weather. During much of the voyage both of these were favorable because the explorers followed a route which kept their ships in the track of the constant easterly trade winds, which blew them steadily westward.

Even with the help of the prevailing winds it took Columbus between two and three months to cross the Atlantic Ocean from the coast of Spain to the fringe of the West Indies. Today we can make the same voyage in a week.

What a lonely, dreary journey that long voyage must have been when Columbus and his companions in their small ships were tossed about on the wide ocean. They knew not whither they were going or what dangers lay

Figure 13. As you look at this picture, make all the comparisons you can between the comforts and conveniences which these people are enjoying while crossing the ocean and the conditions which surrounded Columbus and his crew.

ahead of them before they should reach the edge of this ocean of darkness and terrors. They met no other vessels, saw no other human life, and had no knowledge of events which might be taking place in the land from which they had sailed. Very few vessels sailing on the oceans today make a voyage without meeting or passing other ships on the way and sending some message to or receiving some word from those on board. Few of the modern vessels are out of touch with the land during the time that they are out of sight of it. By means of the radio and of wireless telegraphy, daily news of important events is received, and the passengers can communicate with their friends on shore as easily as they can send a telegram while taking a railway journey on land.

In the time of Columbus, people knew of no other way of propelling ships than by men at the oars and with the help of the wind. At present few craft are run by hand power. Even many of the smaller boats in use are propelled by gasoline engines, and human labor is confined to steering the craft. Sailing vessels are still used to some extent, but many of these have some auxiliary power, which can be used when the wind fails. In recent years great changes are also being made in the fuel which develops the power to send our large ships through the water, day after day, on their long ocean voyages. Steam was formerly produced by the

Figure 14. In early ages, and among some tribes today, people made their boats by hollowing out large tree trunks. This man lives in the Congo River basin in Africa. Think how long it must have taken him to dig out the solid wood and shape his boat.

coal burned in the furnaces, but on many of the great ships coal is no longer used. Petroleum is a cleaner fuel which requires less room for storage and fewer workmen. Perhaps you have seen pictures of stokers stripped to the waist in the hot air of the furnace room feeding the greedy fires with coal. With petroleum this hard, exhausting work is not necessary.

People who lived at the time of Columbus would certainly think that witches were at work in this modern world of ours if they could see us race over our fine, hard roads in our automobiles, cross the wide sands of the Sahara in motor trucks, slide over the snow-covered fields of Greenland in powerful tractors, and sail in airplanes through the air like huge birds with broad wings outspread. Perhaps even more wonderful to these people of olden times than traveling by air and on the surface of the earth would be our means of communication under the land and water. We burrow through mountains and under rivers, we have subways under our city streets, and our submarines sail far below the surface of the great oceans.

The equipment, the controls, and the wonderful devices installed in our land, air, and sea craft would seem to ancient people like inventions of the devil, and the very size of the craft would make them think that giants or gods had been at work. No one can predict how large the ships of the future may be. The great shipyards of the United States and the British Isles are able to build vessels so immense that no harbor in the world could accommodate them and give the necessary traffic to make them financially successful. Vessels which once were considered models of perfection are as different from the ocean greyhounds of today as the early small, jolting horse cars are unlike our large, comfortable electric cars, or the first automobiles are different from our beautiful modern sedans and coaches. The hold of a modern ocean liner would easily accommodate one of the earlier steamships, and room would still be left for other freight.

There are many stages between the first birch-bark canoe of some primitive race and the floating palace of our times, and the birch canoe was in itself a great advance over former methods of water conveyance.

We do not know when man first learned of the buoyancy of water and of the art of swimming. Ages may have elapsed before his descendants found the fallen tree in the river and, striding the log, propelled this first boat through the water by using their hands as paddles. His ingenuity taught him to make the dugout and then the birch-bark canoe and coracle. Later the use of sails saved him from laboring with his hands. Improvements have kept pace with the ages, and since the introduction of steam they have come thick and fast. What the future may bring forth no one who is living today really knows. Whether our ships sail through the air or on the water, they are sure to be larger and swifter than anything we possess at the present time.

TOPICS FOR STUDY

I

1. Description of a large ocean steamer.
2. Cargo steamers and tramp steamers.
3. Variety of ocean craft.
4. Shipbuilding in the British Isles.
5. Location and number of British shipyards.
6. The Clyde River.
7. Scotland: highlands, lowlands, Glasgow.
8. Shipyards on the Clyde.
9. Building an ocean liner.
10. The ships and voyage of Columbus.
11. Ocean travel of today and tomorrow.

II

1. Write the log of a tramp steamer, including stops at six different ports. Give the cargo taken on at each port and its destination. On an outline map of the world trace the voyage of the steamer. Trace also, with a dotted line, the route followed by the tramp steamer mentioned in the text.

2. Write a list of the different kinds of vessels which you have ever seen or read about.

3. What is included in the terms "Great Britain," "British Isles," "British Commonwealth of Nations"?

4. Make a map of the British Isles and on it show the three chief shipbuilding centers.

5. Write a list of the different kinds of workmen employed in building an ocean liner. Use these words for your spelling lesson.

6. See if you can find out where some of the great shipbuilding plants of the United States are located.

7. Make a map of Scotland. Show the surrounding waters, the highlands, lowlands, the coal and iron deposits, the cities mentioned, and the lakes.

III

Make a list of the places mentioned in this chapter. Arrange them by countries, cities, rivers, mountains, etc. From the list select those places which you think are so important that you should always be able to locate them and know something about them. Add these to the list which you are keeping for use in reviews and games.