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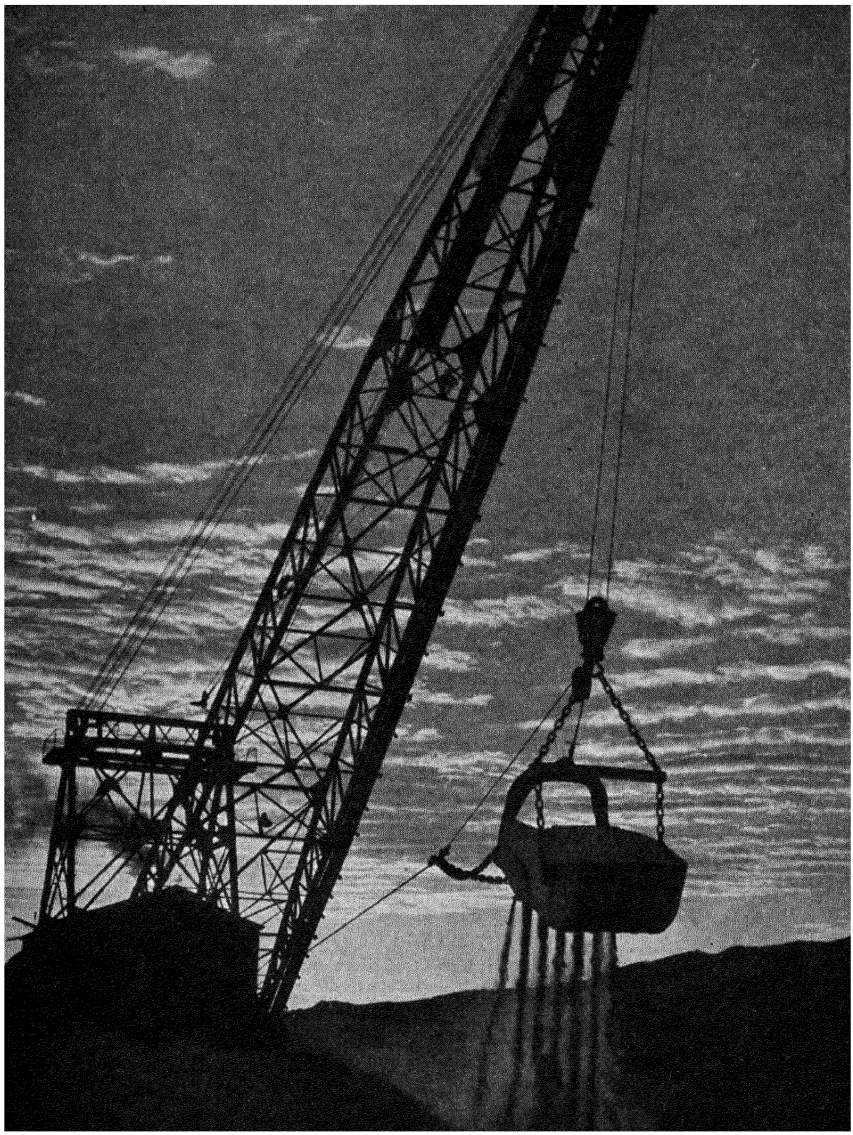
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The Nations Today



Courtesy of the U. S. Department of the Interior

Innumerable machines invented by man have lengthened his arm and multiplied his strength countless times.

The Nations Today

A PHYSICAL, INDUSTRIAL, AND COMMERCIAL GEOGRAPHY

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1947

The Macmillan Company

NEW YORK

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Set up and electrotyped Published February, 1939
Reprinted November, 1939, June, 1940, July, 1940, August, 1940, May, 1941, September, 1941 January, 1942: May, September 1943, July 1944, January, July, 1947

Printed in the United States of America

PREFACE

THE NATIONS TODAY deals primarily with man as an individual and as a member of society in a common environment for which Nature sets the stage. The action is mankind's reaction to the stage. His mode of life, his activities as a producer and a creator, and his relations with his fellows are all influenced by his environment or his modification of it.

This book gives a realistic picture of the physical surroundings of men in the various regions of the world with a survey of the natural forces with which their lives are in harmony or in conflict. It shows man and Nature working together with beneficent results. It points out the obstacles man has had to overcome in his contest with untoward natural surroundings. It is a story of victory for man as a result of indomitable courage, prudent foresight, inventive genius, and everlasting persistence. Its theme is what men do for a living, what progress they have made, how they are adjusting themselves in an interdependent world, and what problems the future holds for them.

This is a rapidly changing world; so the authors have placed their main emphasis on conditions as they are *today*. The student is made to realize that he is in the midst of *today's* environment and a participant in its activities. However, today's realities are only the results of the happenings of a long series of yesterdays. As the present cannot be divorced from the causating past, geography has been linked with history in portraying mankind's progressive advancement. How man has solved his need for recreation, how he has developed a spirit of coöperation, how he has come to realize the need for conservation of health and of resources have been made important features of this text.

The improvements in means of transportation and the miracle of instant communication with most distant parts of the earth have so overcome space and time that it is as easy to think of man today as a citizen of the world as it was a hundred years ago to picture him as a citizen of some political unit. Travel and trade have unified the world and intercourse between the peoples of diverse nationalities has led to a better understanding and has been a powerful factor in establishing good will. Better understanding and good will make for amicable and peaceful relations between nations. Trade rivalry between highly industrialized nations and their need for raw mate-

rials have often led to wars of conquest. However, our government is seeking international peace through the removal of barriers to a freer trade by adjustment of trade treaties at the council table.

All other nations, as well as our own, have domestic problems that they are trying to solve so that their people can enjoy the good life which results from peace, development of resources, and fair distribution of the fruits of labor and production.

Therefore our study begins with our own country with its vast and varied industries—with the production of fields, forests, and mines, and with our utilization of their products in providing food, homes, and apparel for our people as well as exports for foreign lands. The various regions of our country and their production are contrasted with similar regions and their production in other continents. After the student has an understanding of the United States and its various activities, he is introduced to our neighbors of this hemisphere. Then he is transported to the Old World where the individual countries and the life and work of their people are studied with constant comparisons and contrasts with our own country.

The half tones, maps, and graphs are intimately connected with and amplify the text. The maps and graphs in nearly all cases include data of the year which has just closed—1938. Statistics in the voluminous appendix are from official sources and are the latest available. Many photographs were taken especially for this book by James Sawders. The thanks of the authors are due to Mr. and Mrs. Sawders for furnishing information to be included in the captions of these illustrations. To the individuals, corporations, and government agencies that have supplied illustrative material credit is given under the picture or graph.

The authors are deeply indebted to Mr. William T. Miller, Master of the Washington Irving Intermediate School, Boston, for valuable assistance in the preparation of the text.

To many teachers of geography whose suggestions the authors have gladly followed credit should be given even though they are protected under their anonymity. For valuable suggestions and constructive criticism the authors' appreciation must be expressed to Mr. C. Ross Appler of the Girls High School, Boston; Miss Dorothy S. Wheeler and Mr. Arland Jenkins of Bulkeley High School, Hartford; and Miss Lillie Kleinberg of the Braintree High School, Braintree, Massachusetts.

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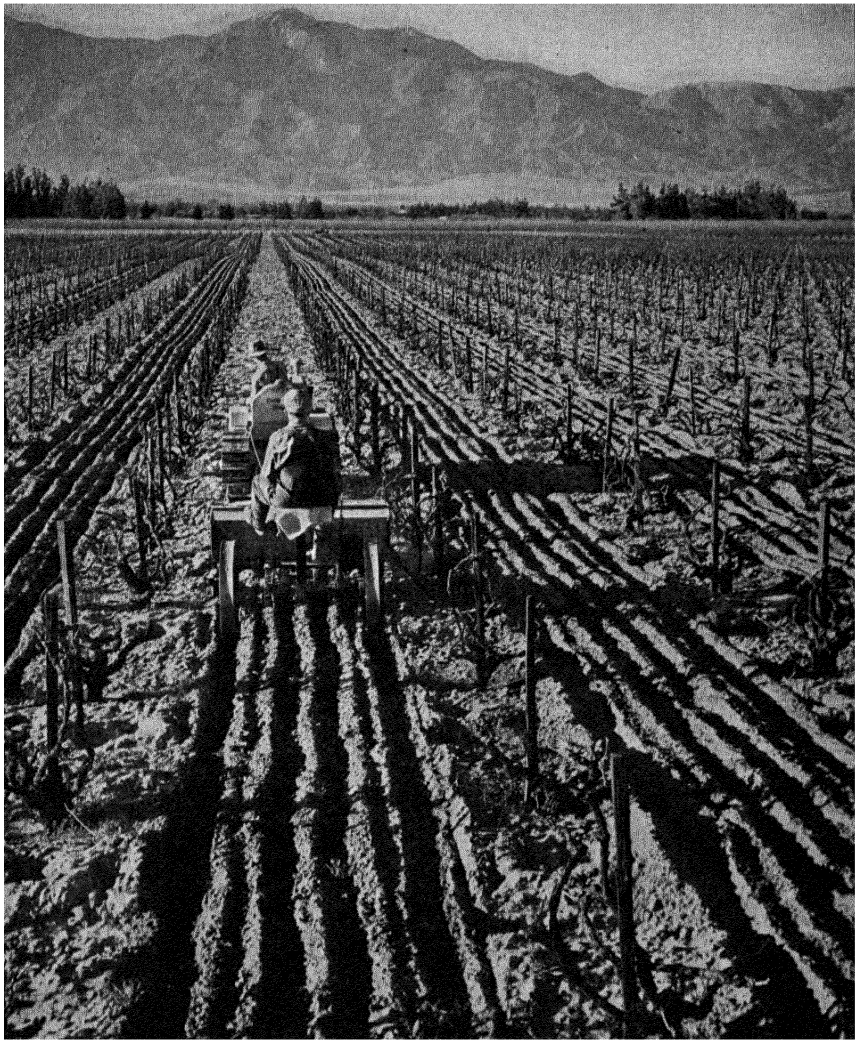
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Courtesy of the U. S. Department of the Interior

Man adapts his mode of life and his activities to the conditions of his physical environment. He works in partnership with nature to achieve his purposes.

FORECAST OF UNIT ONE

HUMAN beings are closely related to the earth on which they live. Their lives are even regulated by its movements. As the earth turns its face from the sun and darkness comes, men cease their work and play and seek rest for the coming day. The movement of the earth about the sun divides time into years. Gravity draws man to the earth. He climbs with difficulty and falls when there is nothing to support him. He sees other heavenly bodies, but all except the moon are so far away that he would not live long enough to reach them even if there were some means of transportation.

The layer of air about the earth is so thin that at the tops of the high mountains breathing is difficult. When man ascends to great heights in balloon or airplane, it is necessary to carry along tanks of oxygen. Life is possible only within very narrow ranges of temperature. When the thermometer rises much above 100° F., man suffers greatly. With temperatures below 50° F. or 60° F., he must protect his body from the cold. It is true that practically all parts of the world having high temperatures are inhabited. On the other hand where temperatures are very low throughout the year as on Antarctica, there is no human life at all. In other regions of low temperature there are as a rule few human beings.

Through the ages human beings have learned to make the best use of their physical surroundings and to adapt themselves to them. Where life has been too hard or too easy, progress has been retarded. Civilizations developed best in regions of temperate climate where there was land to cultivate and where there was protection from peoples less highly developed. Some of the centers of early civilization were in the river valleys of China, Mesopotamia (Iraq), and Egypt. The rich soil of the flood plains yielded excellent crops. Farming required a foresight not necessary for fishing, hunting, or even herding. The need of irrigation made still further demands on human abilities and thus aided in their development. The places where the first civilizations developed were usually protected by seas or deserts so that the people were not obliged to devote much of their time and energy to warfare. The protection afforded by these natural barriers preserved the advances made in these centers of progress and so made possible the transfer of knowledge gained to other lands and to later times. Thus we see that, in spite of man's handicaps and limitations, he has gradually learned to cope with his environment and to make use of resources which in former times he little dreamed of. In the next two sections we shall try to understand something of the progress that man has made and the surroundings which influence his life and work.



Photo from Philip Gendreau

The bounty of the good earth provides food, shelter, clothing, and comfort for mankind.

1. FROM FEAR TO MASTERY

Man meets nature's challenge. Today we know that the earth is a sphere. It has been proved that it turns on its axis and that it revolves around the sun. We know the place of the sun and the moon in our solar system. To the early cave man this was all a fearful mystery. Peering from the mouth of his cave or pushing his way through forests and over streams, he was constantly beset by fears. He believed that he must make sacrifices to the sun and the moon, to the wind and the waves, to win their good will. Here and there one venturing farther than the rest proved fears unfounded, and step by step the earth and its forces were made to do man's bidding. Man has sailed and winged his way around the world. He has girdled it with railroads and with cables. He has built industrial and commercial



© *Field Museum of Natural History*

Primitive man making his morning sacrifice to the rising sun

cities and empires on every continent. Having done all these things, he then turned to the ether, and, harnessing that by means of the wireless, he has conquered time and space.

All animals depend upon other or lower forms of life for existence. Man alone uses them to improve his condition. It has taken untold ages for him to reach his present stage of development. At first, with nothing but his bare hands to aid him, he necessarily lived a very narrow existence. When he learned to throw a stone and heave a club, he made one step forward, for with these as weapons he could better defend himself and more easily kill animals, thus securing food that he could not otherwise obtain.

When he learned to use these weapons as implements—the stone for grinding grain and the club for a lever to lift heavy weights—he took an even greater step forward. Here was the first step in the use of machines.

The Stone Age. Not content to use stones in their natural state, man learned to fashion spears, axes, knives, and arrowheads from them. So widespread was the use of these fashioned stones and for so long a time did their use persist that historians have called that age the *Stone Age.*



© *Field Museum of Natural History*

Caves were man's first dwellings, and their walls were marked with his crude drawings. These picture writings told the story of his life, his battles, and his progress and are proving of great worth in modern man's study of ancient days.

Fire as a servant. When man first learned the mastery of fire, we do not know. It was very early indeed, for among relics of the Stone Age are found charred bits of wood lying on simple family hearths of long ago. Weapons made existence possible; implements and fire made civilization possible. One of the earliest methods of procuring fire was the same as that used by the boy scout of today. Later, sparks were struck from flint.

Animals as servants. Another step in man's progress came when he learned to domesticate wild animals as a source of food and clothing and as beasts of burden. Crude drawings on the walls of the early cave man tell us that that step was taken long ago. The use of the cow, the goat, the sheep, the camel, and the horse has been linked with man's life for untold ages. When he began to domesticate them in large numbers, he became a *shepherd* or *herdsman.* At this period he was still in the wandering stage of existence, living in tents and moving about as the need of fresh pasturage urged him on.

Cultivation of plants. Not until man began to cultivate plants, did he settle down and become civilized. Agriculture requires more foresight than hunting or herding. The hunter can go out and procure his food and clothing from day to day. The farmer has to prepare the soil, cultivate the crop, gather the harvest, and save a part of it for the next year's seed. He may even have to irrigate his land. All this calls for foresight and planning of a high order if he is to succeed.

The Bronze Age. Copper, a soft metal, was one of the first metals to be used by man. The use of this metal combined with tin to make bronze weapons, utensils, and objects of beauty was widespread. We speak of the age of its use as the *Bronze Age.* Following the Bronze Age came the *Iron Age* which is almost identical with the Machine Age. Iron, being harder than copper, has a greater rigidity and takes a keener edge. Its adaptation to man's use was one of the greatest advances of all time.

The wheel. By the use of the wedge and the lever the Stone Age man split stones and erected structures that are the marvel of the ages. Not until man discovered the use of the wheel, however, did he make a revolutionary advance. The wheel has proved to be one of the world's greatest devices to make work easier and to harness power. Today, if wheels should fail to turn, all transportation would cease, long-distance communication would be impossible, mills and factories would be idle, lights would go out, and the world would be in a sorry plight. The man who first grasped the idea of the wheel by using a rolling log and later cross sections of logs for pairs of wheels started wheels moving which will not cease to turn while civilization lasts. Next to fire the wheel is man's most useful servant.

The Machine Age. All early machines were operated by hand. When in the course of time man's ingenuity led him to harness his machines to the wind and the waterfall, the *Machine Age* began, the age in which we are now living. To a certain extent the machine has displaced man, but man is master and always will be master of the machine.

Research for Students

As a class project make a series of posters by means of drawings or with pictures from magazines, newspapers, or other sources, showing:

(1) The evolution of man's weapons from the earliest days till the present time; (2) the improvement in implements and machines; (3) the



Photo by James Sawders

These Iraq shepherds still tend their sheep as did shepherds of old when a man's wealth consisted of his flocks and herds.

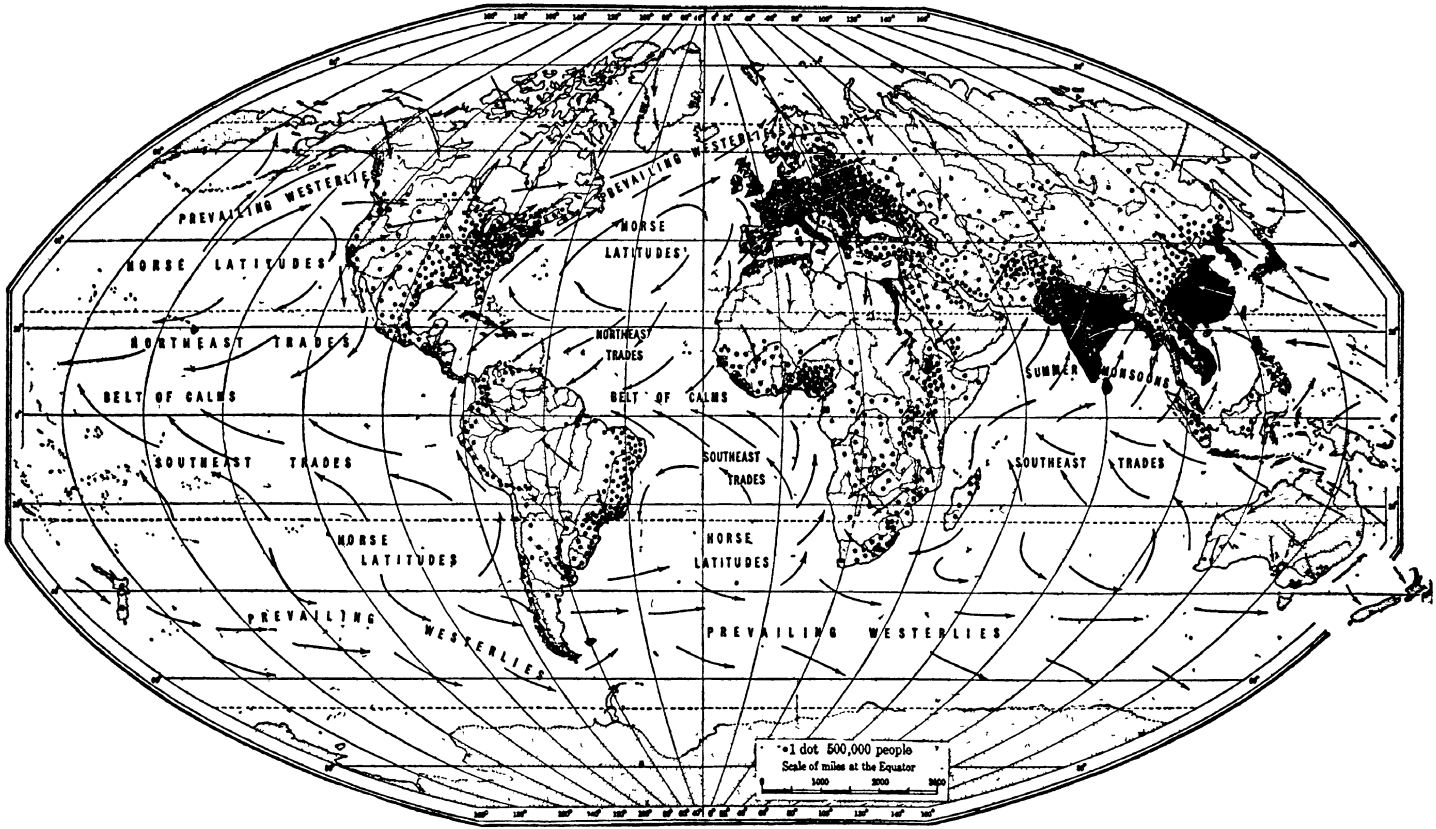
evolution of the homes of man; (4) the uses of fire for light and heat; (5) the great strides made in communication.

2. THE EARTH AS MAN FINDS IT

Our dependence upon the earth. It is often said that all industry is earth-bound. A little thought will show us the truth of this statement. Food, clothing, building materials, and all substances used in manufacturing come to us primarily from the earth itself. All metals and minerals, all plants and animals, and even the power used in manufacturing are of terrestrial origin. We are creatures of the earth and must derive our support from it. The purpose of all our work is to obtain this support.

Since man is so closely bound to the physical earth, it becomes necessary for us in our study of his industrial progress to learn of the natural conditions which most influence human activities.

Where people live. All wild animals are restricted by natural conditions to more or less definite areas. They do not roam the



Map showing the population of the world and the prevailing winds in July

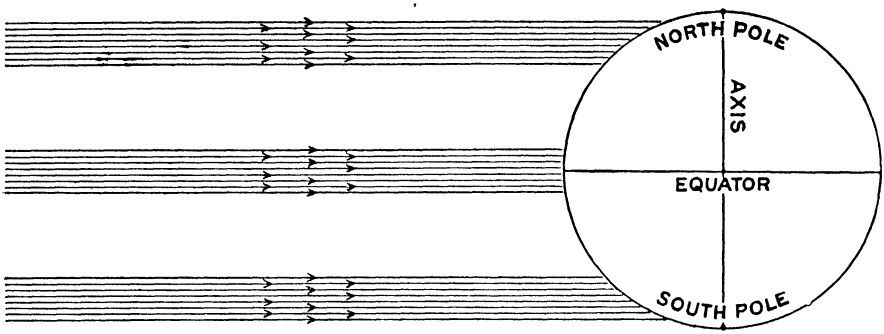
earth at large. Man, however, is not thus restricted. With his superior intelligence and wonderful hand he is able to construct useful implements that make him superior to all other creatures. He clothes himself with artificial garments, builds houses suited to his environment, and uses fire to cook his food and heat his home. Because of his ability to do these things, he has been able to live in almost any part of the world (*M. 8*),* though he cannot prosper everywhere. Antarctica seems to be the only large area without human habitations. We may wonder at the Eskimos' choice of snow and ice for an environment and the Bedouin of the Sahara for his choice of the desert, but neither seems willing to abandon his home for what we regard as better living conditions.

We must remember that before man learned to transport goods as he does today, his immediate environment had to supply practically all his needs. This naturally was the important factor in his acceptance of his abode. With the coming of improved methods of transportation, however, people became less dependent upon home production, and men were less restricted in the choice of their dwelling places. Nevertheless, those areas of the world today which are best able to supply human needs are still most attractive as places for settlement. This is the reason why the best agricultural areas have been sought ever since man first became a tiller of the soil, for this occupation has been and still is his chief means of support. The areas of densest population are the important agricultural areas.

Climate

Weather and climate. Probably no other factor is so important as climate in determining where and how people must live. When we speak of the weather or of climate, we refer to the condition of the atmosphere in which we live. This atmosphere is of vital importance to every living being, for without it no life, as we know it, could exist upon the earth. We are so dependent upon the air that we are highly sensitive to its varying conditions. There are many and important atmospheric changes day by day and season by season. The daily changes we speak of as *weather* while *climate* is the *average weather conditions* that prevail through long periods. In speaking of climate we generally refer to *temperature*, *moisture*, or *wind*, and these are regarded as the elements of climate. In a sense wind may be regarded as a modifier rather than an element of climate.

* *M. 8* means the map on page 8.



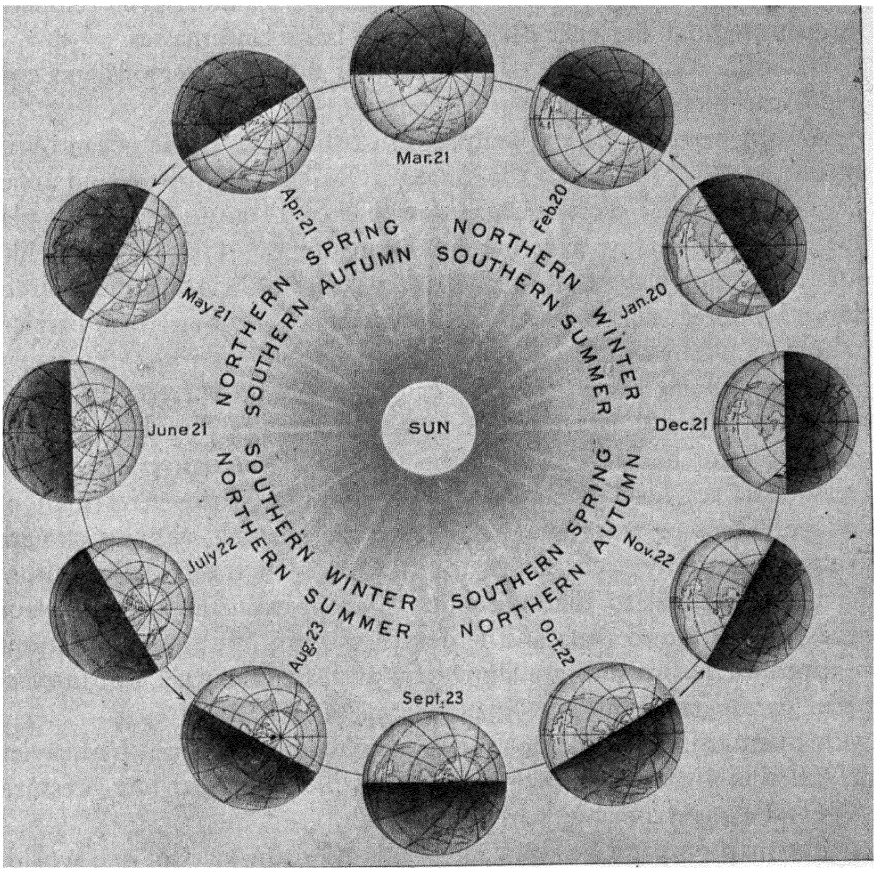
At the equator a band of sunlight 1000 miles wide warms a band on the earth's surface only slightly more than 1000 miles wide. Near the poles, however, the same amount of sunlight must warm a band far wider. The band shown in the drawing is over 2000 miles wide.

Origin of atmospheric temperature. Practically all the heat of the atmosphere is derived from the sun. As the sun's rays pass through the atmosphere, some heat is *absorbed* by the carbon dioxide, dust, and particles of water vapor in the air. Most of the rays which pass through the atmosphere fall upon the earth. Heat is absorbed by the earth as the rays strike upon it. This heat, in turn, is *radiated* back into the atmosphere increasing the temperature of the air. More heat is added to the atmosphere by this radiation from the earth than by the sun's rays themselves.

The very lowest layers of air rest upon the heated surface of the earth and are heated by actual *contact* with it. When the air near the surface becomes warm, it expands and becomes lighter than the air above it. The heavier air sinks and forces the lighter air upward. This, in turn, becomes cooler and heavier, sinks, and displaces the lighter warm air below. This circulation mixes the warm air and the cold air to a height of several miles above the surface of the earth.

Why the air is warm in some places and cold in others. Several factors determine the variations in temperature on our planet. Each will be discussed briefly.

The form of the earth. Near the equator the sun's rays fall vertically upon the earth and give the greatest amount of heat. Farther north and south toward the poles the rays strike the earth obliquely, or slantingly. These oblique rays because they cover larger areas than those near the equator give off less heat. The oblique rays also pass through more atmosphere and thus lose some



A diagram showing the relative positions of sun and earth at the time when each season begins and the position of the vertical rays in each instance.

of their heat. Thus we see why it is colder toward the poles than near the equator.

Change of seasons. The obliquity, or slanting direction, of the sun's rays changes with the seasons. By studying the diagram above, you will understand why in our latitude it is cold in winter and warm in summer. In equatorial regions there is little change between the temperatures of winter and summer. The seasons there are wet and dry rather than warm and cold.

Land and water areas. Water heats slowly and cools slowly while land heats quickly and cools quickly. Air over the oceans is therefore likely to be cooler in summer and warmer in winter than

the air over the land. Thus oceans tend to give a more even temperature throughout the year than occurs in large land masses.

Winds. Warm winds carry warm air into cold regions and cold winds carry cold air into warm regions.

Ocean currents. Temperature is distributed over the ocean by its currents (*M. 13*) in much the same way as by winds over land areas.

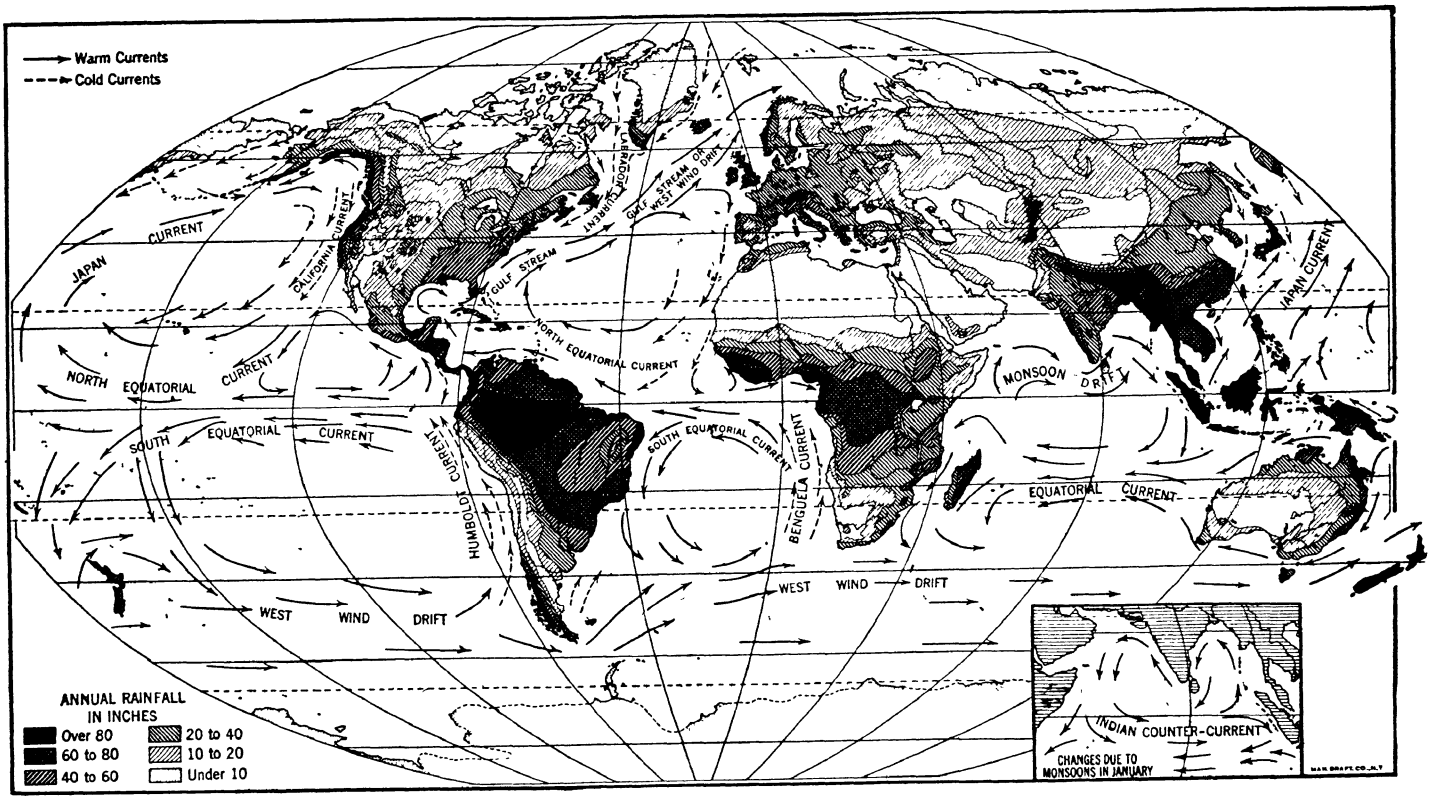
Topography. Temperature decreases with altitude. High plateaus and mountains are therefore cool areas. Great valleys like our Mississippi Valley allow the free passage of winds in any direction. Mountain masses like the Alps and the Himalayas form barriers to cold or warm winds.

Atmospheric pressure. We can move about so freely in the air that we are hardly aware of the fact that it is exerting a great pressure upon our bodies and upon the surface of the earth. The usual pressure at sea level is about fifteen pounds to the square inch of surface. This pressure is equal in all directions and is great enough to crush the body were it not for the fact that the pressure within the body is equal to that without. The pressure in a given place varies from time to time and it decreases with altitude. Variations in atmospheric pressure are shown by an instrument called the *mercurial barometer.*

Movements of the atmosphere. Light air is displaced by heavier air and this gives rise to winds. Winds blow toward low-pressure areas and away from high-pressure areas.

The map on page 8 shows the wind and calm belts of the world. From this learn the location of the four wind belts and the three calm belts; namely, *northeast* and *southeast trades*, *prevailing westerlies* of the northern and of the southern hemispheres, *equatorial calm belt*, and the *horse latitudes*, or *tropical calm belts.* In which belt do we live?

Moisture of the atmosphere. All air contains moisture even though we cannot always see it. When this moisture is invisible, it is in the form of *water vapor* that the air has taken up from the ocean or other moist surfaces by the process of *evaporation.* The warmer the air, the more moisture it can take up. When the air contains all the water vapor that it can hold, it is *saturated.* The temperature at which saturation takes place is the *dew point.* If saturated air is cooled below the dew point, *condensation* occurs. If condensed particles are heavy enough to fall, *precipitation* (rain, snow, or hail) occurs.



Map showing average rainfall all over the world and the cold and warm currents that circulate in the ocean, distributing temperature in much the same way that wind distributes temperature over land areas

Distribution of rainfall. Rainfall is determined in the main by the following factors:

Latitude. Rainfall is generally greatest in equatorial regions and decreases toward the poles (*M. 13*).

Prevailing winds. Winds are generally moist if they blow from warm to cold regions and dry if they blow from cold to warm regions. They are usually moist if they blow from the ocean and dry if they blow from large land masses (*M. 8*).

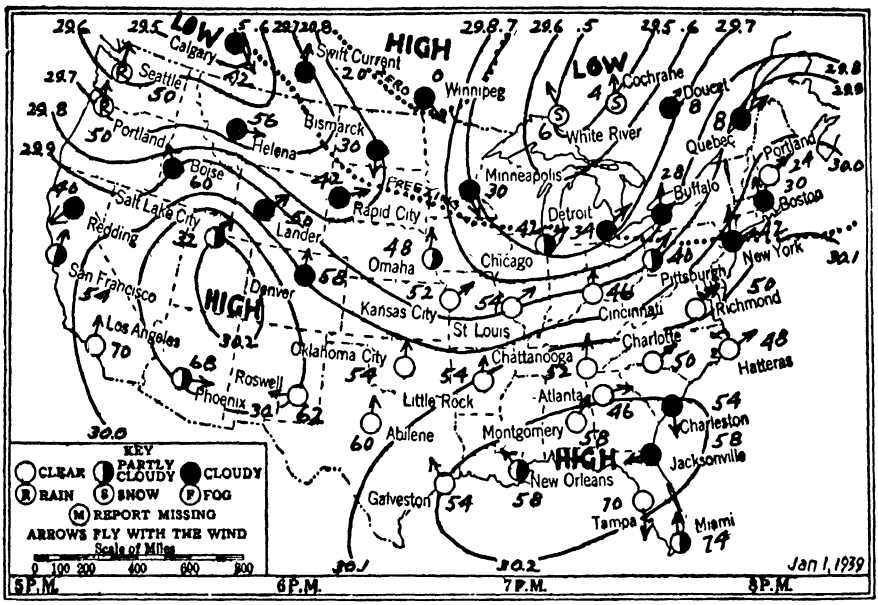
Proximity to the ocean. As a rule rainfall decreases with distance from the ocean though there are exceptions to this rule.

Mountains. Ranges of mountains deflect winds upward and precipitation results on the windward side of the mountains. Areas beyond, that is, on the leeward side, are usually dry.

Cyclonic storms. These are great whirling storms that sweep across our continent and Eurasia in an easterly direction. They are areas of low pressure and for this reason are often called *lows.* The heavier air from all sides presses in toward the center, producing a whirling motion of the air about it (*M. 15*). At the center itself the inrushing air ascends, becomes cooler, and condensation takes place. Such storms draw the moist air from the Gulf of Mexico and the Atlantic Ocean into the interior of our own country, thus bringing rainfall to large areas. Such storms occur in the belt of prevailing westerlies and seem to drift with them across the continent, moving with a velocity of from 500 to 1000 miles a day. A storm in Ohio today is likely to be in New England tomorrow. The approach of such storms is shown by a falling barometer and warmer temperatures.

Anticyclones. Our cyclonic storms, or lows, are followed by an anticyclone or high (*M. 15*). The anticyclone is the opposite of the cyclone in nearly every respect. The wind is blowing outward from the center where the pressure is high. The air at the center is descending. The area is cool instead of warm, and the sky is clear instead of stormy. When the area is well developed in winter, there is a *cold wave.* Its approach is indicated by a rising barometer and a falling thermometer.

Migration of wind and calm belts. These belts (*M. 8*) migrate northward in our summer and southward in winter. The equatorial belt is a rainy belt since the air is ascending, and the tropical belts are dry since the air is descending. Places visited by the equatorial belt will have alternately wet and dry seasons.



Weather map prepared by the U. S. Weather Bureau. The average speed of lows ranges from 477 to 718 miles a day, of highs from 485 to 594 miles a day. The isobars, black lines, pass through points of equal barometric pressure measured in inches.

Monsoons. In southeastern Asia the winds blow from ocean to land in summer and from land to ocean in winter. These periodic winds are the famous *monsoons* of that part of the world. They are due to the difference in the temperature over the adjacent land and water areas. The resulting rainfall in the growing season is of great importance to the agriculture of southeastern Asia.

Climate and human prosperity. In many parts of the torrid zone there are large areas of great fertility. In such areas living conditions are often so easy that people have to work but little for their food, clothing, and shelter, as compared with the vigorous efforts necessary in the colder regions. We find that the greatest progress in civilization has been made in the cool, temperate regions of the world. Hot, moist climates are not invigorating and people do not feel like working hard; whereas in colder climates the worker has much greater energy.

In the hot, moist regions climatic conditions are favorable for the development of many disease-producing germs, and white people



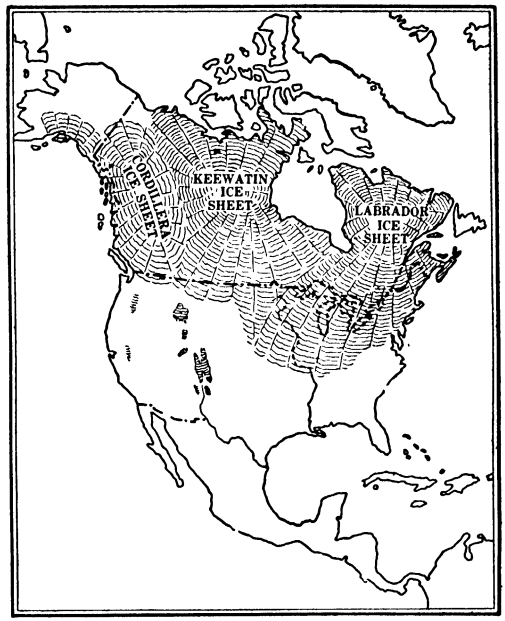
Courtesy of Malayan Information Agency

Indian women planting rubber seeds. Rubber trees grow in the torrid zone, but the latex is used principally in the temperate zone.

cannot live long under such conditions. Most progressive undertakings in the torrid zone, such as the cultivation of sugar cane, tropical fruits, and rubber, are under the management of Americans and Europeans who generally spend but a part of their time in the tropics. In the colder regions people must work for their support or suffer for the necessities of life. They must contend with constantly changing conditions which arise with the passing of storms, cold waves, and the seasons—all of which tend to stimulate energy and thrift. The preparation for cold winters and short growing seasons calls for forethought and hard work. This creates habits of industry and thrift and stimulates inventions. People often think hard work is a misfortune when in reality it is a blessing if not too severe. Of course conditions may be so adverse that no amount of struggle can result in progress.

Climate and human activities. Climate helps to determine not only the place where men can live and the progress they make, but the manner of their life as well. It determines in large measure the kind of homes that they build, the clothes that they wear, the food that they eat, the games that they play, and the occupations that they

follow. The attractive agricultural areas must have seasons long enough and warm enough for the maturing of useful crops, and the rainfall must be sufficient for their growth. The four great areas of dense population – eastern Asia, India, Europe, and eastern North America (*M. 8*) – meet these requirements. Herding areas need less rain but enough for the growth of the needed grasses. Lumbering regions must have moisture enough for the growth of forests.



The surface of North America covered by the ice sheet

Climate also presents *difficulties* that must be overcome. Inland waterways and harbors often freeze in winter, thus interfering with transportation in that season. Floods may occur in spring or at times of heavy rainfall. These interfere with business and do much damage along the river valleys.

Different climates give different products and give rise to different types of agriculture. Our own country is especially rich in its varied climates and products. In these days of cheap transportation we are also able to draw upon the climatic areas of the world at large as will be shown in the various sections of this book.

Other factors than climate operate to influence human activities, and these will be considered in the paragraphs which follow.

Soil

If it were not for the soil, we could have no plants or animal life upon the earth, and man's existence upon the earth would be impossible, however ideal the climate might be. On the other hand however excellent the soil might be, it could serve no useful purpose without a suitable climate—"Useless each without the other."

Fortunately soil is distributed almost everywhere over the earth's surface except upon very steep places. It is formed by the decay, or *disintegration*, of rocks. We sometimes think that decay comes only to plants and animals, but rocks also undergo this change.

Many centuries ago the northeastern part of our country as well as northern Europe and Asia was covered by one or more great ice sheets which came from the north. This ice mass and the water formed by its melting brought much soil and spread it out in a great sheet over the glaciated regions. This sheet of soil is known as *drift*. Being derived from many sources and brought by ice and by streams of varying velocities, its composition and texture vary greatly in different localities. In some places there are many boulders while in others the soil is free from rocks and is easily cultivated. Soil of such a varied character is well suited to many different crops in spite of the fact that much of it lacks fertility and is not easily cultivated. Some of America's best farming land is in this area of glacial soil.

Surface

Plains. Well-watered plains of the temperate zone have furnished man with his most valuable agricultural lands. River valleys, such as those of the Nile, Euphrates, and Ganges with well-developed flood plains, have often served as cradles of early civilizations. As a rule plains have a finer, deeper, and more fertile soil than is found on the slopes of hills or mountains. This is because the finer parts of the soil on the slopes are washed down upon the plains and spread out upon the level land leaving only a thin, coarse soil on the sloping lands. The plain with its finer and more fertile soil is more easily cultivated than the hillside farms, and better crops are grown on the level lands where there is less erosion and consequently there is less loss of soil.

People can live on all parts of the plains; communication and road construction are easy; and products are exchanged with but little difficulty. The great populations of the world have gathered upon such plains or lowlands; there most of the large cities have been built; and railroads have had their best development.

Mountains. There is but little opportunity among mountains for profitable agriculture. It is generally far better to allow forests to grow upon the more rugged ones than to attempt to clear the land for farming. Many of our best forest lands are therefore mountain-



Photo by De Cou

Cattle on the road to the mountain pastures in the Swiss Alps. This herd consists of fine Jersey stock.

ous areas. The great forests of the Sierra Nevada and the Cascade Ranges are striking examples of this fact (*I. 54*).*

Mountainous countries like Switzerland and Norway often use the lower slopes as pasture land for their dairy cattle that are driven to the mountains for summer feeding and back to the lower lands for winter care.

The rocks of mountains are likely to be much folded, turned up on edge, and deeply eroded by stream action. Valleys thus cut often reveal to the miner mineral deposits of great value. Such deposits are generally richer and more easily found among mountains than on plains. Mining is therefore likely to be an important industry among them.

Mountain streams furnish excellent water power. They may be used directly for the operation of factories on their banks or for the development of electric power that may be transmitted to distant manufacturing centers. Countries with no coal or petroleum are fortunate if they have numerous mountain streams for power.

In our study of climate we have seen that mountains are often

* *I. 54* means the illustration on page 54.

important factors in the distribution of rainfall. Mountains also are highly important to many people as recreation areas and as health resorts (*l. 273, 281, 284*).

Rivers and Oceans

Rivers. Before the development of our system of highways and railways, navigable rivers were of great importance in transportation. In many parts of the world they are still important for this service. Most navigable rivers, of course, are on plains while mountain streams are of but little use in transportation. On the other hand mountain streams furnish valuable water power and eventually contribute their waters to many of the navigable rivers.

In the early days of our history navigable streams helped in exploration and settlement. Many streams furnish valuable fisheries, such as those of salmon, herring, and shad. Dams are built across valleys to form reservoirs for power, for irrigation, and for water supply for cities and towns. It is difficult to see how the world could get along without the service of its rivers.

Oceans. Oceans are of prime importance in the life of man. They influence his life and work in the following ways:

(1) In our study of climate we have seen how the oceans affect the distribution of temperature and rainfall. If it were not for the oceans and the winds that blow from them, distributing their moisture obtained by evaporation, all our continental interiors would be deserts, uninhabitable by human beings.

(2) The oceans act as barriers between continents for plants, animals, and human beings. Before men became good sailors, oceans were barriers which separated the people of one land from all others beyond the seas. Even today, in time of war, it is a very important protection as one can easily understand.

(3) In times of peace, however, instead of a barrier, we have in the ocean a very important commercial highway. Nations possessing ocean harbors are greatly aided in their commercial life.

(4) The oceans and their shores are now, always have been, and probably always will be valuable food-producing areas.

(5) Their shores are often health-giving recreation resorts.

(6) The ocean waters hold many minerals in solution, such as salt, potash, phosphates, and lime compounds. Salt may be obtained by the evaporation of sea water.

Minerals, Plants, and Animals

Of course, plants, animals, and minerals are of vital importance to mankind. To the American Indian the great forests were his hunting grounds and nothing more. The mineral wealth he knew nothing of, but he had some acquaintance with agriculture and was therefore at the threshold of human progress. The coming of the European was soon followed by the discovery and development of the marvelous natural wealth of the country. He smelted the ores, utilized the forests, raised useful crops and animals, and from the iron and steel constructed his machinery, railroads, bridges, buildings, and steamships. He developed the water power and mined the coal for the production of steam and electricity. His marvelous material progress during the centuries has been due to his ability to make use of these and other natural resources about him.

Guides to Study

1. The earth is nearer the sun in winter than in summer but the summer temperatures are higher than those of winter. Why is this so?
2. In what direction is the wind in China during the growing season? How does this happen?
3. Why is a cyclonic area likely to be a precipitation area?
4. Why do vertical rays from the sun have greater heating effect than oblique rays?
5. How does the heating of the air affect its pressure? Its capacity for moisture?
6. Name four ways in which the atmosphere becomes heated.
7. Why should each of the following influence the distribution of temperature? (1) changes of seasons; (2) nearness to the ocean; (3) direction of the wind; (4) altitude.
8. Show how climate influences the occupations that people follow and the progress that they can make.
9. Why are the continents in the northern hemisphere hotter in summer than the oceans in the same latitude?
10. Why do the interiors of the continents in the northern hemisphere have relatively light rainfall? Why do continental interiors in equatorial regions have heavy rainfall?
11. Why are the western shores of Europe warmer in summer than the eastern shores of North America in the same latitude?
12. Why is it fortunate for the states of the Middle West that they are visited by cyclonic storms?
13. Deserts are common in trade-wind areas. Why?

14. Study of an anticyclone. State: (1) direction from which it comes; (2) direction of the wind with reference to the center; (3) barometer reading; (4) temperature; (5) direction of whirl; (6) appearance of the sky.

15. Why have not great civilizations developed in the torrid zone?

16. How does it happen that we have many kinds of soil?

17. Why are plains better than mountains for farming?

18. The Mississippi River supplies relatively little water power. Explain.

19. What mineral seems to you most important as an aid to man's work? To which would you give second place?

20. Why is it that so many excellent forests are in mountainous areas?

Research for Students

1. Study and explain to the class the construction and action of a mercurial barometer. Show how it may be used in forecasting weather and in measuring altitude of mountains.

2. Learn the definitions of *isotherm* and *isobar*. Find how they are represented on a weather map. How are high and low areas represented on a weather map? Study the symbols on weather maps to determine their meaning. From a weather map try to forecast weather for your locality for the day following the date of the map.

3. Report to the class on the organization and work of the Weather Bureau. Show its value to farmers, sailors, and others.

4. Account for the desert in northern Chile bordering upon the Pacific. Why has southern Chile a good rainfall?

5. Account for the great river, the Nile, that flows through the arid Sahara. At what season does it flood? Why?

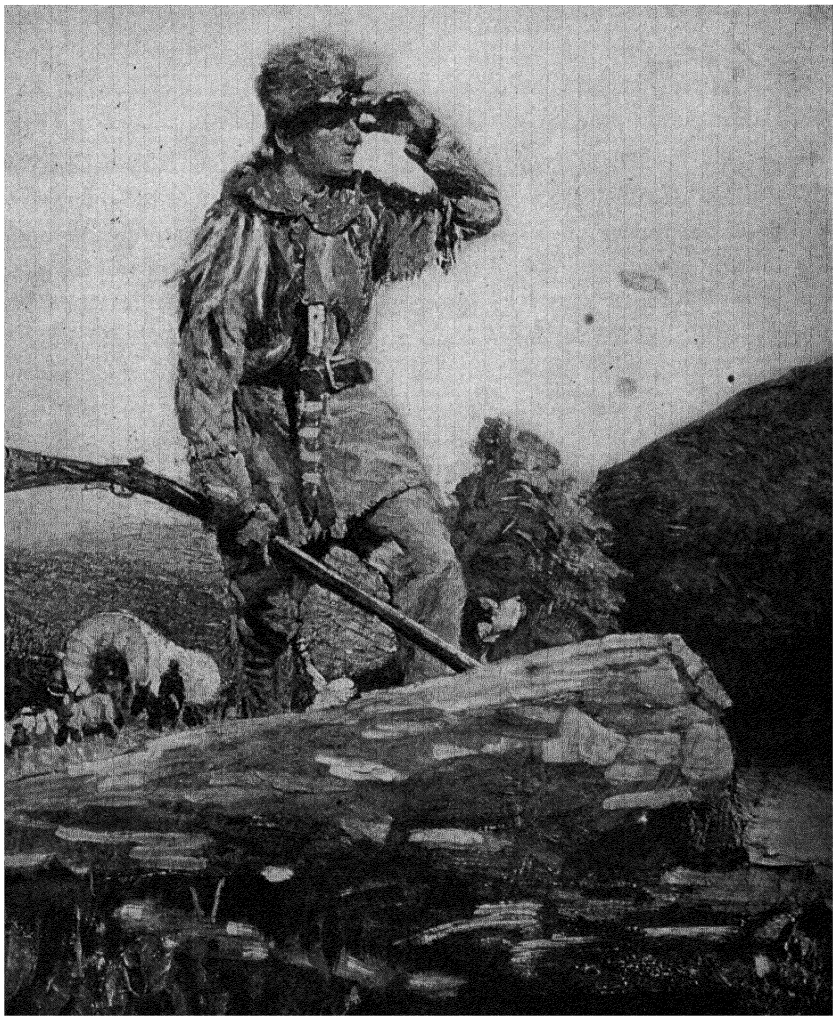
6. Why is the equatorial-calm belt a rainy area?

7. Make a list of tropical products or articles made of tropical products which we have come to depend upon in our home life.

8. Make a collection of pictures that will illustrate the effect of climate upon home construction.

9. Make a list of the areas in Europe that you think must furnish abundant water power. Do the same for our own country.

OUR COUNTRY'S GROWTH AND THE DEVELOPMENT OF ITS INDUSTRIES AND TRADE



From a painting by Stanley M. Arthurs

Daniel Boone looking toward the setting sun as he leads a band of settlers into the West

FORECAST OF UNITS TWO TO TEN

THE United States is a very young country. White men first came here less than five hundred years ago. Countries of the Old World trace their histories back from 2000 to 6000 years. Yet in its short period of growth our country has made astonishing progress and stands today as a leader among all nations in industry and commerce. It is second to none in education, science, and inventions. The development of its resources has brought great wealth and a high standard of living to its people. In the councils of nations it has great influence and the advice of its statesmen is sought on all problems of international concern.

How can a country so young have reached the same levels as other nations three or four times as old? The answer is to be found in a study of the country's resources and its people. Few nations have the wealth of agricultural lands and of vast mineral deposits and of great forests that the United States possesses. Its location in temperate latitudes gives an invigorating climate. Its extent from north to south gives the variety of growing seasons needed to raise crops of various kinds. The cyclones of the westerly winds bring rainfall over a very large part of its surface providing the moisture necessary for plant growth. It has seacoasts on the east, the south, and the west, thus making communication easy with all parts of the world. Such a combination of physical features practically assures success in all occupations.

The people who have made use of these resources have been immigrants and the descendants of immigrants. Immigrants possess the vigor, the vision, and the courage to break with the old and well-known conditions of life and to venture the new and the untried. These pioneers brought with them the knowledge and culture of the ancient civilizations of the Old World. Thus, while the resources of the country were new and undeveloped, there was brought here for their development the accumulated wisdom of the ages.

In Units Two to Ten we shall study the growth of our country and the development of its industries from the time of settlement to the present day. We shall learn to appreciate the great wealth that nature has bestowed upon our land and at the same time give due credit to what the people of the country have done to bring this land to its present high standing and to lay a foundation for future growth. Such a study must involve an understanding of our farming areas with their products utilized as food for man and animals and as raw material for our factories; of our forests with their products, capable of being so variously used; of our minerals, which the ingenuity of man has been able to fashion into an endless variety of tools, machines, and appliances, thus making possible the marvels of modern communication and transportation; of our sources of power and its application; and finally of the problems that beset our country.



Photo from Ewing Galloway

The covered wagon—a relic of the past—again rolls toward the setting sun as farmers from the dust bowl seek new homes on the irrigated lands of the West.

1. LAYING THE FOUNDATION

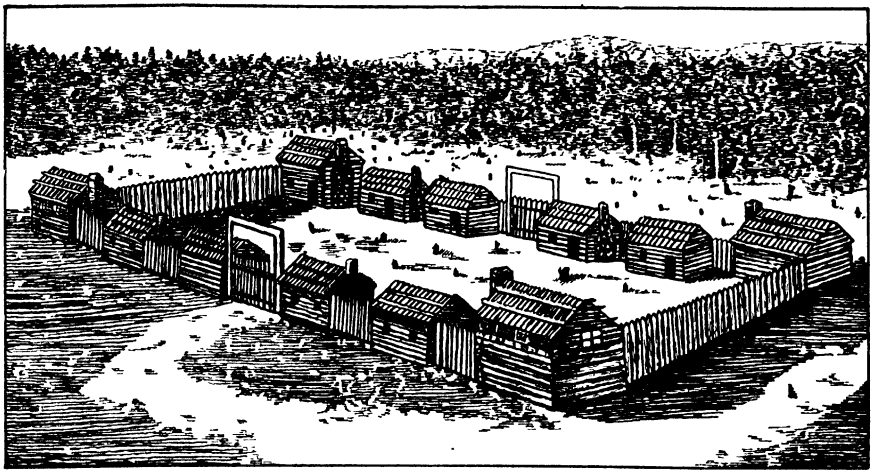
The basis of our development. A great nation like a building, if it is to endure, must be built upon a firm foundation. In the building of a nation those who begin the development of its industries, who make its laws, and who establish its schools and churches lay the foundation upon which all later success rests. The remarkable progress made by our country since its earliest days is largely due to the hardy settlers along the Atlantic Coast and to their descendants who persistently pushed the frontier westward until the present boundaries of the United States were reached. Of course these early founders of our country had little idea of the mighty nation which they were helping to build.

America was discovered by Europeans. It was for this reason that the settlements were first made along the Atlantic Coast and gradually moved westward. If discovery and settlement had been from the Pacific instead of from the Atlantic Ocean, development of the country as a whole would have taken place much more slowly. The high Rocky Mountains and the deserts of the West would have proved much more difficult barriers than did the Appalachians in the East, and the great European markets would not have been so accessible.

What the early settlers did for a living. Although the states bordering the Atlantic Coast declared the Mississippi to be their western boundary, settlement for many years was limited to a narrow strip of land along the coast. The early occupations were fishing, hunting, lumbering, and farming. In the northern section spinning and weaving was a home industry—the women and the girls did the work. Shoes were made by a traveling shoemaker who went from house to house. The skins of animals killed on the farm were tanned and kept in readiness for the shoemaker when he came on his regular visit. These household industries were the small beginnings of great industries which in later years helped to make the northeastern section of the country one of the greatest industrial regions of the world. In the southern sections there developed great plantations growing tobacco and cotton, much of which was shipped to European markets. There was relatively little manufacturing in the South until after the War between the States.

Breaking through the Appalachians. Because the Appalachian Mountains were difficult to cross, they held the population for a time to the limited area between the mountains and the sea. Before the people passed this barrier into the country to the west of the mountains, they had gained in numbers sufficiently to make rapid settlements and to meet the Indian attacks successfully.

Land to the west of the Appalachians was first explored by hunters and trappers who had to blaze their own way over mountain and through forest. One of the best known of the early explorers was Daniel Boone, who had heard of rich lands to the west and was determined to find them. He had many encounters with the Indians and more than once was held prisoner by them. Later he led a band of settlers from Virginia through the Cumberland Gap to Kentucky where they made their homes. Boone himself after some years pushed still farther westward.



Transylvania Fort built by the pioneers at Boonesborough, Kentucky. The stout stockade protected them and their possessions against sudden attack by Indians and wild beasts.

Boone and other explorers were followed by settlers who traveled on foot, on horseback, or in rude covered wagons in which were the women, the children, and the household goods. These emigrants were obliged to cut roads through the forests and to ford streams. Sometimes wagons had to be taken apart and the wheels and other parts had to be carried on the backs of the men until the rugged land or rocky stream had been crossed. Farm animals were driven over the mountains to the new homes in Ohio, Kentucky, Tennessee, and other states between the Appalachians and the Mississippi.

Making homes west of the mountains. There was no rest for the weary men and women at the end of their westward journey. There were log houses to be built and a *stockade*, or high, strong fence, to be constructed to ward off attacks by wild beasts and the Indians. There were few vacations for boys and girls. The boys helped in building and in planting and in harvesting crops. The girls helped in the preparation of food and clothing. Food was obtained from the small gardens and from the few domestic animals. To this supply were added fish from lakes and rivers and game from the forest. The can opener had not then supplanted the spade, the gun, and the fishing rod as a key to a people's food supply.

How markets were reached. At first there was little communication between the new frontier and the East. All the necessities had to be provided by the settlement. As time passed, the crops

grew larger and the farm animals increased in number. There was no market in the West because all settlers produced the same commodities. Markets were reached only by driving animals many miles over the mountains to the East. Grain and salted meats were floated on rafts or flatboats down the rivers to New Orleans, where they were loaded on ships and sent to ports of the Atlantic Coast. You will remember that both Abraham Lincoln and Mark Twain worked for a time as Mississippi River pilots.

Routes to the West. The early emigration across the Appalachians was only the beginning of a westward movement that has continued to the present time. The people of the country turned their backs to the Atlantic and to Europe to devote themselves to the development of the rich resources lying to the west of the Appalachians. Some followed the Mohawk Valley across New York State to the Great Lakes. Others pushed their way through the passes of the Appalachian Mountains to the farming country beyond. These were the routes that were followed in later years by the highways and railroads connecting the East with the interior of the country.

Not all the people who crossed the mountains were content to remain east of the Mississippi River. Many like Daniel Boone pressed on to other fertile plains west of that river. Fortunately all that territory was soon to become the possession of the United States.

Doubling the country's area. In 1803 the United States Government purchased from Napoleon, Emperor of France, the famous Louisiana Territory extending from the Mississippi River west to the Rocky Mountains, north to Canada, and south to Mexico. Little was known of the extent or resources of the newly acquired land. President Jefferson, therefore, sent into the territory a party of men headed by Meriwether Lewis and William Clark. They started from St. Louis and traveled in small boats up the Missouri River until the water became too shallow to travel in this way. Then with horses bought from the Indians and guided by an Indian woman (Sakajawea) and her half-breed husband they pushed their way westward over the unknown Rocky Mountains. After many hardships they reached the headwaters of the Columbia and floated down that river on crude rafts to the Pacific Ocean. They returned to St. Louis over practically the same route after an absence of more than two years.

They had been directed to map the country and to learn what they could of its rivers and mountains and the nature of its soil.

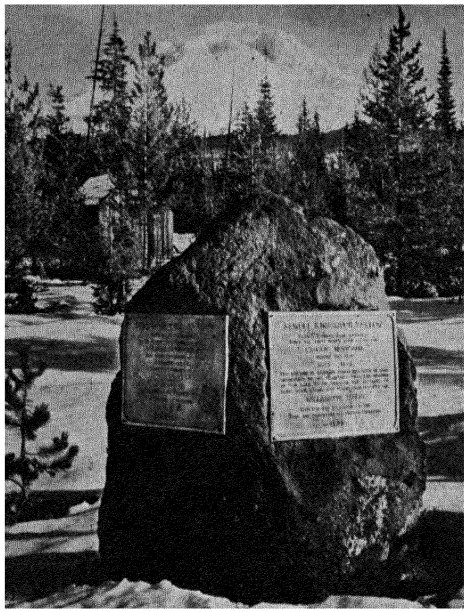


Courtesy of the Historical Society of Montana

Sakajawea with the Lewis and Clark party at Three Forks, Montana. (Reproduction of a painting by E. S. Paxson in the lobby of the House of Representatives, State Capitol, Helena)

They were also to study the Indian tribes, their manner of living, and whether or not they were peaceful. They took with them knives, hatchets, looking glasses, bright-colored handkerchiefs, and clothing for trading with the Indians. These articles helped them to make friends with the natives and to obtain food and other necessary supplies.

The wealth of the new territory. Lewis and Clark reported to the President and the Congress what they had learned of the Louisiana country. But they could not possibly have foretold the great value of the land as we know it today. In size the region was larger than the entire United States before the purchase. From this land have been carved fourteen states or parts of states. Lewis and Clark could not have imagined the millions of bushels of wheat that would be raised in the Dakotas or the great crops of wheat and corn that would be harvested in the states bordering the Mississippi on the west. Neither could they have foreseen the vast numbers of cattle and hogs that would be raised on the Great Plains and the corn that is grown on the prairie lands. They could not possibly have predicted the great wealth of the oil fields of Kansas and Oklahoma or the mineral wealth of the Rocky Mountains. These are only a few of the resources and products added to the wealth of our country by the Louisiana Purchase.



© *Sawyer Scenic Photos*

Monument erected to a Kentucky pioneer, Samuel Kimbrough Barlow, who built the first wagon road across the Cascade Mountains into the Willamette Valley of Oregon Territory.

Florida annexed. Sixteen years after the Louisiana Purchase another valuable tract of land was added to the United States. Spain ceded to us what is now the state of Florida and a strip of land bordering the Gulf of Mexico, nearly as far west as the Mississippi River. This land has proved to be of great value to the country. Florida is one of our great fruit-producing states and serves as a winter resort for people from all parts of the country (*I. 275*).

The Oregon Territory. The Lewis and Clark journey did more than explore the Louisiana Territory. It gave to the United States an additional claim to the Oregon Territory extending from the Rocky Mountains to the Pacific and from Canada to California. This brought to the United States one of our greatest forest areas, the salmon fisheries of our northwestern rivers and shores, besides agricultural lands yielding rich harvests of fruits and grains.

Territory once Mexican becomes a part of the United States. Thousands of citizens from the United States had already settled in the Louisiana Territory before it was purchased from France. Other adventurous people had moved from the United States to the Southwest into what is now Texas. Their numbers increased until they were strong enough to declare their independence of Mexico, form a government of their own, and ask for admission to the United States. Boundary disputes following the annexation of Texas led to the Mexican War. The treaty following the war provided that Mexico should give up all claims to Texas and cede to the United States all other Mexican territory lying to the north of the present boundary of the United States and Mexico. This did not include a

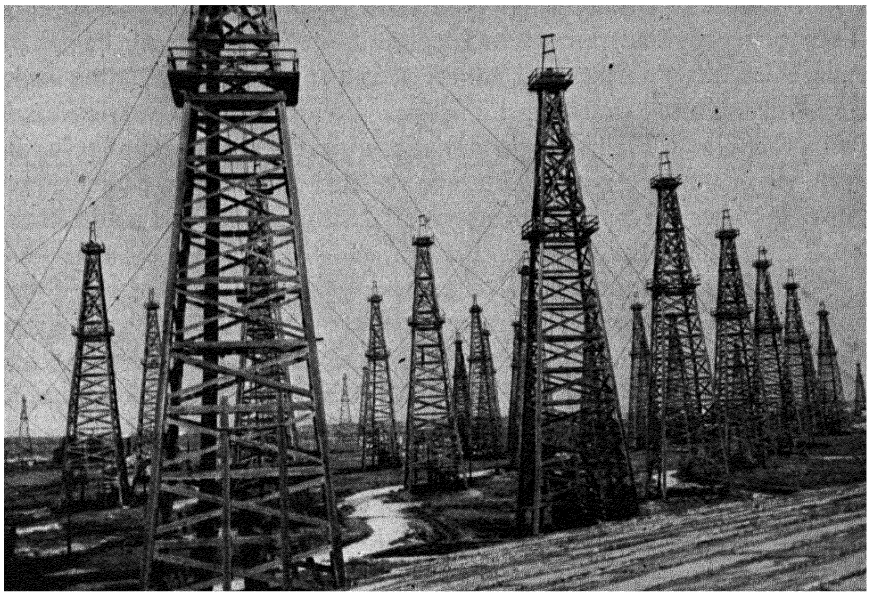


Photo by James Sawders

An oil field in southeastern Texas. This state produces about forty percent of our crude oil each year.

small area known as the Gadsden purchase which was acquired later so that the Southern Pacific Railway might have an easier route to the West.

Value of the lands. Texas and the land ceded by Mexico brought to the United States an untold wealth of resources. Texas is our greatest cotton-producing state. It also possesses some of the richest oil deposits of the country. Its grassy plains for many years have furnished feed for millions of cattle and sheep. Along the lower Rio Grande are extensive groves of orange and grapefruit trees and truck farms which supply northern markets with large quantities of vegetables. California was an especially valuable addition to our territory because of the mild climate of southern California. There groves of citrus fruits have increased in number and size until that state produces about two thirds of the oranges and practically all the lemons raised in the country. In southern California fertile valleys with mild winter climate supply other parts of the country with fresh vegetables and fruits every month in the year. Like Texas, California brought among its many resources vast deposits of petroleum giving fuel and power to a section of the

country almost wholly lacking in coal. California and the Oregon Territory provided ports which serve as outlets over the Pacific to Asia, Alaska, western South America, and through the Panama Canal to eastern United States and Europe. Nearly all the western lands from the Great Plains to the Pacific are rich in minerals including gold, silver, and copper. Thus we see that the United States as we know it today owes much of its greatness to annexations made to the land claimed by the original thirteen states.

Outlying regions added to our possession. Beyond the continent of North America other territories acquired by the United States include Alaska, the Hawaiian Islands, the Philippines, Puerto Rico, the Panama Canal Zone, and a number of small islands. See Unit X.

The rush for gold. One of the great events in the westward movement was the discovery of gold in California in 1849. In California sailors deserted their ships, farmers left their farms, and men of all classes rushed to the river on whose banks gold had been discovered. As soon as the news reached the East, there was great excitement. Men traveled west on horseback and in wagons drawn by oxen. Others boarded ships and sailed around Cape Horn to the California coast. Still others sailed to Panama, crossed the isthmus on muleback, and then took ship again to California. The population of California increased so rapidly that the next year it became a state. This westward movement to the Pacific Coast helped to arouse interest in all the western country.

Finding a way out. The one thing that the Middle West needed above all else was means of communication with the eastern seaboard. It needed the eastern markets for its farms and ranches. It needed the manufactured products of the East and goods imported from Europe. The opening of the Erie Canal in 1825 meant more to the Middle West than the discovery of gold did to California. Freight rates from ports on the Great Lakes to New York City dropped from one hundred dollars to one dollar per ton. Goods from the East passed as cheaply to the farmers of the West. Canalboats carried emigrants from the East to the almost limitless plains west of the Appalachians. Other canals were opened in Pennsylvania which also helped to give an outlet to the Middle West.

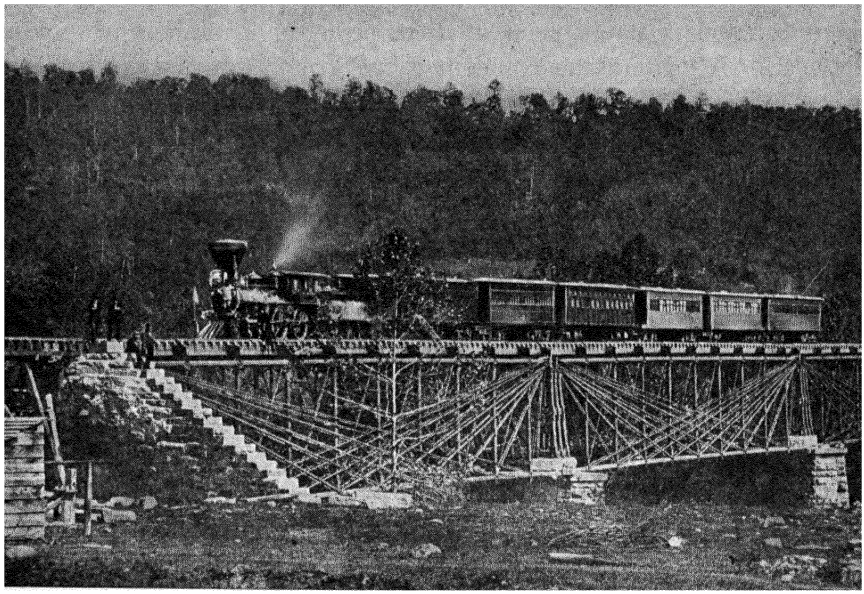
The making of a great city. The Erie Canal helped to make New York City the country's most important port. That city became the leading center for the distribution of western products both for eastern United States and for foreign countries. Goods

moving toward the West began their journey at New York City, since canalboats could load at that port for Buffalo and points between. All along the canal in New York State there grew up many industrial cities and towns. These cities increased in importance in later years, when the canal route was followed by some of the most important railway lines of the country.

America—a land of immigrants. Many of those moving to new homes in the West were immigrants from Europe. In earlier years immigrants came to the United States mostly from the countries of northern Europe, especially Great Britain, the Scandinavian countries, and Germany. Later a much larger proportion arrived from southern Europe. Many of these immigrants settled in the industrial cities of the East where at first large numbers worked as laborers or as operatives in mills and factories. Those who joined the westward movement settled mainly on farms and ranches and helped greatly in making the agricultural West what it is today. Many of our leaders in industry, statesmanship, literature, and other fields came to this country as young men and women. They found opportunities which the Old World did not offer. In making the most of those opportunities they not only helped themselves but their adopted country as well.

The coming of the "iron horse." A few decades after the opening of the canals railroads followed the canals and in very large measure displaced them. Trains moved faster than canalboats; tracks could be laid over land too rugged for canals. The first railroad was the Baltimore and Ohio, and, for more than a year after it was opened for traffic in 1830, its cars were moved by horse power and sails. The first railroad lines connected centers not far apart. Later these lines were bought by the larger companies, connected, and made to tie the more distant parts of the country together.

The East and the West united. By 1860 the East and the larger centers of the Middle West were united by railway. It was nearly ten years later before a railroad was completed to the Pacific Coast. One company, the Union Pacific, began at Omaha laying its tracks westward. Another company, the Central Pacific, started at Sacramento and laid its tracks eastward. The two lines met near Ogden, Utah, May 10, 1869. On that occasion exercises were held celebrating the completion of the great undertaking. The last tie made of mahogany was laid, and the last spike, a gold one, presented by the state of California, was driven.

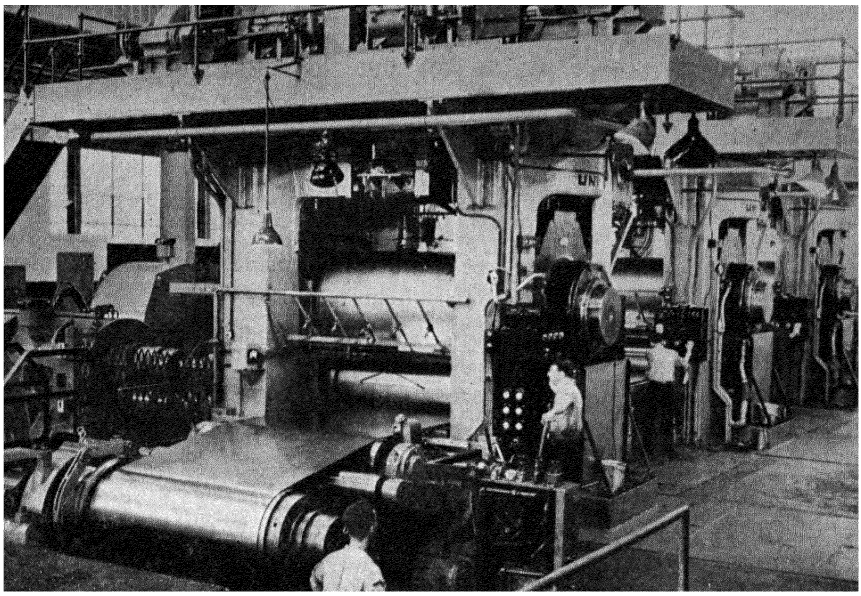


Courtesy of the Baltimore and Ohio Railroad

The first train to cross the Allegheny Mountains on the Baltimore and Ohio Railroad about 1850

The Atlantic and Pacific Coasts were now connected by the "iron horse." Tea and silk from China now had a direct route to the eastern markets of the United States. The manufactures of the eastern part of the country moved west to the Pacific Coast and on to China and Japan. Even more important than their part in developing and increasing trade, the railroads of the country did much to make the inhabitants of the country a united people.

The country grows up. Extension of railroad lines stimulated industries of all kinds as well as agriculture. Mills and factories increased in number and size. Great industrial cities and agricultural centers developed in the Middle West in addition to the older manufacturing and commercial cities of the East. The steel centers about the Great Lakes supplied steel for railroads, for factories, and, later, for automobiles and airplanes. Improved transportation by land and water stimulated agriculture and manufacturing and greatly increased the quantity and variety of goods transported. Inventions of many types speeded up both manufacturing and transportation. Other inventions, including electrical appliances for use in homes, factories, and offices, have created new industries which have added greatly



Courtesy of American Rolling Mill, Midland, Ohio

Long wide ribbons of steel are being "cold-rolled" as they pass through these mills where tremendous pressures are exerted by the rollers. No country rivals the United States in up-to-date steel-manufacturing processes.

to the country's prosperity. In its earlier days our country was largely a farming country which looked to foreign lands for the greater part of its manufactured goods. In more recent years it has become the leading industrial country of the world sending the products of its mills and factories to every corner of the globe. Our great industries have grown from the small beginnings made by the early settlers in the East and by the pioneers who pushed their way westward to new lands and new resources. It was they who laid the foundation which made possible all later development.

Guides to Study

1. Why was it fortunate that America was discovered and settled from the East?
2. What were the occupations of the early settlers along the Atlantic Coast? Why?
3. Complete the following statements:
   a. The Appalachian Mountains were a help to the early settlers because———

b. The Appalachian Mountains were a hindrance to the early settlers because———.

4. What led the people to seek new homes to the west of the mountains?

5. How did methods of transportation hinder the settlement and development of the West?

6. How did the opening of the Erie Canal affect the growth of New York City?

7. How did the discovery of gold in California increase settlement in all the regions west of the Appalachians?

8. In what ways have immigrants helped the growth and development of the country?

9. What great industries were obliged to await the coming of the railroads?

Research for Students

1. On an outline map of the United States show the growth of the country after 1783.

2. Make a list of the resources added to our country by each of the acquisitions of territory.

3. Prepare an oral or written report on the expedition of Lewis and Clark.

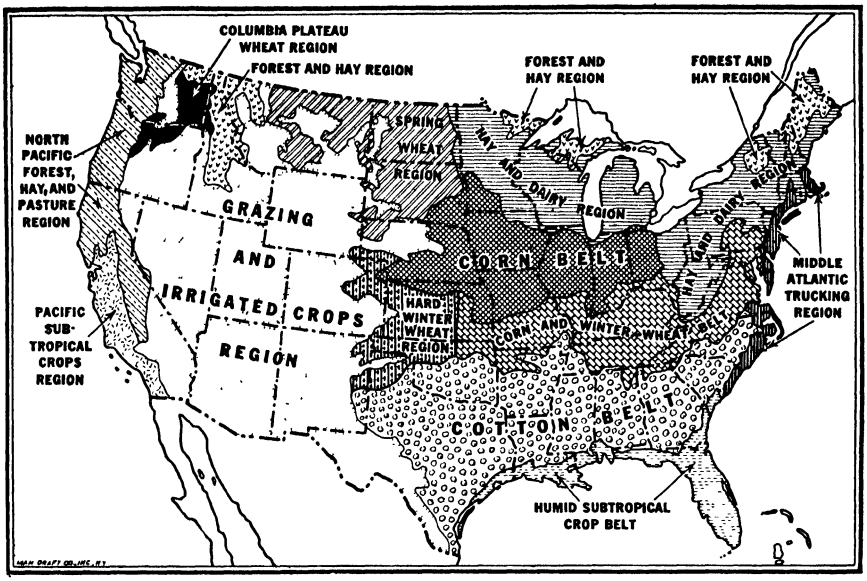
4. Write a few paragraphs about your ancestors and show how the people of your race helped the growth of our country.

5. Debate: The people were justified in their attack upon those who favored the purchase of Alaska.

6. Debate: The United States is wise in planning for the independence of the Philippines.

2. RESOURCES—THE BUILDING STONES OF OUR COUNTRY

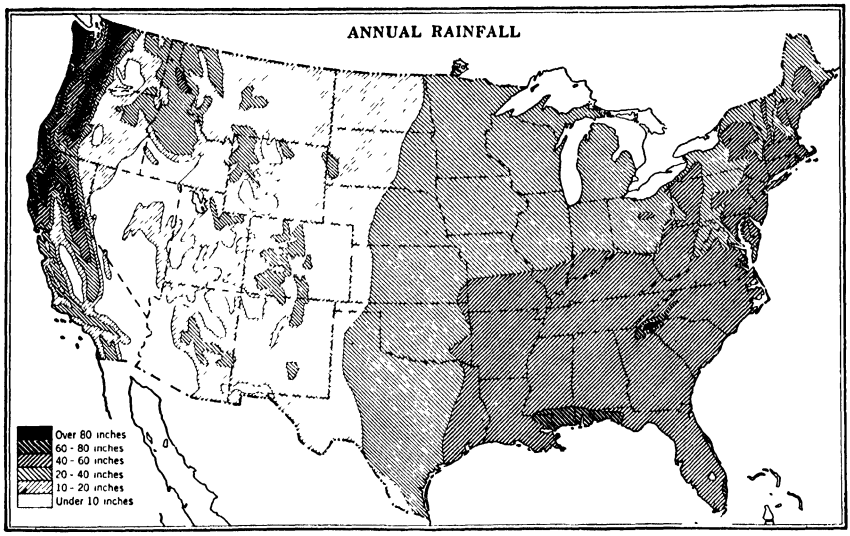
The basis of our national wealth. Our country, as you have learned, started from very small beginnings. Its area gradually increased from a narrow strip along the Atlantic Coast to its present size. The people pushed farther and farther west till all unknown lands were explored and their resources discovered. Farm lands were cultivated, mines were opened, and forests were invaded. Great industries were established, transportation lines were laid, and great cities were built. The growth of the country has been truly marvelous. Our people were fortunate in possessing a land whose

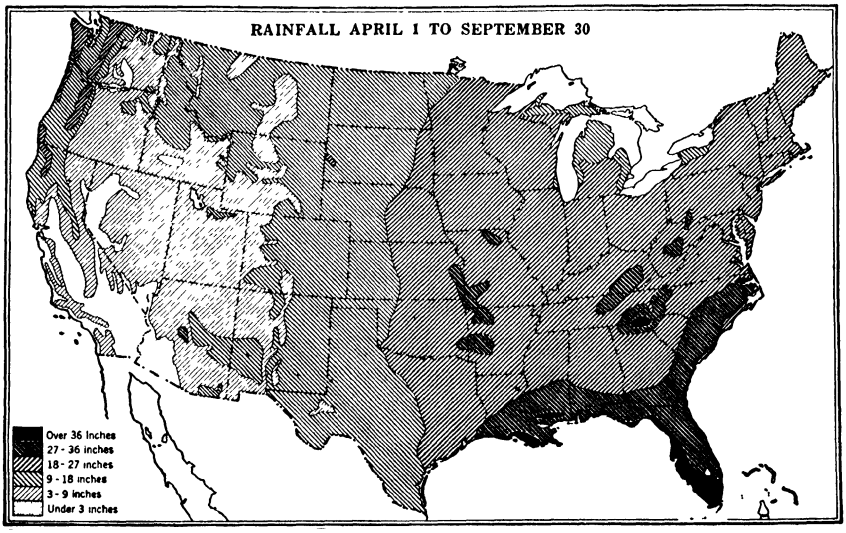


wealth of resources had scarcely been touched and these resources have made possible the development of a great country.

Our Country's Commercial Advantages

A healthful and invigorating climate. Climate is one of the most important factors in man's environment. (Reread pp. 15-17.) The torrid zone is too hot and the frigid zone is too cold for the best development of man's activities. Desert areas furnish almost no raw materials and few if any products to support human life. Regions of excessive rainfall are often unhealthful. The continental United States offers climate of great variety, but a variety without great extremes. In the northernmost section, as in Minnesota or New England, the cold is sufficient to keep the ground frozen throughout the winter. In the southern section, as in lower Florida and southern California, the winters are without frost. In the eastern section of our country the rainfall is sufficient for the growth of crops that support the life of man and domestic animals. West of the hundredth meridian and east of the Sierra Nevada and Cascade Ranges, the rainfall is so scant that the farmer must depend either upon irrigation (pp. 53, 69) or upon dry farming (p. 69). Irrigation is extensively used in parts of California, but much of the Pacific Coast has an abundant rainfall. This variation in temperature, length of





growing season, and rainfall accounts for the diversity of plant and animal life in the various sections and likewise explains the difference in occupations, industries, and commercial activities.

A huge country. Our country, roughly rectangular in shape, extends from east to west for a distance of about 3200 miles and from north to south for a distance of about 1500 miles. From this area could be carved forty-five states the size of New England with enough left over for an additional Maine and Connecticut. It

is more than three times as large as it was when the original thirteen states established our government. The population today is more than thirty times as great as it was when the first census was taken in 1790.

Our favorable location. Our eastern seaboard faces western Europe which is the best commercial market in the world. The interchange of products—agricultural, mineral, and industrial—between eastern United States and western Europe employs millions of workers in production, distribution, and transportation of these commodities. This interchange furnishes a large part of the revenue enjoyed by our railroads and other forms of land transportation and by our steamships. Our western coast faces Asia where there are large opportunities for the development of commerce such as our Atlantic Coast enjoys. On both coasts fine harbors furnish safe anchorage for ships and abundant facilities for loading and unloading cargoes.

Wealth of productive land. The American farmer has been abundantly blessed in having rich virgin soil on which to produce crops to sustain himself and to sell for the support of our industrial population. In various sections of the country the soil and the climate are adapted to the production of most of the products that are grown anywhere else in the world with the exception of a few plants that grow only in the tropics. Most of the farms are on level or slightly rolling land and are so extensive as to permit the use of modern agricultural power-drawn machinery. Thus the quantity of production per man is greatly increased. This is in striking contrast to the small farms of western and southern Europe and of eastern Asia where a very large part of the farm work is done by hand.

Abundant mineral wealth. Our country ranks first among the nations in the production of many of the most useful minerals, such as coal, iron, copper, and petroleum. All these are essential to an industrial nation, and it is a great advantage to have access to large deposits of these minerals instead of having to import them from other countries. Much of the unrest in the world is due to the unequal distribution of these necessary raw materials. The countries that do not have them covet lands in which they may be produced. Our annual production of pig iron is as great as the combined production of four of the large-producing countries of Europe; namely, Germany, France, Great Britain, and Belgium. For many years our



Courtesy of Caterpillar Tractor Co.

Gum, cottonwood, and oak logs leave a Louisiana forest for the sawmill. Our Southern States cut annually about 25,000 million board-feet of lumber.

production of copper was greater than the combined production of all other producing countries in the world. However, owing to increased production elsewhere in very recent years, the United States is now producing only about one third of the annual production of this metal. Our production of petroleum is about 60 percent of the total produced by all countries. Our petroleum reserves are greater than the known reserves of the rest of the world.

Our forest resources. When the white man came to this country, he found great forests of hard and soft woods from what is now Maine south along the entire eastern section of this land and throughout what we now call our Southern States. These forests have been cut down to make way for farms and to produce lumber for building, and many of them too have been destroyed by fires. Up to a generation ago few people realized that we would eventually be faced by a shortage of lumber or that its price would be greatly increased by the distance that it would have to be hauled as the eastern forests were destroyed. While our Southern States are still abundantly supplied with timber, a large part of the lumber that we

need must be shipped from our western forests. Only comparatively recently have the people realized how destructively our forests have been treated and how necessary conservation of this gift of nature must become (pp. 351-354). How completely the center of lumber production has shifted may be seen from the illustrations (*M. 165, M. 171*). The Government and lumber-producing companies are devoting great sums of money to reforestation of cut-over or burnt-over lands (*I. 353*).

Abundant power resources. Coal, petroleum, and water power have all contributed enormously to American industrial development. The United States has spent enormous sums of money in developing our water-power resources, combining with their development flood control, the conservation of soil, irrigation, and the navigation of inland waterways. Improved methods of using coal and petroleum in the production of power has made possible conservation of these two important but diminishing resources. Without the energy developed from these three sources—coal, petroleum, and water power—our country would never have become a leader as an industrial nation.

Natural Regions and Their Resources

The United States consists of five great natural regions as determined by relief, or the elevation, of the surface of the land areas (*M. 42*). Each one of these divisions is characterized by products and occupations which are largely determined by the nature of the region. These five areas are: (1) the Atlantic and Gulf Coastal Plains; (2) the Appalachian Highland; (3) the Interior Plains; (4) the Rocky Mountains and Intermontane Plateaus; and (5) the Pacific Highlands and Lowlands.

The Coastal Plain. From the map (p. 42) note how extensive this region is. Its area is about one tenth of that of the entire country. It is extremely narrow in the north and gradually expands as it extends southward until it includes the entire state of Florida, the southern part of the states immediately north of Florida, then swings northward to include western Kentucky and Tennessee, and a large part of the drainage area of the lower Mississippi, as well as the lower courses of the Texas rivers that flow southeastward to the Gulf. This Coastal Plain was once submerged and a great part of it today is characterized by sandy soil. Such soil is not naturally of high fertility but can be made highly productive by the use of


CANADA
CASCADE RANGE
COLUMBIA PLATEAU
ROCKY MOUNTAINS
LAKE AGASSIZ PLAINS
ROCK COUNTRY
LAKE
ADIRONDACKS
NEW ENGLAND HIGHLANDS
SIERRA NEVADA
COAST RANGES
BASIN AND RANGE REGION
COLORADO PLATEAU
GREAT (WESTERN) PLAINS
INTERIOR
CENTRAL PLAINS
OZARK PLATEAU
APPALACHIAN PLATEAUS
APPALACHIAN HIGHLANDS
PIEDMONT PLATEAU
COASTAL PLAINS
CONTINENTAL SHELF
ATLANTIC OCEAN
PACIFIC OCEAN
RELIEF MAP OF THE UNITED STATES
Modeled by EDWIN E. HOWELL
SCALE
0 50 100 200 300 400 500
miles
GULF OF MEXICO

fertilizers. Since it was once the floor of the ocean, there are few elevations. It is easy to build highways through it, and the farmers can make large use of agricultural machinery. In certain sections of it there are swamps, but much of this swampland has been drained and turned into large acreages of fertile farm lands. In the northern area, especially on Long Island, in New Jersey, and farther south, truck gardening is the important occupation of the farmer. By use of fertilizers two crops or more a year are often secured from the same land and proximity to the great industrial centers affords a market for all the foodstuffs that can be produced. From these truck gardens hundreds of carloads and truckloads of vegetables are brought into New York and other cities of the metropolitan area to feed the workers in the offices, stores, and factories of this section with its dense population. Farther south in Virginia and North Carolina truck gardening is less important, but large crops of fruits, cereals, and peanuts, as well as tobacco, are grown. The great cotton crop of our Southern States is produced largely on the Coastal Plain. The rice fields of Texas, Louisiana, and Arkansas are entirely in this region as are the sugar-cane plantations of Louisiana. All the oranges, grapefruits, and other fruits and vegetables of Florida are products of this region. In the Lower Rio Grande Valley of Texas a great citrus-fruit and vegetable industry has grown up. By means of rapid transportation fruits and vegetables reach the cities of the North and the East only a few hours after they are taken from the truck garden, field, orchard, or grove, and as a result these necessary foods can be found in the city markets the year around. In certain sections of the Coastal Plain the soil is particularly adapted to the growth of pine trees, which are valuable for lumber, paper, and naval stores (p. 173). In swamp areas the cypress tree grows luxuriantly and from it are sawed millions of feet of choice lumber annually. Other soft and hard woods also are found in forested areas.

In the Gulf Coastal Plain are mineral deposits of great value. A very important and cheap fertilizer is obtained from the phosphate rock (p. 247) which is abundant in Florida. Huge beds of sulphur (p. 243) are found in Texas and Louisiana. Great underground reservoirs of oil exist in Texas, Louisiana, and Arkansas, and the rich flow from these pools is largely responsible for our country's being the world's leading producer of petroleum and petroleum products (pp. 212-217).



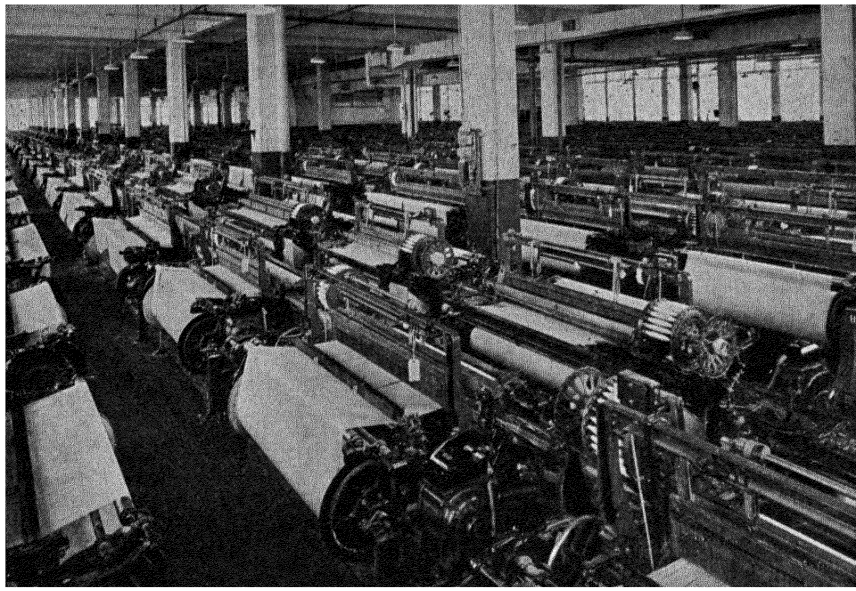
Photo by James Sawders

The swamps of the lower South produce abundant growths of cypress trees, the wood eternal. Cypress is proof against termites and other borers and its heart is impervious to decay, making it perfect for building lumber.

The Appalachian Highland. West of the Atlantic Coastal Plain is a low hill country that was once a high and rugged mountain region. It extends from New York State to Alabama. This highland region is made up of three distinct parts: (1) the Piedmont Plateau on the east; (2) the Appalachian Plateaus on the west; (3) the Great Valley and the Blue Ridge in between. The Great Valley is also known as the *Appalachian Ridge and Valley Region.*

The Piedmont. This plateau lies between the Coastal Plain and the Blue Ridge. The soil is deep and rich and the surface fairly level. On account of its favorable climate it is a noted agricultural area and productive of many kinds of crops. In the north apples, tobacco, and dairy products are abundantly produced. Much wheat and corn are also grown. In the southern part cotton is the important crop.

The Fall Line. Just west of the Coastal Plain soil and surface changes become noticeable. Here the streams pass from the sedimentary rocks of the old mountains to the softer clays and sands of



Courtesy of Pacific Mills

This cotton mill in the Piedmont section of South Carolina is typical of the new manufacturing industries that are making their homes in the South of today.

the Coastal Plain. The rivers flowing from the Piedmont have carried away the soft materials and have deposited them as clay or sand on the level surface of the plain or have carried them into the ocean. Because the underlying structure is rock, falls have been developed along the contact between the Piedmont and the Coastal Plain. These falls mark the head of navigation on the rivers and furnish water power that is being used in factories located in the cities that have grown up along the Fall Line. Trace the Fall Line on the map (*Pl. 2*),* and you will find such cities located there as Richmond in Virginia, Raleigh in North Carolina, Columbia in South Carolina, and Augusta and Macon in Georgia. Such falls are not confined to the Fall Line but may be found throughout the Piedmont section, affording many sites for the development of water power. This accounts for the location of many of the cotton mills and other industries that are found in the Piedmont.

The Appalachian Plateaus. West of the Appalachian Highland are the Appalachian Plateaus which include the Allegheny and the

* *Pl. 2* refers to the second colored map in the Appendix.

Cumberland Plateaus (*Pl. 2*). The plateau section includes the Catskills in New York and extends southward to northern Alabama. In this region are vast deposits of bituminous coal, especially in western Pennsylvania, West Virginia, western Kentucky, and eastern Ohio. Iron ore, limestone, petroleum, and natural gas occur in great abundance. The ridges and mountains are still covered with hardwood forests from which much valuable timber is cut. The excellent farm lands produce grains, livestock, fruits, and vegetables.

The Great Valley and the Blue Ridge. West of the Piedmont is the Blue Ridge, a range reaching from near Harpers Ferry, West Virginia, to northern Georgia. Just west of the Blue Ridge lies the Great Valley of the Appalachian Highland. It extends from the St. Lawrence Valley to central Alabama—a distance of more than 1000 miles. Its width varies from twenty-five to sixty-five miles. It is really a series of many small valleys separated from each other by low ridges that run lengthwise the Great Valley. Dissected as it is by ridges and streams, individual names are given to various parts of this region. Many rivers drain the Valley, as the Delaware, Susquehanna, Lehigh, Potomac, James, Shenandoah, Roanoke, New, Holston, and the Tennessee. Hence, in northeastern Pennsylvania there is the Lehigh Valley; Lebanon and Cumberland Valleys lie near the Susquehanna River; in northern Virginia is the Shenandoah Valley, or the Valley of Virginia; and farther south are the East Tennessee Valleys—all parts of the Great Valley. Two great national parks are included in this area—the Shenandoah National Park in northwestern Virginia and the Great Smoky Mountains National Park in North Carolina and Tennessee.

Many highways and railroads traverse this region, following its use generations ago by the pioneers seeking the frontier in their covered wagons. Naturally the road builders and railroad engineers followed the paths blazed by the migrants to the West. Prosperous towns have developed throughout this region where raw materials for manufacture and power resources are abundant. However, farming has always been the leading occupation due largely to the rich limestone soil and favorable climatic conditions. Fields of wheat, corn, and clover, with many an orchard of apples and other fruits, afford a magnificent panorama. Mineral wealth also abounds. In Pennsylvania are rich stores of anthracite and farther south bituminous coal is abundant. In northern Alabama the nearness of coal fields, iron-ore mines, and limestone has made Birmingham one of

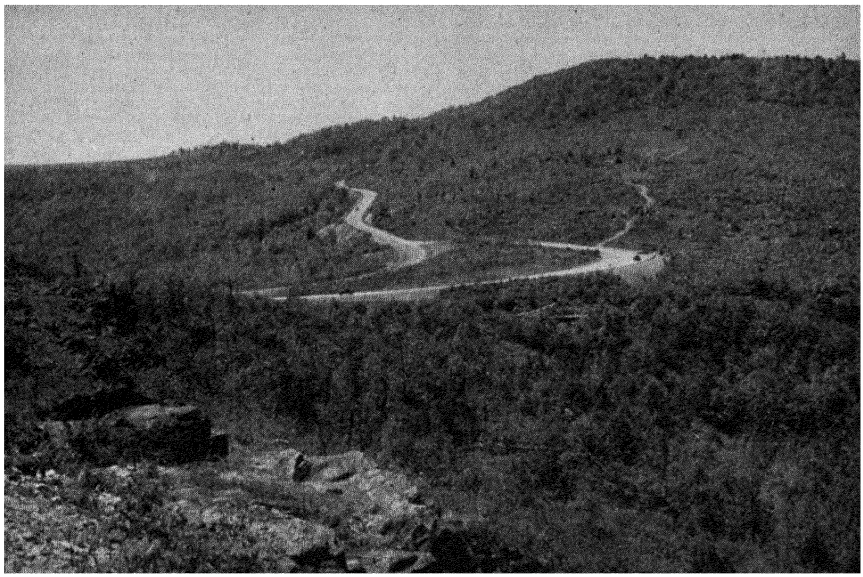


Photo by James Sawders

Skyline Drive in the Shenandoah National Park follows the crest of the Blue Ridge Mountains. Over this same ridge the early settlers pushed their way westward from Virginia to Kentucky and Tennessee.

the most important iron and steel centers of the country. The city has become an important railroad center also with nine important systems furnishing transportation facilities. Elsewhere in the Great Valley exist abundant stores of iron ore and other minerals. Limestone throughout this region is an important highway-building material, and great quantities are also used to produce lime, cement, and fertilizers. From the abundant clays brick, tiles, pipes, and other clay products are manufactured in many places.

The forests of pine, spruce, and other evergreen trees on the ridges still produce much marketable lumber but excessive cutting has greatly lessened the quantity produced. A variety of hardwoods grow on the ridges and in the valleys. Manufacturing industries other than those mentioned are being attracted to the towns and cities of the Great Valley because of the proximity of raw materials and an abundant labor supply. There they also find a lower cost of living for workers, less industrial strife, access to cheap power, and lower taxes. Such conditions are bringing an increasing number of industries, especially textile-manufacturing plants, to the

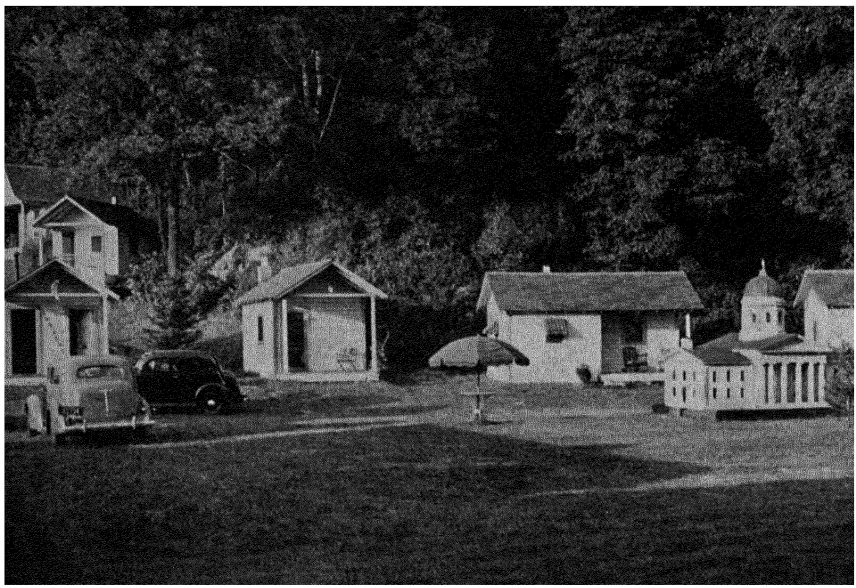
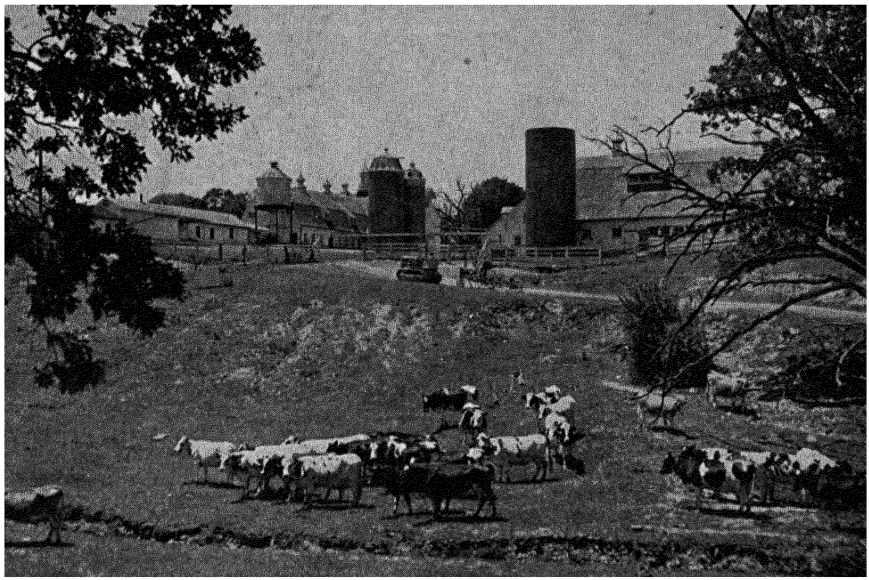


Photo by James Sawders

"Toy Town"—a tourist camp in Montpelier, the capital city of Vermont —has built its little cottages about a tiny replica of the stately capitol building.

southern part of this region. There workers can grow much of their own food and yet have an income from their wages paid by a mill or factory.

New England. The mountains of New England may be considered as a northward extension of the mountains of the Appalachian Highland. The southern and eastern uplands of New England strikingly resemble the southern Piedmont. It is a land of old and hard rocks. Glaciers scraped away the soil and carried rocks from the elevations and strewed them over the land. Streams have stolen the loose soil as it has been set in motion by wind and rain. Along its deeply indented ocean boundary there is no level coastal plain. The thin and rocky soil of much of its surface makes farming unprofitable. Only a few years ago the landscape was conspicuous for its abandoned farms with weed-infested fields, decaying fences, boarded-up farmhouses, and dilapidated barns. Then came the automobile bringing tourists and vacationists to climb the mountains, fish in the innumerable lakes, visit its historic shrines, revel in the exhilarating climate, and otherwise enjoy its manifold attractions.

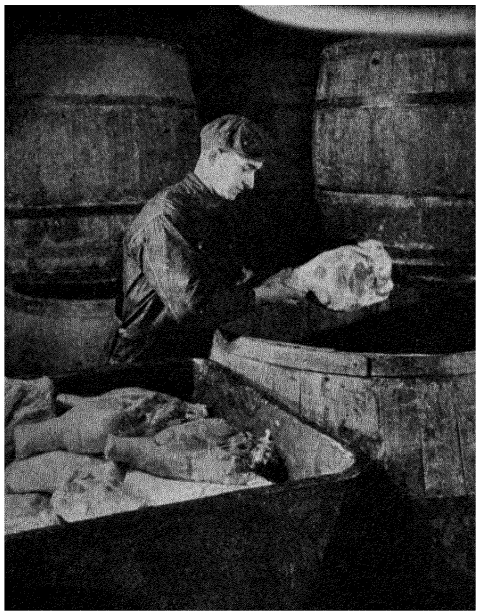


Courtesy of Caterpillar Tractor Co.

A farmstead in the Central Plains. This is a typical Illinois farm, with its sleek cattle, modern barns, towering silos, and up-to-date farm machinery.

Abandoned farms were purchased by city dwellers, and houses and barns were renovated or rebuilt for human habitation. Tourist homes and filling stations soon dotted the highways, and a new prosperity came to the section. Dairy farming, truck gardening, and fruitgrowing succeeded where general agriculture had failed. New England's rapid streams that could be used to develop power, its numerous and excellent harbors, and its unequaled location for the development of industry and commerce have turned the energies of the people into nonagricultural pursuits. Lack of mineral resources caused the development of metal manufacturing in a manner and on a scale entirely different from what might have occurred if this section had produced its own raw materials. The story of manufacturing in New England will be told in later sections (pp. 235, 254, 257, 310-311).

The Interior Plains. Between the Appalachian Highland on the east and the Rocky Mountains on the west lie the Interior Plains occupying approximately half the area of the whole United States. This large region shows a great diversity of climate, soil, resources, and human activities. For purposes of description we divide it into



Courtesy of Swift and Co.

Curing a famous brand of hams

the Central Plains, or Central Lowlands, and the Great Western Plains.

The Central Plains. The section of the Interior Plains lying east of the 100th meridian is a vast area of nearly level land having an abundance of rich soil and sufficient rainfall to make irrigation unnecessary. It is the region from which comes a large part of the food supply of the nation. The cereals, especially wheat and corn, find here the soil and moisture required to make this the most important food-producing area in the world. The level land makes possible the extensive use of farm machinery so that enormous crops can be produced in proportion to the number of agricultural workers engaged. It is natural too that this great food and feed section should be the place where millions of cattle, hogs, and sheep are raised to supply meat for all the people. Throughout this comparatively level country the construction of highways and railroads has been proportionately cheaper. For this reason this section is abundantly supplied with arteries of transportation by which the products of the farms easily and quickly reach the markets.

One would hardly expect an area so well suited to agriculture to possess mineral resources; yet many of the states included in this region are underlain by rich deposits of coal and lignite (*M. 208*). Petroleum and natural gas are found in many sections. Limestone and valuable clays are also abundant.

Much of the manufacturing of this region has to do with the processing of food products. Hence, packing houses, flour mills, canning factories, and similar industries furnish employment to thousands of workers. Wherever water power or power derived from coal and good transportation facilities make easy the securing of



Photo from H. Armstrong Roberts

Large iron mine in the Mesabi Range under lease to operators by the State. Royalties from this and other mines on state-owned land go to Minnesota's school fund.

raw materials and the distribution of finished products, other manufacturing industries have sprung up. Some of these are engaged in the manufacture of leather and articles made of leather, the building of automobiles with many different plants furnishing parts or accessories, and the construction of farm machinery; still others are busied with the manufacture of home appliances, plumbing supplies, electrical devices, rubber goods, and countless other necessities or luxuries. The number and diversity of manufacturing plants, factories, and mills are constantly on the increase.

The Laurentian Highland. Bitten into deeply by the western extension of Lake Superior is an area known as the *Rocky Lake Country*. It includes northeastern Minnesota, northern Wisconsin, and part of the peninsula of northern Michigan (*Pl. 2*). It is a southern extension of an upland, most of which lies in Canada north of the St. Lawrence River and the Great Lakes where it is called *the Canadian Shield.* This region abounds in various mineral ores. Northern Minnesota and the upper peninsula of Michigan contain the richest iron-ore deposits in the world. The Keweenaw peninsula

of upper Michigan contains some of the largest-producing copper mines in this country. Formerly this area was heavily forested and its white pine was much sought after, but excessive cutting of both hardwoods and softwoods has made this region much less important as a lumber producer than it was a few years ago. Reforestation and conservation, encouraged by state governments, may again make this section's tree crop important.

The Ozark Plateau. In southern Missouri and northwestern Arkansas is an upland of very old rock in the midst of the Central Plains; it covers an area about equal to that of the state of Georgia. Forests once covered the entire region, and it is still a source of tree products, especially oak railroad ties and mine props. The hillsides once covered by forests now produce luscious apples and other fruits. Parts of the plateau seem especially adapted to the production of strawberries and grapes. This plateau also has underground wealth in the form of lead and zinc ores; it also has great hills of granite and an abundance of building stone.

The Great Plains. From the Central Plains to the foot of the Rocky Mountains and from Canada to Mexico the Great Plains extend (*M. 42*). These plains are in reality high plateaus almost barren of trees. The westerly winds lose most of their moisture in passing over the Coast Ranges and over the Sierra Nevada and the Cascade Ranges and consequently the Great Plains are a land of little rain and most of the farming must be carried on by irrigation or by dry farming. If it were not for the cyclonic storms which bring moisture-laden winds from as far away as the Atlantic Ocean and the Gulf of Mexico, this region would be as dry or drier than the country immediately west of the Rocky Mountains, which is the region of smallest rainfall in the United States (*M. 38*). On these plains great herds of buffaloes once roamed because of the native grasses which afforded them food. Later these animals were almost exterminated by the Indians and the Western pioneers, and herds of cattle grazed there in their place. Stories and songs of the cowboys and the round-ups remind us of those days when this great expanse of territory was Government land. It was a sort of public range where hundreds of herds, each with its distinctive brand, were cared for by the herdsmen mounted on their cow ponies. Today fences subdividing this area indicate that private possession has succeeded Government ownership. Alfalfa (*I. 53*) and other drought-resisting plants and cultivated grasses have been planted to supple-



Courtesy of J. I. Case Co.

On the level expanses of the Great Plains are harvested, with modern machinery, enormous crops of alfalfa, a drought-resisting legume, excellent for cattle feed and to improve the soil.

ment the native grasses that formerly furnished pasture for the cattle. The Great Plains also have considerable mineral wealth that has only been exploited in a small way. In eastern Colorado coal is mined, and North Dakota, Montana, and Wyoming have vast beds of subbituminous coal and lignite. Petroleum is being produced in several states of the Great Plains including the Texas Panhandle (*M. 211*).

The Rocky Mountains and the Intermontane Plateaus. This area includes the Rocky Mountains and the plateau region between them and the Sierra Nevada and the Cascade Ranges farther west. Because of its light rainfall it is the most extensively irrigated section of the country. The National Government once owned all the land, but now much of it is in the possession of private owners. Because their cost is too great to be undertaken by the farmers themselves, the Government has developed the large irrigation projects in this area. Millions of sheep pasture on the Government-owned lands and the ranches that are privately owned. Herds of cattle feed on the grass in many sections.

This region is rich in many minerals. Gold, silver, copper, and



Photo from H. Armstrong Roberts

Giant redwood trees abound in the forests of Northern California and of southwestern Oregon.

zinc are found here. Coal and iron ore are abundant and petroleum is an important product in several states. There are immense resources of oil-producing shale and phosphate rock that will be utilized at some future time.

The Pacific Highlands and Lowlands. Westward from the Sierra Nevada and the Cascade Ranges and extending to the western ocean is the so-called *Pacific Slope*—an area of highlands and lowlands. This region exhibits great diversity in temperature and rainfall and consequently in agricultural products. In the south are the wonderful fruit and vegetable lands where irrigation must be used because of the lack of sufficient rainfall for growth of plants. In the north are the huge forests of majestic redwoods, sequoias, cedars, Douglas firs, and pines. This area is our greatest present and future source of lumber (*M. 171*). In the valleys between the almost parallel ranges are rich agricultural lands and the homes of a large part of the rural population. Coal and iron are scarce in this region. Since 1892, however, when petroleum was discovered in California, this source of power and the harnessing of streams have provided abundant and cheap facilities for the development of manufacturing

industries. Water from its mountain sources supplies both irrigation and power for the lowlands unendowed by nature with sufficient rainfall or with coal.

An occupation giving employment to thousands of workers is the fishing industry. The catching and canning of salmon will be described more fully later (pp. 155-160). Other industries which employ large numbers of people in this region are petroleum refineries, fruit and vegetable canneries, wineries, packing houses, flour mills, lumber mills, and pulp and paper mills. Several transcontinental railroads and air lines furnish comfortable and rapid transportation all the way to the western coast from all sections of the country. Fast freight lines with refrigerator cars transport fruits and vegetables from California's orchards, vineyards, and truck gardens to the cities of the eastern seaboard. The Pacific Coast has not as many natural harbors as the Atlantic Coast has, but San Francisco harbor and Puget Sound offer unexcelled shipping facilities for coastwise shipping and seaborne commerce to and from the Orient. The city of Los Angeles has constructed an excellent artificial harbor. See pages 316-317.

Guides to Study

1. Name the principal natural resources which have been the foundation of our industrial development.

2. Show how climate affects the industries and occupations of a people. Illustrate by some examples in our own country.

3. Compare the size of the continental United States with that of the largest country in each of the five major continents and with Australia. (See Table 1 in the Appendix.)

4. Name three important products of each of the five natural regions (p. 41) of the United States. Name one or more states in each region that is important in the production of each product.

5. Why have railroads and highways followed the courses taken by the pioneers as they moved westward?

6. Name as many ways as you can in which the automobile has aided the prosperity of New England.

7. What farm and forest products of your locality are used in local manufacturing plants in any way?

8. Explain the following terms: Piedmont, Fall Line, irrigation, conservation, reforestation, Texas Panhandle, intermontane plateau.

RESEARCH FOR STUDENTS

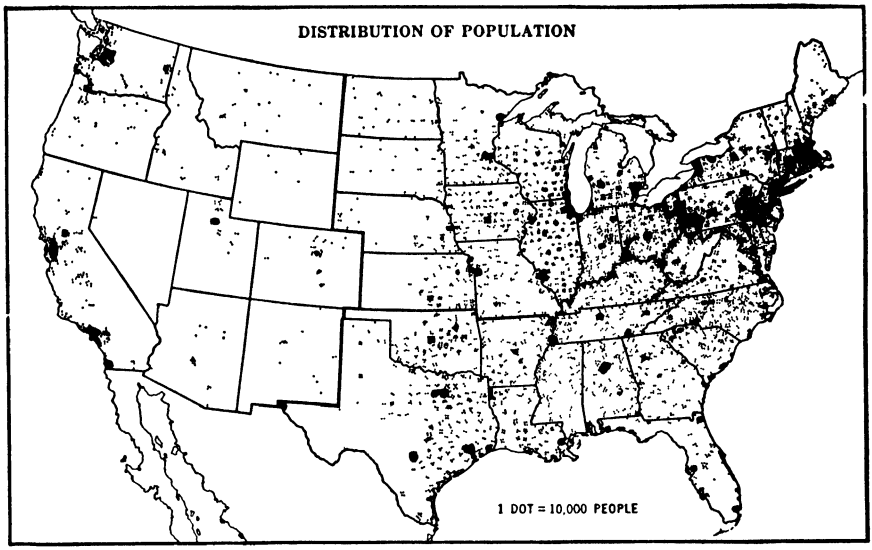
1. Make a collection of pictures showing the resources and industries of one or more of the natural regions of the United States.
2. On an outline map of the United States locate the leading resources, such as coal, iron, copper, petroleum, timber.
3. Report: The chief resources of the region in which you live.
4. Report: How the resources of a country aid in its development.
5. Debate: Coal is the most valuable resource a country can possess.

3. THE PEOPLE—THE BUILDERS OF OUR COUNTRY

People—our country's greatest resource. Rich as our country is in natural resources, these alone are not enough to account for our rapid development. Our progress has been due in large part to the devout, industrious, and thrifty people who settled here. Their ideas and ideals have been passed on from generation to generation. No people has been more deeply interested in providing opportunities for advancement. Our public-school system and our public libraries are among the best in the world.

The American people have been most ambitious, energetic, and ingenious. A larger number of patents have been secured by Americans than by any other people. More machines have been invented and used in America than in any other country. The character of our people therefore has done much to make this land of ours one of the best places in the world in which to live and work.

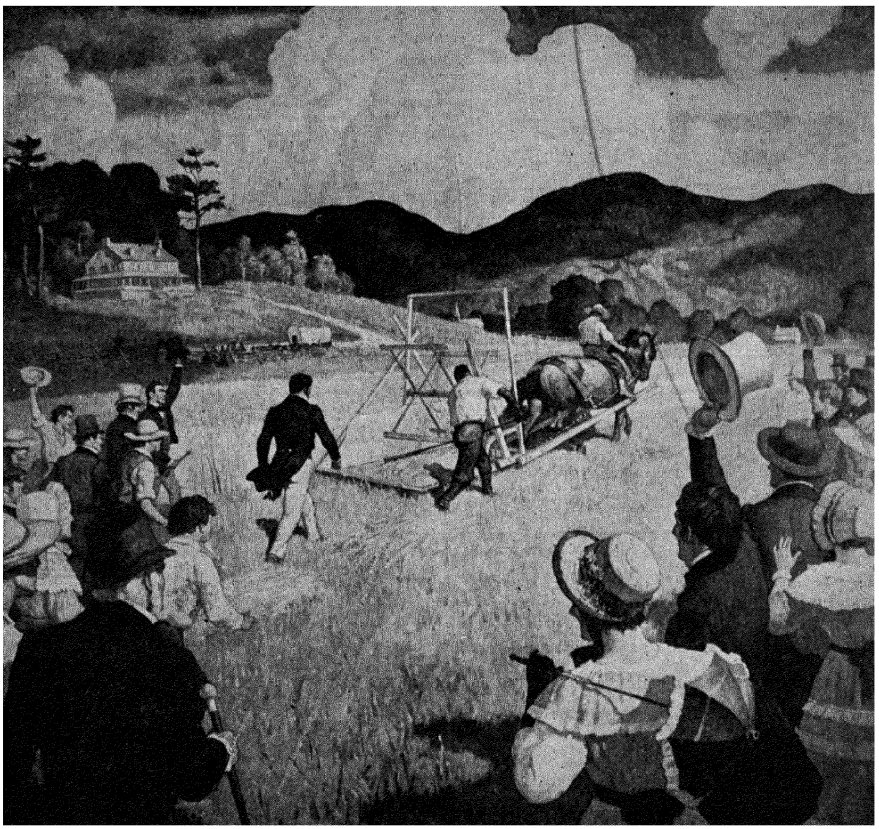
Machines on the farm. In no occupation have there been greater advances than in agriculture. Instead of turning the soil with a spade or with a horse-drawn plow, the farmer often uses a gasoline tractor with power to turn ten or twelve furrows at one time. Instead of walking over the ground and scattering seed by the handful, the farmer rides a drill which scatters seeds by the bushel and plants many acres a day. In place of the sickle, the scythe, or the cradle, the workman of today guides a giant harvester which does the work of many men. Cyrus Hall McCormick, the inventor of the reaper, is said to have done more for the cause of agriculture than any other man. With labor-saving machines our farm lands have been developed, and these give food to our people, feed for our animals, and raw materials for our mills and factories as well as products to be exported.



Irrigation and dry-farming methods have given large crops to areas where formerly little or nothing could be grown. Steamships, trucks, and railroads with refrigerating devices carry perishable products to distant markets in perfect condition. Thus today scientific methods of farming together with improved means of transportation and marketing have made possible the efficient use of our farm lands.

Hidden wealth. Even the primitive Indian could make some use of grassland and forest resources, for they really stared him in the face, but beneath the surface of the ground in many parts of the country were resources in the form of coal, iron, petroleum, and other minerals which were not known for centuries. Even if the Indians had known of their presence, they would have been unable to make use of them. From the time of the first settlers, however, to the present these vast deposits have gradually been discovered and used to build up our large manufacturing industries which have come to be the greatest in the world.

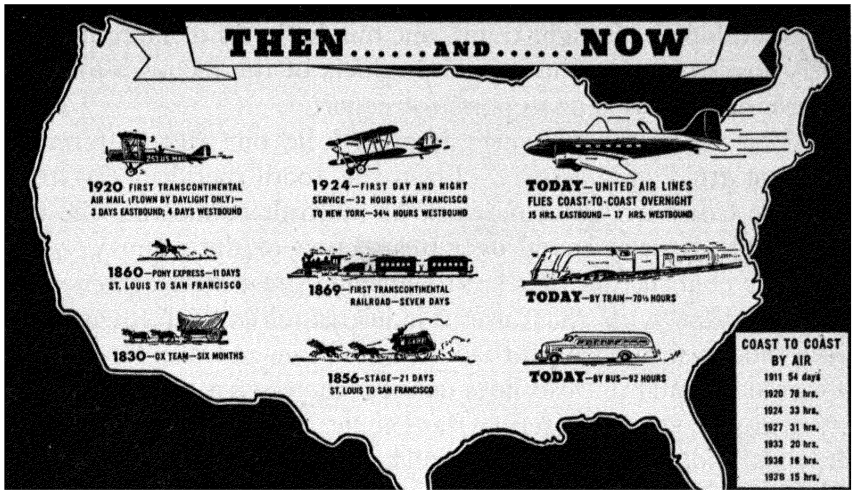
Machines replace handwork. Manufacturing as well as farming has made great progress. There is an enormous difference between the crude methods of manufacture used in the homes and small shops of early times and the automatic machines of the present, which turn out automobiles, radios, clothing, and food products at a rate so rapid as to be almost beyond belief. This progress has



Courtesy of the International Harvester Co.

The world's first reaper—invented by Cyrus Hall McCormick—in a public test at Steele's Tavern, Virginia, in July, 1831. (From a painting by N. C. Wyeth.)

been made possible by many years of painstaking research by highly skilled workers seeking constantly to find better methods of work and to build better machines. When articles are made in large quantities in a single factory, labor becomes *specialized*. Each person has a certain piece of work to do which he does all day long day after day. Of course he does it much better than the man who does many kinds of work in a small plant. In a large plant where labor is specialized and efficient, the article being made moves rapidly from one worker to another. In this way production is increased and the final cost is reduced. For these reasons small factories cannot compete with larger ones. Often they are purchased by the



Courtesy of United Air Lines

larger company which in this way becomes still larger, or the small company may be obliged to go out of business.

The day of "big business." The industries of today, therefore, are in most cases controlled by great companies, known as *corporations*. The coal mines of the whole country are worked by a relatively small number of companies. Iron and steel are produced by a few large concerns, such as the United States Steel Company and the Bethlehem Steel Company. The greater number of automobiles are manufactured by a few large corporations, such as General Motors, the Ford Motor Company, and the Chrysler Corporation. The leaders of the large corporations are often men who have worked their way up from the lowest positions. Some of them came to this country as poor immigrants and today hold high places in the country's industrial life. The large corporation is managed by a few men, known as *directors*, but the corporation has many owners who hold shares of stock and receive a part of the profits.

The world moves faster. Not only is the progress of the country shown by improvements in methods of farming and manufacturing but also in methods of transportation. Transportation has been speeded up so that now one may cross our country in hours instead of weeks or even months as in the days of the Conestoga wagon. Great railroad lines connect all parts of the country from east to west and from north to south. Without them our farm

lands, our mines, and our great industries could not possibly have been developed. Freight trains, one hundred cars or more in length, carry loads of grain, meats, and products of the factories to regions where they are used or to ports for export.

West of the Appalachian Highland lie our richest farm land and our great steel centers. From the 100th meridian east to the Atlantic Coast is a great network of railroads connecting the many cities and towns scattered over this section of the country. These railroads connect the rich farm lands and great steel centers of the Middle West with the eastern industrial cities and towns which need food, raw materials for factories, and iron and steel for machines. Transcontinental railroad lines connect the eastern half of the country with the states bordering the Pacific. The rest of the country depends upon these states for fruits, vegetables, lumber, and other products. The railroads profit greatly from tourists who enjoy the beautiful scenery of the western mountains and the delightful climate of California. We smile as we look at pictures of the locomotives and cars of the first railroads. They seem like toys when compared with our streamlined trains rushing across the country at seventy or eighty miles an hour.

The airplane excels even the fastest train in shortening space and time as it flies above the waters as well as the land carrying mail, passengers, and freight. Some of the quickest flights across the continent have made it possible for a pilot to eat breakfast in California and supper of the same day in New Jersey or New York.

News flashes. The speed with which news may be sent exceeds even the speed of train or airplane. In early days news was sent by messenger either on foot or on horseback. Now our newspapers tell us what has happened in all parts of the world in the past few hours. Even this may not be news to us because we may have learned the facts some time before by radio. It was four weeks from the time of election before Andrew Jackson knew that he had been elected President of the United States. Now the candidate for President knows of his election even before all the votes have been counted.

The telegraph, telephone, radio, the automobile, and the airplane depend upon the use of electricity. We are also indebted to electricity for electric light and power and for many household appliances. The difference between the world of a hundred years ago and that of today is very largely due to a difference in the knowl-



Photo from Wide World Photos

This is the instrument by which photographs are sent by wire. Such photographs are commonly reproduced in our newspapers a few hours after an event happening hundreds or thousands of miles away.

edge and use of electricity. American inventors, including Samuel F. B. Morse, Alexander Graham Bell, and Thomas A. Edison, have made great contributions to progress by the use to which they put electricity.

Our place in the future. These examples are but a few of the changes which make the life of today quite unlike that of a century ago and many of them unlike the life of twenty-five years ago. What changes has the future to offer? One hardly dares to guess. But you may be sure that in your lifetime there will be new inventions and great discoveries that will make life in the near future quite different from life as we know it today. Young men and women, boys and girls, now in our schools are those who will help bring these changes about, for the opportunities of today and tomorrow are just as great as those of yesterday. A little more than fifty years ago a college professor in a chemistry class in Ohio said to his class, "Fame and fortune await the man who can discover a method of separating aluminum from its ores at small cost." One young man (Charles Martin Hall) said to himself, "I am the man."

He went to work and succeeded, and his discovery made possible the many present-day uses of aluminum. Formerly the metal was as costly as silver; now we use it for common kitchen utensils.

A wider neighborhood. In olden times neighborliness was limited to people living in the same community. Even short distances made them strangers. There was little travel, and means of communicating with others were limited. Now ships, trains, airplanes, automobiles, and trailers carry people from place to place. The trailer is a moving home which makes it possible for people to live on the road—to spend their summers in the North and their winters in the South—and at the same time carry their homes along with them. We are on the move. We know people and their work in distant places because they have visited us or we have visited them.

We are in constant touch with all parts of the country and with other countries by means of the newspaper and the radio. Our interests and our sympathies are no longer limited to those whom we actually see from day to day. In former times people gladly aided others in their own communities in times of hardship but gave little attention to want and distress at a distance because of little knowledge of faraway places and lack of means of helping at a distance. Now suffering due to fire, floods, famine, earthquake, or other causes is known at once in all its details the country over or world over. Immediately money is raised even though the trouble is far away, and representatives of the Red Cross and the Government see that the money is used to help the sufferers. For instance, when floods along the Ohio, the Mississippi, or the rivers of New England drive the people from their homes, men and money are sent from all parts of the country to relieve them.

The good of all. Today, as never before, thought is given to the welfare of all. Government and business plan to care for the unemployed, to pension those too old to work, and to provide better housing, especially in the crowded parts of cities. Employees work shorter hours with greater opportunity for leisure. The working day was once ten, twelve, or even more hours. Now the most common working day is eight hours long.

Conditions of labor are constantly being improved; wages are higher; and working conditions are being made safer, more healthful, and more agreeable. Laws and the rules of labor organizations are making it easier for capital and labor to settle their differences through conferences rather than by means of strikes and lockouts.

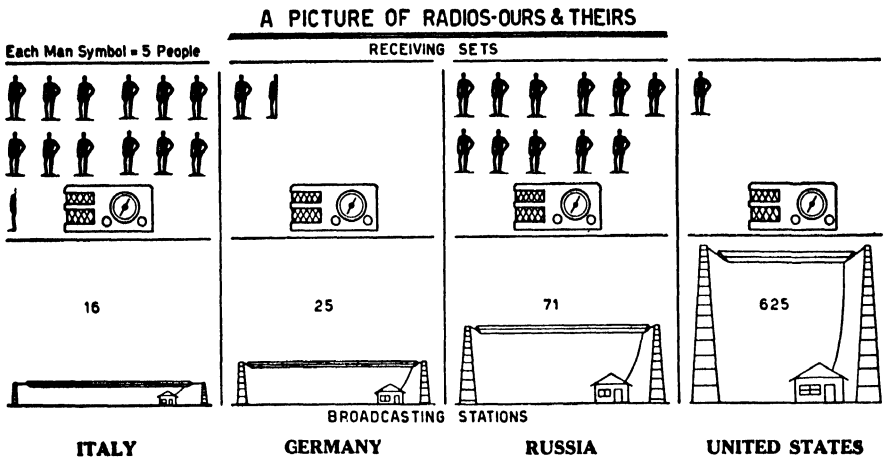


Courtesy of the American Iron and Steel Institute

Year by year the steel industry is climbing to a new safety record.

Luxuries become necessities. Perhaps more important than all other changes that have taken place in our country in the past hundred years is the change in the *standard of living*. The people as a whole are better clothed and better fed than in former years. The use of machines and improved means of transportation have brought to all homes products from all parts of the world. Many things once thought to be luxuries are now regarded as necessities. Conveniences and sources of entertainment wholly unknown fifty or seventy-five years ago are now found in almost every home.

Our country, because of the character of the people and its great resources, makes use of new inventions to a greater extent than any other country. The people of the United States own and use about three fourths of all the automobiles in the world. We have one automobile for every five people. All the people of the country could go riding at one time if they chose to do so, and sometimes it seems as if they did. We have more than half of the telephones of the world. There is in this country one telephone for every eight people. This is larger in proportion to population than in any other land. The number of radio receiving sets in the United States is nearly the same as in all other countries combined. We have one receiving set for every five inhabitants. This means a radio for practically every home. The production, distribution, and showing of motion pictures has come to be one of the greatest industries of



From "Our Country, Our People, and Theirs"

Our radio stations are privately owned and have the same freedom accorded them as is accorded to the press. Their censorship is self-imposed.

the country. The moving picture reaches all cities and nearly all the larger towns. They provide not only entertainment and enjoyment but help to spread information concerning what is going on in all parts of our own country and in the world at large. They have also come to occupy a large place as an aid to teaching many subjects in schools and colleges.

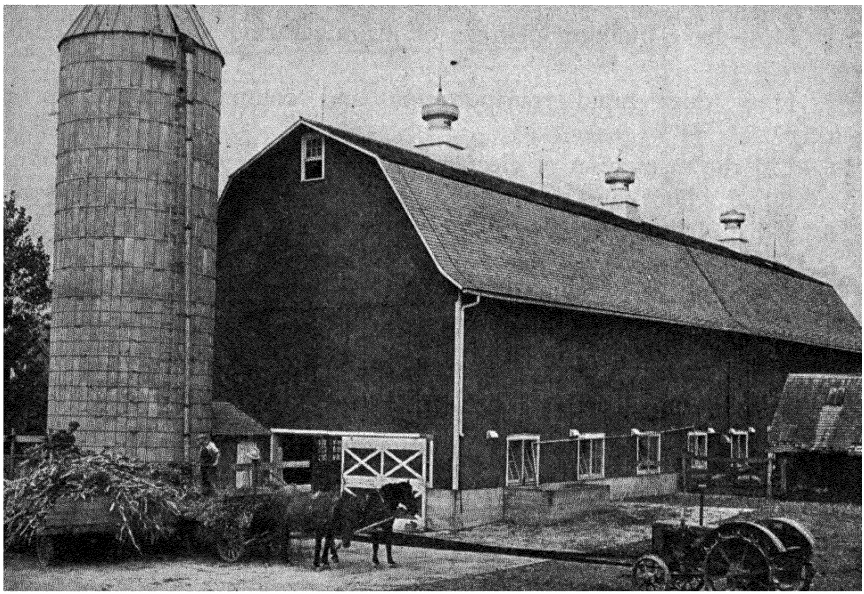
Our place in the world. Progress in our country is of course only a part of world progress. We learn much from the people of other lands, and they in turn learn from us. All advancement tends to bring nations closer together. The prosperity of one country helps others. Backward conditions which result in poverty, disease, or strife are soon felt outside the borders of a country. We in the United States are greatly concerned over a war in Ethiopia, conflicts in Spain, and the policies of Italy, Russia, Germany, or Japan. We are a part of this complex struggling world of nations and are deeply affected by what takes place in almost any part of it. We cannot escape our responsibility, no matter how much we would like to do so. Leaders of our government are almost constantly in conference with leaders of other nations as to how questions of world-wide interest are to be solved. We are citizens of the world as well as citizens of the United States.

Guides to Study

1. Why are people a country's greatest resource?
2. How does farm life of today differ from that of earlier years?
3. Show how methods of manufacture today differ from those of colonial days.
4. How have modern methods of manufacturing led to "big business"?
5. How does rapid transportation and communication help a country?
6. List the many uses of electricity.
7. Upon whom does the future progress of a country depend?
8. What is a neighborhood?
9. What has made possible our high standard of living?
10. What contributions can we make to our country's future welfare?

Research for Students

1. Make a list of resources that man must search for.
2. Collect pictures contrasting old methods and present-day methods of doing work.
3. Report: How inventions have affected the growth of our country.
4. Report: The development of transportation in the United States.



Courtesy of J. I. Case Co.

The prosperity of the whole country depends very largely upon the success of those who till the soil.

1. AGRICULTURE—WHAT MEN LIVE BY

All depend upon the farmer. Few parts of the earth where plants do not grow are inhabited. The Eskimo, it is true, lives mainly on meat and fish, dresses in skins, and builds his shelter with stones and skins, or at times of blocks of snow. In practically all other parts of the world man turns to the soil for much of his food, clothing, and shelter. For this reason not only our supplies but all our industries depend upon the farmer.

How other industries depend upon agriculture. All industries depend upon the farm in large measure. Workers in mills must have food, nearly all of which is produced upon the farm or ranch. Cotton and wool for textile mills, hides for tanneries and shoe fac-



Photo from Kaufmann-Fabry

Chicago, our second largest city, owes the beginning of its growth to the great farming areas contiguous to it. Railroad and lake transportation and the development of manufacturing industries have kept it unrivaled.

tories, grain for flour mills, and vegetables for canneries are all farm products.

Railroads gain much of their income by carrying agricultural products to market and by bringing back the many supplies needed on the farm. The farmer is one of the country's greatest buyers. Farmers need supplies of all kinds for the home just as all other workers do. In addition, they need millions of dollars' worth of automobiles, tractors, and many kinds of farm machinery.

Agriculture plays a large part in our foreign trade. For many years cotton has been our greatest export. Some of the other farm products sent to foreign lands are grain, meats, fruits of various kinds, and tobacco. The farmer is, of course, also a buyer of many imported products. By aiding industries and commerce the farm is largely responsible for the growth of many of our large agricultural and industrial cities, such as Chicago, St. Louis, Kansas City, and many others. It also adds to the prosperity of our seaports in so far as goods moving to and from the farm pass through them.

The prosperity of the country as a whole depends to a great

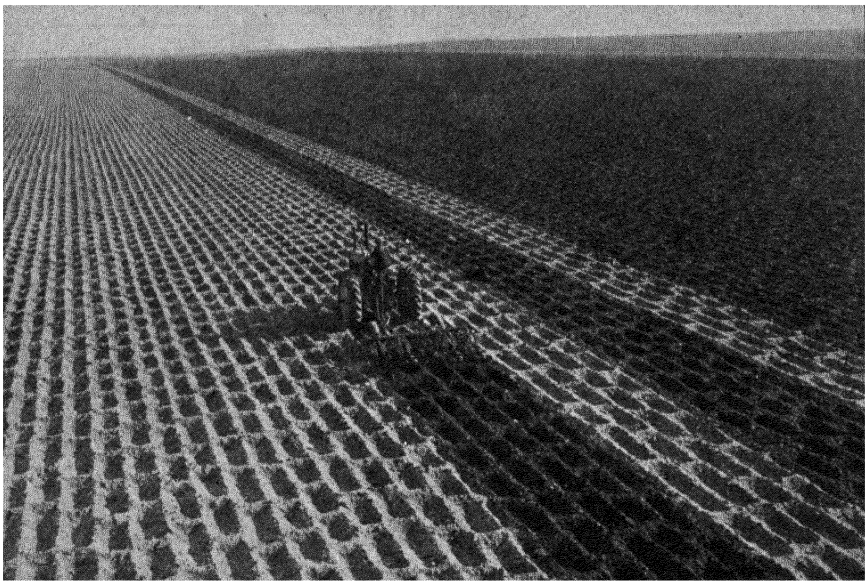
extent upon the success of the farmer. If crops are large, there is abundant food, raw materials for mills and factories, and work for the railroads. If the farmer can sell his crops at a profit, he has money with which to buy and thus help to keep many other industries busy and prosperous. The part which the farmer plays in the welfare of all is best shown in an agricultural region where only a single crop, such as wheat, is grown. In such a locality all the money received comes from the wheat sold. The grocer, the druggist, the banker, and the proprietor of the moving-picture theater are all interested in the weather and the price of wheat. If the wheat crop is good and if the grain sells at a fair price, then all prosper.

The large banks make available to their depositors each month reports showing business conditions the country over. One of the most important items in the report tells the size of the major crops and the prices the farmer is receiving for them. The bankers know that the prosperity of the farmer is a strong indication of what the prosperity of all industries will be in the near future.

When does farming pay? The farmer is not always successful. He can succeed best in places where the soil is rich, where the land is level or nearly so, and where there is a good market for his products. Of course, much depends on the farmer himself. He must know the kinds of soil on his farm and how it must be cultivated and fertilized. He must know market conditions and what crops will bring him best returns. He should keep in touch with Departments of Government which distribute bulletins and are ready to help the farmer solve his problems as they arise.

Good soil for farming. Good soil is usually fine soil, rich in mineral matter which the roots of the plants can absorb. Some of the best soil is found on the flood plains of rivers. The overflow of a river in past centuries has brought fine soil from many sources and deposited it on the valley floor. Such flood plains have attracted people from earliest times, and upon them early civilizations developed as on the flood plains of the Nile, the Tigris, and the Euphrates and on the plains of the rivers of China. The level surface of plains makes farm work much easier than it is upon steep slopes. Rich soil and level surface have made the Central Plains of the United States one of the best farming regions of the world.

Different climates; different crops. No other occupation depends so much on the weather and on climate as farming. Some crops, such as wheat, do well in temperate climates where the grow-



Courtesy of Goodyear Tire and Rubber Co.

The depressions created by this new machine collect the snow and rain, preventing erosion and loss of soil by run-off.

ing season is short. Others like cotton must have a longer summer. Sugar cane does best where it grows the year round with all months free from frost. Rainfall as well as heat is very necessary for plant growth. Rice requires a great deal of water and even in rainy regions irrigation is necessary to keep the land flooded for a part of the growing season. A single inch of rain in July on the Corn Belt is estimated to be worth $400,000,000 to the farmers.

If the rainfall is very light, certain plants, such as alfalfa and kaffir, which do well even with a small supply of moisture, are suitable for growing; but if there is little or no rain, then the land may be irrigated if there are streams at hand from which water can be diverted.

In semiarid regions the earth is kept well stirred so that there will be as little loss from evaporation as possible. Often a crop is planted only once in two or three years since the rainfall of one year is not enough to grow a crop. This method of conserving the moisture and growing crops is called *dry farming*.

Guides to Study

1. What articles in your home besides food came either directly or indirectly from the farm?
2. What great industries depend upon the farmer in part for their prosperity?
3. How does the size of a crop in one country affect prices in another country? Why?
4. How does a great port like New York depend upon farms for a part of its business?
5. What manufacturers look to the farmer as a buyer of a part of their output?
6. If you were to buy a farm, what conditions would you look for?

Research for Students

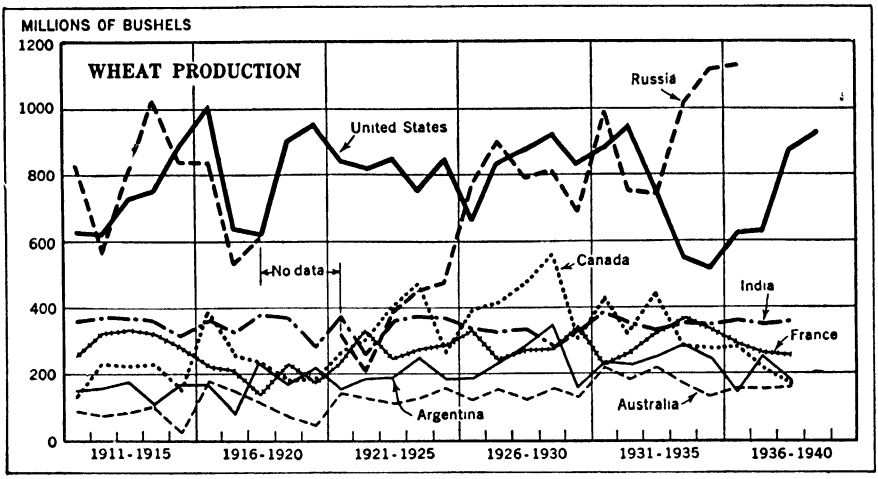
1. On a map of the United States locate at least ten cities which owe their growth in large part to the products of farms or ranches. State the products related to each city.
2. Why are mail-order houses particularly helpful to farmers? What can they order by mail?
3. Learn the conditions of temperature and rainfall best adapted to the growth of each of the following crops: wheat, corn, cotton, sugar cane, rice, oranges.
4. What is dry farming? Where is it practiced? How does it differ from irrigation?
5. Topic for debate: Manufacturing is a more important industry than farming.

2. OUR DAILY BREAD

Wheat—the Staff of Life

A grain as old as civilization. No one knows how long man has grown wheat and used it as food. Grains of wheat have been found in prehistoric tombs, and the oldest records speak of the grain. All the plants which give man much of his food and clothing once grew wild or were developed from wild plants. Wheat was no doubt simply a wild grass which man has so cultivated and improved that it would produce seeds more abundantly and of much better quality.

Wheat is widely used. No other flour is so popular as wheat flour. Wheat has no equal for making bread because of the sticky



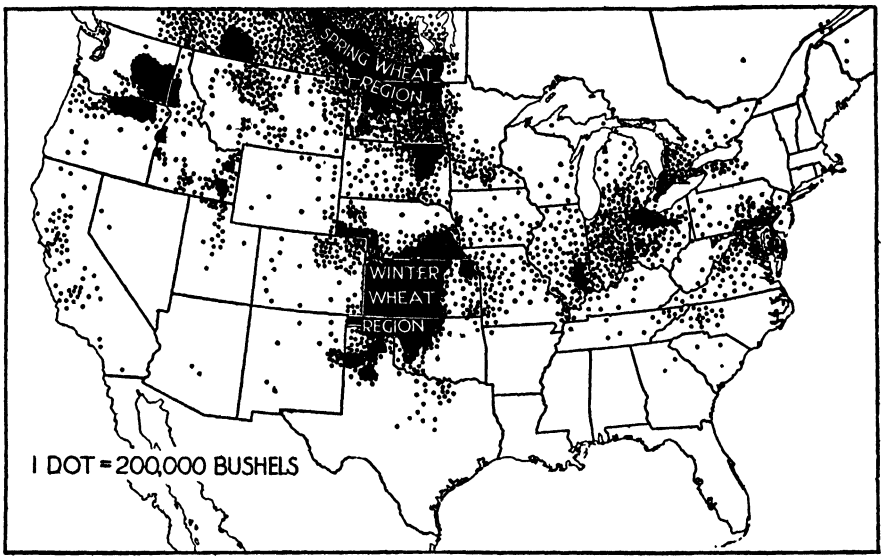
gluten which it contains. The gluten forms a dough which is expanded by yeast or baking powder to make a light fluffy loaf. Wheat flour is also used in making cakes, pastry, breakfast foods, and macaroni.

To meet the world-wide demand wheat is grown in every continent and is exported from one or more of the countries of each continent. It is one of the world's greatest articles of commerce.

Wheat areas the country over. On our Interior Plains is the largest wheat area of the country. It extends from Ohio on the east to Kansas and Nebraska on the west and from Minnesota and North Dakota on the north to Texas on the south. Here the land is level or gently rolling. The rainfall which is not too heavy comes mostly in the growing season. Precipitation is light in late summer and autumn when the ripe grain would be injured by wet weather. The soil of the plains is rich in humus formed by the decay of grasses, which grew on the plains for centuries before the days of the white man and the plow. The rich soil has made it possible to grow crop after crop of wheat without the use of fertilizers.

This wheat-growing area extends northward into Canada which is one of the leading wheat-producing countries of the world. Some of the largest wheat farms of our own country are in the Columbia River basin of Washington and Oregon. The Great Valley of central California also produces millions of bushels of wheat.

Spring and winter wheats. In the southern part of the Central Plains wheat is commonly planted in the fall and harvested the next



summer. The grain grows to the height of a few inches in the fall, lies dormant through the winter, and continues its growth very early in the spring. It has the advantage of the moisture from fall and spring rains and the melting snows of spring. It also escapes the intense heat of summer for a large part of the growing season. Such wheat is known as *winter wheat.*

Farther north in Minnesota and the Dakotas and in the adjoining regions of Canada wheat is planted in the spring and harvested in the autumn. Here the winters are too cold for the wheat to live through this season as it does farther south. This so-called *spring wheat* and the grain of the more arid portions of the winter-wheat areas are *hard* wheats. The grain of the eastern portion of the winter areas where the rainfall is heavier is *soft wheat.* The hard wheats are especially valuable for breadmaking while the soft wheats are useful for making pastries and for mixing with hard wheats for making flour of intermediate grade for various uses.

Durum wheats have been introduced from other countries because of their ability to thrive where the rainfall is very light. Durum wheat is rich in gluten and is especially useful in making macaroni.

Search is constantly being made for seeds which will give grains of better quality and larger yields. New varieties of wheat have made it possible to grow wheat farther and farther north where the summers are short and farther west where the rainfall is lighter.



Courtesy of J. I. Case Co.

A modern combine cutting and threshing wheat near Plaza, Washington. By nightfall grain from thirty-five acres will be cut, threshed, and in the bags.

How wheat is raised. With the use of machinery one man can cultivate hundreds of acres of land. In the spring-wheat region as soon as the frost is out of the ground, the land is plowed by gang plows drawn by large tractors. The grain is planted by machines, called *drills*, in rows six or seven inches apart instead of being scattered by hand as in our forefathers' time. As growth takes place, the ground is covered by a carpet of plants which change from green to golden yellow as the grain ripens. No other work is necessary until harvest. Wheat is harvested by large machines, known as *binders*, which cut the grain and tie it into bundles; or, if it is thoroughly dried, the combined harvester and thresher is used. This machine, known as a *combine*, not only cuts the wheat but threshes it; that is, it separates the grain from the husks and straw and puts the grain in sacks ready for transportation.

The harvest season in the winter-wheat region starts in late May or June in Texas, comes later and later in states farther north, and finally ends in the spring-wheat fields of the Dakotas and in Canada in August or September.

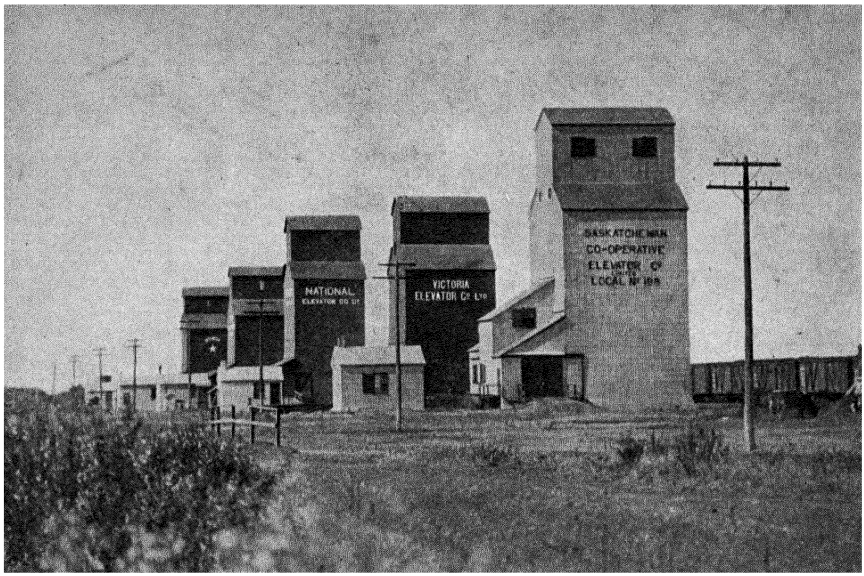


Photo by James Sawders

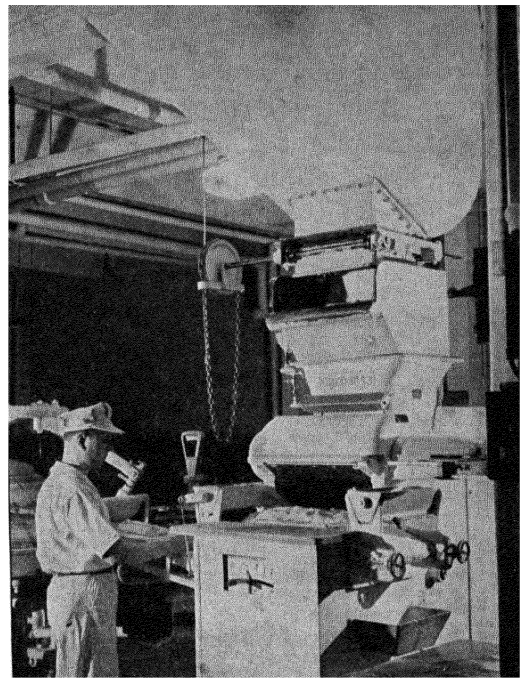
Enormous grain elevators like these near Calgary collect Canada's wheat crop from the prairie provinces before it starts its journey to the mills of the Dominion, the United States, and foreign lands.

From farm to market. Wheat keeps well even from season to season and can be transported to the most distant markets without loss or damage. The farmer takes his threshed grain to the nearest railroad station where it is loaded on cars or placed in storehouses, known as *elevators.*

From the country stations the wheat goes to the milling cities or to the great distributing centers. From the spring-wheat regions of the United States and Canada wheat moves across the Great Lakes and to the shipping ports either by way of the St. Lawrence River to Montreal or through Buffalo to the Atlantic ports of the United States. About one quarter of Canada's exports of wheat is shipped from ports of the United States. This is due principally to the fact that these ports are open all the year while Montreal's port is closed by ice for three or four months.

Wheat from the Pacific ports is shipped to the Orient or through the Panama Canal to Caribbean countries and to the ports of Europe. Exports from any part of the country may be in the form of wheat or flour. Wheat goes to wheat-raising countries of Europe which

have their own flour mills while flour is more likely to be exported to tropical lands which have few if any mills of their own.



Courtesy of the Sherwin-Williams Co.

Giant machines take the labor out of bread-making—the dough drops out of the huge hopper into the cutter below and comes out loaf size ready for baking.

Between the millstones. In the early days of our country each community raised its own grain and ground its own meal and flour. The miller was paid by receiving *toll* of each farmer's flour. The grinding was done by two large stones one above the other turned by water power. Many cities and towns of today owe their locations to water-power sites used long ago for grinding grain and sawing lumber.

The old-fashioned millstones proved unsatisfactory in grinding hard spring and winter wheats. But new methods of milling were devised which make of the hard wheats the very best flour. Thus came the development of the Northwest into our most important wheat- and flour-producing region.

Flour-milling centers. Minneapolis was formerly our own and the world's great milling center. This importance was due principally to the fact that it is in the center of a great wheat-producing area and has good transportation and water-power facilities, being served by the Falls of St. Anthony by which large amounts of power are developed. Buffalo is now the leading flour-milling city. It is well located for both milling and marketing. Wheat raised on the Columbia Plateau goes by rail to Seattle or Portland. Here it is manufactured into flour for the local market. Both wheat and

flour are exported in large quantities to the Orient, Japan being the most important market.

Problems confronting the American wheat farmer. On the majority of the large wheat farms in our country wheat is the cash crop. After planting, there is danger that drought may destroy the crop or that too much rain may cause rust. Severe open winters are hard on the winter-wheat crop. Insects, particularly grasshoppers, are serious pests. The farmer is especially concerned with market conditions. A fair price brings profit and prosperity. A low price on the other hand may bring discouragement and hardship to the whole wheat-growing area. Conditions in the other wheat-producing countries affect prices in this country. When the total world crop is large, the price of wheat declines. This has led to the efforts of our government and the governments of other wheat-producing nations to reduce the area under cultivation and to limit the amount exported. International conferences have been held to discuss the problem, but as yet little has been accomplished.

Wheat the world over. While our country is a great producer of wheat, it is no longer the leading nation. For a number of years Russia has led all other countries. The countries of Europe combined produce about four times as much wheat as the United States. Next to Russia the chief producing countries of Europe are France, Italy, and Germany. Other important wheat-producing countries are India, Canada, Argentina, Australia, and China.

World trade in wheat. A country may raise a great many bushels of wheat and yet have little to sell because it is needed for its own large population. The greatest exporters of wheat are Canada, Argentina, and Australia, not because they are the largest producers but because their home needs are not great.

Great Britain imports more than one half as much as all other countries combined. The other wheat-importing countries are mainly those of Western Europe where the occupations are chiefly industrial and the population is dense. Countries outside Europe that import considerable quantities are Brazil and Japan.

Maize, or Indian Corn

America's gift. For centuries before the white man came to our shores, the Indians were raising corn and storing it in the ground to tide them over between crops. Several times the Virginia Colony



Courtesy of J. I. Case Co.

Corn, or maize, is America's gift to the world. It is now grown on every continent as food for man and feed for animals.

was saved from starvation because the friendly Indians were willing to share their supply with the colonists. The newcomers who had to live by their wits in this new and untried land quickly saw the value of this new grain as a food supply. They immediately set about clearing the land and planting in Indian fashion their few hills of corn around the burned stumps. Usually a dead fish was buried in each hill for fertilizer. These early crops were small, but they foreshadowed a mighty industry. Corn was the ideal grain for a pioneer civilization. The eager colonist saw that it grew quickly, gave a large return, had excellent keeping qualities, and was a valuable food for both man and beast. Another of its most important qualities was the ease with which it could be converted into mush and quick breads, the *hasty pudding* and *johnnycakes* of our grandfathers. To this day Harvard University students consider it a great honor to be elected to membership in "The Hasty Pudding Club," a club which had its origin in the far-off days when hasty pudding was an important item in the bill of fare.

Bumper crops of corn. Today our corn crop is often three or four times the size of our wheat crop and more than twice as valu-

able. In spite of the excess of our corn crop over our wheat crop the majority of our families eat much more wheat than corn. As a breakfast cereal corn holds its own with wheat, but as an ingredient of bread it takes second place because it cannot be made into so desirable a commercial loaf.

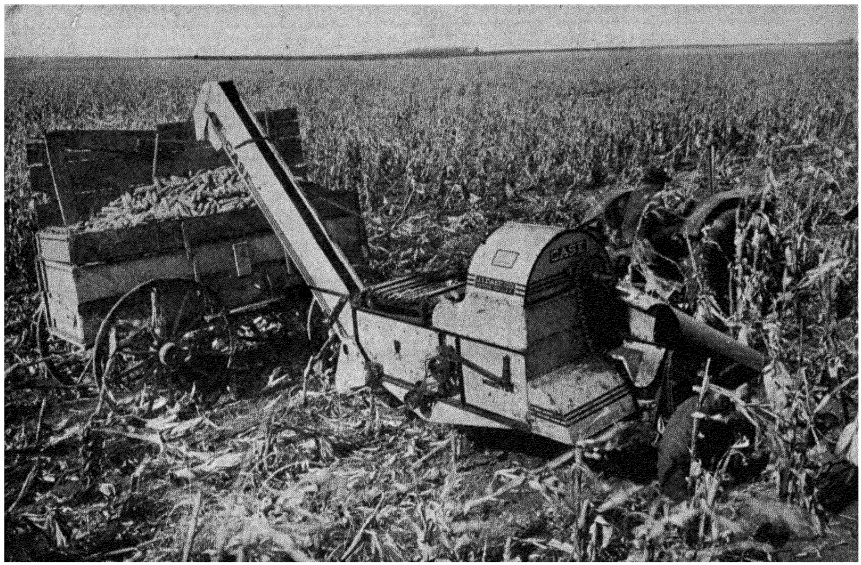
Although we may have less corn than wheat cereal or bread on our tables, nevertheless corn is there but it is disguised as roast beef, pork, lamb, chicken, and turkey and as butter, cheese, milk, and eggs. About four fifths of our corn crop is fed to the animals on our farms. They, in turn, supply us with nearly all our meat, much of our leather, and as work animals help produce many of our vegetables.

Field corn—our great crop. By careful selection of seeds through the years several types of corn have been obtained. Field corn, sweet corn, and popcorn are the three chief varieties. Field corn, which is raised chiefly for animal food, constitutes about ninety percent of our entire corn crop. Sweet corn is the corn that is used as a vegetable upon our tables, and it is the variety of corn that is canned.

The Corn Belt. Although corn can be grown in every state in the Union, the region best adapted to its growth is practically the same as the winter-wheat region. The three states that lead in its production and partially constitute the Corn Belt are Iowa, Illinois, and Nebraska. The Corn Belt is the most famous corn-growing area in the world. The land is level, and the soil is deep and fertile; summer rains give sufficient moisture; and the growing season is free from frost and long enough to ripen the varieties that produce the most abundant crops. In the cotton-growing states corn is also an important crop. See map on page 37.

The Corn Belt farmer keeps busy. Most of the farmers in the Corn Belt raise oats and hay and often winter wheat in addition to corn. Oats may be planted earlier than corn; it, with hay, furnishes food for the farm animals. Soon after the corn is planted, hay is ready for cutting. Corn then needs cultivation, and after this the oat crop is ready for harvesting. This keeps laborers employed continuously throughout the summer months until the corn crop is ready for harvesting.

Fodder corn. In all the corn-growing states much corn is raised for fodder. While yet green, the corn is cut and fed to cattle on the small farms. On the larger farms the stalks with the ears



Courtesy of J. I. Case Co.

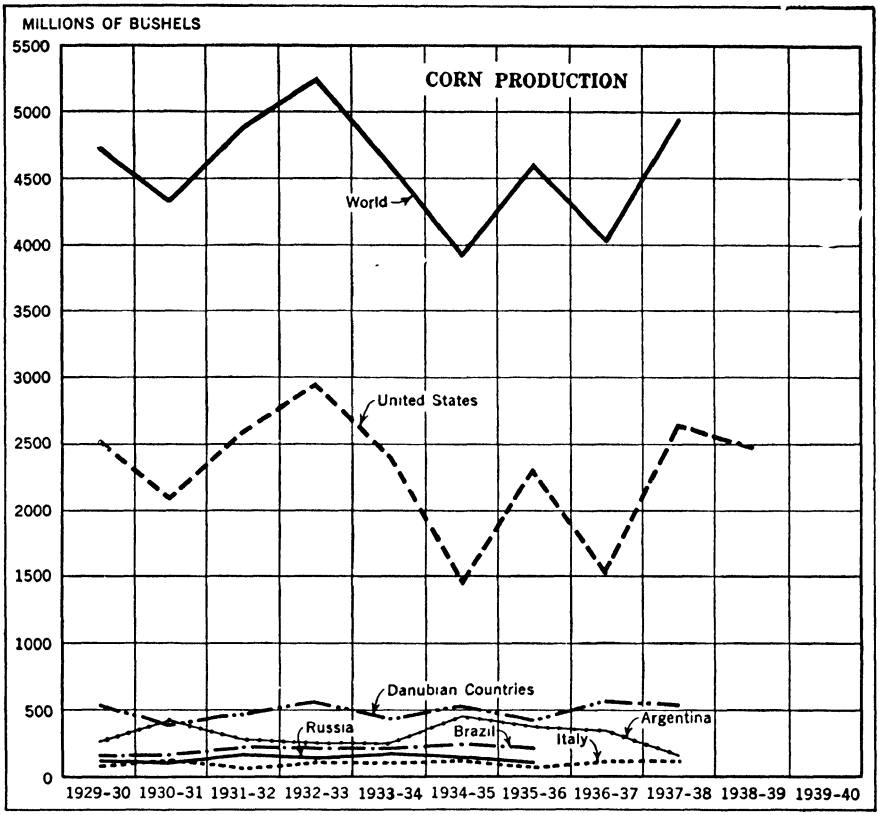
A modern corn picker on a farm near Ellsworth, Minnesota. Such a machine will gather twelve to fifteen hundred bushels in a day.

are cut into small pieces and stored in tanklike structures, called *silos*. Such fodder—called *silage*—undergoes a slight chemical change in the silo and makes excellent winter food for dairy cows and cattle that are being fattened for the market.

Corn products. After the field corn is harvested, husked, and shelled, much of it is crushed to make cracked corn and ground to make corn meal. Both have great food value for men and farm animals. Many forms of breakfast food are made in part from corn. Other products of corn used in the home are cornstarch and corn oil which is used as a salad oil and in making soap. Glucose made from cornstarch is used as a sirup for table purposes and in the manufacture of hard candies.

No doubt many other uses will be found for parts of the corn plant. Already from the stalks fiber board is being made; from the grain itself motor fuel is obtained. As new uses are found for corn, the farmers' market for this valuable crop is enlarged.

Corn in world trade. Although corn is our most valuable crop, it plays but a small part in our foreign trade. Of course, much of it does go abroad in the form of pork, lard, and other animal prod-



ucts. Not more than two percent actually leaves the country as corn. We say that our corn goes to market "on the hoof."

Within the country itself corn is shipped from producing regions to other sections as feed for farm animals. But even at home the trade in the products of farm animals fed upon corn is much greater than the trade in corn. People in all parts of the country, regardless of their occupations, are benefited by the corn crop. To the consumer a bountiful crop means abundant and cheaper food. It means better business for the railroads, for the manufacturer of farm machinery, and for the banker. It would be hard to name a business which is not in some way benefited.

Corn in other lands. Our country usually produces about one half of the world's corn crop. Other leading countries are Argentina, Brazil, Russia, and Rumania. Although Argentina's crop is often not more than one eighth as much as ours, it supplies about two thirds of the world's exported corn. The countries of Western

Europe with dense population and stall-fed cattle are the largest importers of corn. The United Kingdom leads, followed by the Netherlands, Germany, Belgium, and France.

Rice—the Food of Millions

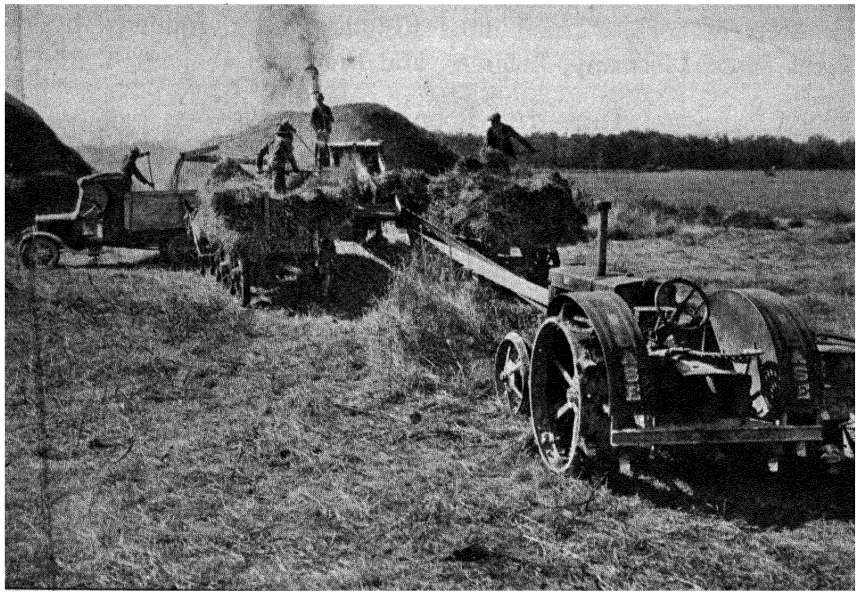
Where rice thrives. Rice is one of the world's largest grain crops and serves as the food of a larger number of people than any other grain. Rice thrives best in regions having warm, moist summers; therefore, the greatest-producing regions are in the monsoon regions of India, southeastern Asia, and the East Indies. Rice is to Asia and tropical regions in general what wheat is to America and other temperate countries.

Food for millions. More than a third of the people of the world have rice as their most important article of food. The monsoon countries could not support their dense populations without some such crop as rice. It grows best in lands where wheat cannot be raised, and the yield per acre is large. Moreover, centuries of experience have taught the people of the monsoon countries how to use their lands to the best advantage.

Raising the crop. If the people of monsoon countries were not willing to bend their backs to the breaking point, they would certainly go hungry because practically all the work of the rice fields is done by hand. The land must be leveled off and divided into plots by ridges which allow the fields to be flooded to a depth of several inches. After the field is flooded, the muddy soil is either stirred by hand or plowed with a crude implement drawn by a water buffalo. (*I. 627*)

Then comes the most trying task of all. Small rice plants which have been growing close together in a nursery are carefully planted one by one in the sloppy mud by men, women, and children. It would be much the same as if we planted our great wheat fields one plant at a time. If that were necessary, there would be much less unemployment in our country than exists today. As the plants grow, the water must be changed from time to time, and the fields must be kept free from weeds.

As the plants mature, they turn from green to bright yellow. The water is then drawn off the fields in preparation for harvest. Even then the tired backs have no respite. The grain is cut by hand with sickles, bound in small bundles, and allowed to dry. The seeds are separated from the stalks either by hand or by driving



Courtesy of J. I. Case Co.

Threshing rice near Stuttgart, Arkansas. The same machine threshes both wheat and rice.

animals over a threshing floor to tread out the grain. The hulls must then be removed, and, if the rice is to be exported, it is usually polished. Polishing makes rice more attractive in appearance, but it removes some of its most valuable food properties.

Chief producing countries. China probably raises more rice than any other country, but there are no census reports in China to give us exact figures. Other countries which produce very large quantities are India, Japan, the East Indies, Siam, and the Philippine Islands.

Rice growing in the United States. Rice growing began in this country about 250 years ago when a ship captain made the governor of South Carolina a present of a small quantity of rice. For many years that state and Georgia had the only important rice-growing areas in America. Today the leading rice fields of the United States are in the Texas-Louisiana region bordering the Gulf of Mexico, eastern Arkansas, and the delta lands of the Sacramento Valley in California.

Our success in raising rice is due to the farmers from the wheat-lands of the North who applied wheat-raising methods to rice cul-

ture. Rice is now planted in our producing areas by machines and is also harvested and threshed by machines. By this method men receiving good wages can raise rice at a lower cost than the East Indian, the Chinese, or the Japanese workers who receive wages of only a few cents per day. We are thus able to raise all the rice that we need ourselves and to ship millions of pounds to countries of Western Europe, Central and South America, Canada, and Cuba.

Rice in world trade. Rice does not enter largely into world trade. The great producers of rice are also great consumers. Only a few countries have a surplus for export. Among these are British India, French Indo-China, and Siam. The greatest buyers of rice are China, British Malaya, Ceylon, and France. The countries of temperate lands as a rule import comparatively small quantities of rice since their food consists more largely of other grains.

Other Grains

Oats are raised mainly as food for horses. Oatmeal or rolled oats is a well-known breakfast food, but only a small part of the crop is used for this purpose. Oats thrive in a cool temperature climate. In the United States they are grown chiefly in our northern states. Iowa, Illinois, Minnesota, South Dakota, Ohio, and Wisconsin lead all other states in production.

Barley is a quick-growing grain and is, therefore, a particularly desirable crop in regions where the growing season is short and the summers cool. In the home barley is used largely in making soups and broths. Large quantities are used by brewers in the manufacture of alcoholic beverages. Minnesota, North Dakota, South Dakota, California, and Wisconsin are our leading barley-producing states.

Rye is raised to a much greater extent in European countries than in the United States. It grows well even in poor sandy soil. Bread made from rye is not so tasty as that made from wheat. The so-called "black bread" of Europe is made from rye. In our country the largest production of rye is in North Dakota, Minnesota, Nebraska, South Dakota, and Wisconsin.

Guides to Study

1. Why is wheat so widely grown?
2. What conditions of surface, soil, and climate favor the raising of wheat?

3. Why is wheat in the winter-wheat region planted in the fall?

4. How does the time of harvest season differ in different parts of the Wheat Belt? Why?

5. Why have the Government and the farmer sought new varieties of wheat?

6. Describe the methods of raising, transporting, milling, and marketing wheat.

7. Why are the countries that produce the largest crops not the greatest exporters?

8. How would a city dweller suffer from a failure of the corn crop?

9. Why is our Corn Belt the leading corn-growing region of the world?

10. What are the many uses made of corn?

11. Why does corn play so small a part in world trade?

Research for Students

1. On an outline map of the United States indicate the areas producing: (*a*) spring wheat, (*b*) winter wheat. Locate and print the names of the chief flour-milling cities; the chief ports exporting wheat.

2. Make collections of pictures showing: (*a*) methods of wheat farming; (*b*) transportation and milling of wheat.

3. Make a list and if possible a collection of the by-products of wheat and corn.

4. Write papers on the following topics: (*a*) the wheat farmer's problems; (*b*) how the Government helps the producer of wheat and corn.

5. Make bar graphs similar to that on page 235 showing: (*a*) the relative importance of wheat-growing countries; (*b*) the relative importance of corn-growing countries. (Use the production tables in the Appendix.)

6. Find out the number of pounds in a bushel of each of the grains mentioned in this section.

3. VEGETABLES AND FRUITS

Products of Gardens, Truck Farms, and Orchards

Vegetables as foods. While we can live without fruits and vegetables, we cannot keep our bodies in good health without them. The digestive system needs the bulk which vegetables supply; and both vegetables and fruits contain valuable mineral elements and vitamins. Minerals are necessary for the building of various kinds of body



Photo by James Sawders

Bananas from the West Indies being transferred from the hold of the ship by an escalator to a waiting freight train at New Orleans

tissues. Vitamins are certain properties of foods which promote bodily growth and aid in the prevention of disease. New vitamins are constantly being discovered; and fruits and vegetables are rich in these health-giving factors. In addition to these values, vegetables and fruits give a pleasing variety in our diet.

In the days of the sailing ship, when voyages were long and the crew's *mess* was limited to salted foods and crackers, sailors were commonly afflicted with a disease known as *scurvy*. It was found that this disease was due to a lack of vegetables and fruits in the diet. Laws were then passed by various countries requiring shipowners to provide fruits and vegetables as a part of the sailors' bill of fare. British sailors are called *limejuicers* because British law requires that all sailors be given a regular allowance of lime or lemon juice.

The world's gardens at our doors. Since people in all parts of the country are so anxious to have vegetables and fruits on their tables the year round, a great marketing industry has grown up to supply these needs. Formerly it was very hard to get green vegetables and fresh fruits in the cold winter months. Now, however, cold storage and rapid transportation make it possible for us to have

the fresh products of the farm and orchard at all seasons. Our Northern States get fruits and vegetables in the winter not only from our own Southern States, but from Mexico and the West Indies as well. In early summer the Northern States supply their own needs and even ship products to Canada. In the latter part of the summer, when our crops are all harvested, we get our late vegetables from the farms of southern Canada. There is, of course, also a constant exchange between different sections of the country of products which grow only in particular regions. Many areas in our country famed for their orchards and gardens would not find it profitable to carry on these industries if it were not for modern methods of transportation and preservation of foods.

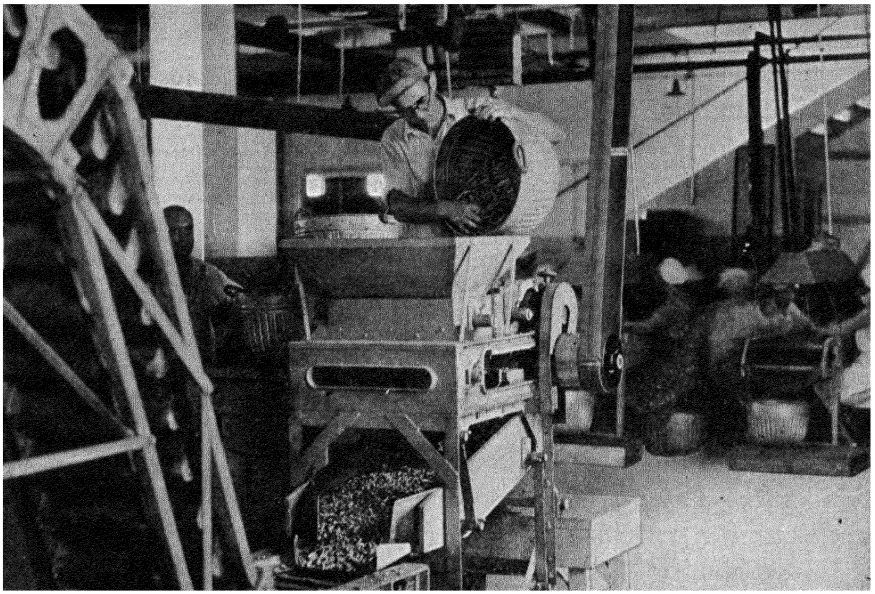
Market gardens and truck farms. To keep our markets supplied with fresh vegetables, two types of occupations have been developed, *market gardening* and *truck farming*. The truck farm is larger than the market garden and usually sends its products to more distant markets.

Market gardens are found near all our large cities, which they supply with large quantities of vegetables of all kinds. These market gardens are cultivated intensively. Exactly the right kind of fertilizer is used, the crop is planted as early as possible, the soil is kept free from weeds, and insects and plant diseases are controlled by spraying. Harvesting is done carefully, and the produce is rushed to the market, where it brings a good price because of its earliness, its freshness, and its high quality. Market gardeners try to use their valuable land in such a way that they can secure two crops from the same area each year. This is done by planting a quick-growing crop like spinach, harvesting it promptly, and following it with something like late beans.

Often the market garden has a hothouse where plants are raised for early transplanting in the open fields. Such products as cucumbers and tomatoes are sometimes raised and ripened entirely under glass. The operation of a hothouse is expensive, but, when it is close to a large city market, the saving in transportation cost makes it profitable. Hothouse products command a much higher price than those raised in the open.

On the truck farm the same intensive methods are used, and the same effort is made to get crops early so as to secure good prices.

Getting crops to market. Before the days of rapid transportation and cold storage, potatoes, cabbages, and root crops were stored



Courtesy of Sherwin-Williams Co.

String beans, one of our favorite canned vegetables, starting their journey through a cannery

in underground vegetable cellars where they kept in excellent condition. This method is still used in country districts far from railroads. But in the cities and towns the demand now is for fresh vegetables the year round. Fresh beets, carrots, and cabbages are sought by the customers even in winter and early spring. If they cannot be supplied by local growers, they are brought by fast trains or trucks from distant states and sold for very reasonable prices.

The motor truck has been a great timesaver for the farmer. Instead of driving his horses all night in order to get to market in the early morning, he now covers great distances in a very short time. Rapid transportation has thus greatly extended the market-gardening areas. Fast freight trains have also greatly benefited truck farmers. They transport the products of California, Texas, Georgia, Florida, and other distant states to the cities of northern United States and even to Canada.

Canning centers. Canning is also an important factor in giving us fruits and vegetables throughout the year. Canneries use enormous quantities of the surplus products of farms and orchards. In many places this industry has become so important that large farms

are operated entirely to supply the canneries located near by. To provide the quantity and maintain the quality of certain brands of vegetables and fruits the cannery owners tell the farmers exactly the kind and the amount of crops to raise.

The leading states for vegetable canning are California, Maryland, Wisconsin, and New York. California puts up nearly all the canned asparagus of the country. Illinois leads in corn canning; Maryland produces about one third of our canned tomatoes; and Wisconsin provides about one third of our canned peas.

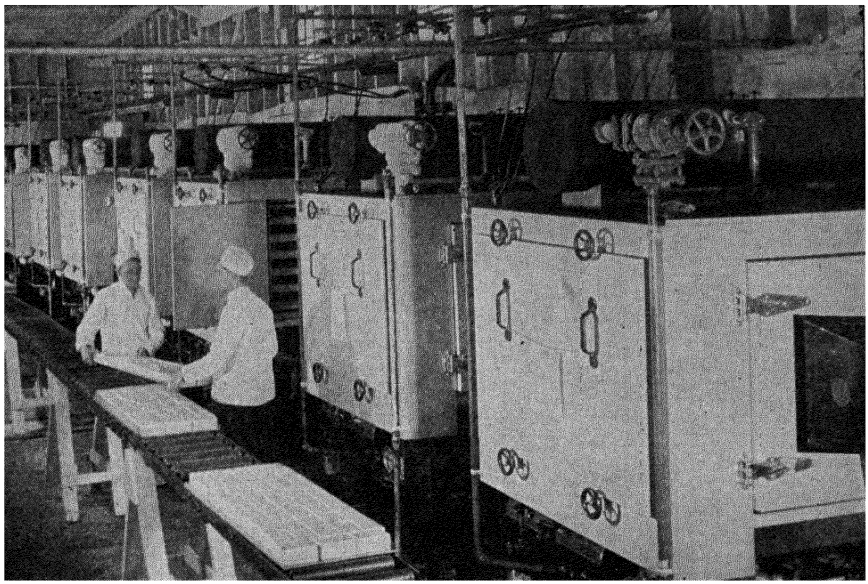
The Chesapeake Bay region of Maryland and Delaware has many advantages as a canning center. The many inlets of the bay keep the temperature mild through a long growing season. They also give excellent water routes to carry the farm products to the canneries. Finally, the region is close to the great centers of population of the Eastern States; so canned goods can be marketed at small cost for transportation.

How canning helps. Canned goods help the consumer because they are usually cheaper than fresh vegetables, especially in off seasons, that is, when fresh fruits and vegetables either are out of the market or are very high in price. Canned products go to markets which fresh produce cannot reach, such as country stores far from the railroad. They are very convenient for use on camping trips, on cruises, and for exploring expeditions, and they are easy to pack for export.

Canning also helps the farmer by giving him an outlet for his surplus crops which he might have to sell at a loss or throw away when the market is oversupplied. Truck farmers especially benefit from this fact, for they can often sell to canneries at a better price than they could get in the open market.

Food preserved in other ways. Vegetables, fruits, and meats are now frozen while fresh and preserved in the frozen state in perfect condition until they reach the consumer. Like canned foods they may be eaten in any place at any time if it has been possible to keep them frozen. In this way we may have in midwinter corn on the cob, green peas, berries, indeed almost any kind of food which was once limited to certain times of the year. Fruits, vegetables, and other foods are also preserved by drying (pp. 99-100).

The potato—our leading crop. If you were asked to name the most valuable vegetable crop in the United States, would you think of the potato first? It is a fact that the value of the potatoes raised



Courtesy of Birds Eye Frosted Foods

By quick freezing fruits, vegetables, and meats can be preserved indefinitely in a fresh condition. They are distributed in a frozen state to the stores where they are purchased by housewives.

in the United States each year is usually greater than that of all other vegetables combined. The leading potato-growing state is Maine. Aroostook County in the northern part of that state produces an enormous crop every year. It is a one-crop country. A good crop with high prices brings prosperity to the farmers and the businessmen. A poor crop or low prices mean a lack of ready money and hard times. Maine potatoes go to the markets of the Northeastern States, and Aroostook seed potatoes are sent to all parts of the country. Many of the early potatoes of the South are raised from seed potatoes shipped from Maine. Florida, Texas, California, North Carolina, Virginia, and New Jersey send potatoes to the northern markets in the spring and early summer before the Maine crop is ready. The Northwest is making a bid for the high-grade potato market by careful grading. The Idaho potatoes, for instance, because of their shape and size are excellent for baking. In distant markets they are sold in small packages or by the dozen.

Potatoes in Europe. While the potato is a native of America, Europe now raises far more potatoes than we do. Because the potato



Photo by James Sawders

Harvesting the famous Aroostook County potatoes on a farm near Presque Isle, Maine. This Maine county produces more than one-sixth of the potatoes grown in the United States.

was brought to a high state of cultivation in Ireland, it is often referred to as the Irish potato. Germany produces annually about four times as many bushels of potatoes as the United States. Russia's production in some years has exceeded Germany's. Poland's crop is about three times our own and France's is considerably greater than ours. You may wonder how some of these smaller countries can grow such large potato crops. The answer is found in their careful cultivation of the land and their scientific use of fertilizers. Their yield per acre is much greater than ours. These crowded European countries depend upon potatoes not only for food, but also for many industrial uses, such as the production of alcohol and chemicals. Potatoes are also widely used in Europe for stock feed, especially for swine. The pork of Germany is raised on potatoes instead of on corn, the feed used in our Central States.

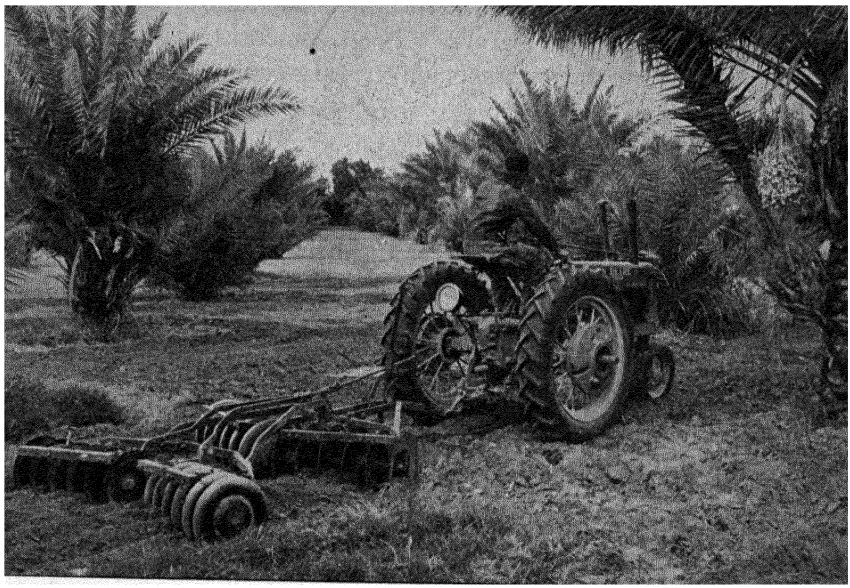
Peanuts. Peanuts, grown in the Southern States, are also an important food product. The peanut has many uses. It is eaten roasted, is made into various kinds of candy, and is used as peanut butter. It yields an oil and provides many interesting and profitable

by-products. Many of these by-products have been developed by Dr. George Washington Carver, a Negro scientist in Georgia. He has produced from the peanut such varied articles as cheese, breakfast food, linoleum, axle grease, soap, face powder, wood stains, dyes, drugs, flour, floor-sweeping compounds, insulation material, cattle bedding, and stock feed. At first Dr. Carver urged the farmers of the South to plant peanuts because they add nitrogen to the soil by means of the bacteria in their roots. This crop was particularly useful on lands which had become exhausted by repeated crops of cotton. Peanuts are raised in sections of the South where the ravages of the boll weevil have made cotton growing unprofitable. Peanuts are also raised as feed for hogs. The animals are allowed to enter the fields and dig the nuts for themselves. The states leading in the production of peanuts are Georgia, Alabama, North Carolina, and Virginia. We import peanuts from Japan, China, and the Philippine Islands. Other countries producing surplus crops of peanuts are British India, Senegal, and Nigeria. The peanut crop of the United States has an annual value of more than $40,000,000. In recent years the consumption of peanuts in the United States has amounted to ten pounds per capita.

Fruits

Their food value. Most people like to eat fruits and berries, and they form an important and valuable part of our diet. Like vegetables they contain vitamins and mineral elements which are very necessary for good health. When foods are cooked, many of the vitamins are destroyed. Since most fruits are eaten raw, their vitamins are retained. Fruits and berries, when ripe and fresh, are therefore excellent foods.

Fruits in the United States. Our country is so large and its climate and soils so varied that we produce many different kinds of fruits. Indeed, in a large fruit store, most of the products on display are grown in the United States. However, there are some kinds of fruit which we cannot produce. This is chiefly due to climatic conditions, for even our warmest regions lack the continuous high temperatures needed to produce such fruits as bananas, coconuts, pineapples, figs, and dates. (Dates are raised commercially in California and figs in California and Texas, but the quantities produced are not nearly enough to satisfy the demand.) All these tropical fruits we import in large quantities. We get bananas from Cen-

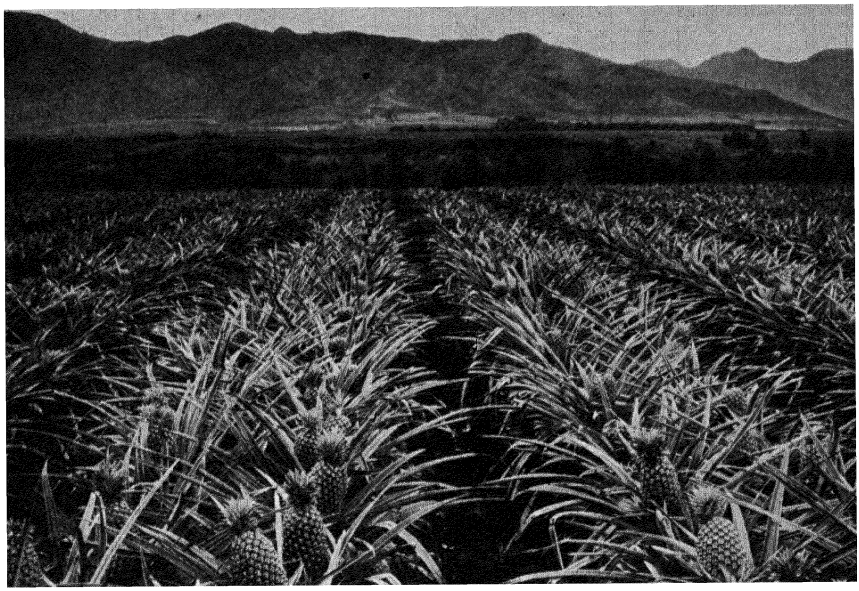


Courtesy of Goodyear Tire and Rubber Co.

The trees in this Arizona date garden are twelve years old and now produce about five hundred pounds of fruit each per year.

tral America and the West Indies, coconuts from the Caribbean, figs from Turkey, Greece, and Italy, dates from Iraq, Saudi Arabia, and the United Kingdom (as reëxports), and pineapples from Hawaii. Formerly, such tropical fruits were very expensive; but now improved methods of production and transportation bring them to our markets at very reasonable prices. Great fruit plantations are operated under scientific management, and refrigerator steamers and freight cars make quick deliveries to our great centers of population. For example, bananas were once a costly luxury; now they have become a staple and inexpensive article of food in most American homes.

Citrus fruits. Oranges, grapefruits, and lemons are called *citrus fruits* because they all come from trees belonging to the *Citrus* family. These fruits are very sensitive to cold and can be successfully grown only in subtropical climates. For this reason Southern California and Florida are our two most important centers for the raising of these products. Even in these regions frosts sometimes kill not only the fruit buds but the trees themselves. When the frost is light, orchards can be protected by smudge fires built among the trees.



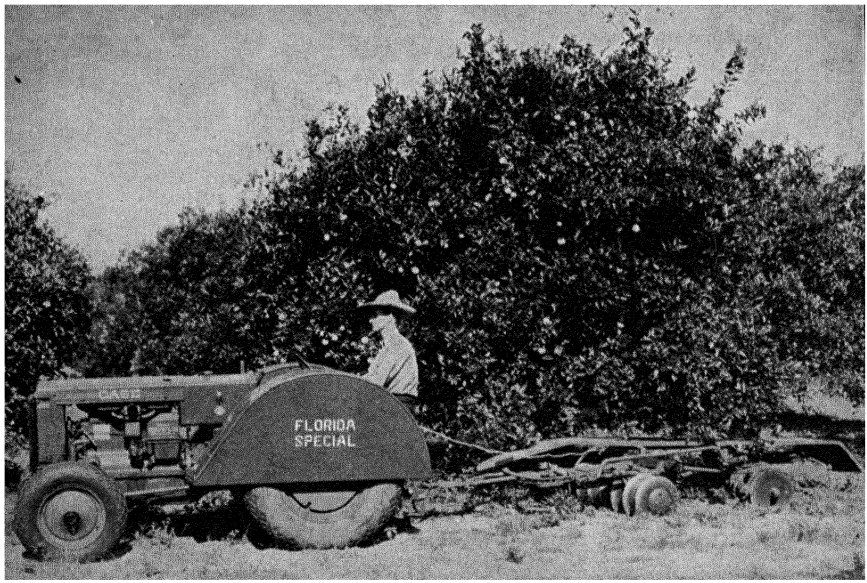
Pineapples and sugar cane are the two important crops of Hawaii. We import enormous quantities of fresh and canned pineapples from the territory.

But growers become extremely worried when the temperature nears the freezing point.

Florida produces more than seventy-five percent (in some years as much as ninety percent) of the total grapefruit crop of the United States while California grows about two thirds of all the oranges and nearly all the lemons raised in this country.

California oranges are about half navels and half Valencias. The navels are in the market from November to May, and the Valencias from May to November. Florida oranges are most abundant in the late fall and winter.

World production of citrus fruits. For many years Spain grew more oranges than any other country in the world. It still leads all countries in exports of oranges. Italy, Algeria, Palestine, Syria, and Greece are all important producers of oranges. The Union of South Africa and Australia now supply themselves with home-grown oranges and are entering world markets with exports, especially to England. Although Chinese oranges are not so well known, large quantities of this fruit have been grown in China for many



Courtesy of J. I Case Co.

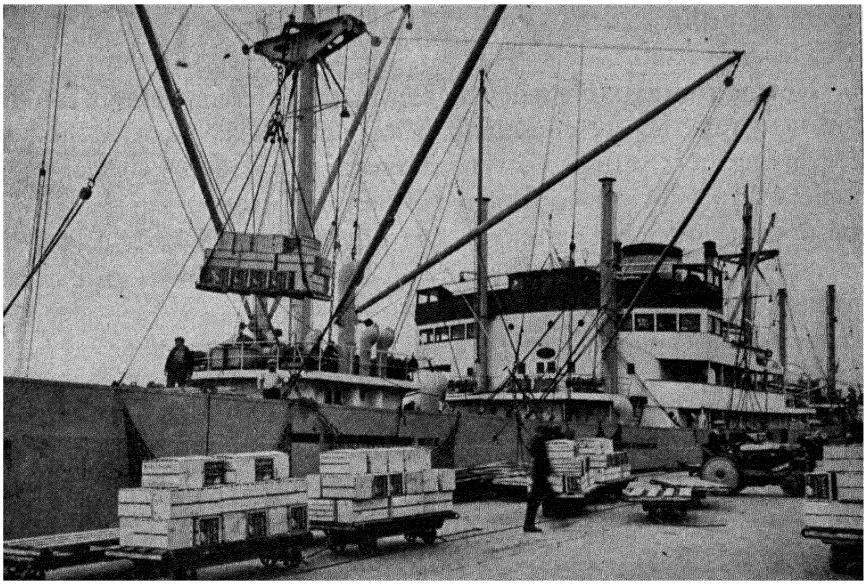
Cultivating an orange grove at Winter Garden, Florida. This state leads in the production of grapefruits and is second in the production of oranges.

centuries. In fact, the orange is thought to be a native of southeastern Asia. It was brought to America by the early Spanish missionaries, and now the two leading producing countries are in the New World—our own country and Brazil.

In Puerto Rico many oranges grow wild in the mountains and along the roads. These wild trees were originally planted as shade for the coffee trees or as hedges. They receive little or no care at present; but, strangely enough, they produce fruit of excellent quality.

The grapefruit is a newer fruit than the orange and is not so widely cultivated. More than ninety percent of the world's crop is produced in the United States. The West Indies and South Africa grow some grapefruits. The West Indies and Mexico raise most of the limes of the world. Southern Italy is one of the leading regions for the growing of lemons.

World trade in citrus fruits. We consume most of the oranges, grapefruits, and lemons raised in the United States; and we even import considerable quantities of these fruits and limes. The small



Courtesy of California Fruit Growers' Exchange

California's golden fruit being loaded at the harbor of Los Angeles for foreign ports. Our citrus fruits are shipped to England, Northern Europe, Australia, and the Orient.

quantity of oranges imported comes chiefly from Japan, with some coming also from Cuba and Puerto Rico. Some lemons are imported from Italy.

We export some citrus fruits into various world markets. Canada is our best customer for these products. Europe is the largest importer of oranges and lemons, but it gets most of its supply from the Mediterranean countries. Spanish, Italian, and African oranges can be sold in the European markets at much lower prices than the American fruit. This makes it difficult for us to build up a large European trade in citrus fruits. The United Kingdom is our best European customer. Comparatively little American grapefruit has reached the European markets until recently; now there is a growing demand for fresh and canned American grapefruit from the countries of Northwestern Europe.

Apples. The most popular and widely cultivated fruit in the United States is the apple. It is excellent for cooking in different forms; and many varieties are highly prized for table use. It keeps well and so is available for use the year round. Such fruits as the

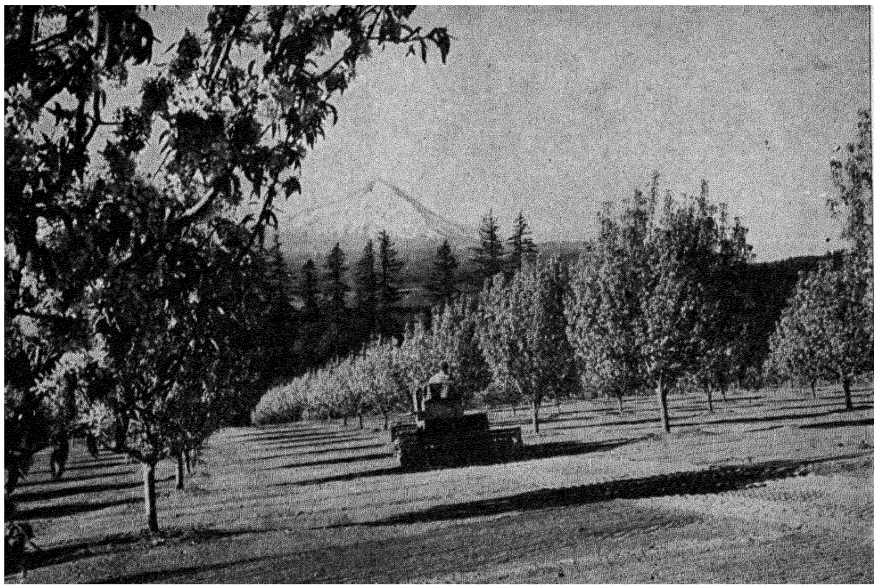
peach, plum, and cherry may be more delicious, but none has such desirable qualities as the apple. The apple may well be called America's leading fruit.

New varieties. There are a great many different kinds of apples, and new varieties are constantly being developed. The method of developing new varieties is very interesting. Seeds taken from any apple will produce trees which will bear fruits quite different from the original apple. The only way to perpetuate an individual type of apple is by grafting or budding. This is done in the following manner. A bud or twig of the chosen tree is inserted under the bark of another young apple tree of any kind so that the two parts will grow together. The bud or twig will become a part of the new tree and will yield fruit exactly the same as the tree from which it was cut. From these new branches buds or twigs are grafted into other trees. Thus the new variety of apple is multiplied indefinitely, and a new type of apple is made plentiful. New varieties of other fruits are grown in the same way.

Apple areas. Apples are grown in nearly every part of the United States though some areas are more productive than others. The only place where the apple does not thrive is in the hot moist parts of the South. Some varieties will not stand the extreme cold of the North; but there are hardy apples that do well even in Canada.

Pacific Coast apples. One of the best apple-growing regions in the world is just east of the Cascade Mountains in Washington and Oregon. While the climate is quite dry, excellent irrigation systems supply enough water for the trees; and the long weeks of sunshine give the fruit a beautiful color. The Yakima and Wenatchee Valleys ship apples not only to all parts of the United States but also to many parts of Europe. The fruit is very carefully harvested, graded, wrapped, and packed in boxes. It commands high prices because it is classed as fancy fruit. Washington leads all other states in apple production. This region also grows large crops of peaches, pears, and other fruits.

The Great Lakes apple region. In apple culture it is not good to have the buds come out too early in the spring because a late frost may then destroy the buds and ruin the crop. The region about the Great Lakes has an excellent climate for apples and other fruits. Since large bodies of water warm up slowly, the surrounding lands remain cool until quite late in the spring. Thus the cool winds from the Great Lakes keep the adjoining lands cool. This



Courtesy of Caterpillar Tractor Co.

An apple orchard in bloom in the Hood River Valley of Oregon. Note the snow-capped mountain in the background.

prevents the fruit buds from swelling too early, and the danger from late frosts is thus avoided.

In the same way, because water cools slowly, early fall frosts are warded off by warm air from the lakes. This tempering influence of the near-by lakes accounts for the large apple, peach, and grape crops of the Great Lakes region.

New York was for many years our leading apple-growing state. It now ranks second only to Washington. Western New York also does an extensive business in growing young trees for the general market. Places where these young trees are grown are called *nurseries.*

Southern Ontario is another great fruit-growing region which benefits from the great expanse of lake water to the south. This region specializes in more hardy varieties of apples than those of New York State. Nova Scotia, another Canadian province, raises a large apple crop, much of which is exported to Great Britain.

Other apple areas. In the Appalachian valleys from Pennsylvania to Virginia we find another region where fine apples have been grown since the days of the first settlements. Indeed the



Courtesy of New York State College of Agriculture

New York, once our leading apple-growing state, has lost its leadership to Washington State. Its commercial crop, however, averages about 20,000,000 bushels a year.

Virginia Piedmont was exporting apples to England long before the Revolution.

New England is another old and prolific apple-raising region. Farmers here found very early that the uneven and rocky soil was better suited to orchards than to general farming. Many very fine varieties of apples are produced in New England, and the development of commercial orchards is increasing. The New England colleges of agriculture now specialize in fruit culture. One great advantage enjoyed by New England apple growers is that they are very near the great markets of the eastern cities.

Missouri and Arkansas raise fine apples on the Ozark Plateau. This is a natural apple country, and it has many orchards of considerable size. Large nurseries have also been established in this section. From these and other smaller areas American apples are sent into many European markets.

Peaches. The peach is less hardy than the apple and is more subject to damage from late spring frosts; but it is widely grown in the United States. The largest commercial crops are raised in

the warmer parts of the country. However, just south of Lake Ontario, in New York State, the tempering influence of the lake allows good crops to be grown; and peaches are successfully produced even as far north as New England.

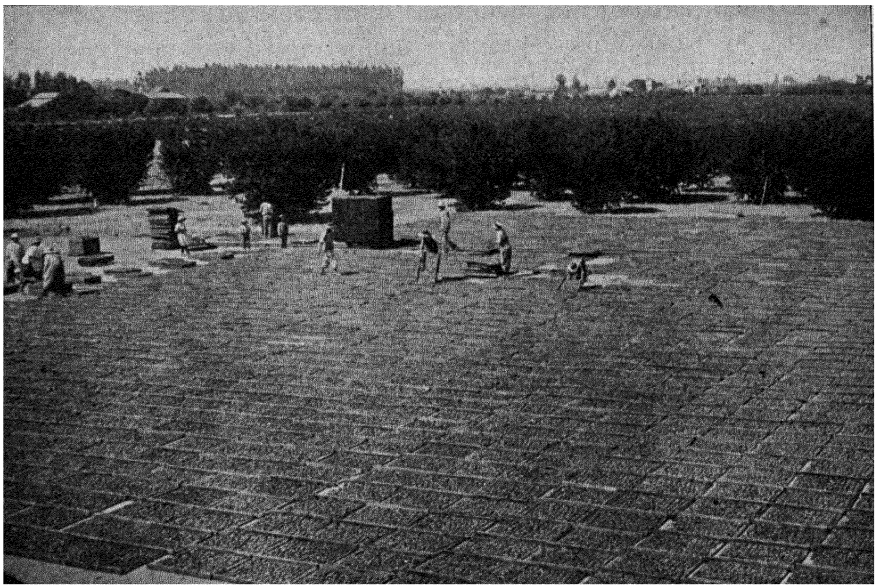
The leading peach-growing area of the country is the Great Valley of central California. This state holds first rank in this crop. Georgia is second to California in production and, with Delaware, sends large quantities of peaches into the eastern markets.

Grapes. California produces about ninety percent of all the grapes grown in the United States. Many of the California grapes are of European varieties which were originally brought there by the early Spanish missionaries and settlers. One half of the California grapes are raisin grapes and about one fourth are used in the manufacture of wine. More than 300,000 tons of table grapes are sent to all parts of the United States from California. Of the relatively small quantity of grapes exported the larger part goes to Canada.

The grapes of the eastern United States are entirely different from those of Europe. They have been developed from the native vines of that region. They do not keep well and are used chiefly as a table fruit and for preserves and jellies. Western New York, northern Ohio, and southwestern Michigan are also important grape-growing regions. Considerable quantities of grapes are also produced in southern Ontario.

Dried and canned fruits. Many fruits like grapes, prunes, apricots, dates, and figs are dried and sold in that form, often in attractive packages. The drying and packing of these fruits has become one of the leading industries of California. Practically all our raisins and more than half of the world's prune crop come from that state. Raisins, of course, are simply dried grapes, and prunes are sun-dried plums The San Joaquin Valley of California, where this industry centers, has a Mediterranean climate with long, dry summers. This makes it possible to dry the fruit in the sun, which is a great advantage. We export large quantities of dried fruits to Europe, even to Mediterranean countries.

Surplus or imperfect fruit which cannot be sold in the fresh-fruit market is canned or made into some form of preserves. These processes are an important source of income for the fruitgrowers of California and other orchard states. As in the case of vegetables, fruit is often raised solely for the use of the canneries, and most



Courtesy of the Fresno County Chamber of Commerce

Trays of peaches drying in the sunny climate of Fresno County, California. Sun-dried fruits are shipped all over the world from this state.

brands of canned fruit are of high quality. Some fruit also is evaporated by artificial heat instead of being dried in the open sunshine. Our markets display many varieties of this evaporated fruit.

Fruit coöperatives. The marketing of so perishable a crop as fruit has always been difficult. The individual grower is not always able to get his crop harvested properly. He cannot always get it to market at just the right time. He sometimes has difficulty with commission men, on whom he must depend for the sale of his product. Western fruitgrowers have now formed coöperative associations to overcome these obstacles. The association picks, packs, transports, and sells the product. Experts see to it that the best methods and skilled labor are employed, that adequate and fast transportation is provided, and that the best prices are obtained. These coöperative associations have proved a great advantage, not only to the fruitgrowers, but to farmers in other lines as well.

Guides to Study

1. In what different ways are we supplied with fresh vegetables?
2. How do market gardens differ from truck farms?

3. How are vegetables transported to near-by markets? To distant markets?

4. In what different ways are fruits and vegetables preserved? What are the advantages of each method?

5. Why has the growing of peanuts in the South been encouraged in recent years?

6. Why does the United States raise a much greater variety of fruits than do the countries of northern Europe?

7. How are new varieties of apples obtained?

8. State the advantages of each of the fruit-producing regions of the United States.

9. What would the citrus-fruit grower of Southern California do if there were no fast freight trains and refrigerated cars?

10. How do coöperative associations help the truck farmer and the fruitgrower?

Research for Students

1. Make a list of the vegetables and fruits sold in your markets at all seasons of the year. Learn from what part of the world each is received. Find the advantages each region has for growing its special products.

2. Make a study of the ways in which new fruits and vegetables have been obtained. Begin by listing the products purchasable today which could not be had many years ago.

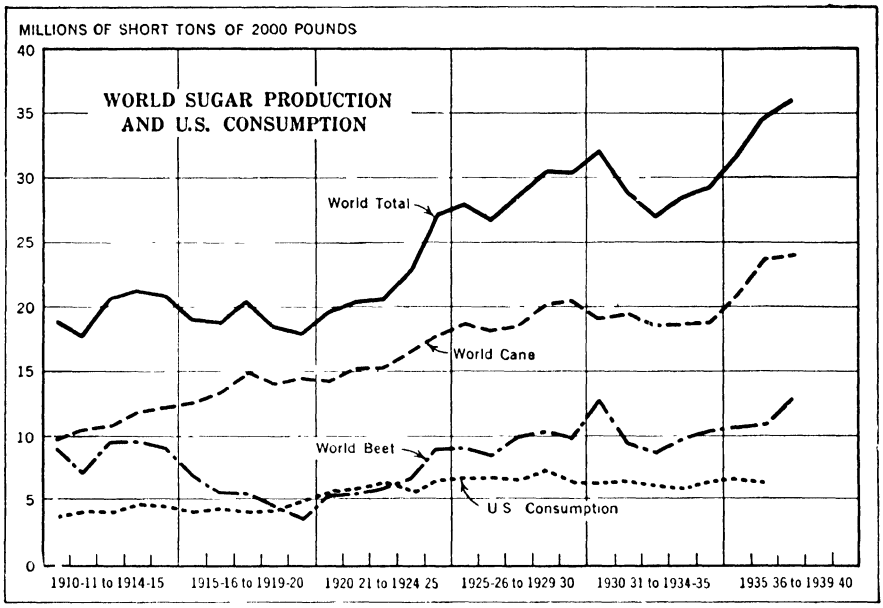
3. Peanuts are raised in West Africa, India, China, and other countries as well as in the United States. Find the use made of peanuts in those countries. Learn also how the peanut competes with the coconut and with cottonseed.

4. Study newspapers and magazines to note advertisements of cooperatives such as promote Sun-kist oranges and Land o' Lakes butter.

4. FILLING THE WORLD'S SUGAR BOWL

The Production and Manufacture of Sugar

An important energy food. Early man, driven by hunger and entirely dependent upon nature's food supply, by tasting and testing soon found that some plants and fruits were more palatable than others. We know that it is the varying quantity of sugar that largely determines the flavor and desirability of many of our foods. Sugar is found in practically every plant that grows. In some plants it is stored in the sap, in others in the root, and in others in the blossom. When we rob the bee of its honey, we are



taking the sugar which it has laboriously collected from the blossoms of the clover, the apple, or the goldenrod. Sugar was long supposed to be simply a luxury on our tables. Scientists now tell us that it is a very important energy-producing food.

So much sugar is consumed today that it is one of the leading commodities of world trade. Here in the United States we consume more sugar per capita than in any other country. The average amount is about one hundred pounds per year for each man, woman, and child in the country. We use ten times as much as we did one hundred years ago. Not all of this sugar passes through the family sugar bucket. Much of it is used in bakeries, candy factories, and by the makers of soft drinks. The change in our habits of living and the greater consumption of ice cream, sweets, and beverages have been responsible for the enormous increase in the amount of sugar consumed.

Sugar—a gift from the East. Not many centuries ago sugar cane was unknown to the inhabitants of Europe. The few surviving Crusaders who returned from the Holy Land in the twelfth and thirteenth centuries brought plants back with them. Within two or three centuries it was being grown in many of the tropical European colonies. Now as then Spain and the island of Sicily are the chief cane-sugar producing areas in Europe.



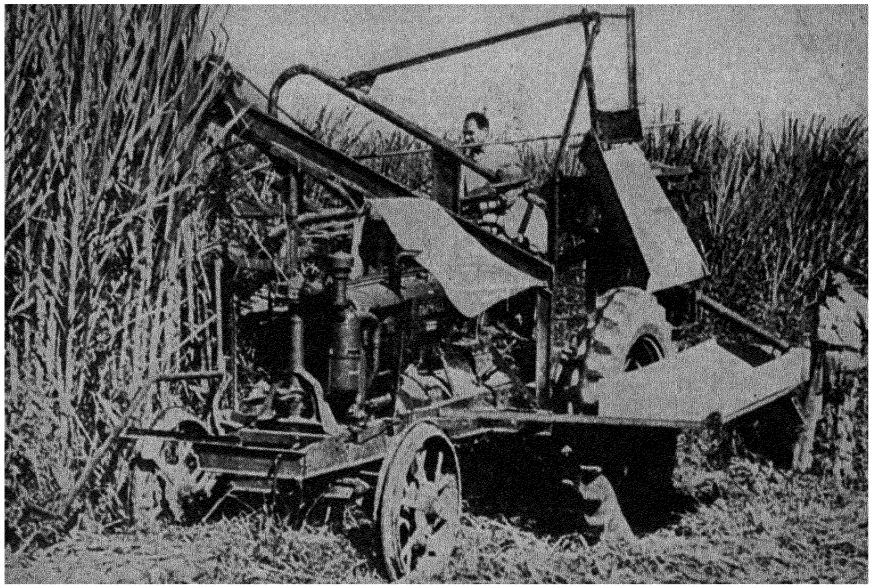
Courtesy of Caterpillar Tractor Co.

This machine plants the sugar cane and puts fertilizer in the furrow in a single operation in the Hawaiian fields.

Where sugar cane thrives. Sugar cane is a stout tropical or subtropical grass resembling corn. Under cultivation it grows to a height of twelve to fifteen feet. It thrives best in lowlands where the climate is hot and moist and entirely free from frosts. It also requires much sunshine and an abundance of water supplied either by rain or irrigation.

How sugar cane is grown. Sugar cane is seldom grown from seed—instead, stalks of the cane are laid in deep furrows and are covered well. New shoots spring up from the *nodes*, or joints, of the buried stalks. Much cultivation is necessary until the growing plants shade the ground. Today many planters overcome this need by covering their fields with paper. The paper not only keeps out the weeds, but it also holds the moisture in the ground. It is easily pierced by the sharp young shoot of cane. The growing season is a long one. In Louisiana it is about eight months. In some tropical countries, such as Cuba, cane may be allowed to grow as long as eighteen months before harvesting, thus producing a higher sugar content.

If the cane is planted in regions of occasional frosts, not only



© Photo from International News Photos

This sugar-cane harvester built by a Louisiana planter, Allan Ramsey Wurtele, in a $500 machine shop cuts cane ten to twelve feet tall at the rate of one ton in three to four minutes. It strips and tops the cane and deposits it in piles.

is the sugar content lowered, but the fields must be replanted every year. As this replanting uses up from one sixth to one fourth of the crop, the yield of sugar is seriously affected. In the hot regions of Cuba, India, and Java where the roots are not harmed by frost, the cane will spring up from the old roots for five years or more. The yield, however, is better if every few years the fields are plowed up and planted anew.

Harvesting the cane. Until recently machines were not used in the harvesting of sugar cane. The stalks were cut by hand and the leaves and tops removed. Sometimes the fields are set on fire to remove the leaves and tops before cutting the stalks themselves. The growers learned this method by the accidental burning of a field of cane. On the larger and more up-to-date plantations machines are now used which, it is claimed, will do the work of two hundred laborers. As the yield of cane may be as high as sixty tons an acre, labor-saving devices can be counted on to do much to speed up the work of harvesting. Transportation of the cane to the mill

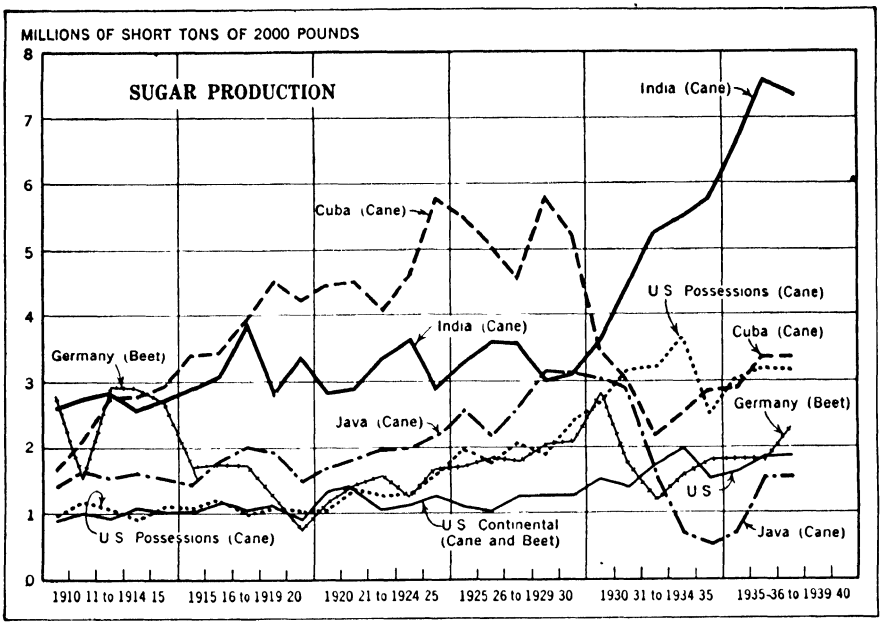
is another stupendous task. The crop is not only heavy but bulky. In primitive regions it is carried by mule team or slow-going oxen. The more up-to-date plantations use trucks or railway lines. If railway lines are used, the tracks are moved from place to place as the harvesting progresses. A sugar mill in order to be run profitably must have at least five thousand acres of cane reasonably near at hand. Since the amount of sugar from each ton of cane is seldom more than two hundred and forty pounds, one can readily see the advantage of having the mills near the plantations.

How the sugar mill works. First the cane is crushed and compressed, pressing out the juice which is evaporated in vacuum pans. Practically nothing is lost in the process. The production of sugar is of course the main object of the milling of the cane. Molasses is a valuable by-product. Even the pulp, known as *bagasse*, has a variety of uses. It may be used as fuel for running the mills or it may be mixed with molasses and used for feed for cattle. Large quantities are compressed into sheets for wall board. It is sometimes used in the manufacture of paper.

There are several grades of molasses produced in the milling process. The best grades are used as food for man. The lower grades from which nearly all the sugar has been removed are, as we have noted, mixed with the cane pulp or with alfalfa for cattle feed. Blackstrap, as this cheaper grade of molasses is called, also yields alcohol.

When sugar first comes from the mill, it is known as *raw sugar* and is of a brownish color and coarse-grained. In order to make it more palatable for table use, it is shipped to refineries which are usually located at the ports of the large consumer countries, such as the United States and Great Britain. Since sugar loses little weight in refining, it costs no more to transport the raw than the refined sugar. There are large refineries in Boston, New York, Philadelphia, Baltimore, New Orleans, and San Francisco. These cities are near the great markets for sugar, and skilled labor is readily obtained. Raw sugar produced outside our borders is brought to the refineries by ship and, after being refined, is sent to all parts of the country by rail.

Lands where sugar cane grows. For many years Cuba led the world in sugar production. It has vast areas of rich soil and an almost ideal climate. There is ample rain for the growth of the cane followed by a dry season when the sugar is stored in the stalks.



Only a small portion of the country suitable for growing sugar is now used for that purpose. Following the Spanish-American War, capital from the United States was invested in Cuban sugar lands to the extent of more than a billion dollars. Much of the raw sugar moves from Cuban mills to the refineries of the United States.

For a number of years India has led all other countries in the production of cane sugar. It is widely grown wherever the water supply is sufficient. It is raised on small farms and is wholly consumed within the country. Notwithstanding its large production, India is obliged to import sugar from Java. Java follows India and Cuba as a producer of cane sugar. Java could produce much larger crops, but the demand for food is so great that laws provide that sugar cane and other crops shall not displace the rice fields. Java exports sugar not only to India, but to China and Japan and in smaller quantities to Europe and the United States. Other important cane-sugar producing regions include the possessions of the United States, Hawaii, the Philippines, and Puerto Rico. The production of Taiwan (Formosa), which belongs to Japan, is somewhat larger than that of Puerto Rico. The world production of sugar (cane and beet) in 1937-38 was almost double what it was in 1920-21.

Beet Sugar

The sugar beet. If it were not for the sugar beet, the people of temperate lands would be dependent upon tropical regions for their sugar. During the Napoleonic Wars, when France was unable to secure sugar from the West Indies, the French people turned to the beet as their source of sugar. Since that time the production of beet sugar has increased enormously.

For the success of the beet-sugar industry we are indebted to the German farmer and the German chemist. By careful selection the beets yield much more sugar than formerly; by improved methods of milling much more sugar is obtained from the same quantity of beets. Until recently our commercial growers imported seed from Europe. By careful breeding and selection varieties of sugar beets have been developed in the United States which resist disease. Therefore seed is now raised very largely in this country.

The sugar beet yields more than sugar. The production of beet sugar in temperate lands brings several advantages to the countries producing it. It makes the country more nearly independent for its sugar supply; it provides another farm product, another use for farm lands, and more work for farm labor. The pulp and tops supply feed for farm animals. Each acre of sugar beets in addition to the sugar that it yields may be made to produce by the use of pulp, tops, and molasses as animal feed three hundred pounds of meat in the form of beef, mutton, or pork. Moreover, the beet-sugar mills give the region another manufacturing industry.

Growing sugar beets. The climate best suited to sugar beets is one in which the summers are not too warm. Too much heat gives more fiber and less sugar. There should be a good supply of water in the early growing season and drier and cooler weather as harvesting time approaches. Much hand labor is needed. The young plants must be thinned, and in the earlier stages of growth weeds too must be removed by hand. Much of this tiresome work is usually done by women and children. School vacations are often planned so that children will be free to work in the beet fields. Since beets require much cheap labor, they are often grown in rather thickly settled regions as in Germany, Czecho-Slovakia, and other countries of Europe. *(I. 519)*

The beet goes to the mill. Cane sugar, as we have seen, goes as raw sugar from mills on the plantations to refineries near the



Courtesy of the Great Western Sugar Co.

The great mountain of sugar beets in the background is being built by automatic machines. This is necessary because the harvest season of four or five weeks supplies the mill with beets that require operation for two or three months to convert them into sugar. Each mill will convert many such piles during a season.

consuming regions. Beet sugar, on the contrary, is milled and refined in the same plant. The mills are near the fields, thus making it unnecessary to transport the heavy beets long distances. Furthermore, the by-products can best be used in country regions either in fresh condition or preserved in silos as cattle fodder. Colorado, California, Michigan, and Nebraska lead all other states of our country in beet-sugar production. Idaho and Montana are increasing their production.

Beet sugar areas. The United States produces more than three times as much sugar from beets as from cane. Louisiana and Florida are the only states in which sugar cane can be profitably grown. Even these small areas could probably not continue without the aid of a protective tariff. The areas adapted to sugar beets are much greater. These areas also enjoy the benefits of tariff, but, unlike the sugar-cane fields of the South, they suffer no disadvantage of climate as compared with other countries. Given a larger supply of cheap

labor, we could doubtless produce much larger crops of beet sugar. The countries leading in the production of beet sugar are Russia, Germany, the United States, and France.

The governments of Great Britain and Italy are both encouraging the production of beet sugar so that these countries will not be so largely dependent upon imports. The quantity of sugar now imported by Italy is only a small part of that consumed. Italy's sugar beets are not only supplying sugar but alcohol for motor fuel.

Importers and exporters of sugar. The United States is the greatest consumer and importer of sugar. Of the 6,500,000 tons consumed, about one fourth is produced at home in the form of both cane and beet sugar; one third to one half is brought in from our insular possessions, the Hawaiian Islands, Puerto Rico, and the Philippines; and the remainder is imported from foreign countries, mainly from Cuba. In recent years a quota has been fixed for the quantity of sugar which may be brought into the United States, duty free, from Puerto Rico and the Philippines. By limiting the amount imported free of duty, a better market is offered for sugar produced in continental United States. Sugar coming into our country from Cuba pays a lower tariff than that imported from other foreign countries.

Great Britain imports almost as much sugar as we do, but a much larger proportion of that brought into the country is reexported. Other countries importing sugar, but in much smaller quantities, are Canada and France. India, although the greatest sugar producer in the world, finds it necessary to import still more for its population of more than 350,000,000 people.

The leading exporters of cane sugar are Cuba, the Philippines, and Netherland India. Czecho-Slovakia takes first place as an exporter of beet sugar. Countries exporting smaller quantities are Poland, Belgium, and Hungary.

Guides to Study

1. Why does sugar occupy so large a place in world agriculture and trade?

2. How is it that the people of the United States use more sugar per person than do the people of any other country?

3. At the time of the discovery of America sugar was considered a great luxury in European countries and was very expensive. Why was this so?

4. How do the conditions for growing sugar in Louisiana differ from those in Cuba?

5. Through what processes must cane sugar pass as it moves from field to market?

6. What advantages are there in producing sugar from beets as well as from cane?

7. How do the conditions and methods of beet-sugar production differ from those of cane-sugar production?

8. Why are beet-sugar mills and cane-sugar mills both near the fields of production?

9. How does a tariff aid the producer of sugar in the United States?

10. What advantage has each of the following producing regions Hawaii? Puerto Rico? Cuba?

Research for Students

1. Using the encyclopedia or other reference books learn and report to the class the history of sugar from the time of the Crusades to the present time.

2. Make a bar graph similar to that on page 235 showing the amount of cane sugar produced by the leading countries. Make a similar graph for beet sugar. (Use the tables in the Appendix.)

3. On a map of the world locate the leading sugar-producing regions. Draw the chief routes from the producing countries to the importing countries. Locate the chief refining centers of the United States.

4. Make a list of the uses of sugar; a list of the uses of the by-products of the sugar cane; a list of the uses of the by-products of the sugar beet. How does the use of these by-products affect the price of sugar?

5. Have different members of the class study and report on the methods of raising sugar in each of the leading producing regions. Why can some regions produce larger crops and at lower prices than others?

5. BEVERAGES AND TOBACCO

Coffee

Coffee—our favorite breakfast cup. Coffee was first introduced into Europe about four hundred years ago by the establishment of a *coffeehouse* at Constantinople. So popular did the new beverage become that within a century coffeehouses were thriving in all the large European cities. The first London house was opened by a Greek in 1652. Since then the use of coffee has become so wide-

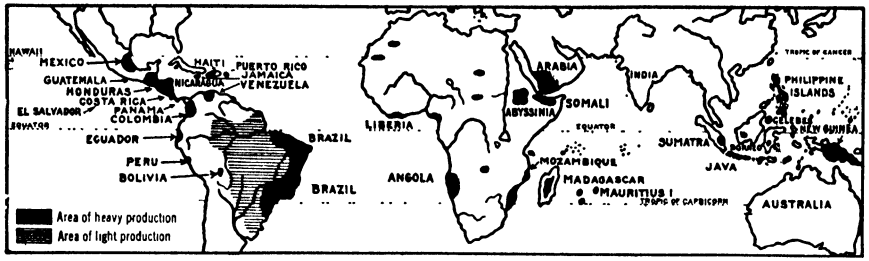


Courtesy of 20th Century-Fox Film Corporation

The famous Lloyd's coffeehouse as it appeared in the motion-picture production of "Lloyd's of London"

spread that today nearly every civilized home, if not a coffeehouse, is most certainly a coffee-using home. Here in the United States we use more coffee than any other country. The average consumption is more than one pound a month per person. The Swedes are great coffee drinkers too. Their average consumption is higher than ours, but, as the population of Sweden is less than that of the United States, their total consumption is less than ours. In England the average quantity of coffee consumed in a year is less than a pound per person. The British are tea drinkers.

Where coffee is grown. In earlier days, when the householder bought the coffee bean and ground his own coffee in home grinders, many used Mocha coffee exclusively. Others were ardent users of Java coffee; still others insisted on a blending of the two. Now with the widespread use of trade names we insist on using our favorite brand which, whether of the Mocha or Java type, probably comes from Brazil. The tree is supposed to be a native of Ethiopia. About three hundred years ago plants were taken from Mocha in Arabia to Java. From Java trees were taken to the botanical museum in Amsterdam. From Amsterdam a tree was sent to the botanical



Courtesy of Brazilian-American Coffee Promotion Committee

Coffee-producing regions of the world

garden in Paris. A layer from the tree in Paris was sent to Martinique, a French possession in the West Indies, about two hundred years ago. The climate of Martinique proved to be so well adapted to the culture of the coffee tree that in a short time trees were available for all the West Indies. From the West Indies it was introduced to the mainland of South America. Brazil is now the leading coffee-producing country. It raises more than twice as much as all the other countries combined. Although Colombia produces usually only about one seventh as much coffee as Brazil, it ranks second to that country. Other countries that produce large quantities are Venezuela, Netherland India, El Salvador, and Guatemala. With the exception of Netherland India you will note that all the chief coffee-producing countries are now in the western hemisphere. This is interesting because, as we have learned, coffee is a native of the Old World.

What the coffee plant needs. Both the coffee tree and its fruit require a hot climate with plenty of rain during the growing season and dry sunshiny weather for harvesttime. Since it does not like wet feet, it grows best in rolling country where land drainage and air drainage are good. In other words, it thrives best in tropical uplands where these conditions exist and where there is little or no danger of frosts. In the Brazilian coffee-growing region frosts do sometimes occur, but not frequently enough to discourage its culture.

Brazil, the land of coffee. In the southern part of this country near the Atlantic Ocean there is an extensive plateau region covered to a great depth by a rich soil of decomposed volcanic rock. So vast is this area and so nearly ideal the conditions that Brazil could easily raise enough coffee to supply the whole world. Coffee is grown over an area about equal in size to that portion of our country

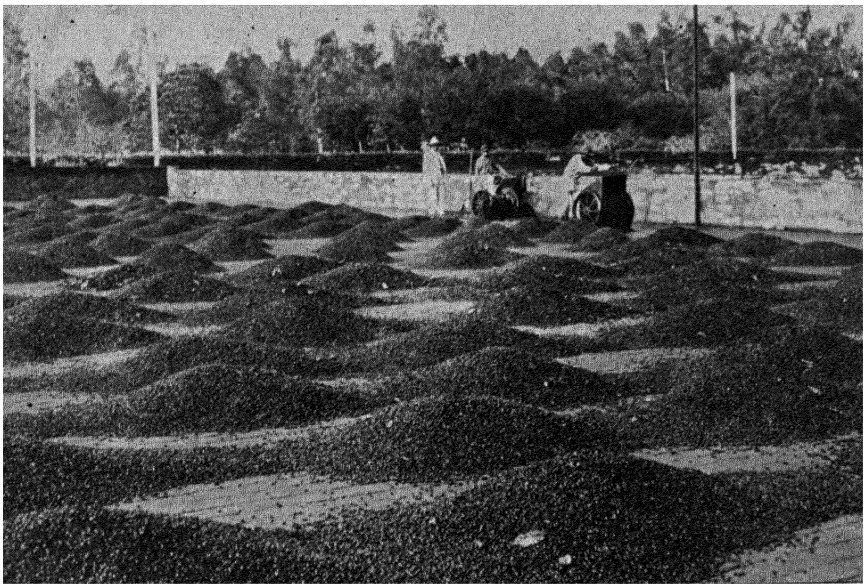


Photo from Philip Gendreau

Coffee beans spread out on this concrete floor to dry in the sun at São Paulo, Brazil

east of the Mississippi River. São Paulo, a southern state, produces the largest quantity. In many coffee-growing regions blossoms and both green and ripe fruit may be borne on the trees at the same time. This complicates the harvesting. In São Paulo the cold and the dry seasons come together, causing the berries to ripen evenly and making harvesting much easier.

Preparation for market. In a wild state coffee trees grow to a height of twenty feet, but for purposes of cultivation they are kept down to a height of ten or twelve feet. When four or five years old, they begin to bear fruit. The fruit is a pulpy berry somewhat like a red cherry. In the heart of each berry are two seeds, or *beans*, rounded on the outside but flat where they come together. In order to remove these beans from the cherry the fruit must first be soaked and then put through a pulping machine to remove the skin and pulp. The beans are then partially dried and put through a second machine to remove the paperlike covering which incloses them. They are then ready for the final thorough drying in the sun, after which they are packed in bags of 132 pounds each, ready for storage or shipment. It is said that the coffee-carrying railroad

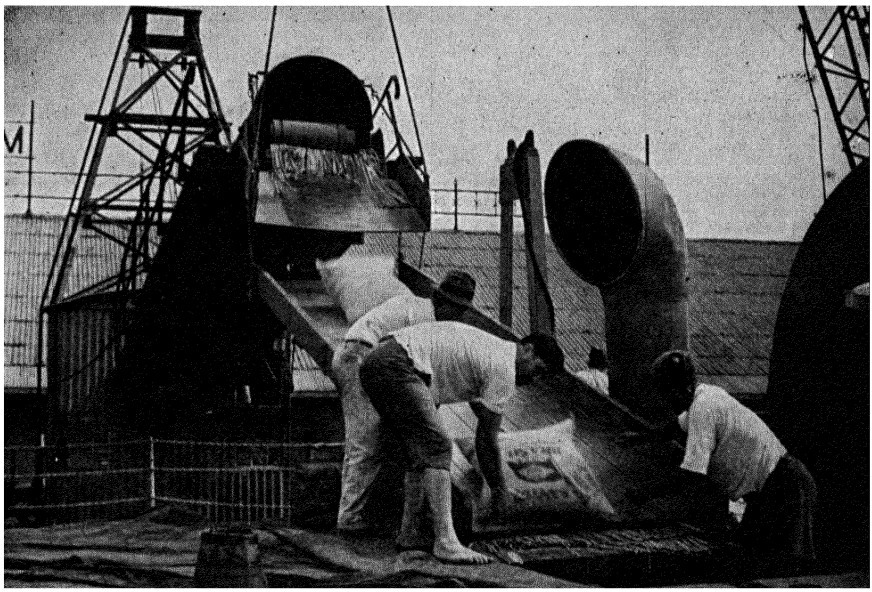


Photo by James Sawders

On the docks at Santos, Brazil, chief coffee port of the world. The finest modern coffee-loading machinery automatically conveys the sack of coffee from truck and warehouse straight to the hold of the waiting ship.

from São Paulo to Santos is the best-paying railroad in the world. Rio Janeiro ranks second to São Paulo in the exportation of coffee.

Coffee is an almost imperishable crop and under proper conditions may be stored for months or years. The wealth derived from the industry has done much to promote the growth and prosperity of the near-by cities of Rio Janeiro and São Paulo.

As a large plantation calls for the labor of many hands, there are settlements of several thousand persons on a single plantation. The work must be done very carefully. Much of the modern machinery used comes from the United States. As on the large sugar plantations, many coffee planters have their private railroads.

Our chief source. We are Brazil's best coffee customer. Of the more than a billion and a half pounds that we import every year about two thirds comes from that country. The Brazilian planter bases his crop on our market. If at any time this source of supply should be cut off, it would take the combined crop of the rest of the world to supply our needs. We import a very small quantity

of coffee from Netherland India and varying quantities from Venezuela, Colombia, El Salvador, Guatemala, and Mexico. The coffee grown in these countries has a milder flavor than that grown in Brazil; hence it is desirable in blending coffee for fine flavor.

Overproduction. Brazilians found the coffee industry so profitable that the supply tended to be greater than the needs of the world markets. Large sums were spent in advertising coffee in America and Europe. Even then prices continued to fall and the state of São Paulo attempted to limit output by discouraging new plantings. Coffee was also held in storehouses throughout the coffee-producing region and was permitted to move to the markets only when the price was high enough to yield a profit. These methods helped for a time to keep prices at a higher level because Brazil produces so large a part of the world's crop. In recent years, however, all efforts to keep up prices have failed, and the government has decided to remove all restrictions and to yield to the law of supply and demand.

Tea

Tea, an afternoon cup. Since the Boston Tea Party looms large in our history, one might think that we are a nation of tea drinkers, but that is not the case. We average less than a pound of tea a year per person. The inhabitants of Great Britain and its possessions are the world's tea drinkers. The English use twelve times as much tea per person as we do, the Australians and New Zealanders eight times as much, and the Canadians four times as much. Great quantities of tea are also consumed in the Far Eastern countries where it is raised. (*I. 629*)

Where tea grows. Historically we know more about tea than coffee. This may be due to the fact that tea grows in China where it has been cultivated since the dawn of history. It is believed that many centuries ago it was introduced into China from Assam in India. In the eighth century tea gardens were planted in Japan with seeds brought from China. Some of these gardens are still in existence. Later tea was introduced into Taiwan (Formosa) and the islands of the East Indies. Not knowing that it grew wild there, the British introduced it into India in 1865. India now leads all other countries in the exportation of tea, some of it even being sent to China. Other tea-growing regions are Netherland India and Ceylon.



Photo from Associated Screen News, Limited

Ceylonese women picking tea from a plantation on the mountainside. Much tea from the island of Ceylon reaches London and is reexported to other consuming countries.

Tea grows in a wider range of climatic regions than coffee. Although we usually think of it as a tropical plant, it is not affected by frosts and so can be grown in regions having a temperate climate. The best Ceylon tea is grown on the mountain slopes more than a mile above sea level. Tea could be grown in our Southern States, but not profitably as we could not compete with the abundant cheap labor of the Far East.

The Chinese tea growers are small planters. In India and Ceylon there are numerous large plantations, many of them owned and operated by Englishmen. The British people, having been extensive consumers of tea for the last two hundred years and more, have become experts in blending it. London is the center of the world trade in tea. The trade names of many of its blends are household words the world over. The great yachtsman, the late Sir Thomas Lipton, was one of England's great tea merchants.

Preparing tea for market. The tea tree like the coffee tree grows naturally to a height of about twenty feet. On the plantations, however, it is pruned to a height that will make it easy for

the women and children pickers to gather the leaves. A full crop can be secured from trees when they are from five to ten years old. When once well established, if kept well pruned, they will yield a profitable harvest for fifty years or more.

While the tea tree is an evergreen, the leaves are picked only at the time of the new growth and only the fresh shoots are plucked. In Taiwan the crop is picked once or twice a month; in Ceylon every ten or twelve days. The picking is always done by hand, and in China the leaves are rolled by hand during the drying process. In India more modern and sanitary methods are now in effect and much of the work formerly done by hand is now done by machines. Whether the tea is to be black or green depends almost wholly on the process of preparation. If black tea is desired, after a partial drying in the sun and passage through rollers, the leaves are spread out and covered with a moist cloth to induce fermentation. Green tea is not allowed to ferment. In either case the final drying is done in metal baskets or pans over heat.

To keep out moisture and preserve its aroma, tea after being cured is carefully packed in boxes lined with lead foil before being shipped. If kept sealed, it suffers no ill effects from long ocean voyages. Tea from China and Japan reaches us through our western ports; that from India and Ceylon usually comes to our Atlantic and Gulf ports by the way of the Suez Canal and the Mediterranean.

Cocoa

Food and drink. Unlike tea or coffee cocoa is a food as well as a stimulating drink. Indeed, its botanical name *Theobroma* means "food for the gods." Early Spanish explorers found Mexican Indians drinking a beverage, brewed from the cacao bean, which they called *chocolatl.* They introduced it into Europe, but its use did not become widespread until the latter part of the eighteenth century. Its present popularity has made up for its slow start and now it would be hard to find a spot in any part of the civilized world where cocoa in one form or another is not in daily demand. At our soda fountains, at candy counters, in our homes, and in public eating places it holds a most important place. In the form of chocolate it forms a part of the British soldiers' daily ration.

Where we get our supply. The cacao, or cocoa, tree is a native of the American tropics. While it requires heat and moisture for its growth, it thrives best in the shadow of taller and larger trees which



Courtesy of Hershey Estates

There are lots of cups of cocoa in the pannier baskets slung across the little donkey's back. Cocoa is grown in tropic lands where often these humble beasts are the only means of transport.

shut out the excessive heat of the sun and at the same time shield it from strong tropical winds. As the tree is in constant bloom, there is always ripe fruit on the tree, but as a rule the crop is gathered only once or twice a year. The pods containing the beans or seeds grow out of the main trunk and large branches of the tree.

Men, women, and children armed with large knives or hooks on long poles cut the pods from the trees. The seeds are removed from the pods and allowed to lie in heaps on the ground until the pulp rots away, or they may be put in bins to ferment for several days. Fermentation removes the bitter taste and softens the pulp so that it is more easily removed. After being separated from the pulp, the beans are spread on bamboo mats and left in the sun for five or six days to dry. Great care has to be taken after drying to make sure that they do not get damp and moldy.

The beans are shipped in sacks to factories in western Europe and in the United States where, after the outer coat is removed, the beans are ground to a fine powder. Sugar may be added to the powder to make chocolate. The cocoa oil may be removed to pro-

duce cocoa. The cocoa oil makes an excellent base for face creams and other cosmetics.

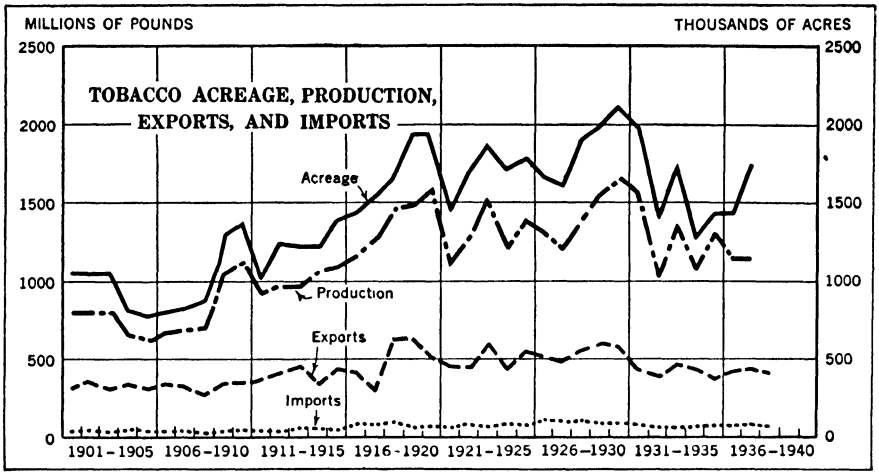
Until fairly recent years the chief sources of the world's supply of cocoa were tropical South America and the West Indies, but many trees there have been killed by a tropical blight. Now the bulk of this product comes from the western coast of Africa near the Gulf of Guinea. It is raised mostly in small groves managed by native farmers. African cocoa has not quite so fine a flavor as that grown in the western hemisphere.

Who uses cocoa? While the people of the United States are coffee drinkers and the British are tea drinkers, in Spain cocoa is the favorite beverage. The largest quantities of cocoa, however, are used in the United States, a candy-loving nation. We average three pounds of cocoa per person annually. Much is also used in Germany, Great Britain, France, the Netherlands, and Switzerland. The Netherlands is famous for its high-grade cocoa and Switzerland for its fine milk chocolate.

Tobacco

The American weed. We all know the story of Sir Walter Raleigh whose alarmed servant saw him "belching smoke," and, thinking him on fire, dashed a glass of ale in his face to put out the conflagration. Sir Walter had acquired the habit of smoking from the Indians with whom he had come in contact on his journeys of exploration and discovery to the western hemisphere. Since then, untold numbers of tobacco plants have gone up in smoke from pipes, cigars, and cigarettes. Smoking is one of the world's costliest habits.

In their zeal for finding treasure early colonists in Virginia shipped a load of what they thought was gold ore to England. Great was their disappointment when word came back that their precious cargo was nothing but a worthless mineral, known as *fool's gold.* If not rich in gold, Virginia's soil was rich in other elements that soon made the cultivation of tobacco a very profitable industry. The leaves of the plant in very truth were used as a substitute for gold. Ministers' salaries were paid in it, as were fines, taxes, and all other business obligations. One hundred pounds of it were paid for each of the ninety young women who were brought over here as wives for the colonists. It was introduced into Europe where it was soon in great demand. So intensively was it cultivated that as early as 1615 the very streets of Jamestown were planted with it. The plant is



comparatively slow-growing and needs constant cultivation; so when twenty negroes were brought to the Virginia shores in 1619 they were eagerly bought as slaves to carry on the back-breaking work.

Tobacco fields. Tobacco is much more dependent on soil than on climate for a successful crop. If the soil is right and moisture adequate, it can be grown as readily in the northern part of the temperate zones as in the hotter regions of the tropics. Warmth is necessary, but temperature and length of growing season are secondary requirements. Consequently it is found growing in scattered areas in many parts of the world. India, Russia, Brazil, Netherland India, Japan, Greece, the Philippines, and Turkey produce it in large quantities. In this country it is now an important crop in fifteen states. North Carolina, Kentucky, Virginia, and Tennessee lead in its production. These states produce two thirds of the American crop. In some countries the quality of the crop or the desirability of the leaf for specific purposes offsets the quantity produced. The best cigar filler comes from Cuba, the best thin wrapper from Sumatra, and cigarette tobaccos from Turkey and Greece.

Cultivating tobacco. The seeds are so small that they cannot be sown broadcast. They are planted in beds and are protected by cheesecloth. The seedlings are later transplanted either by hand or machine. The plants are carefully cultivated, and the blossoms are picked as soon as they appear in order that all the nourishment may go to the leaves. Often the growing plants are shaded by cheesecloth or laths in order to procure a tender, delicate leaf. The plants



Courtesy of Mobile Chamber of Commerce

At the dock at Mobile, Alabama. Tobacco packed in hogsheads is being put on board a ship for a foreign destination, probably England, one of our best customers.

are harvested by cutting the stems close to the ground or by stripping off the leaves. The leaves are dried in properly ventilated and heated sheds. The crop is very perishable and, therefore, must be marketed as soon as cured regardless of price.

Who uses the tobacco? The United States grows, uses, and exports more tobacco than any other country in the world. Centers noted for the manufacture of tobacco, chiefly cigarettes, are Winston-Salem and Durham, in North Carolina, and Louisville, in Kentucky. Each day Durham sends out seventy-five carloads of tobacco products and the output of Winston-Salem is even greater. Key West and Tampa, Florida, are noted for the manufacture of cigars from Cuban tobacco.

Cigarettes make up the chief export of manufactured tobacco from the United States. China is our best customer. Cigarettes also go to the Philippines, Panama, France, and the Malay Peninsula. Great Britain and Germany are the largest importers of unmanufactured tobacco.

Guides to Study

1. Trace the use of coffee from Asia to America.
2. Why are Americans coffee drinkers and the British tea drinkers?
3. Why does Brazil lead in coffee production?
4. Account for the fact that tea is a product of the Old World while most of the coffee is grown in the Americas.
5. How have Brazilians tried to limit the production of coffee? Why have they not been wholly successful?
6. How does the preparation of tea for market differ from that of coffee?
7. Under what conditions does cocoa thrive best?
8. Why did the Virginia colonists find tobacco a profitable crop?
9. What regions specialize in raising tobacco? Why?

Research for Students

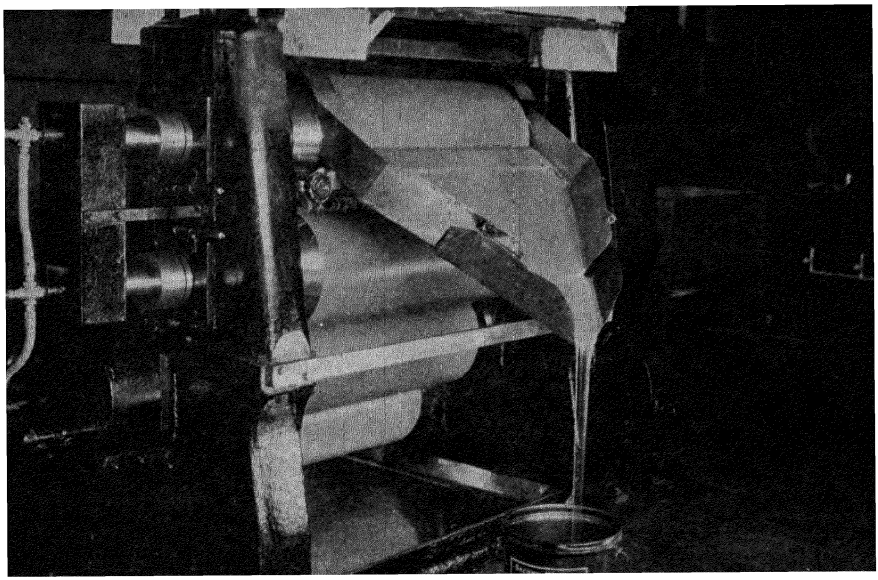
1. Trace on an outline map of the world the more important routes over which coffee passes. Draw in color the routes to the United States.
2. On the same map of the world shade lightly the tea-producing countries. Trace routes from those countries to the leading importing countries.
3. Make a list of the different ways in which cocoa is used. Why has its use greatly increased?
4. List the countries or regions noted for special kinds of tobacco On a map of the United States locate cities noted for the manufacture and distribution of tobacco and tobacco products.

6. OILS FROM SEEDS AND FRUITS

Their Household and Industrial Uses

The source of vegetable oils. The seeds and fruits of plants usually contain oil of some kind. This was meant for the use of the plant itself, but man collects the seeds and fruits, presses them, and uses the oil for himself. Oil can be obtained from a great variety of plants which grow under various climatic conditions. Some of the most useful oil-producing plants grow in tropical regions where land and labor can be had at small cost.

Vegetable oils in daily life. We use vegetable oils in a number of ways. They are to be found in many of our foods; they form a part of the soap used in the laundry and for toilet purposes; they are



Courtesy of the Sherwin-Williams Co.

In the manufacture of paints and varnishes we are dependent upon vegetable oils produced from seeds and fruits of plants grown in our own land and on foreign soil.

in the paints and varnishes which cover the exteriors of our houses and the walls and floors of our rooms. They are in the ink with which this book is printed.

Lard and butter substitutes. Much of the oil consumed as food is used in cooking in the place of lard or butter. As the population of the world increases, the supply of animal fats is not sufficient to meet our needs. We therefore turn to the plant world to find oils that will supply our bodies with the fats needed. The vegetable oils are usually cheaper than animal fats and contain essentially the same food elements. In recent years a way has been found to add to them the vitamins which in former years were lacking.

Margarine or oleomargarine is the name usually applied to a substitute for butter. Substitutes for lard have a variety of trade names. These substitutes consist mostly of vegetable oils but in most instances they contain a certain proportion of animal fats. By the addition of hydrogen the liquid vegetable oils are changed to the solid form which is preferred by people of the cooler temperate regions.

Margarine competes with butter. The greater the production and use of margarine, the less is the demand for butter. In the United States farmers have caused laws to be passed which discourage the use of margarine. The product must be distinctly labeled as margarine and cannot be colored to look like butter before it reaches the consumer.

We do, however, use large quantities of cottonseed oil and coconut oil in making commercial butter and lard substitutes. European countries manufacture and use much larger quantities of margarine than does the United States. In the densely settled regions of northwestern Europe many oilseeds are imported, and large quantities of margarine are manufactured. The margarine serves as a butter substitute while the cake left after the oil is pressed from the seeds makes excellent feed for the stall-fed cattle. Countries, like Denmark, which specialize in the production and exportation of butter use much margarine at home and thus have more butter for export. The seedcake fed to cows helps make still more butter for sale abroad.

Wealth from waste. One of our most useful oils comes from cottonseeds. Once these were waste products of the cotton gin, and the piles of seeds became so large and produced such a bad odor that the gin had to be moved to a new location. Now the value of the seeds in some years is nearly one third that of the cotton itself. The seeds alone have brought the farmers of the South more than $200,000,000 in a single year.

After careful refining the oil is used in making substitutes for lard and butter. By far the greater part is used for this purpose. It is used in packing fish as a substitute for olive oil. It is also used in making salad oils and in the manufacture of soaps. The cake remaining after the oil has been expressed is used as cattle feed and as fertilizer. The United States is of course the greatest producer of cottonseed oil as well as of cottonseed cake.

Peanut oil. As we have already learned, the peanut has many uses. Under the name of monkeynut, groundnut, or goober, as well as peanut, it is raised in many parts of the world. The oil which it yields is of excellent quality and has much the same use as cottonseed oil. "Nut" margarine is made largely of coconut oil and peanut oil. The oil also is used in the industries, as in the making of artificial leather and kid gloves. We import millions of pounds of inedible oil, most of which comes from China.

Coconut oil. The coconut palm thrives in the hot moist lands of equatorial regions. It thrives best on lands near the sea. It is found on many of the islands of the South Pacific probably because nuts have fallen into the water and have been carried by the winds to other islands, thus causing new groves to spring up. The chief producing regions are Netherland India, the Philippine Islands, and British Malaya.

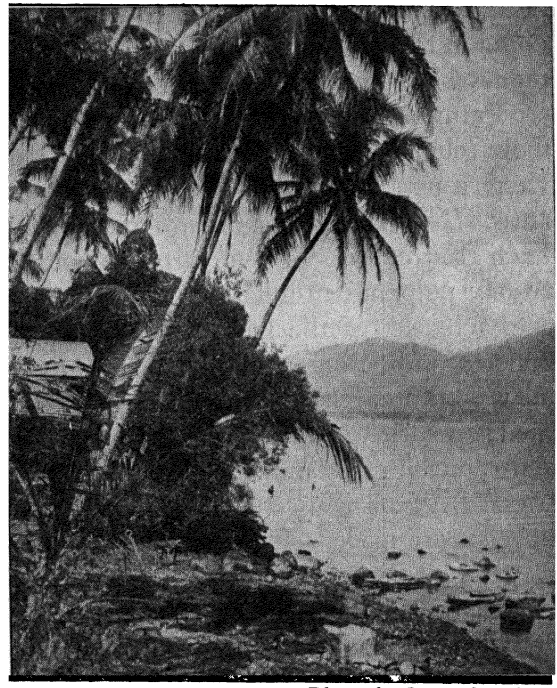


Photo by James Sawders

Coconut trees in Sumatra, one of the islands of Netherland India, supply much of the coconut oil and copra that we import.

From the nut of the coconut palm is obtained one of our most useful vegetable oils. It is used in making margarine, soaps, and cosmetics. The dried meat of the nut is known as *copra.* The oil may be expressed from the fresh meat or from copra. Both the oil and copra are exported from the producing regions.

The United States imports more coconut oil and copra than any other vegetable oil. It is also the greatest consumer of coconut oil. Other countries importing large quantities of copra are Germany, France, and Denmark. These countries are all noted for the manufacture of margarine. They import much more copra than coconut oil. This gives work for the oil mills and also gives them the cake as cattle feed.

The coconut palm is a very useful tree in its native lands. It provides oil and cake as it does for us. The milk within the nut furnishes a refreshing drink, and the meat serves as a nourishing food. From the leaves and wood materials are obtained for building houses, boats, and beds. A native who owns a small coconut grove

need not worry. From time to time he gathers the nuts, dries the copra in the sun, and sells the product to Chinese traders. With this money he can buy anything the coconut palm itself does not provide.

Palm oil. The oil palm like the coconut palm thrives in the hot moist climate of equatorial regions. The trees are native to the western part of central Africa where they are distributed over large areas. The fruit grows in large clusters at the top of a short trunk. Each fruit consists of two parts, an outer fibrous portion containing an oily pulp and an inner kernel, or nut.

Each part of the fruit yields its own grade of oil. Oil is obtained from the outer pulp by boiling the fruits in water. Then the oil is separated either by skimming the oil from the surface or by the evaporation of the water. This oil is used as food by the natives and is put in casks and shipped in large quantities to industrial countries. Palm oil is used in the manufacture of tin plate from which tin cans are made. The thin sheets of steel are dipped into a bath of palm oil before the coating of tin is applied.

Oil is also obtained from the kernels which the natives shell by cracking them between stones or by the use of a stone hammer. As a rule the kernels are shipped to importing countries where the shells are removed by machines. The oil from the kernels is superior to that obtained from the pulp. Palm-kernel oil is used in making margarine and lard substitutes, but it is used more largely in the manufacture of soap. A large soap company controls large areas in the Belgian Congo from which it receives oil for its factories in Europe and in the United States. To bring the oil and kernels to West African ports, it has constructed railroads in the forests and operates its own ships on the rivers.

Palm oil has been produced for some years on plantations in Netherland East Indies. This oil produced and prepared under careful supervision is superior to that of West Africa and brings a higher price in the world markets. Although the industry of this region is relatively young, even now the United States imports more palm oil from the East Indies than from West Africa.

Olive oil. This oil is obtained from the pulp of the fruit of the olive tree. The tree grows in all countries bordering the Mediterranean Sea, and it is those countries that produce and export the greatest quantities of oil. Spain, Italy, and Greece lead all other countries.

To secure the highest grade of oil, the ripe olives are ground

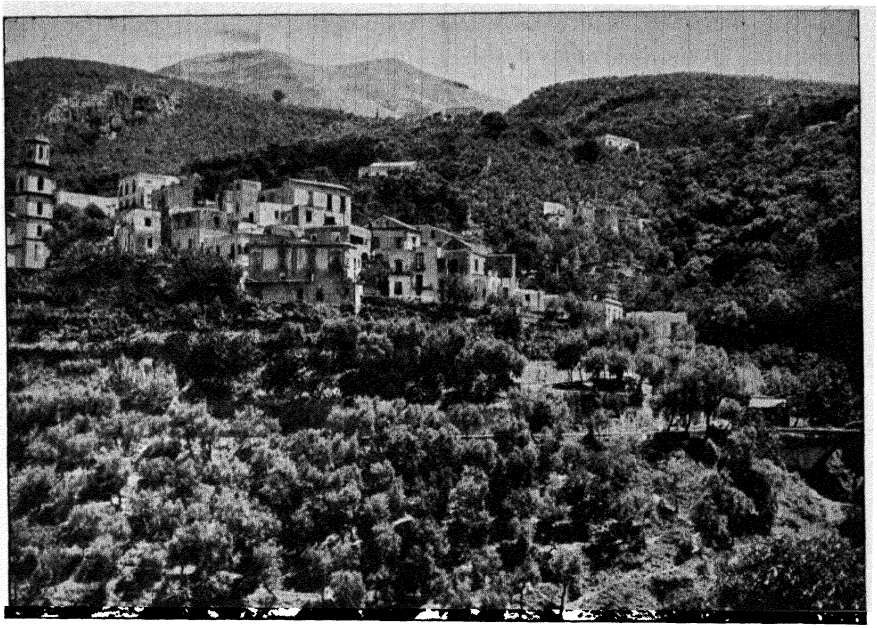


Photo by James Sawders

Terraced hillsides grow the highly prized olive trees that produce one of Italy's foremost exports. They are famous too for their productive vineyards. Terraced farms are common in Italy, where every inch of arable land must be tilled and planted.

lightly so that the seeds will not be crushed. Only a small quantity of oil is obtained by this gentle pressure. The pressure is increased and repeated several times. More oil is forced out of the pulp, but it is of lower grade.

In Mediterranean countries where the rainfall is light and animal fats are scarce and high, olive oil serves as a cooking fat and as a substitute for butter. It is used for packing fish, such as sardines, and is also used as salad oil. Because of the great demand for olive oil and because of its high price, it is often cheapened by the addition of cottonseed oil or peanut oil. For this reason Mediterranean countries have passed laws which make it difficult to adulterate their product. It is to their advantage to have a reputation for handling only a first-class oil. The leading importers of olive oil are the United States, France, Argentina, and Great Britain.

Soybean oil. We used to think of the soybean as being mainly a source of oil for soap and paints. We also thought of it as a product of Manchukuo and China. But we are finding so many

uses for the bean that we wonder where the list will end. Besides being useful for making varnishes, linoleums, and printer's inks, it is used in making artificial leather, and for plastics such as the steering wheel and the buttons on the panels of modern automobiles. It is said that the automobile industry finds more than ten different uses for the soybean.

Manchukuo and China produce a very large part of the world's crop of soybeans. In those countries, besides supplying food in several forms, the oil and the beans become a most important export. Manchukuo exports beans and oil to Japan, to the industrial countries of Europe, and to the United States. European countries, such as Germany and Denmark, use a refined form of the oil in making margarine and lard substitutes. The United States is finding so many uses for it that we are constantly increasing our acreage and yield. We are producing about three times the quantity that we produced ten years ago. Like the peanut the soybean enriches the soil by the addition of nitrogen.

Linseed oil. The very name "linoleum" tells us of what that article is made. As the oil hardens, it holds together the cork and gums which are used in making linoleums. Linseed oil is also used in paints and varnishes. As paint dries, the oil, by uniting with the oxygen of the air, forms a tough hard coat which protects from the weather the surface that it covers and improves its appearance. Printer's ink contains a large proportion of boiled linseed oil. The seedcake is used for cattle feed.

Flax is raised for seed where agriculture is carried on extensively, that is, where large areas are cultivated and where planting and harvesting are done by machines. India is perhaps the exception to this rule. The United States and Canada cultivate large areas for flaxseed in the spring-wheat region using machines as they do in the growing of wheat. The states of our country which lead in production are Minnesota and the Dakotas. Argentina, Russia, and India, however, all surpass the United States in the number of bushels raised. The United States not only uses all its own crop but imports several times as much as it raises.

When flax is grown for fiber, much hand labor is required in raising it, in harvesting, and in preparing it for the textile machines. For this reason flax raised for fiber is raised in lands where labor is cheap, as in Ireland, Belgium, Russia, and Poland. The same plant is used whether raised for seed or fiber, but, if raised for fiber, the



Courtesy of the Florida Agricultural Experiment Station

One of the many tung-oil groves that are being cultivated in Florida and in several other Southern States

plants are placed closer together and are not allowed to ripen. If allowed to ripen, the fibers in the stem become weak and brittle and therefore unfit for use as a textile.

Tung, or China wood, oil. Perhaps you have seen in an advertisement a picture of some one spilling or pouring boiling water on a highly polished table. The advertisement tells us that no harm has been done because a high grade of varnish was used in finishing the table. Such varnish owes its superior qualities to tung oil. It is the best quick-drying and waterproofing oil known, and industries have found hundreds of uses for it. Varnishes made from it harden rapidly and are resistant to heat and chemicals. It is also taking the place of linseed oil in the manufacture of linoleums. This oil is used in the making of printer's inks, in insulating electric cables, and in the manufacture of automobile brake bands. New uses no doubt will greatly increase the demand for this oil.

Tung oil comes from nuts borne by a tree native to central and southern China. The oil was introduced into Europe by Portuguese spice traders in the sixteenth century but did not reach the United States until about seventy years ago. Since that time the demand has

constantly increased. Although we import more than a third of China's output, that is not nearly enough to supply our needs.

About thirty years ago an American consul in China shipped a supply of seeds to this country. Seedling trees were planted in a narrow belt running from Florida to California. The climate and soil of our Gulf States proved to be well adapted to the tung tree. It is estimated that about 100,000 acres have now been planted to tung trees and the yearly yield from those areas has reached a total of 1,500,000 pounds. This, however, is only a little more than one percent of what we import from China annually. One small mill in this country producing 60 gallons per hour does the work of one thousand coolies using the crude methods of the Chinese. There is a good profit in producing tung oil, and no doubt the area planted to tung trees will be greatly increased. Mississippi now leads in acreage and production, followed by Florida and other Gulf States.

Guides to Study

1. What uses are made of vegetable oils?
2. Why is more attention being given to the production and use of oilseeds?
3. How does the margarine industry affect the dairy farmer in the United States? In European countries?
4. How does the use of cottonseed affect the cotton grower?
5. What uses do we make of oilseeds from equatorial regions?
6. What uses are made of oilseeds by primitive peoples?
7. Why is flax raised for fiber in some countries and for seed in others?
8. Why is more attention being given to the raising of soybeans in the United States?
9. Explain the increasing demand for tung oil in this country.
10. Why is it difficult to obtain all the tung oil that we need from China?

Research for Students

1. List the uses made of vegetable oils as food. List the uses made of them in industries.
2. On a desk outline map of the world indicate the producing regions of each kind of oilseeds.
3. Using encyclopedias and other reference books report to the class on methods of production and preparation for use of one or more of the oilseeds.

4. Write to the Department of Agriculture, Washington, D. C., for pamphlets on the soybean or the tung nut and prepare reports.

5. Write an essay on the following topic: The ways in which vegetable oils have come into my home.

7. LIVING FACTORIES OF THE FARM AND THE RANCH

Meat and Clothing from Grass and Grain

Domestic animals in civilized life. One of the first things done by prehistoric man to improve his living conditions was to *domesticate*, or tame, the animals which he found running wild about him. In the earliest Scripture stories we read of domesticated flocks and herds. Our life today would be barren indeed if we did not have the products of these domestic animals. Our meat would be limited to that furnished by hunters. We would have few eggs and very little butter, milk, or cheese. Leather and wool would be scarce and poor; and even transportation would be undeveloped.

Our whole history would be different if man had not tamed the horse, the cow, the ox, the camel, the sheep, the hog, the water buffalo, the elephant, the reindeer, the llama, the dog, the yak, the goat, and other animals which have been our faithful servants for thousands of years. These animals not only supply a large amount of our food and raw materials; they have also been invaluable in travel and transportation all over the world. The meat, dairy, leather, and woolen industries employ many thousands of workers in our country, and the combined value of these products easily exceeds that of all other American manufactures.

Before the development of water, steam, and electric power, beasts of burden did all our heavy work and were our chief means of travel and transportation. Even now the horse and mule are widely used in America; and in less progressive parts of the world beasts of burden are indispensable.

In this section we shall treat the four most important domestic animals of the United States: cattle, sheep, hogs, and poultry.

The Food We Get from Cattle

How cattle serve us. The two chief foods that cattle provide are meat and dairy products. Oxen formerly did most of the heavy work on our farms; but tractors and trucks have now replaced



Photo by James Sawders

Many different animals have been domesticated by man in order that he may have draft animals or beasts of burden. Here are llamas and donkeys carrying burdens in Bolivia. The llamas and donkeys each use their own trail along the high plateau.

them. However, many farms still use horses and mules, and horse-drawn delivery wagons are not uncommon in many cities and towns. In other parts of the world draft animals still do most of the farm work. But our chief dependence on cattle is for food.

Different breeds of cattle. Certain breeds of cattle have been developed to produce fine beef, and others to produce abundant milk. Among the breeds of beef cattle are the Shorthorn, Hereford, and Aberdeen Angus. The best-known milk breeds are the Jersey, Guernsey, Holstein, and Ayrshire. Some farmers raise one breed of cattle for both beef and milk; but this has not proved very successful.

Cattle are believed to have originated in the forests and grassy plains of Europe and Asia. They were first brought to America by the French and English settlers of the Atlantic Coast and by the Spanish who conquered Mexico. From the Atlantic Coast they gradually spread out into Canada and into our Middle West. From Mexico cattle were brought to Texas, to the Southwest, and to California. The different breeds of American cattle have thus been



Photo from Cook and Gormley

Hereford steers being fattened at a farm near Aurora, Illinois. Many grass-fed cattle from the Southwest are brought to this section to be fattened on grain before being sent to the stockyards.

developed from those brought from different parts of Europe. The English and Dutch have for centuries been raising special breeds for both dairy and meat production. Spanish cattle have also been skillfully bred. When these various breeds were brought to America, our farmers continued to experiment; and from their efforts we now have a highly developed science of cattle breeding. The United States Department of Agriculture, State Agricultural Departments, Agricultural Colleges, and individual ranchers have done much to improve the quality of our domestic animals.

Beef supply in early days. Before people began to move into the great West, the meat and dairy industries were confined to the Atlantic States. There was plenty of room for good pasturage and for the raising of hay and grain for winter feeding. As the population grew, there was an increasing demand for beef and dairy products. Cattle raising was a profitable industry. When working cattle or milch cows became too old for service, they were fattened and killed for beef. As the demand increased, young cattle were raised especially for beef and were fattened on the various farm

crops. Of course this beef was not equal in quality to that which we get today.

Development of the beef industry. In early days cattle were slaughtered on the farms where they were raised or somewhere near by. The beef was sold in local markets since there were no railroads to carry it long distances to other markets. Gradually, however, the population of the eastern cities increased, and thousands of pioneers moved westward to open up the prairie states of Ohio, Indiana, and Illinois. Here on the rich plains was an ideal cattle country, and settlers were soon able to raise large herds of fine cattle. There was a great demand for beef in the East; but there were at first no railroads to carry it to the eastern markets. As a result, the cattle raisers had to drive their herds across country for long distances. This cattle driving was an exciting but slow process. Steers occasionally got loose from the main herd and had to be chased and caught before the drive could be resumed. It took many men and horses to keep the cattle moving and to prevent losses. Sometimes there were even gunfights, when "cattle rustlers" tried to steal stray animals or to raid the large herds. The cow hands, or "cowpunchers," as they were sometimes called, had to be strong, fearless, and good horsemen. They were often quite violent in their language and conduct.

This overland cattle driving was very wasteful. Many animals died on the way, and those which reached their destination were so weakened and exhausted that they had to be rested and fattened before they were fit for use as beef. When the railroads were extended westward, large cattle cars were built, and the animals were loaded into them and carried to the eastern markets in a very short time. The days of the picturesque cattle drives were over. However, even cattle cars were not entirely successful, and many animals died on the long trip eastward, because the early freight trains were much slower than our present fast lines and the cattle often suffered from hunger, thirst, and crowding.

Before the railroads reached the Far West, great herds of cattle from Texas were still driven to the railroad terminals of the Middle West and there shipped to the East. Now the railroads reach all the great cattle centers, and there is very little shipping of live cattle for long distances.

The last great improvement in the transportation of beef was the refrigerated car. This made it possible to kill the animals near the

cattle ranches, to pack the meat into the cold cars, and to deliver it fresh to far-off markets.

Cattle raising. Cattle are raised both on farms and on ranches. On the farm there is usually good pasturage for summer grazing and crops of corn, hay, and alfalfa for winter forage. A ranch is devoted almost entirely to cattle raising. Our great ranches are mostly located in the regions of light rainfall on the Great Plains and in Texas and other parts of the Southwest. Here there is not enough moisture for general farming; but there are wild grasses of various kinds suitable for cattle grazing. While the cattle can live in these semiarid pasture lands, they do not grow fat on the wild-grass pasturage. Therefore, instead of trying to fatten their cattle for the market, many of these ranchers sell the young cattle to farmers in the Corn Belt. These animals are shipped to the farms, are fattened there on hay and grain, and then are sold for beef.

Corn is an especially good grain for fattening cattle and swine. Enormous crops of corn are raised in our Middle West; but most of it is fed to cattle and hogs. Corn does not keep well, and there would be no export market for our great crops if they were not converted into meat by being fed to animals. Thus the farmer gets a profit from his grain by selling it in the form of beef and pork. The Corn Belt farms are an important factor in the production of meat and meat products for our tables.

Meat packing. The killing of the animals and the preparation of the meat for sale is called *meat packing*. This business usually ranks first or second among our manufacturing industries in the value of its products, and it employs more than one hundred thousand people in more than one thousand plants. The production of meat, lard, and by-products is now valued at about $2,000,000,000 a year. Meat packing does not mean that all meat is packed in boxes, barrels, or other containers. Many meat products are so packed; but beef is handled differently. The animal is first killed and *dressed;* that is, it is skinned, cleaned, and certain parts removed. The carcass is then hung up, thoroughly chilled, and shipped out in that form. All this work is done with great speed and skill, and much machinery is used. Some plants slaughter thousands of cattle every day.

Besides fresh meats packing houses turn out many other products. Bacon, hams, and shoulders are smoked. Sausages and sausage meat and canned meats of various kinds are prepared. The large packing houses have cold-storage distributing centers in many large cities

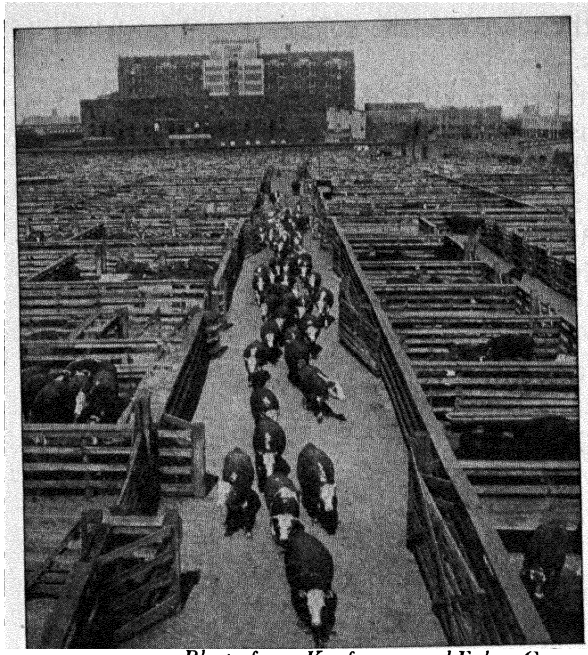


Photo from Kaufmann and Fabry Co.

Cattle traveling down their last lane at the Chicago Stockyards

throughout the country. These warehouses keep the surrounding regions supplied with fresh meat at all seasons.

Packing houses also make a large number of by-products from the cattle that they kill. Fertilizers are made from bones, blood, and other waste materials. Glue is made from hoofs and bones; soap, margarine, and glycerine are made from fats; strings for tennis rackets and musical instruments from the intestines; and leather from the hides. Another important product of recent development is thyroid extract used in medicine. Nothing is allowed to go to waste; it has been said that in the slaughtering of hogs they use everything but the squeal.

Packing centers. Most of the great packing houses are located in the Middle West, in or near the Corn Belt. Can you see the reason for this? The leading meat-packing cities are Chicago, Omaha, Denver, Kansas City, East St. Louis, Fort Worth, Sioux City, South St. Joseph, South St. Paul, Cincinnati, and Indianapolis. These meat-packing cities are all great railroad centers, which makes it easy for them to get their raw materials, the live animals, and to ship their finished products to all parts of the country.

The Dairying Industry

Dairy products. Our milk comes almost entirely from cows although some goat's milk is used. Besides fresh milk our dairies produce condensed, evaporated, and powdered milk. When some of the water is evaporated from milk and sugar is added, we have *condensed milk*. When unsweetened, the product is called *evap-*

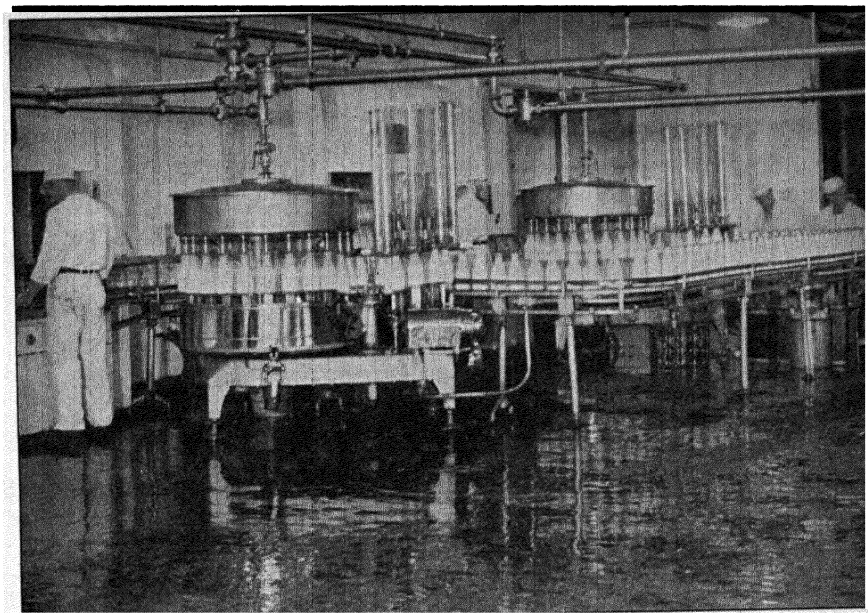


Photo by James Sawders

Strict regulations control the production, handling, and distribution of milk and milk products. Here is a section of the interior of the largest milk-bottling plant in the world where automatic machinery does the work.

orated milk. When the water is entirely evaporated, we get *powdered milk.* Canned, condensed, and evaporated milk will keep for a long time, and they have become very popular as substitutes for fresh milk. For camping, cruising, and picnic trips canned milk is convenient and economical. In homes it is widely used for cooking and with tea and coffee. Powdered milk is an important ingredient in malted milk, baby foods, and prepared cocoas. Butter is made by churning the cream from fresh milk, and it is pure fat. Cheese is made from whole milk and contains both fat and protein. Pure cream is also sold for use with coffee and for whipped cream, ice cream, and other desserts. There are about 4500 ice-cream manufacturing plants in this country which require annually two and one half billion quarts of milk.

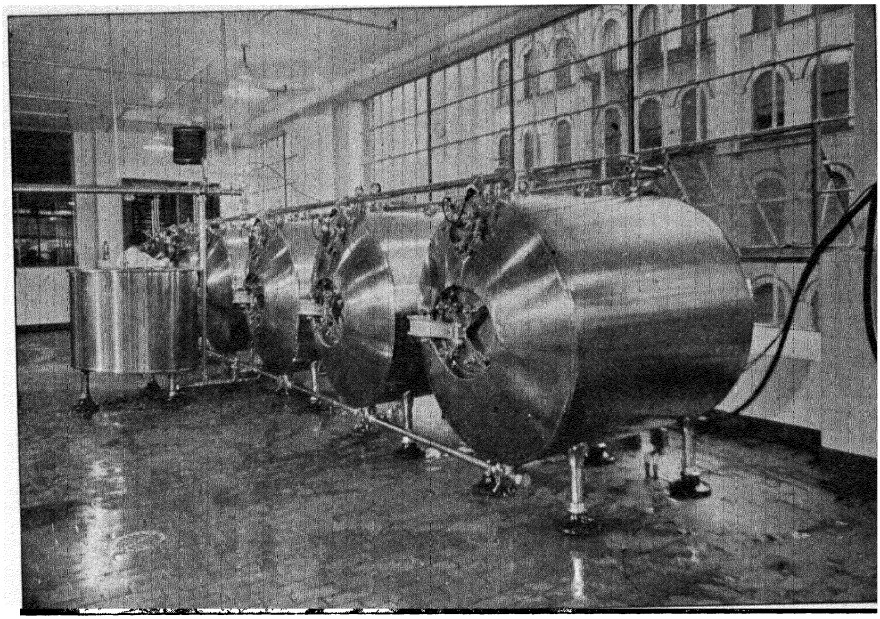
Milk production. The dairy business is one of our greatest industries with an annual production of about $4,000,000,000. On 4,500,000 American farms 26,000,000 dairy cows produce almost 50,000,000,000 quarts of milk. Dairy cows are found practically all

over our country. Even in the suburbs of large cities we frequently see scattered groups of cows grazing on vacant land. However, certain sections are better suited than others for milk production. Three conditions favor the development of good dairy cattle: a cool climate, good pasture and hay lands, and nearness to grain supplies. The best areas of this kind in our country are New England and the Middle Atlantic States, the region just north of the Corn Belt, and parts of the Pacific Coast. Among the leading milk-producing states are Wisconsin, Minnesota, New York, Iowa, and Illinois. More than fifty percent of the dairy cows of the United States are found in the area north of the Ohio and Potomac Rivers and east of the Missouri River. This is due not only to the favorable climatic conditions but also to the fact that more than fifty percent of the people of the United States live in the same area. To supply the dairy needs of so many people is an enormous undertaking.

The breeding of dairy cattle. Just as in the case of beef cattle, special attention has been given to the breeding of dairy cows. Some breeds produce milk rich in cream for buttermaking. Others give larger yields of milk which is not so rich in cream but is well suited for family use or for cheese. Among the finest breeds of buttermakers are Jerseys, Guernseys, Alderneys, and Ayrshires. For large milk production the favorite breed is the Holstein-Friesian. These are the large black and white cattle which are so often seen grazing in our pastures. All of these breeds convert their food into milk rather than into fat beef.

Dairying methods. Like the packing houses, modern dairies utilize machinery and skilled labor to improve and increase their production. Fresh milk is collected daily from the farms, placed in refrigerator cars, and rushed to the central dairy. Here it is graded, bottled, and pasteurized. Pasteurizing is done by heating the milk to a temperature of about 145° Fahrenheit for a period of thirty minutes. This is done to kill any disease germs which may be in the milk. The process gets its name from Louis Pasteur, the great French scientist, who discovered the fact that germs cause disease and suggested means to combat them. After the milk is cooled, it is delivered promptly to the stores and homes of the cities and towns in the vicinity. Health authorities enforce clean methods in the production and delivery of milk, and their efforts have greatly reduced the spread of certain diseases.

Butter is now made almost entirely by machinery. Power-driven



Courtesy of Borden's Farm Products

Battery of pasteurizing tanks in a modern dairy plant. Their use insures a product uncontaminated by disease germs.

separators remove the cream, which is then churned in another machine. Even the packing is done by machinery, and the result is a very high-grade, pure product.

In making cheese, the protein part of milk, known as *casein*, is coagulated, or made into curds. These are pressed into the desired shapes and allowed to ferment for weeks or even for months. Cheese is also packed by machinery. There are a great many different kinds of cheese. They are all made from milk; the difference comes partly from the flavoring matter used, but chiefly from the different kinds of microorganisms used in the process of fermentation. The amount of water left in the curds also affects the quality of the cheese. Our greatest production is of American, or Cheddar, cheese; but in Wisconsin the people of Swiss descent make very fine Swiss, Limburger, and other types of foreign cheeses.

The dairy business has been greatly helped by the development of coöperative organizations of farmers similar to the fruit coöperatives of California. These coöperatives collect the milk, prepare it for sale, operate creameries, and see that the farmers get the best possible returns for their products.



available for pasturage, much grain, cottonseed meal, and oil cake must be imported for cattle feed. The United States and Argentina supply large quantities of these imports.

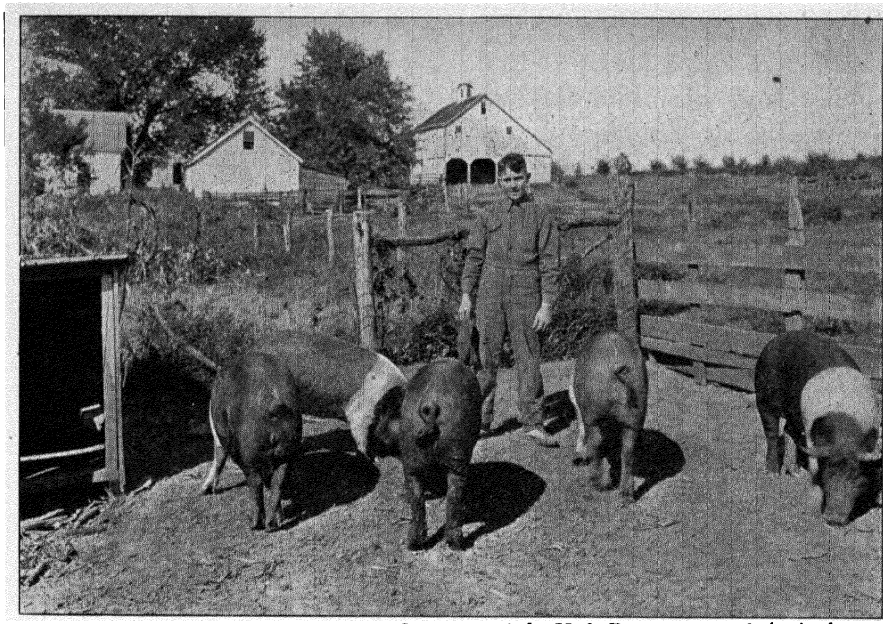
World trade in dairy products. The United States uses most of the butter and cheese produced here, and there is little left for export. We do, however, export large quantities of condensed and evaporated milk in cans. We import small amounts of butter from Denmark, New Zealand, Argentina, the Baltic States of Europe, and a few other countries and a considerable amount of the special types of cheeses made in Europe. The leading cheese exporters are New Zealand, the Netherlands, Canada, Italy, Switzerland, and Denmark. The largest exporters of butter are Denmark, New Zealand, Australia, and the Netherlands. The United Kingdom and Germany import more butter and cheese than any other countries. Their large populations require so much fresh milk that they have too little surplus for the manufacture of butter and cheese.

From Corn to Pork

Swine. While hogs are raised in all parts of the United States, more than half of our swine are found in the Corn Belt. This is because corn is a very fine fattening food for all animals and for swine in particular. The farmers of the Middle West raise far more corn than they can sell as grain or meal. But there is a world-wide market for pork; therefore, the corn is fed to the hogs and a good profit is realized.

Iowa leads all other states in both corn and hog production. Other great pork-producing states are Illinois, Indiana, Ohio, Missouri, Minnesota, and Nebraska. In many other parts of the country hogs are fed on local crops, like the peanuts of the South and the acorns and other nuts of mountain regions. On farms hogs dispose of a large amount of waste materials, such as skim milk and discarded fruits and vegetables. They will eat almost anything.

Hog raising. The raising of hogs does not require so much labor or time as cattle raising. They are often turned loose in fields of clover or alfalfa and grow fat. They are even put into cornfields in the fall, where they do their own harvesting. They will clean out a field of almost any kind in a very short time. They have tremendous appetites, and therefore they grow very fast. It takes only about nine months for a hog to grow to full marketable size. Since it takes two or three years for a steer to reach a salable weight,



Courtesy of the U. S. Department of Agriculture

A 4H boy considering his prospects of having a prize winner among this group of Hampshire hogs

many farmers prefer to raise hogs. Of course, the full-grown steer will equal several hogs in value; but the returns from swine are quicker. In the Corn Belt there are more hogs than cattle; but in the country as a whole cattle exceed swine in number.

Hog products. The chief use of swine is for the production of pork in various forms. Hams, shoulders, loins, bacon, and lard are the most important of these; and they are prepared in the packing houses already described (p. 135). Most pork is smoked, but a large amount of fresh pork is handled in the same manner as fresh beef.

There are also many by-products from swine. Their bristles are used in brushes; their hides make a tough, strong leather; and practically every part of the animal is used. Even the feet and knuckle-bones are pickled and sold as a delicacy.

Food and Clothing from Sheep

Sheep in history. In our earliest historical records we read of the sheep as a domesticated animal. Flocks of sheep were one of the first forms of wealth. In early religious rites young sheep were sacrificed as burnt offerings. Wool from the sheep's fleece was the

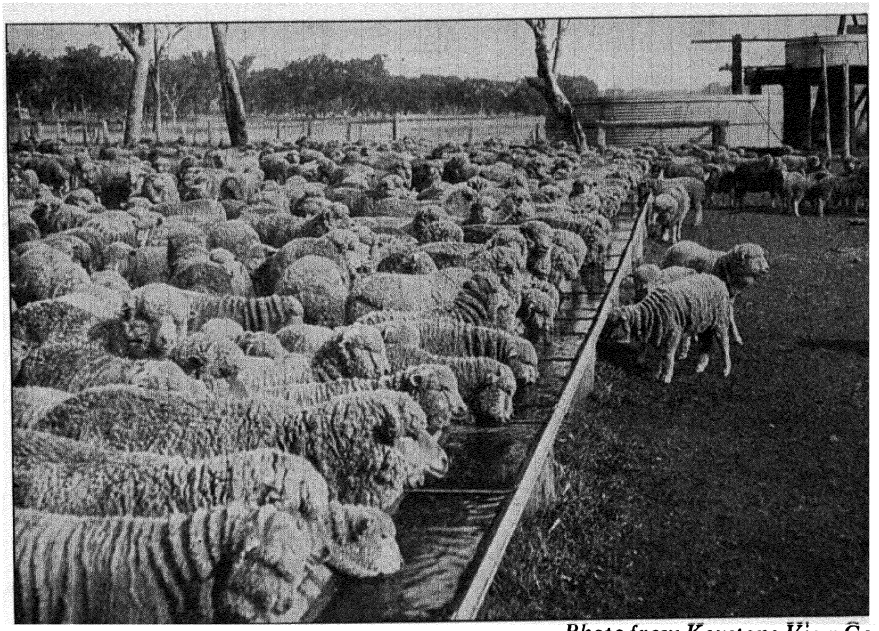


Photo from Keystone View Co.

An Australian water trough at which five thousand sheep slake their thirst

earliest form of woven cloth; and the skins of sheep were used both for clothing and shelter. Their flesh was one of the first kinds of meat to be used as man passed out of the hunting stage.

Sheep are well suited for life in the dry, semidesert regions where those ancient people lived. They can eat coarse grasses and even weeds and shrubs which are not relished by cattle. Their small muzzles and sharp teeth enable them to clip vegetation very close to the ground. Besides this they are so light and sure-footed that they can climb rough slopes and therefore thrive in regions too hilly for cattle. Consequently we find sheep scattered very widely over the entire world.

Kinds of sheep. Sheep give us wool for weaving and mutton for food. While all sheep produce fleeces from which wool is spun, scientific breeding has produced several types which excel in wool production. Our chief wool producer is the Merino, or Spanish type of sheep. For mutton our best type is the Southdown, which is of English origin. There are crossbred types of sheep which give good yields of both wool and mutton. These are especially numerous in Australia, which is the greatest sheep-raising region of the world.

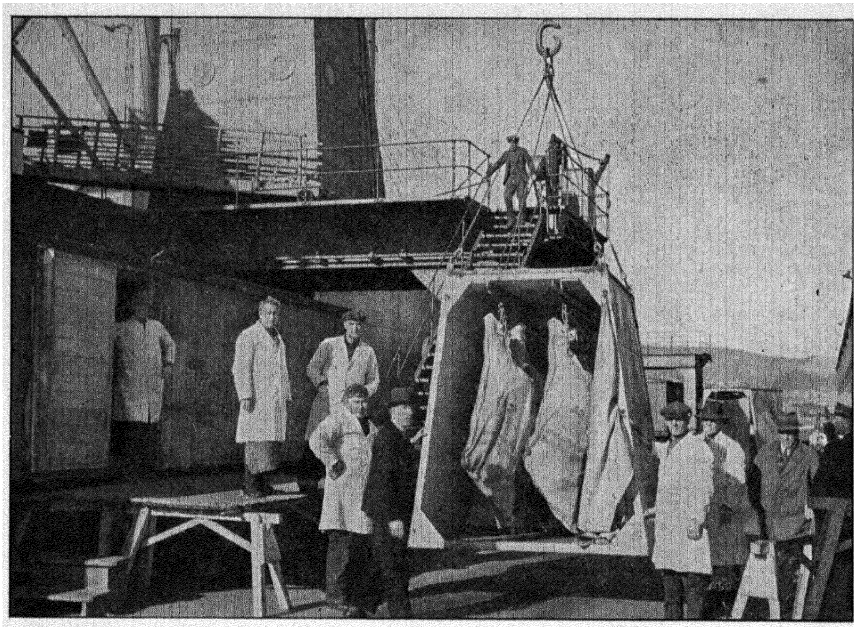


Photo by James Sawders

Loading frozen meats for English ports at Wellington, New Zealand. The modern miracle of artificial refrigeration makes this journey halfway around the world possible.

Here in the United States we raise sheep for wool in the dry Western States; but in the Middle West sheep are raised chiefly for mutton. Thousands of young lambs are shipped into the Corn Belt to be fattened, just as cattle are. The same great packing centers prepare the lamb and mutton for sale in the large city markets.

Our greatest sheep-raising state is Texas. Others with more than 2,000,000 head each are Montana, California, Utah, Wyoming, Idaho, New Mexico, Oregon, and Ohio. Our manufacturing industries require so much wool that we are forced to import large quantities each year. These imports come mostly from Australia, Argentina, and South Africa. Much of this imported raw wool comes into the port of Boston, which is our greatest wool market and the center of a great woolen textile region. The hides of sheep are also used for leather.

World trade in meat. We hear a great deal about the high standard of living in the United States. One feature of this standard is the large amount of meat consumed by our people, which is much larger than that eaten in any other country. When our population

was smaller and our meat production large, we exported a great deal of beef and pork to Europe. At one time whole shiploads of live cattle were sent to England. Later frozen beef was exported. But now our population is so large that our meat production does not leave much surplus for export. We still export large quantities of pork products, but very little beef. Indeed we ourselves import a large amount of canned beef from Argentina.

Only a few countries produce surplus meat. Argentina and Uruguay lead in beef exports, New Zealand and Australia in mutton and lamb, and the United States and Denmark in hog products. Canada, the Netherlands, Brazil, Poland, and Eire (formerly called the Irish Free State) all export meat products.

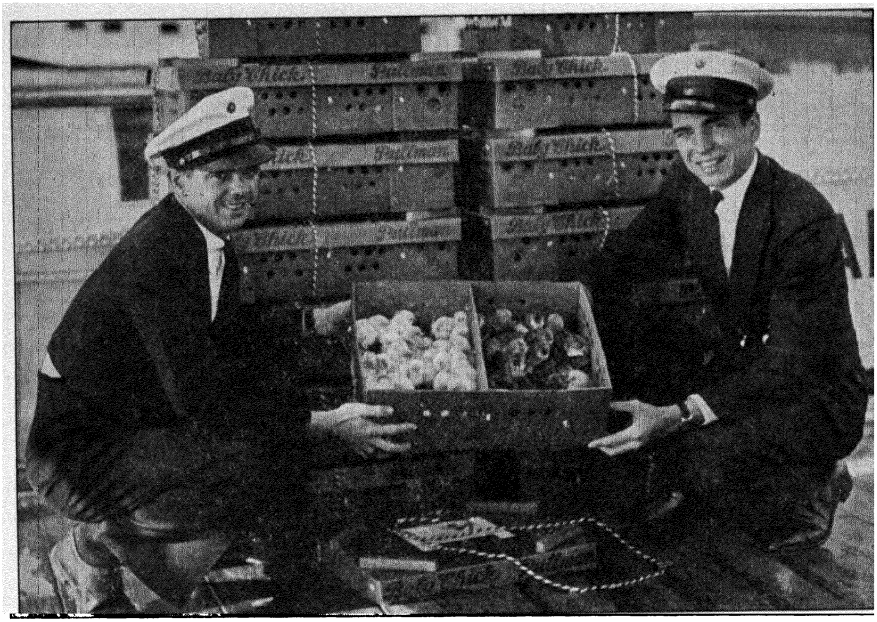
Meat in Asia. Knowing that India and China have a combined population of nearly 850,000,000, we might think that these two countries would consume large quantities of meat. However, such is not the case. In India vast numbers of the people practice the Hindu religion, which prohibits the use of meat for food. So, although India has one quarter of all the cattle in the world, they are nearly all used as beasts of burden or for milk production. China has comparatively few cattle and sheep, and beef and mutton are almost unknown there. Hence, it is easy to understand why Australia and New Zealand find no markets for their meat in Asia, but send it halfway around the world to Great Britain and other European countries.

Poultry and Eggs

Fowls as food producers. The word *poultry* is usually applied to chickens, but it also includes turkeys, ducks, and geese, all of which are important food products.

Chickens, like cattle and sheep, are of two varieties. Some are bred to produce heavy, meaty birds; others to give a large egg yield. The ordinary farm usually raises a utility breed which is good for both meat and egg production. Breeds vary greatly in color and size, and there are a great many mixed types.

Poultry farming. Poultry farming has become a highly specialized industry. Hatching is done in large incubators, often heated by electricity. The baby chicks are either shipped to other farms or raised to maturity in heated brooders on the farms where they are hatched. Many thousands of day-old chicks are shipped by mail and express to all parts of the country and usually arrive in good



Courtesy of Miami News Service

Shipping baby chicks to South America by airplane—an industry that is approaching a million dollars a year

condition. These baby chicks require no food for several days, living on the yolk of the eggs from which they were hatched.

Many young chickens are fattened rapidly and sold when about three months old as broilers. Chickens more than a year old are called *fowl* and are less tender than younger birds. An enormous number of chickens and fowl are used as food. Canned chicken soup is sold in great quantities. Eggs are also an important article of food, and their production and sale is a large industry.

The poultry business. The greatest poultry and egg production in the United States is in the North Central States, particularly Iowa, Illinois, Missouri, Kansas, Ohio, and Indiana. Texas, Pennsylvania, New York, and California are also great poultry states. But every section of the country abounds in poultry. Accurate figures are impossible to obtain; but it is estimated that there are in the United States more than five hundred million chickens, and that each year there are produced over two and one half billion dozens of eggs. Turkeys, ducks, and geese are not nearly so numerous; but turkeys are becoming more and more popular, particularly during the fall and winter holiday seasons.

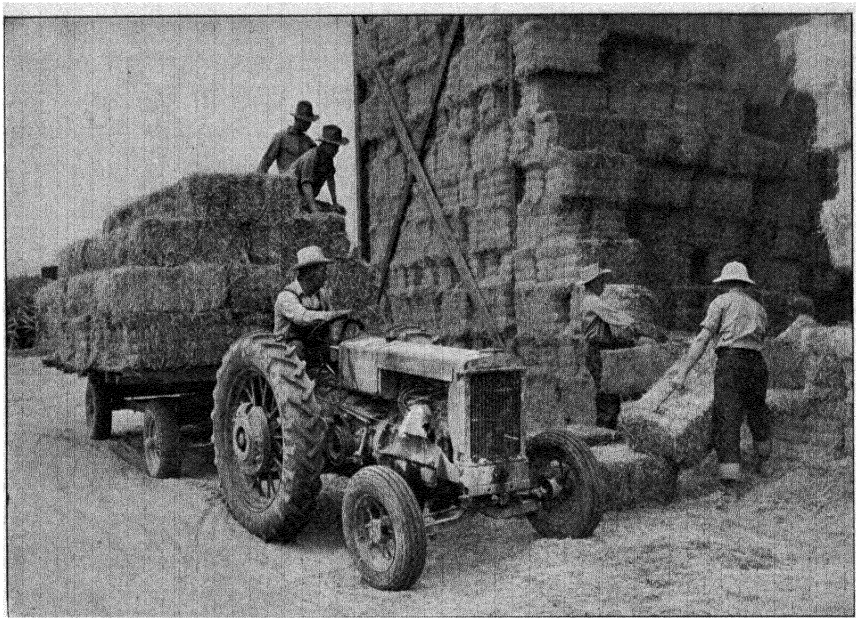
Among foreign countries one of the greatest poultry and egg producers is China. The Chinese are the greatest exporters of eggs in the world. They specialize in reducing eggs to a powder and exporting them in this form. The Chinese also consume vast numbers of chickens and eggs as food. (*I. 610*)

The Importance of Hay

What animals eat. Grass and hay are the main foods of cattle, sheep, horses, and mules. Grass is so common that we do not realize its importance. But if it were not for grass, we would probably have no beef or milk, no wool or leather. During the warm season animals live and thrive entirely on the grass, clover, and alfalfa of the open pasture. In cold countries no grass is available in winter; so grain and dried fodder must be supplied. The silo, filled with cut-up cornstalks and other vegetation, supplies much winter food; but hay is the farmer's main reliance. The northern farmer must harvest hay in summer and store it in barns or in outdoor haystacks. In warm countries no such storage of hay is necessary.

The hay crop. Hay ranks third among our crops in value. It is mostly used locally and not exported; so we read nothing about it in trade statistics. Because of the enormous use of the automobile, the autotruck, and the tractor, the number of horses and mules on farms has decreased greatly; but the production of hay is as large as ever. This is because more hay is fed to dairy and meat animals than formerly. Much hay is also sent to cities and towns where horses and mules are still in use. Also hay is shipped to farms where there are large numbers of animals but very limited pasturage. As a result, hay is an important commodity of domestic trade. For instance, in a recent year, over three million tons of hay were transported on the Ohio River alone.

Hay production. A glance at the map on page 37 will show that the great hay-producing regions in the United States are in the Northeast, in the Corn Belt, and in the section just north of the Corn Belt. The reason for this distribution is largely climatic. In these areas there is usually well-distributed summer rainfall, with enough sunny weather to permit the harvesting and drying of the hay. The heavy winter snows prevent the killing of the grass roots and thus protect the crop. The soils of these areas are good grass producers. In many parts of New England there are hilly tracts which are too rough for general farming, but are good grass lands.



Courtesy of the Goodyear Tire and Rubber Co.

From Arizona's irrigated land four crops of alfalfa a year are cut. This farm produced 17,000 bales in 1937, part of which is shown in the picture.

The great animal industry of the Middle West and the Northeast makes hay an extremely valuable product in these regions. Pastures and hay lands occupy more than half of the farm acreage there.

In the drier regions of Kansas and Nebraska and in the irrigated areas of the Far West the leading hay crop is alfalfa. This is a kind of clover with very long roots. Their length enables this plant to reach down into the soil and secure moisture in very dry areas and to resist drought. Alfalfa yields several crops each season and supplies fodder which is very rich in protein. It has been of great assistance to cattle raising in the West.

The leaves of various other plants besides grasses are dried and used as forage for cattle. Legumes, such as the soybean, are thus used; and peanut vines supply good cattle feed. Even when hay is not cut, grasslands are everywhere used for the summer pasturage of all kinds of animals. Poultry are often allowed to run freely in grassy and unproductive fields, where they feed on worms, insects, and various kinds of seeds.

Leather and Its Uses

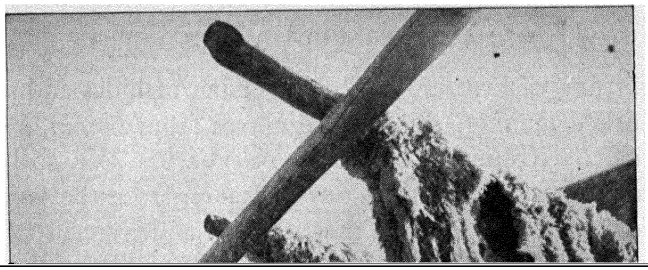
The tanning of leather. The conversion of hides and skins into leather is called *tanning*. This word comes from *tannin*, a chemical obtained chiefly from hemlock and oak bark. We still hear of *oak-tanned* leather. After the skins are taken from the tanning vat, oil is worked into them to make them flexible and waterproof.

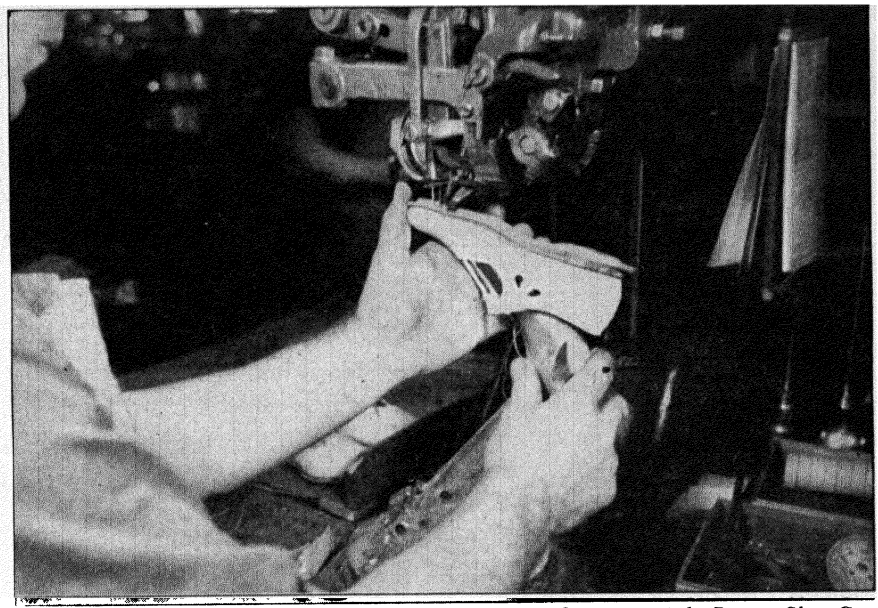
Oak and hemlock trees were formerly very plentiful in northeastern United States, and for this reason New England early became a leading leather region, Salem, Lynn, and Peabody being important centers of the industry. When the tanbark supply became scarce, the industry spread to other sections; but New England still makes a large amount of leather. Philadelphia now leads all other cities as a tanning center. Chicago and Milwaukee also rank high in leather production. These western cities have the advantage of being close to the source of supply of hides and skins, and they also have access to large supplies of tanbark. We import tanning materials of various kinds in large quantities.

The Philadelphia leather industry was greatly benefited by the invention of the chromium method of tanning. A chemical compound of chromium is used instead of tannin, and this chrome leather is better and less expensive than other kinds and is now very widely used.

The importance of hides. The United States makes more leather than any other country in the world. Germany, the United Kingdom, France, the Netherlands, Czecho-Slovakia, and Canada also produce a great deal of this product. Originally American tanners could get all the hides that they needed from our own farms and ranches. The industry now demands so much raw material that we are forced to import large quantities of hides and skins. Cattle hides come to us chiefly from Argentina, Canada, and Uruguay; sheep and lamb skins come from New Zealand, Argentina, and Great Britain; and goat and kid skins from India, China, and Brazil. Many other lands send us smaller quantities of various kinds of hides and skins. Boston and Philadelphia are two of our greatest ports for the importation of these raw materials.

Leather in industry. The chief use of leather is for the manufacture of shoes, in which the United States leads the world. The people of the United States are the best-shod people in the world. Our first shoemaking centers were in New England, where the shoe





Courtesy of the Brown Shoe Co.

American shoe-manufacturing machinery has made this country the unrivaled shoe producer of the world.

leather are already being used. Wood, paper, and cloth are treated chemically and used instead of leather for many purposes. Chemical research thus attempts to find new synthetic products to take the place of many natural raw materials.

Guides to Study

1. Why may domestic animals be thought of as living factories?
2. What advantages are there in developing fine breeds of animals?
3. How do the methods of transporting meats and other animal products from the West to the East differ from those of a hundred years ago?
4. In what type of country is grazing carried on? Why?
5. How does the care of cattle in the Corn Belt differ from that on the Great Plains to the west?
6. How does the utilization of the by-products of the packing plants affect the price of meat? Why?
7. In what parts of the United States is dairying most important? Why?
8. Why is dairying important in densely settled countries?
9. Why does the Corn Belt farmer prefer to sell his corn in the form of beef or pork?

10. What kind of region is well adapted to sheep raising?

11. Why does the United States export less beef than formerly?

12. Why is the poultry industry more widely distributed than any other animal industry?

13. Explain why hay is one of the country's most valuable crops.

14. What countries supply our tanneries with hides, skins, and materials which contain tannin?

15. What efforts are being made to make our supply of leather go as far as possible? Why?

Research for Students

1. Using encyclopedias or other reference books, learn from what part of the world each of our domestic animals came.

2. Make a list of the different breeds of cattle and sheep and find out the advantages of each to the rancher or farmer.

3. Consult Table 35 in the Appendix and make bar graphs showing the number of cattle, sheep, and hogs in a few of the leading countries.

4. Assign to members of the class special reports on: Life on a cattle ranch; Life on a Corn Belt farm; What takes place in the stockyards.

5. Trace milk from the farm (1) to the bottle of milk left on the doorstep in the city; (2) to cheese and butter in the dairy store of the town or city.

6. Learn all the ways in which cooperative societies aid the farmer or dairyman.

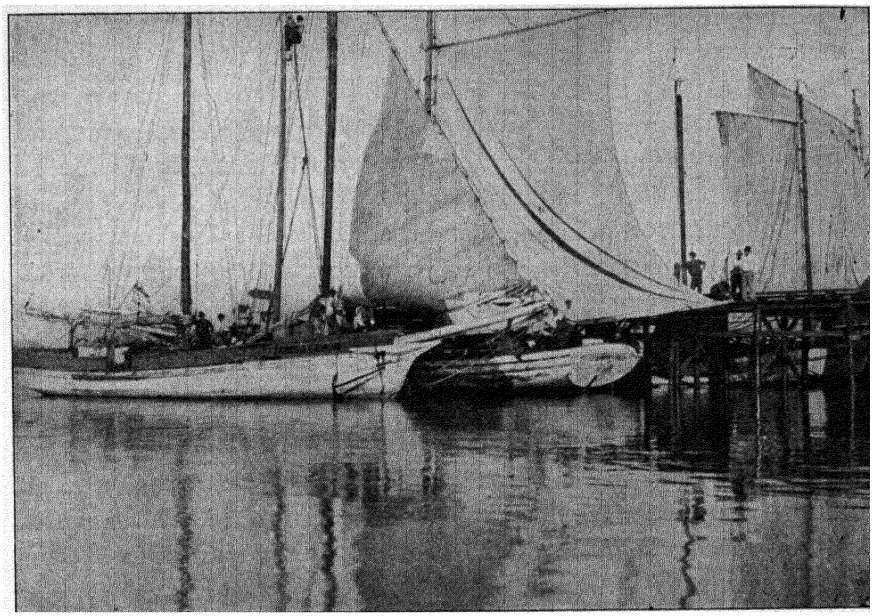


Photo by Anthony V. Ragusin

Fishing boats in the Back Bay harbor at Biloxi, Mississippi, where more than five hundred boats comprise the fishing fleet engaged in gathering sea foods of many kinds

FISHING FROM SHORE TO SHORE

Fishing led to knowledge of the world. From earliest times fishermen have been pioneers. They ventured farther and farther from their own shores till new lands were discovered. In the new lands they found new products to take home and new markets for the homeland. Thus the fisherman became first a discoverer, then an explorer, and finally a merchant or carrier of goods. Besides carrying goods the traders transmitted ideas from country to country. In this way the people of one country came to know their neighbors better and to progress more rapidly. The great discoverers and explorers who conquered their fears and found new routes around Africa to India and across the Atlantic to the Americas were sailors

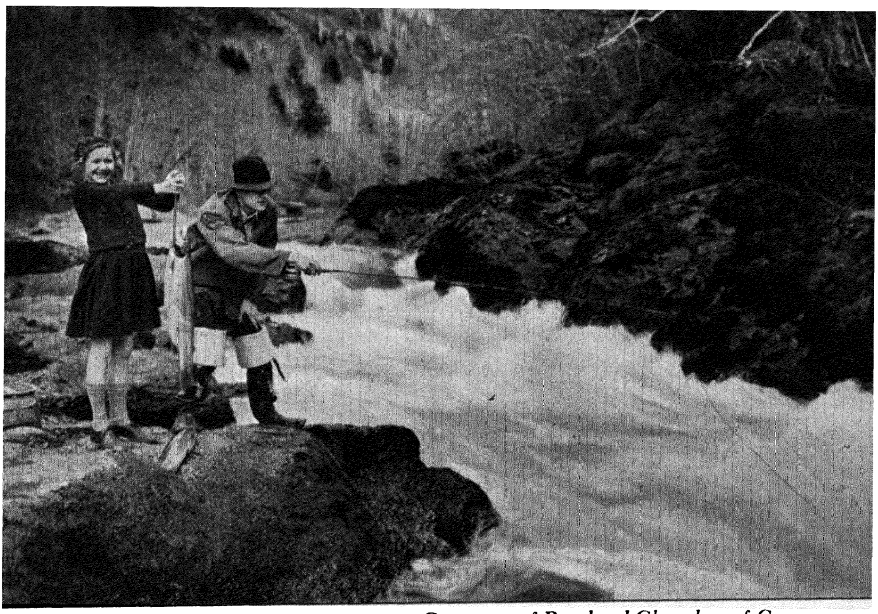
who gained their early knowledge of the sea on fishing vessels. The vikings, the British, the Dutch, the Spanish, and the Portuguese were all great explorers and no doubt gained their knowledge of the sea as fishermen.

Fishing leads to other industries. The fisherman not only supplies us with food and other products of the sea, but he gives work to many people. Fishing vessels must be built; nets, trawls, and hooks must be provided; and rubber boots and oilskin coats and trousers must be made. After the fish reach land, they must be dried, salted, canned, and transported to market. Fresh fish are stored in great refrigerating plants cooled by modern machinery. On its way to market the fish must be kept cool by ice cut from ponds or made by artificial refrigeration.

By-products of fishing serve many useful purposes. The oil of cod and halibut is used in medicine while the menhaden and other fish give the currier his oil for finishing leather. Whale oil is also used for this purpose as well as for lubricating machinery and for making soap and candles. The refuse left after extracting the oil from fish is known as *scrap* and is used as a fertilizer. When refined, this scrap becomes *fish meal* and in combination with other feed is fed to animals.

Leather is made from the skins of fish. The skins of seals and sharks are tanned and used as leather. Porpoise skin is tough and is used for lacing for machine belts. Walrus skin is very thick and must be split before being treated. Directly and indirectly the fishing industry gives work to many people and supplies us with many useful products.

Let's go fishing. Many a tired office worker leans back in his chair and dreams of boyhood fishing days. Soon the dream gets the better of him, and with rod, reel, and high boots he seeks lake or stream for a week or two of sport. Fishing for sport may be fun for the sportsmen, but it is a real business for men who guide the fishermen, cook their food, paddle their canoes, and pitch their tents. It is also real business for railroads which carry thousands of sportsmen from city to lake and forest and home again. State and Federal Governments stock streams and lakes with trout and other fish that the fisherman may not be disappointed when he comes. Wardens have authority to see that all laws relating to fishing are obeyed. Much advertising is done to inform and to tempt men to leave their work and spend their money in one region or another.



Courtesy of Portland Chamber of Commerce

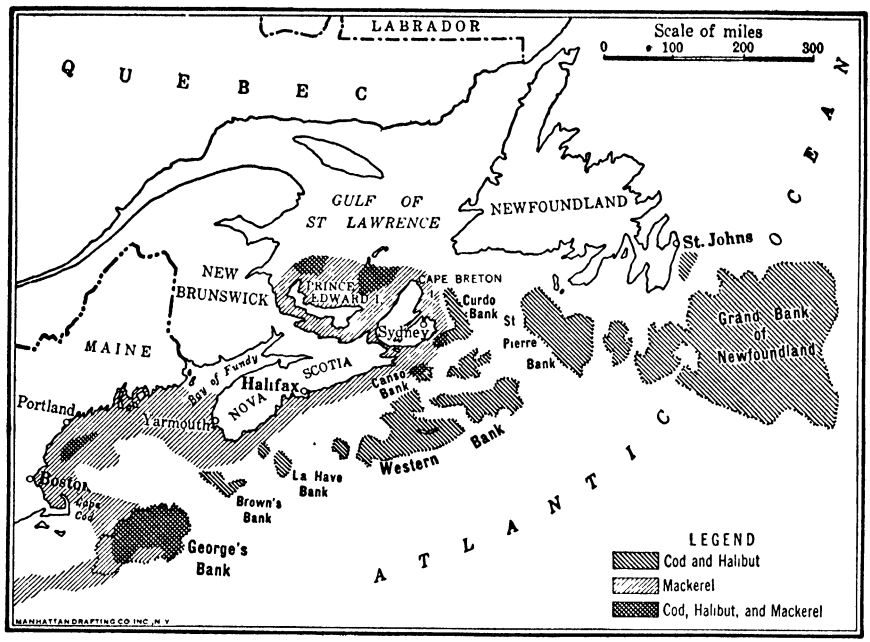
Trout fishing on this swift-flowing Oregon stream seems like a fisherman's dream come true.

Fishing for sport brings good returns both to those who catch the fish and to those who labor for the fisherman's success.

Location of fishing areas. Few fish are taken in mid-ocean. The important fishing regions of the world are located upon the continental shelves where the water is relatively shallow and often with rocky bottom. Shallow areas some distance from shore are known as *banks*. The Banks of Newfoundland have been famous fishing grounds ever since the discovery of North America. Light reaches the bottom of the sea on the banks and thus makes possible the growth of plant life upon which the fish and their prey feed. Some of the world's most noted fishing grounds are in the shallow waters off the northeastern coast of North America, the northwestern shores of Europe, and the eastern shores of Asia.

Some kinds of fish as the salmon, shad, herring, and smelt swim up the streams to spawn either in the streams themselves or in the ponds or lakes from which they flow. On these streams many fish are taken as they swim up the streams. This method is, of course, very destructive of fish life and must be carefully restricted.

The Bureau of Fisheries gives the annual commercial catch of



fishery commodities all over the world as 34,000,000,000 pounds worth $744,000,000.

Fisheries of the United States

Fisheries of the North Atlantic. The fishing industry off the northern coast is one of the most important of North America. Here lie the Newfoundland Banks and the Georges Banks. The fish taken on the banks live near the bottom of the sea and are known as *ground fish*. These include the cod, haddock, and halibut.

Ground fish. Many years ago these fish were caught from the decks of the fishing vessels by means of hand lines. Later the sailors went out from the vessel in small boats, called *dories*, and fished with hand lines. In still later times fish have been taken in much larger numbers by means of trawls. These consist of strong lines from a quarter mile to a mile in length. Short lines with baited hooks are attached to the long line five or six feet apart. Each end of the long line, or *trawl*, is supported by a floating keg. The trawl sags in the water until the baited hooks are near the bottom. Fish are taken from the trawl once or twice a day. As the fish are removed, fresh bait is placed on the hooks. The fish are taken to the vessel, split, cleaned, and salted. When the catch is completed, the vessel sails

to a fishing port, such as Boston or Gloucester, where the fish are dried and prepared for market. Another type of trawl consists of a large net drawn along the bottom of the sea by a vessel propelled by steam.

Surface fish. Mackerel, herring, and menhaden swim near the surface in great numbers known as *schools*. These fish are caught by means of a *seine*, or net which is placed in the water in a vertical position. One end of the net remains in a fixed position while the other is drawn by a boat around the school. The net is gradually drawn closer and closed at the bottom to form a pocket thus taking hundreds of fish at a single haul. As the ship moves on, close watch is kept for other schools. Mackerel move into northern waters from April to November. There they spawn and return south in the winter. Their winter habitation is unknown.

Shellfish. Lobsters are caught in baited traps, or *pots*, along the shores of New England and Canada. The trap rests on the bottom and is located by means of a wooden or cork float. Continued fishing has greatly reduced the supply. Old men living on the coast tell of days when it was possible with a pole to pry out from crevices beneath the rocks in a brief time all the lobsters needed for home use. Now they are found only in deeper water and caught only by means of traps.

Oysters and clams abound along the Atlantic and Gulf Coasts. Clams are dug from the sand or mud on our beaches, or *flats*. Oysters cannot live in sand or mud but are found along the shores in clear shallow water where they attach themselves when young to empty shells or other solid bodies. They are found from Cape Cod southward along the Atlantic and Gulf shores with Chesapeake Bay the leading center of the industry. Oyster beds are generally leased by individuals or companies from the government owning the shores. Empty shells or other *cultch* is scattered over the bottom to which the young oysters attach themselves for the remainder of their lives. Oysters are gathered by means of rakes or tongs. They are shipped in the shell or cut out and packed in jars or other containers and by means of refrigeration are shipped as fresh oysters to all parts of the country. Others are cut from the shells, canned, and sent to all parts of the world.

Fisheries of the South Atlantic and Gulf Coasts. Fish are not so abundant in the South as they are in the cooler waters of the North, yet the South has its advantages. Less frequent storms and

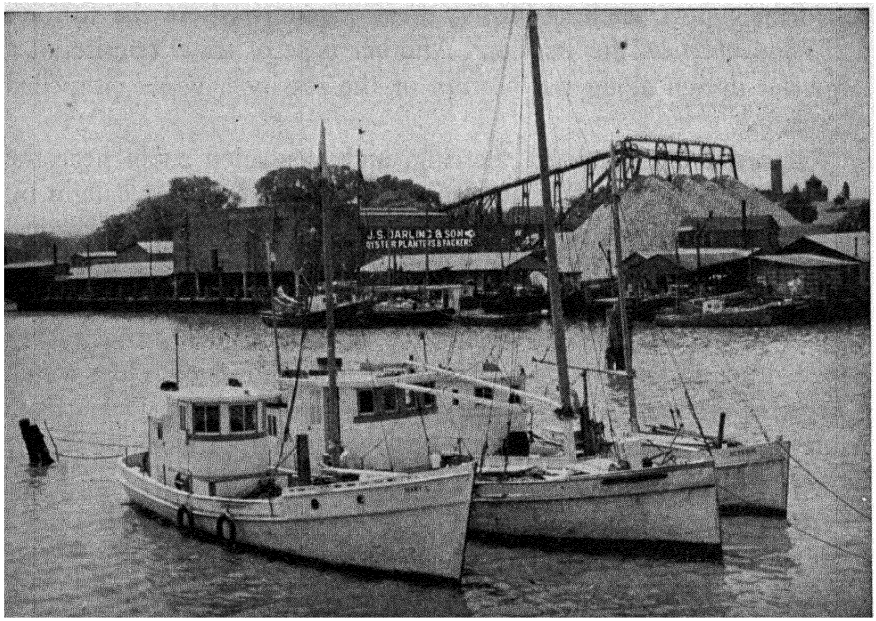
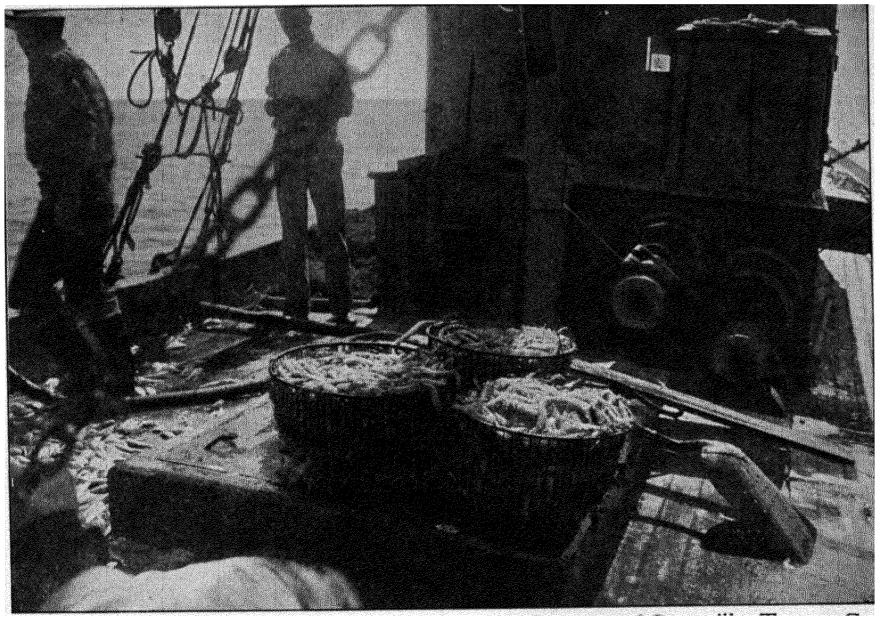


Photo by James Sawders

Oysters provide road-building material as well as food and material for buttons. Oyster boats in the harbor at Hampton with the cannery on the shore. The pile of shells on the bank will be used as foundation roadbeds.

warmer temperatures render the fisherman's life less dangerous and less rigorous. Cape Hatteras is the southern limit for the cod and mackerel of northern waters. In the southern waters are found the shrimp, menhaden, shad, Spanish mackerel, and oyster. Scallop fishing is important off the shores of North Carolina. The most valuable product of the Gulf Coast is the oyster. Other fish are the shrimp, red snapper, mullet, Spanish mackerel, and sea trout. Much crab meat is canned and shipped to all parts of the country. In the Southern States alligators are killed for their hides. Sea turtles are sought by fishermen of all the Gulf States. Some of the larger species weigh more than half a ton.

Sponge fisheries. Sponges grow near the reefs of Florida and the adjacent islands. Some of the sponges are hooked from the floor of the sea with the aid of a long pole. The sponges are sighted with the aid of a bucket having a glass bottom. Others are obtained by diving. By this method the sponges can be secured from greater depths and in better condition.



Courtesy of Caterpillar Tractor Co.

A good catch of shrimp taken in Florida waters

Fisheries of the Pacific Coast. Fish in Pacific waters of the United States include the salmon, the tuna, and the halibut. By far the most important fish taken from the rivers of Washington, Oregon, and Alaska is the salmon. These fish after years spent in the ocean return to the rivers in which they were hatched. The fish swim up the rivers—jumping falls if not too high—to their spawning grounds. The great Bonneville Dam on the Columbia River not far from Portland provides a ladder which enables the fish to ascend the river. If this ladder were not present, the fish would be unable to reach their spawning ground and there would be great loss to the salmon industry.

Salmon are caught by means of nets of various kinds. Some of the nets are drawn in by horses over shallow sand bars. The greater part of the catch is canned. The salmon have been caught in such large numbers that laws have been passed to protect them, and fish hatcheries supply millions of young fish to the rivers each year. The fish hatchery protects the young fish from their enemies until they are better able to care for themselves. The value of the salmon canned from the rivers of the coast is valued at above five million

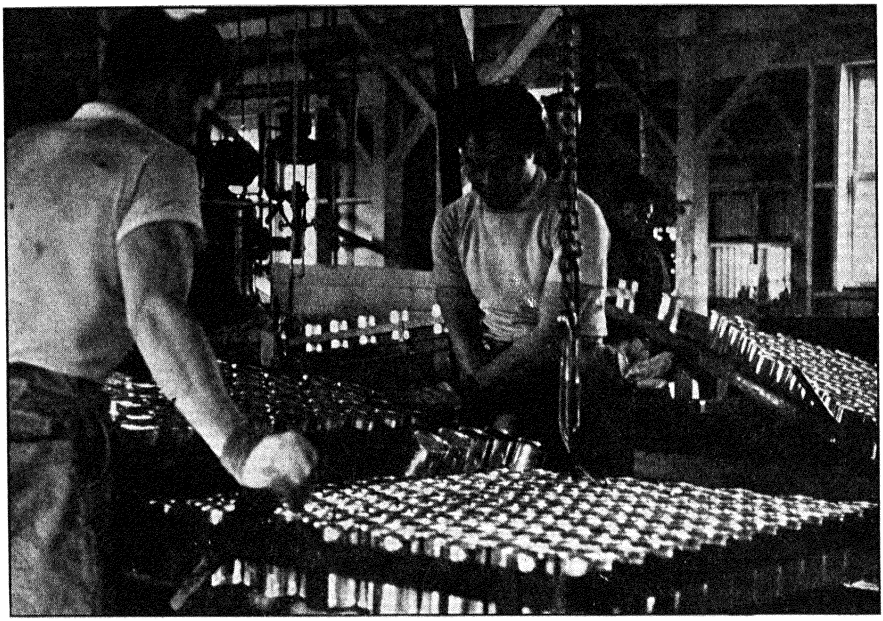


Photo from Philip Gendreau

Interior of a salmon cannery at Cordova, Alaska. The annual value of the canned salmon equals several times the amount paid for Alaska.

dollars per year when the run is high. The Alaska pack is several times as great.

The Old World's Fishing Industries

European fisheries. Nearly all the countries of northwestern Europe have extensive fisheries. The shallow waters of the North and Baltic Seas abound with fish. Grimsby, England, has long been famous as the leading fishing center of the world. Products of Norwegian fisheries are sold in all American markets. For years the ruler of the Netherlands ate a herring at a public gathering in recognition of the importance of fishing to that country. Fishermen of France and other countries of western Europe visit regularly the Newfoundland Banks. The fisheries of those countries laid the foundation for their shipbuilding and the growth of their navies and merchant fleets.

Asiatic fisheries. Other waters containing fish in great numbers border the eastern coasts of Asiatic Russia and surround the islands of Japan. Fishing is one of the leading industries of the Japanese. In that densely settled country the demand for food is great and in

the surrounding waters teeming with life the people find a very welcome addition to the food which their tiny farms can supply. Besides providing food for the Japanese fish serve a very useful purpose in fertilizing the land. Exports of canned products find their way into many world markets. Japan's commercial catch is estimated to be 6,600,000,000 pounds worth $87,000,000. This is larger than the catch of any other country and its value is greater than that of any other country except the United States, whose catch of 4,840,000,000 pounds is estimated to be worth $92,800,000. (*I. 623*)

Fishing for whales. Whale fishing probably began when the Norwegians sent out vessels in search of whales more than a thousand years ago. Since that time fishermen of many countries have sought the animal for its oil and whalebone. Among the leaders in the industry in the past were the British, the Dutch, the French, the Spanish, and the Norwegians. During the last century the United States was among the foremost countries in whale fishing. New Bedford, Massachusetts, was the greatest whaling port of the world. Now the Norwegians have almost a complete monopoly. Their ships scour the northern seas and the borders of Antarctica. A hundred Norwegian ships with 8000 men hunt for whales in Antarctic waters.

The chief product of the whale is oil. Before the days of petroleum this was used for lighting purposes. It is now used for dressing leather, for lubrication, and for making soap. In some countries refined whale oil is used in making lard and butter substitutes. Other products of the industry are whalebone, glue, and fertilizer. Whale meat is eaten in Japan and to a limited extent in Norway. In New Zealand it is canned. (*I. 476*)

Fish in our foreign trade. In addition to the great quantities of fish caught off our coasts and in the Great Lakes, we still have not enough to meet our needs. From Canada we receive millions of pounds of fresh or frozen salmon, halibut, swordfish, and smelts and great quantities of salted and pickled fish including cod and haddock. In a recent year Japan sent us more than 9,000,000 pounds of fresh or frozen tuna fish and swordfish besides many tons of canned tuna fish and crab meat. From Norway we receive more than 19,000 tons of canned sardines and herring and millions of pounds of whale oil and cod-liver oil.

Our exports of fish consist largely of fresh and canned salmon. Fresh fish is shipped to the countries of western Europe and even to Argentina. Salt fish is exported mainly to the countries of the Carib-

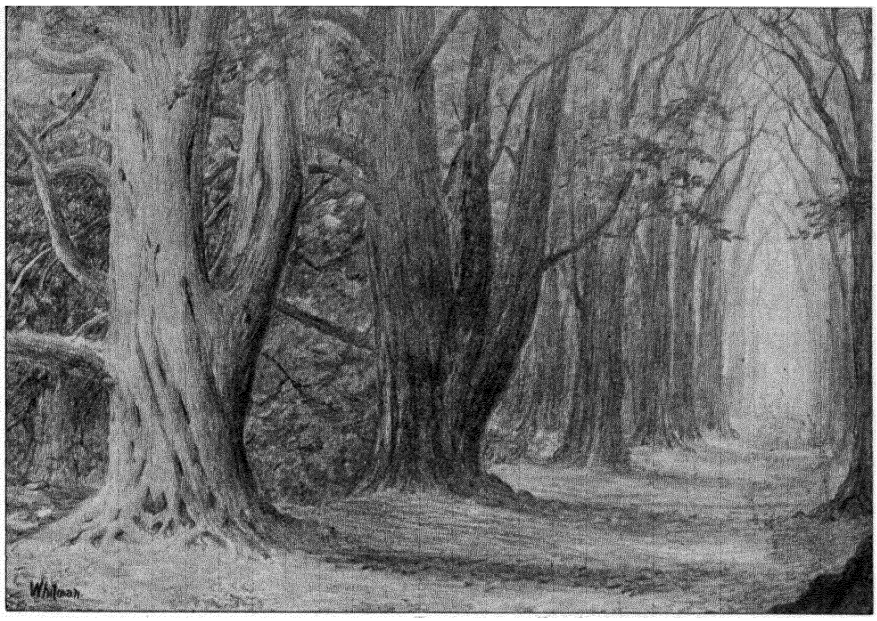
bean. Our canned salmon goes to nearly every country of the world, but Great Britain takes more than eighty percent of our entire export.

Guides to Study

1. How has the fishing industry been a great help to world progress?
2. How are other industries stimulated by fisheries?
3. Where are fish found in largest numbers? Why?
4. Describe the different methods used in catching fish.
5. How have their fisheries proved of great benefit to the countries of western Europe and to Japan?
6. How do the uses of whale oil today differ from those of former years?

Research for Students

1. Plan an exhibit of materials used in the fishing industry including small models of ships, trawls, and nets. Add pictures showing how fish are caught in different parts of the world.
2. Appoint a committee to report to the class on the way in which fish are preserved so that they may be sent to distant markets. What are the different methods of refrigeration?
3. On an outline map of the world locate the leading fishing grounds. List the kinds of fish found in each area. Locate the chief fishing ports of the world.
4. Make a list of the different kinds of fish and fish products sold in the fish markets and grocery stores in your vicinity.
5. Learn how the early methods of fishing for whales differ from those of the present time.



From a pencil painting by John Pratt Whitman
"The cathedral beeches"

1. WOOD AND ITS USES

First uses of the forests. "The groves were God's first temples." In them man learned to worship. The columns and the arches of man-made churches and cathedrals are patterned after those of the forest. It may be that forests seemed sacred to early man because they gave him the necessities and the comforts of life. Primitive tribes of the past, like those of the present, found in the forest shelter from heat and cold, food from plants and animals, and protection from their enemies. As man learned to plant and harvest, it became necessary to clear the land so that he could use his simple tools and to remove the forest foliage so that his garden might have sunlight. He found that he could remove the forest shade in two ways. He could set fire to a portion of the forest and thus remove both trunks and foliage. The ashes from the fire helped to fertilize his crops. An-

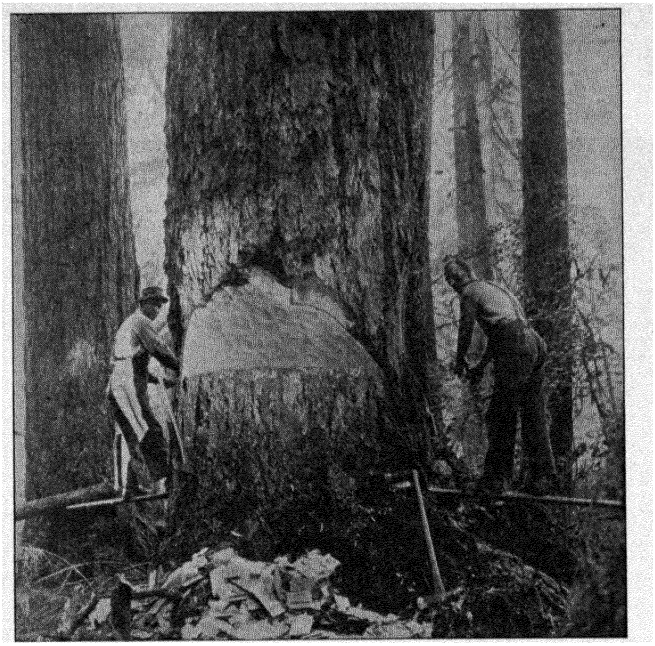


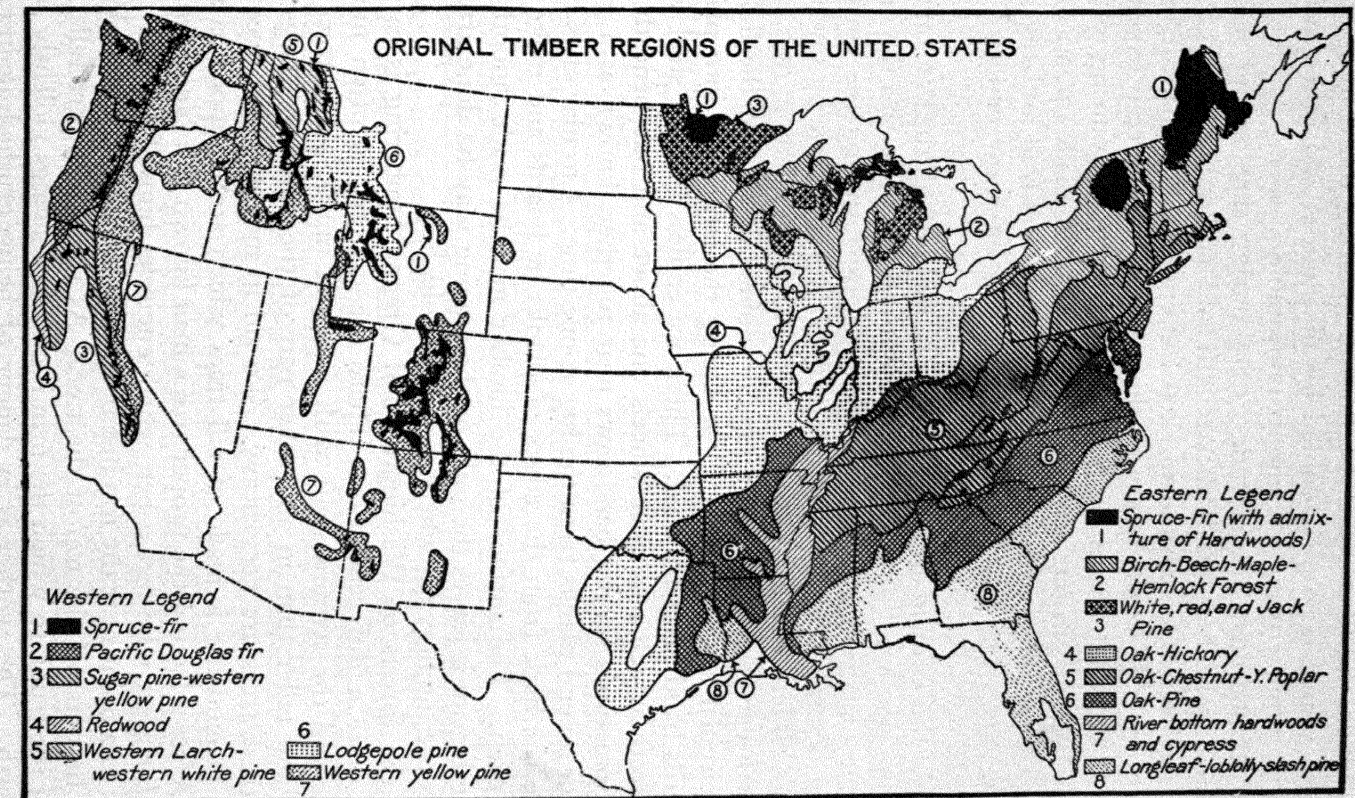
Photo by John D. Cress

Lumberjacks felling a giant Douglas fir in a Washington forest

other method followed by the American Indians and the early white settlers was to kill the trees by removing a strip of bark entirely around the tree. Corn was then planted among the dead trees.

From earliest times man made use of the forests near the shore to make his boats—some by stretching the bark of trees or the skins of animals over a light framework of wood, and others by hollowing out the trunks of large trees. As his skill increased and tools were invented, the trees were cut into timbers, planks, and boards. He could then build larger and stronger boats which gave him courage to venture farther and farther from his own shores. It was not until the middle of the last century that wood began to give way to steel for the building of ships.

Making trees into lumber. Methods of lumbering differ in different parts of the country. In Canada and northern United States the winter season offers the best conditions for lumbering. Then the ground is frozen and even swampy land supports men, horses, and tractors. The rough ground is usually covered with snow over which smooth roads can be built from the logging camps to the river



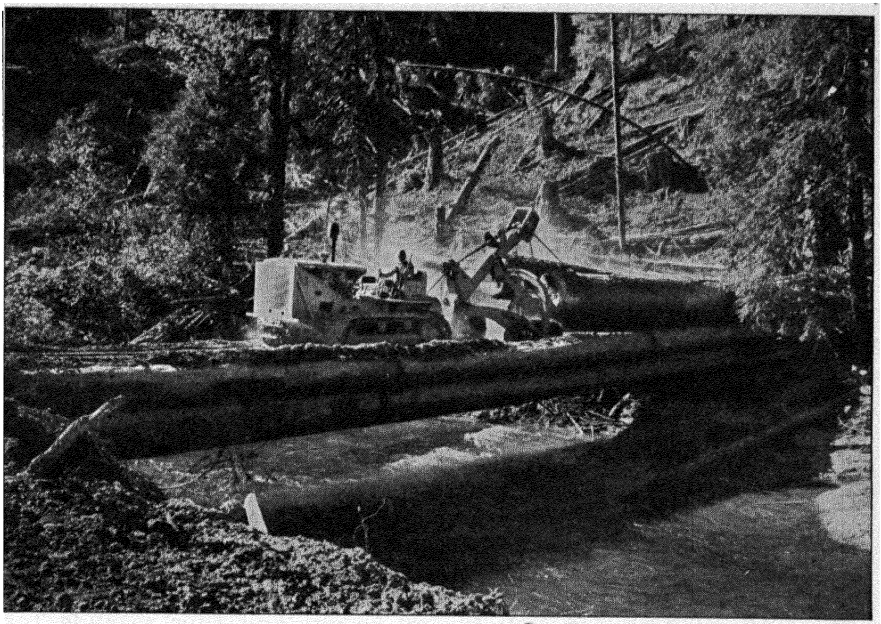
Courtesy U. S. Forest Service

down which the logs are to be floated. During the cold weather men and animals are not troubled by mosquitoes and other insects which in summer make life almost unbearable.

The lumbermen live in rude camps during the logging season. The hard work requires both strength and endurance. After the trees have been selected and marked for cutting, a V-shaped notch is cut in one side of the tree near the ground. The tree is expected to fall on the side toward the notch. The rest of the cutting is then done by a large crosscut saw which is used on the side opposite the notch. After the tree falls, the branches are removed and the tree cut into logs. The logs are then drawn over the snow or ice to the riverbank.

With the coming of spring and the melting of the ice on the river the logs are floated in great numbers down to the sawmills. Here they are yarded in enclosures made by fastening the ends of floating logs together. An endless chain draws them one by one into the mill. Here the log is placed on a carriage which moves back and forth carrying it against a rapidly moving saw. For the lighter work circular saws are used. For slicing the large logs into planks or boards band saws are used. These are endless belts of steel with sharp teeth which pass over wheels one above and one beneath the log. Sometimes several band saws near together, known as a *gang saw*, cut several planks from the log at one time. Circular saws then remove the bark from the edges of planks or boards and make the edges even. The surface of the lumber may be made smooth by planing before it leaves the mill, or the planing may be done after it reaches the lumberyard where it is to be sold.

In the forests of Washington and Oregon lumbering is carried on in quite a different way. There the country is often mountainous and the streams swift with falls and rapids. The trees are larger and taller than in any other part of the country. Logs cut from these trees are very heavy. To aid in moving them over the rough ground use is made of tall trees which are equipped as *spar trees*. After selecting the proper tree a man known as a *high-climber*, or *high-rigger*, who uses a belt which encircles himself and the tree, climbs to a point near the top just below the lowest branches. With a saw he cuts off the top of the tree. As the upper part falls, the part of the trunk to which the man is attached swings violently back and forth. The worker is in danger of being crushed against the tree or of being thrown to the ground. First heavy wire cables are run from the top of the spar to the ground to serve as supports.



Courtesy of Caterpillar Tractor Co.

Transporting logs from a Linn County forest in Washington to a sawmill in Holley. Note the unique bridge across the stream.

Near the top of the spar a heavy pulley is attached through which passes a strong wire cable. Near the trunk one end of the cable is wound around a cylinder turned by an engine or motor. The other end of the cable may be attached to logs as much as one thousand feet distant. The logs are drawn to the base of the tree and there loaded on cars or trucks. Two spar trees may be connected by a cable known as a *high-line* along which a trolley runs back and forth. By means of pulleys the logs are drawn over rough ground or through the air over ravines to the yard or railway. Some of the logs are so large that one is all that a flatcar can carry.

The many uses of wood. There is hardly a human need which the forest does not help to supply. People in nearly every corner of the globe provide their shelter with wood in some form. After the house is completed, it is furnished with articles made largely of wood. Wood has been used to aid in transportation from the crudest carts of primitive peoples to the railways of today. Large quantities of lumber are still used for ties even though railway cars are now made chiefly of steel.

Wood is also a great help in communication. Nearly all our

paper whether for newsprint, business use, or books is made of wood pulp. Telephone and telegraph poles are of wood.

In recent years we have learned to clothe ourselves, not exactly with wood, but with rayon the chief source of which is cellulose made from wood pulp. Rayon is rapidly taking the place of silk and to a less extent of cotton and wool. This same cellulose is also used in making lacquers for spraying automobiles and many other objects. It is also a source of plastics which for some purposes are rapidly taking the place of wood, metal, bone, and hard rubber. Cellophane, another product of cellulose, is finding an almost unlimited number of uses. It protects that which it covers, at the same time leaving the article in full view of the purchaser.

As firewood wood is doubtless used in a larger number of homes the world over than any other fuel. Countless homes heated mainly by coal, oil, or gas burn wood in fireplaces because of the beauty and cheer which the wood fire gives. These are only a few of many ways in which the forests serve mankind. It is an unwise country indeed which does not conserve its forests and thus provide for future needs.

Lumber for building. More than half of the lumber of the United States is used in the construction of houses, barns, stores, and other buildings. In large cities and towns where buildings must be tall and fireproof, buildings are made of steel, stone, cement, and brick. Wood could not bear the weight of our skyscrapers. Even stone and brick require the reinforcement which only steel can give.

Building construction is one of our few billion-dollar industries. The amount of building going on at any time is a measure of a country's prosperity. The construction of a building calls not only for lumber but for the use of equipment and supplies of many kinds. Men in many trades and professions find work to do when building is going on. And wherever this goes on, lumber is being used.

Furniture for homes and offices. Furniture making had its beginnings in the early settlements along the Atlantic Coast. The styles followed those of the lands from which the settlers came, and designs were often remarkable for their beauty. Even today many of them are regarded as masterpieces and are extensively imitated.

Much of the furniture both for homes and offices is made of wood. It is true that more and more office equipment made of steel is taking the place of that made of wood. Only the lumber used in the construction of buildings exceeds in value that used in making



Courtesy of the Sherwin-Williams Co.

A woodcarver with his array of tools continues an age-old industry.

furniture. The leading furniture centers are in northern United States from New York and Pennsylvania on the east to Michigan and Ohio on the west. Grand Rapids, Michigan, once the leader in furniture production is now surpassed by New York City and Chicago. Other centers of importance are in the Piedmont sections of Virginia and the Carolinas. Most of the furniture imported comes from Great Britain and consists chiefly of antiques.

Containers past and present. In former years the proprietors of retail stores of nearly all kinds received their goods in wood containers, in the form of either boxes or barrels. The drygoods merchant and the druggist received their supplies in boxes, some large and some small. The grocer's flour, sugar, salt, lard, potatoes, apples, and vinegar came in barrels or, as in the case of molasses, in larger barrels, known as *hogsheads.* Many other products sold by the grocer were brought to his store in wooden boxes varying in size. These boxes contained soap, starch, raisins, tobacco, and nearly everything else carried by the grocer.

Today, because lumber is much higher in price, fewer barrels and boxes are used. Instead, goods are packed in pasteboard cartons or in bags made of paper or cloth. Apples and many other fruits are

often shipped in baskets which are lighter because they require the use of less wood and because they allow circulation of air which keeps the fruit in better condition.

Formerly cement and lime for building purposes or for fertilizer were shipped in casks or barrels. Now strong paper bags are commonly used. Petroleum when first transported from field to refinery and later to market was shipped in barrels. Even today the output of oil by countries or states is always given in number of barrels. Yet oil is now transported by pipe lines, by tank cars, or by trucks.

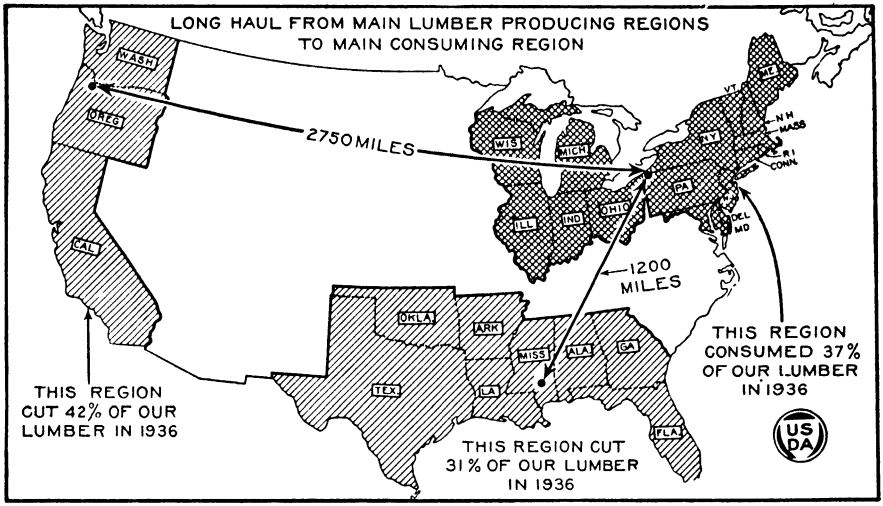
Even the tin can has in many circumstances taken the place of wood for handling molasses, lubricating oils, paints, and many other articles in common use. Nevertheless lumber is still used to a great extent in making containers although wherever possible the material used is much lighter than when lumber was more plentiful and cheaper.

Forests the world over. In almost every part of the world lumber is a necessity. Fortunately forests are widely distributed over the earth. Where lumber cannot be obtained, the people, as in some desert regions, live in tents made from the skins of animals. The Eskimo makes temporary shelters from blocks of snow and ice. Often stones are used for crude homes in regions where trees cannot grow.

Of all the continents Asia and South America have the largest forest areas. The forests of the Amazon Valley are almost unlimited; yet, because of the dense jungle and the difficulties of transportation, the region supplies but little lumber. The great forests of Asiatic Russia would be much more valuable if they were nearer areas of large population. Distances for much of this region make the cost of getting the lumber to market prohibitive.

Forest lands cover nearly one third of the continent of Europe. Northern Europe, including Norway, Sweden, Finland, and Russia, has extensive areas of very valuable forests of pine, spruce, and hemlock trees, which are useful for building purposes and for making paper pulp. In the more densely settled parts of Central Europe the forests are given much care so that a supply for the future will be assured. In those regions small twigs and bits of roots which we would consider fit only for a bonfire are bound into fagots for firewood to save the precious trees.

Our own forests. Nature has been kind to us in giving the United States extensive areas of forest lands. These are fairly well



distributed over the country. All our Northern States from Maine to Minnesota were once well covered with evergreen trees and some hardwoods. The Southern States from Virginia on the northeast to Texas on the southwest still possess great areas of valuable forest lands. Our greatest reserves, however, are in the Pacific Northwest, particularly in Washington and Oregon. See map on page 165.

Forests of northern United States. This was originally one of the richest forest areas of the country. The stands of timber were mainly of pine, spruce, and hemlock. These softwoods are preferable to hardwoods for most building purposes. As a rule they have straight grain, do not crack or warp, and, because of their softness, are easily worked.

The early settlers in these regions needed land for gardens, fields, and pastures. The trees were cut and the logs rolled into piles and burned. Groups of neighbors helped one another clear their land. A gathering of farmers to roll the heavy logs into piles was a *log-rolling*. Now, when our Congressmen help one another put bills through the Congress, they are said to be logrolling.

This northern forest area has come to be the most densely settled part of the country. As the population increased, vast quantities of lumber were needed for homes, stores, ships, railroads, paper, and other purposes. The trees were cut with little regard for future needs. For these reasons only a small fraction of the original forest lands now produce lumber or even paper pulp. Now every industry



Young pine trees used for newsprint and kraft papers are providing a new industry of enormous proportions for the South.

of the region depends upon the South or the Northwest for the greater part of the lumber used.

Consumers of lumber in the Northern States must pay the cost of transporting it from the South or from the Northwest by way of the Panama Canal or overland across the Rocky Mountains. Transportation adds to the cost of lumber, makes the cost of homes greater, and increases the rent which the owner of property must receive. Everyone who owns a home or who pays rent must help pay the cost of transporting lumber from a distance. Everyone then should be interested in making the forest lands of his part of the country yield the greatest return possible.

Hardwood forests. Trees yielding hardwoods are found throughout all the eastern forest areas. Lying between the northern regions and those of the South is a belt consisting mainly of hardwood trees, such as oak, ash, maple, and gum. The hardwoods are well adapted for finishing the interior of houses and for making furniture.

Forests of the South. Until very recently the Southeastern States yielded the largest annual cut of all our forest areas. The softwoods are quite different from the woods of the northern areas.



Courtesy of Florida Forest and Park Service

Gathering pine gum from which turpentine will be distilled for paints and varnishes and other uses

Much lumber is shipped from these states to our Northern States and to many foreign countries. This area, if properly cared for, will probably supply much of our lumber for the future. Pines of the Southland grow more rapidly than trees do in any other part of the country. The mild climate and abundant rainfall make for a very rapid growth. It is to this section that our paper industry seems to be rapidly moving. In recent years thousands of acres have been reforested thus providing for future needs.

Naval stores. Naval stores, such as tar, turpentine, and rosin, are products of the southern forests. These products are so named because in the days of wooden ships they were used by shipbuilders and on board the ships. A sailor was often referred to as a *tar.* These products now find other uses. Turpentine is used in making paints and varnishes. Rosin is used in making varnishes, soaps, and linoleums and in sizing paper.

Originally to obtain the gum—the source of rosin and turpentine —the bark was removed from one side of a pine tree near the base. The fluid collected in a pocket cut in the tree below a series of

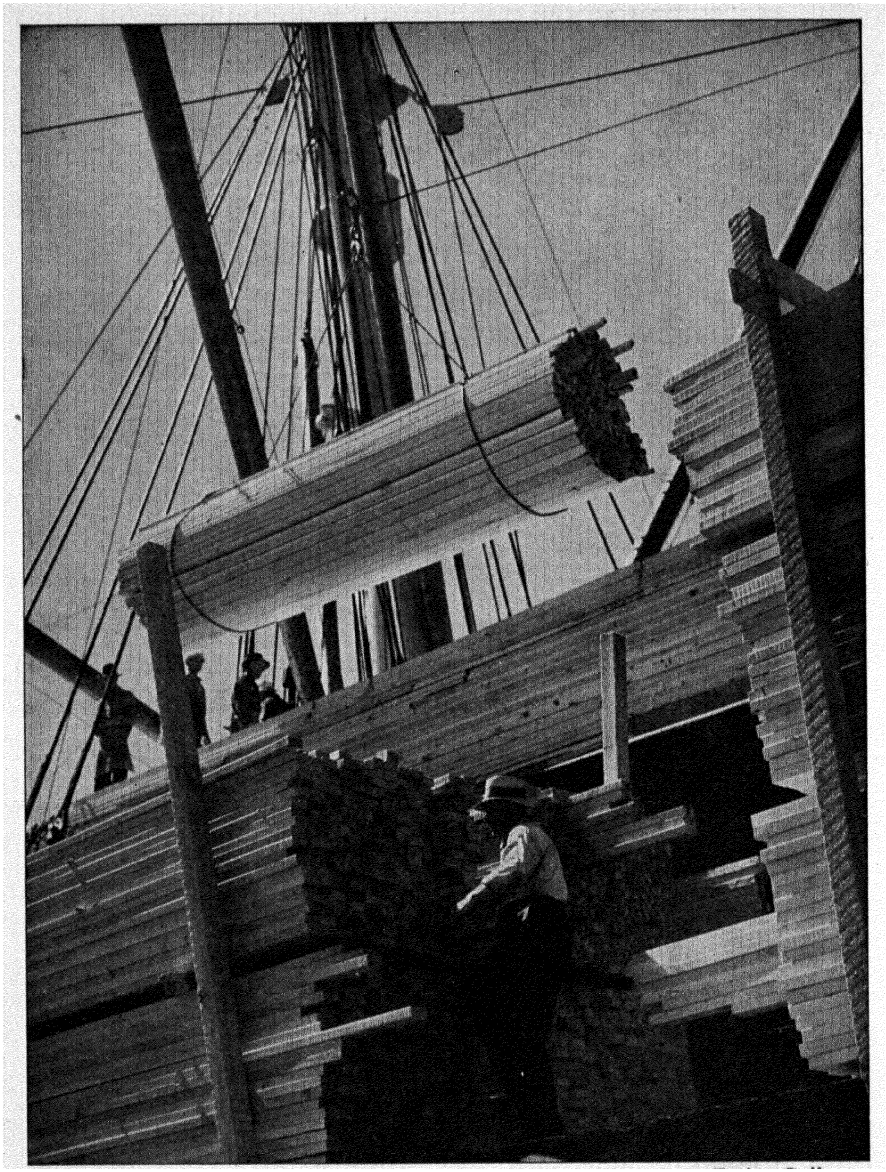


Photo from Ewing Galloway

Loading a steamer with lumber at Bellingham, Washington. Thousands of new homes building and to be built will contribute greatly to the prosperity of the nation.

gashes. This method was very injurious and soon killed the trees. In recent years a metal cup has taken the place of the pocket. By this method less injury is done to the tree. By distillation rosin and turpentine are obtained from the raw gum. The United States produces more than half the world's naval stores, and more than half of its production is sold abroad, especially to England, Germany, and the Netherlands. About 50,000 workers are employed in this $40,000,000 industry.

Forest areas of the West. There are two forest areas in western United States. One is in the Rocky Mountain region and the other in the Pacific Northwest. The pines, spruces, and firs of the Rocky Mountains are in a thinly settled region and are not easily accessible to the great lumber markets. Therefore, only a very small portion of this area has been cut over.

The greatest forest reserves of the whole country are in western Washington and Oregon. Here are pine trees, spruce, hemlock, and Douglas firs. These great forest areas have been reserved mainly because of their distance from lumber markets. Now that other areas are becoming depleted, the country is drawing heavily on the resources of the Northwest. For some years the annual cut has exceeded even that of the South. Lumber from the Northwest is shipped to the eastern coast of the United States, to the countries of South America bordering the Pacific, and to China, Japan, and Australia. Farther south in California is the home of the giant sequoias, commonly known as the *big trees*, many of them thousands of years old.

Imports and exports of lumber. Although our forests are being destroyed more than four times as fast as they are replaced by growth, yet we export lumber and other forest products to the value of nearly $100,000,000. Great Britain takes nearly a third of the exported products of our sawmills. Japan is a convenient market for the lumber of Washington and Oregon and that country is one of our best customers. Articles made of wood go in large quantities to Great Britain, Canada, and Cuba as well as to other countries.

Our imported lumber comes mainly from Canada. From that country we import quantities of spruce, hemlock, and pine for building purposes. That country also sends us each year more than 3,500,000 Christmas trees, besides great quantities of pulpwood, wood pulp, and newsprint. We receive mahogany from Central America, the west coast of Africa, Mexico, and Brazil.

Guides to Study

1. How are primitive peoples benefited by forests?
2. How do methods of lumbering differ in different parts of the country? Why?
3. Why are many buildings in cities constructed in large part of materials other than wood?
4. Show how the location of forests has helped to determine the location of certain industries.
5. What parts of our country at different times have been the chief lumber-producing sections?
6. Where are the forest regions of the United States and what is the relative importance of each?
7. What kinds of lumber do we export and what kinds do we import? Account for the differences.

Research for Students

1. Make a list of industries dependent wholly or in part upon forests.
2. On an outline map of the United States shade in the leading forest areas. Trace the routes which lumber would take in moving to your section of the country.
3. Make a notebook containing pictures, maps, and newspaper clippings relating to wood and its uses.
4. Make a collection of different kinds of wood and other forest products.
5. Special report by one or more members of the class: The need and methods of conserving our forests.
6. Appoint a committee to learn and report on the many uses of cellulose.

2. PAPER—A MARK OF CIVILIZATION

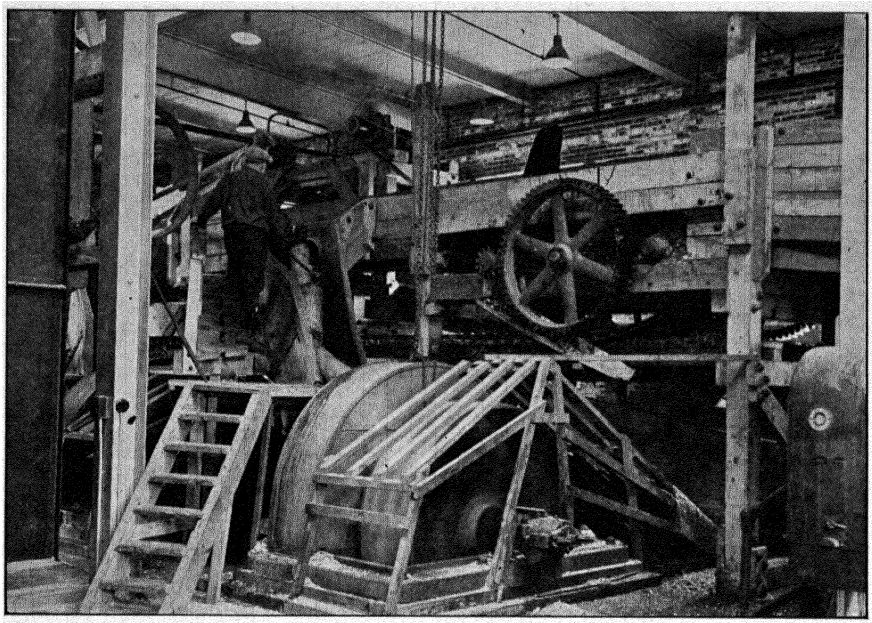
A product of multiple uses. Paper has become so much a part of our modern life that it is difficult to imagine how man ever existed without it. In our homes, in our offices, and in all our trades and professions it plays an inconspicuous but important part. Varying in texture from the most delicate tissue to the sturdy wallboard or paper shingle, it serves us in our homes as twine or in the form of bags and wrapping paper; it serves the merchant as a protection in the handling of foodstuffs and merchandise in general. The artist paints and etches on it, the authors' works are printed on it, and the doctor and the lawyer keep their records on it. So large a part does

paper play in our intellectual lives that we have come to use the word *paper* when we usually have in mind that which is written or printed on it. We read the daily *paper*. We write an examination *paper*. The scholar reads his *paper* before an audience of learned men. Much of the wisdom and lore of the ages is now recorded on paper and stored in our libraries and museums for the use of countless future generations.

Tablets of stone. Primitive man, when he conceived the idea of recording his personal ideas or the exploits of his tribe, engraved them upon stone or inscribed them on bricks of clay. We can still find many old sketches or inscriptions on the walls and ceilings of caves, on temple walls, or in collections of tablets that correspond to our modern libraries. Later skins of animals were used as a vehicle for such recordings. The American Indian used the skin of the deer, Asiatics and Europeans used the skin of the sheep, known as *parchment*. Even today, when college diplomas are inscribed on paper, they are often referred to as *sheepskins*. Biblical and other early Scriptures were written by hand on parchment. The sheets of parchment were fastened together to form long rolls. These rolls could be easily stored and transported; therefore they were a great improvement over the tablets of stone. Our own time is truly an age of paper. Its wide use and the very important function that it serves in our modern life attest to that. Not only does it serve in its own field, but, as a conserver of other materials, it plays a very important part.

The story of paper. Thousands of years ago the Egyptians made paper from the pith of the papyrus plant as a substitute for parchment. Thin slices of the pith of the plant were laid crosswise and lengthwise, moistened, pressed into thin sheets, and then dried. These sheets like the plant from which they were made were called *papyrus*—whence comes our word *paper*. The Chinese and Japanese too have for ages made paper from rice straw. The art of making linen paper from rags was introduced into Europe by the Moors.

Papermaking in the United States. *In the Northeastern States.* Although the first paper mills in this country were established near Philadelphia, New England was for a long time the chief center of the industry. In early years paper was made exclusively from rags. The waste from the many textile mills added to contents of the domestic rag bags supplied all the material that the trade demanded. As education became more widespread and increasing numbers of



Courtesy of the Ticonderoga Pulp and Paper Co.

The first step in papermaking. This is the machinery by which logs are ground up preparatory to their reduction to pulp.

people learned to read and write, the demand for cheap paper became so great that there were not enough rags to meet the demand. When the discovery was made that wood could be used as a substitute for rags, the whole industry was revolutionized. The mills were then moved to the large streams near the softwood forests of the Northeast where at first there appeared to be an unlimited supply of raw material. So rapid has been the devastation of these forests that manufacturers have become alarmed lest the supply become exhausted.

In Washington and Oregon. Papermaking has come to be a very important industry in western Washington and Oregon. This region is favored by its great supplies of raw material and by an abundant supply of water. Papermaking calls for much power to run the great machines which grind the logs and mix the pulp and to turn the enormous rollers at an unbelievable speed. Vast quantities of water are used in the mill itself for mixing the pulp and keeping it in a fluid condition until it is finally dried upon the rollers. No other part of the country offers better facilities for papermaking than the forest regions of Oregon and Washington.

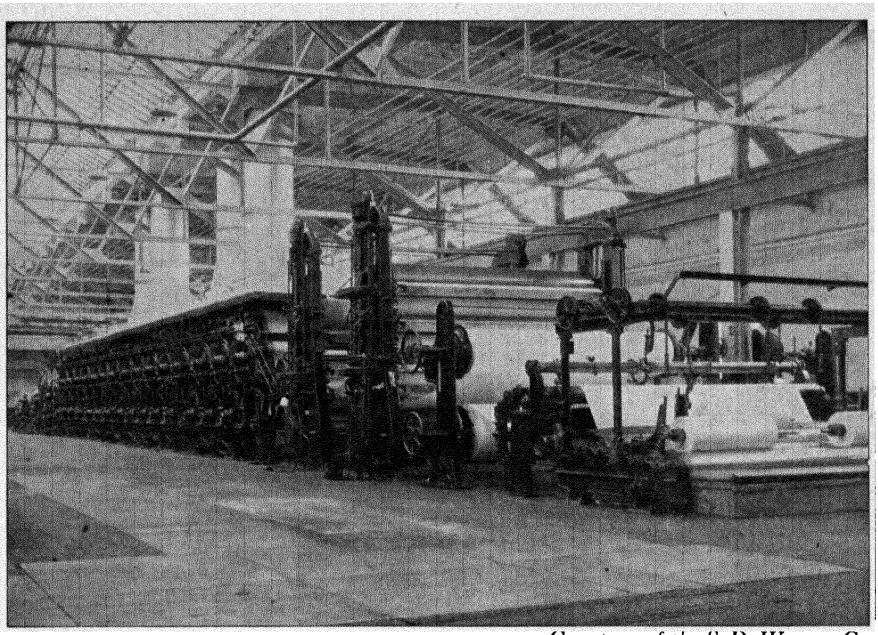


Courtesy of the Ticonderoga Pulp and Paper Co.

These are the beaters in a paper mill in which the wood fibers are made to absorb water before they proceed to the machine shown on the next page.

In the Southern States. Industrial chemists have devoted their efforts to the use of the pines in the Southern States in the manufacture of paper pulp. Processes have been discovered whereby a very satisfactory paper is now made from this new source of supply. Now paper-mill owners and other capitalists have become interested in this section of the country. In the South trees grow more rapidly than in the North and for this reason it is possible that the southern forest areas may supply a large part of our future demands for wood pulp. The late Dr. Charles Herty, whose chemical research made possible the use of the southern pines for paper, believed the forests of the South could meet the world's demand for pulp if replanting were properly done. Three of the largest replantings of forest trees of 1937 were made in Louisiana, Mississippi, and Texas. These three plantings alone totaled nearly 60,000 acres. Some of the largest paper mills in the world have been constructed in the Southern States.

Today's paper. The finest grades of writing paper are still made of linen rags. Paper made of cotton rags and other materials is sometimes given what is called a linen finish to enhance its desirability.



Courtesy of the S. D. Warren Co.

The fluid pulp from the beaters is poured into this machine at one end, is deprived of its excess of water as it passes through, and dried by heated rollers. It emerges as a continuous strip of paper which is wound upon rollers, and is then ready for use.

The bulk of our paper supply, however, nine tenths of it in fact, is made of wood pulp. Not all kinds of trees yield a pulp that can be used in the manufacture of paper. Spruce wood, with its simple fibers which are practically all of the same nature, makes the best pulp. Fir, hemlock, and poplar can be used and very recently southern pine has been found to yield a satisfactory pulp. Paper made from rags is much more durable than that made from wood pulp. Newsprint made from wood pulp becomes brittle and yellow with age. Some of our largest newspapers, such as the *New York Times*, run off a small number of copies of each edition on rag paper which will stand the test of time when placed in the larger libraries. They will then be found in good condition by future generations. Coarse and heavy grades of paper are made of straw, sugar-cane waste, jute, old burlap, and old Manila rope.

The process of papermaking. The logs are cut into two-foot lengths, and the bark is removed by revolving knives. The wood is then ground into pulp. A better grade of paper is obtained by

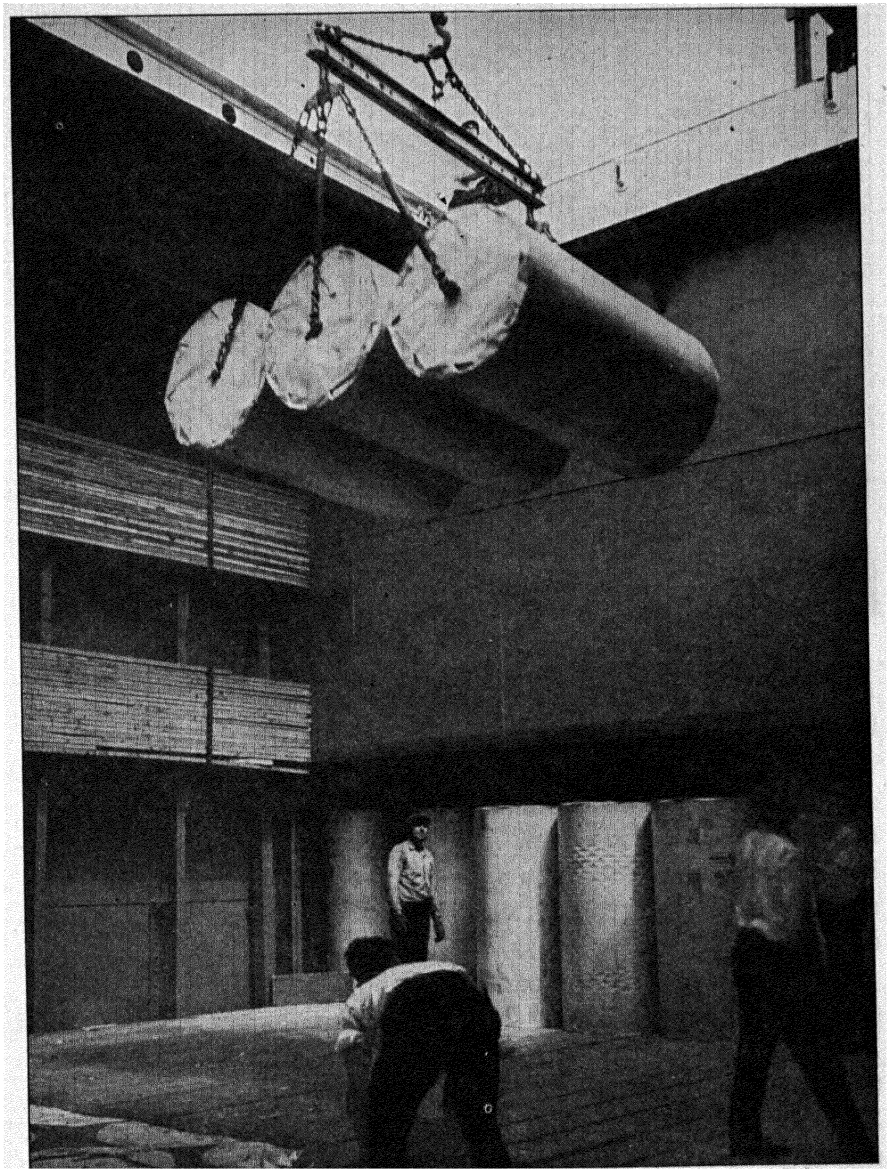


Photo from Kaufmann and Fabry Co.

Loading rolls of paper into the hold of a lake steamer

what is known as the *sulphite* process. By this method the fibers separate more easily and are therefore longer, thus producing a stronger and finer grade of paper. The process from pulp to paper is carried on by a single machine. As the paper issues from the rollers, a thou-



Photo from Ewing Galloway

Firecrackers in the making—a factory in Macao, near Hong Kong. The Chinese invented these noisemakers and they love their clatter and brightness.

sand feet a minute, it is wound on huge spools or rolls varying from five to eighteen feet in width. The best grades of writing paper and ledger paper are sized with a solution of gelatin after being run off the machine. The sizing is very necessary if paper is to have an ink-resisting surface.

Who uses most of the paper? No other part of the world consumes so much paper as our Northern, Eastern, and Central States A single Sunday edition of one of our great city newspapers uses the pulpwood from more than two hundred acres of forest land. Added to this is the demand for paper stock for innumerable daily papers all over the country with their many extras, weekly and monthly magazines, and millions of books. Wrapping paper, paper bags, wallpaper, building paper, paper shingles, dishes, etc., enough to meet the needs of our enormous population, call for an amount of paper pulp that is almost beyond reckoning. To meet this ever-increasing demand for paper, large quantities of pulpwood are imported from Canada and smaller quantities from Sweden, Finland, Norway, and Russia.

What becomes of wastepaper? Most kinds of paper are very cheap; yet it pays to collect wastepaper and manufacture it into articles of cheaper grade, such as cardboard and material for packing cases. Only a few years ago chemists discovered a way of removing the ink from old newspapers and magazines. Now this waste can be made into clean white paper similar to that made from the original wood pulp.

Thousands of tons of old newspapers are exported to foreign countries. In some European countries where paper is expensive, old papers are used for wrapping paper in the stores. If you were to buy an article in one of these stores, you might find it wrapped in one of your old newspapers. In China old newspapers are used for wrapping articles shipped from one part of the country to another. In southern China our old papers are used in the manufacture of firecrackers. In the northern part of the country where the climate is colder, they are used to cover the walls of rooms to keep out the cold. In Java to which we send great quantities of old newspapers, the storekeepers cut the papers into exact sizes and paste the parts together to make paper bags.

Guides to Study

1. Why may paper be considered a mark of civilization?
2. How were records made before the days of paper?
3. Why have papermaking centers moved from one part of the country to another?
4. To what uses has paper been put besides that for writing and printing?
5. What becomes of wastepaper?

Research for Students

1. Report to the class on the history of papermaking in the United States.
2. Make a study of the history of printing and report to the class.
3. Collect samples of different paper products. Tell of what each is made and state the uses of each.

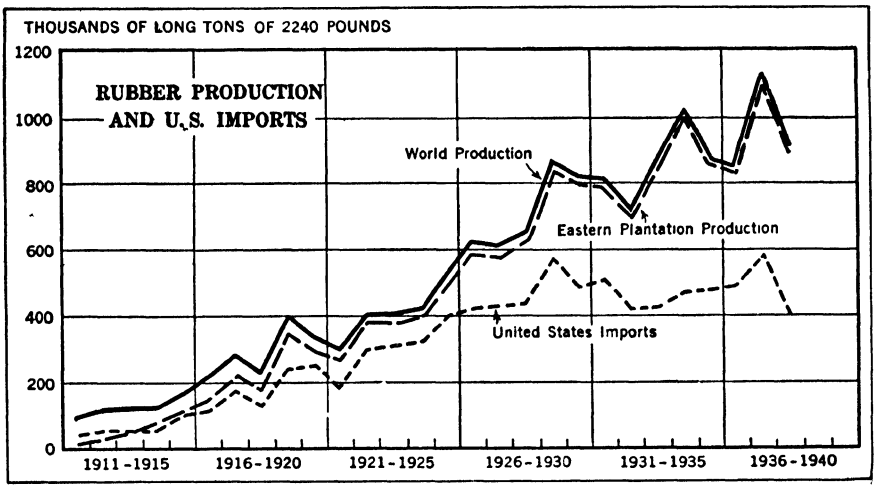
3. RUBBER—A PRODUCT OF VARIED USES

We learn to use rubber. The early Spanish explorers found the natives of Central and South America wearing shoes made of rubber and the children playing with balls made of it. Small quantities were taken back to Europe and experimented with. The first use to which it was put was as an eraser, whence the name *rubber*. In 1823 a Scottish chemist, Charles Macintosh, discovered that rubber could be dissolved in benzine and spread upon cloth to make it waterproof. The raincoat, known as a mackintosh, got its name from this inventor. About the same time another inventor learned that it could be cut into thin strips and woven into an elastic material. The captains of sailing vessels used to carry boots and shoes to ports in the rubber-growing areas to have them coated with this strange waterproof substance. About 1853 a Boston sea captain imported five hundred pairs of rubber boots into this country. From time to time various new uses have been found for this substance.

Results of Goodyear's accidental discovery. By accidentally dropping into a fire a piece of rubber covered with sulphur, Charles Goodyear made a discovery that revolutionized the whole industry. When cooled, the accidentally dropped piece of rubber remained the same at all temperatures. Before this rubber was sticky when warm, and brittle when cold. Goodyear named his new process of treating rubber *vulcanizing*. Vulcanized rubber widely extended the use of rubber and brought great credit to a man who had sacrificed business and family and had been imprisoned for debt because of it. Goodyear has been described as "a man with an India-rubber coat on, India-rubber shoes, an India-rubber cap, and in his pockets an India-rubber purse and not a cent in it." As a result of Goodyear's discovery more than 30,000 different kinds of articles made of rubber have come into general use.

Since 1850 our consumption of rubber has doubled approximately every ten years. There seems to be every reason to believe that this ratio of gain may be maintained for many decades. The rubber-manufacturing industry is directly employing about 150,000 workers and the production of the rubber industry has a value rapidly approaching $1,000,000,000 annually.

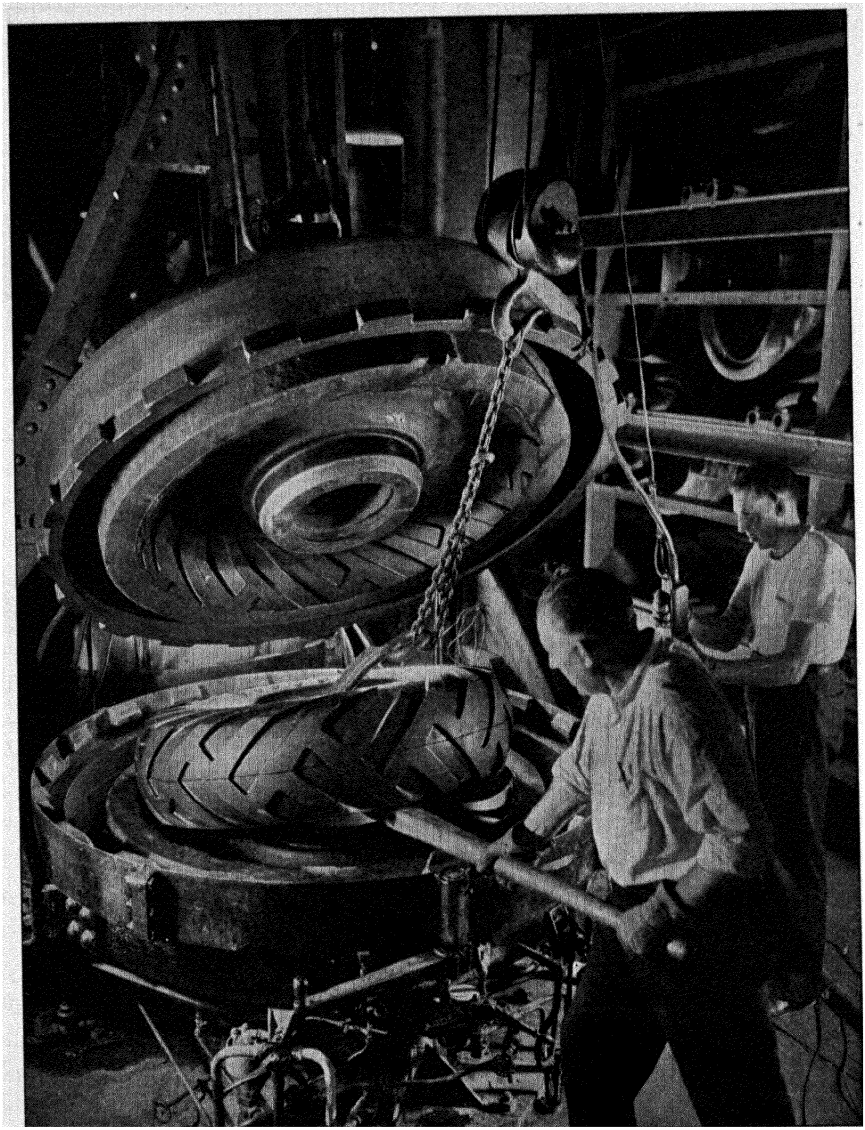
Tubes and tires. Today there is a world-wide demand for rubber and rubber products. We lead the world in our demand for it.



About six sevenths of the crude rubber consumed is used for automobile tubes and tires. The first bicycles had steel tires. In trying to make the cyclist's ride easier, John Dunlop, in 1885, filled a rubber tube with air and fitted it to a bicycle wheel. Thus the pneumatic tube came into existence. Later solid rubber tires were put on the wheels of pleasure carriages. When the automobile was invented in the early nineties, rubber tires, so to speak, were waiting for it.

The number of automobiles, trucks, and buses registered in our country is more than two thirds of the world's total. These figures help us to understand why we need such great quantities of crude rubber. At times rubber has been our most valuable import, reaching to an amount exceeding 350,000 tons in a year. So great is the home demand for tires that only one in twenty is exported. More than half the tubes and tires made in the United States are manufactured in and around Akron, Ohio, not far from the great automobile-manufacturing region.

Cheaper tires but greater mileage. Our use of rubber for making tires has constantly increased. The reasons for this are that many more automobiles are manufactured and used and they are driven in winter as well as summer, no matter what the weather may be. But the amount of rubber used per mile and the cost per mile is very much less than twenty-five years ago. Then the average cost was forty dollars or more per tire and the life of a tire was not over five thousand miles. Today the cost of a tire is not more than a third of the former price and the life is four or five times as long.



Courtesy of the Firestone Tire and Rubber Co.

Removing a tire from a modern jacket mold. Steam heat causes the rubber to vulcanize because of the chemicals that have been mixed with it. Tremendous pressure exerted by the air bag inside the tire forces the tread rubber out into the nonskid-tread pattern of the mold.

This change in cost per mile is due in part to the lower cost of crude rubber. It is due in much larger measure to improved methods of manufacture. Chemicals are added which greatly shorten the vulcanizing process. Other substances are added which enable the tire to withstand better the wear of the road and make it less likely to become brittle with age. Carbon black, a fine black powder made by burning natural gas in a limited amount of air, is used in great quantities in making tires. Its use greatly improves the wearing qualities of the tire and thus adds to its length of life. It has been estimated that improvements in the making of tires have saved the motoring public more than thirty billion dollars in the past twenty years.

Other uses of rubber. Large quantities of rubber are used in the manufacture of boots and shoes. Massachusetts is the leading state in this industry. Another use for rubber is in the manufacture of elastic material for bathing suits and underwear. This is often advertised as *lastex*. One of the most important uses of rubber is as insulation for electric wires. Being a nonconductor of electricity, it thus safeguards our homes, offices, and factories. Since it is a waterproof nonconductor, it is indispensable as a protection for underground or underwater electric cables. In our homes and in our hospitals rubber has countless other uses. Many articles of sporting goods are made wholly or in part of rubber.

Where rubber trees grow. Commercial rubber is made from a fluid, called *latex*, obtained from several species of tropical trees. In the early days the latex was gathered from wild trees wholly. The trees from which most of our rubber comes grow in regions not far from the equator where temperatures are high and rainfall is abundant. In Brazil and central Africa these trees do not grow in groves but are scattered through the tropical jungle. There the work of gathering the latex is done by half-civilized natives. With the best effort on a worker's part it takes several weeks to collect enough to make a one-hundred-pound ball of crude rubber. So difficult is the collection from the wild trees and so expensive the transportation that now much of our rubber comes from trees grown on plantations.

Wild rubber. The natives who collect the fluid make a gash in the tree and place a clay cup beneath the gash to collect the flow of latex. It is collected daily. It is then made into *biscuits* by hardening it over a smoky fire of palm nuts. At first the biscuit is very small; then layer after layer is added and dried until the biscuit becomes a ball. These balls of rubber are collected from various points



Photo by James Sawders

Close-up of a tapped rubber tree in the Strait Settlements near Singapore. The little cup on the tree trunk catches the latex as it drips from the cut.

along the Amazon River and taken to Pará where they are exported. Since the rubber trees of Brazil and central Africa grow wild, we call the rubber produced in those regions *wild rubber.*

Plantation rubber. So great has become the world-wide demand for rubber that Brazil has been unable to supply the necessary quantity. The plantation rubber of British Malaya, India, Ceylon, and Netherland India is now the chief source of supply (*l. 16*).

The plantations of the Middle East owe their beginning to seeds taken from Brazil more than sixty years ago. Henry Wickham (later Sir Henry Wickham) gathered a large number of seeds of rubber trees in Brazil, planted them in London greenhouses, and transported the little trees to Ceylon. From these seeds have come all the great rubber plantations of the Middle East. In recent years these plantations have supplied more than ninety-five percent of the world's rubber.

An ideal rubber country. That part of the world offers almost ideal conditions for producing rubber. There are the same high temperatures and abundant rains that are found in the jungles of the Amazon Valley and central Africa. The plantations are near the sea; so transportation is much easier than in the jungles of Brazil and Africa. Scientific methods are used under the direction of skilled superintendents. Labor can be trained and controlled in a way not possible in wild-rubber regions. Selection and breeding have given trees producing a maximum quantity of rubber.

Curing rubber on plantations. Instead of being hardened by smoking, the latex is coagulated by the addition of acetic acid. The rubber is then pressed into sheets and packed in boxes or cartons for

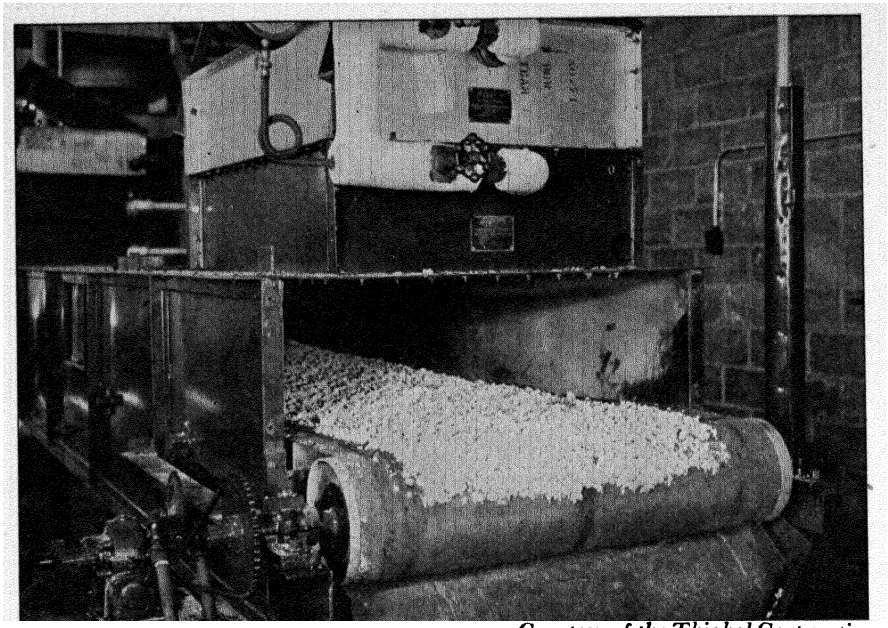


Photo by De Cou

Smoked rubber drying on a line in front of a native hut near Singapore. This is a cash crop for a small grower who must compete with the large plantations.

shipment. In some cases the latex is sprayed into the top of a heated room. As the substance hardens, it falls to the floor in flakes. Some latex is shipped to the United States in liquid form and is used in the rubber industries without going through a hardening process. Liquid latex is kept in good condition by the addition of ammonia.

New sources of rubber. Manufacturers in the United States are almost wholly dependent upon foreign countries for their supply of rubber. From 1922 to 1928 British rubber growers in the Middle East tried to limit their output for the purpose of keeping prices at a higher level. This attempt led American manufacturers to establish rubber plantations of their own. The Ford Motor Company bought for this purpose more than 3,000,000 acres along the Amazon River and called the region *Fordlandia.* The Firestone Tire Company secured a million acres in Liberia and has planted more than 10,000,000 trees. These holdings will no doubt in the near future yield many thousand tons of crude rubber. Even before these lands were bought, American tire manufacturers had bought large tracts of land in British India and Netherland India for the same purpose.



Courtesy of the Thiokol Corporation

A process in the manufacture of synthetic rubber. Just as man has improved on the silkworm's product in many ways, so he has produced a material in some ways superior to the rubber made from latex. Chemical research marches on.

Efforts are also being made by the United States Department of Agriculture to produce rubber in this country. Rubber trees planted in southern Florida have lived for several years. Lands now unused in that state may some day add to our rubber supply. Goldenrod and a Mexican plant similar to the sagebrush of our western deserts are both grown in southern California and produce small quantities of rubber. The work in Florida is as yet only in the experimental stage, but California projects are yielding more than a million pounds of rubber per year.

Substitutes for rubber. Plantation owners and manufacturers would do well to keep an eye on the chemist. He is hard at work to find a laboratory product that will possess all the desirable qualities of rubber and that will not be too expensive. And the chemist is making excellent progress. Already two of his substitute products are in some ways superior to rubber. One of these is *Neoprene* which has the advantage of not being affected by oils, heat, or chemicals. It is used in making gasoline hose, rubberized fabrics, foot-

wear, and other articles. On the tread of automobile tires it wears better than rubber. At present the price is greater than that of rubber, but new methods of production which will lower the cost will no doubt be discovered.

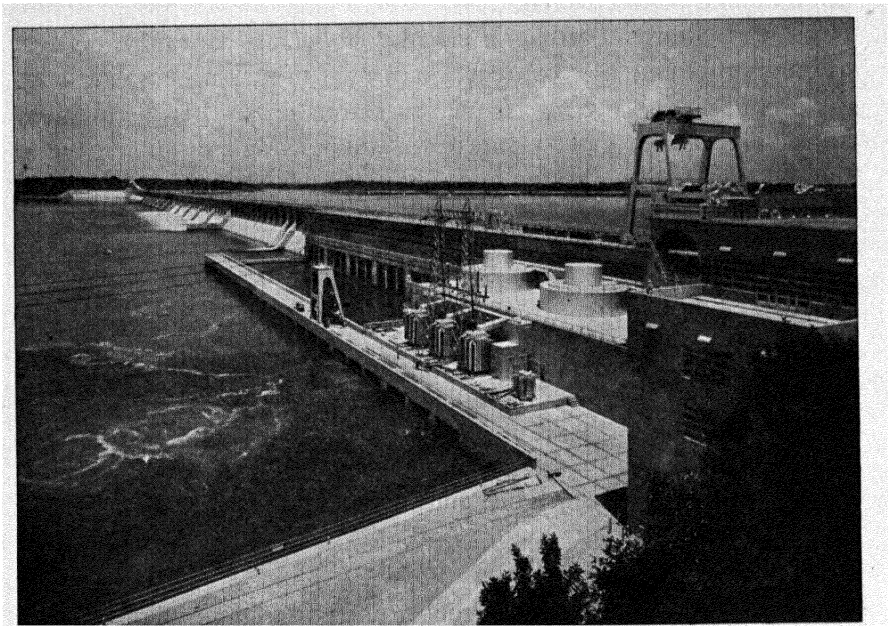
Another synthetic rubber is called *Thiokol.* Its qualities and uses are much the same as Neoprene. It is used in making gasoline hose and tubes used in spraying lacquer on automobiles. It is better than rubber for making gas containers for balloons and dirigibles. The raw materials used in making both of these substitutes are very cheap. The principal substances required in the manufacture of Thiokol are sulphur, natural gas, and salt. What is needed is a cheaper method of manufacture. It is said that in two hours on an acre of floor space in a factory two hundred tons of synthetic rubber can be made. An acre of rubber trees after five-years growth will yield only five hundred pounds of rubber per year. It is very likely that in years to come much of our rubber will come from the factories of New Jersey, Delaware, and other states rather than from the moist hot lands of Brazil, India, and Netherland India.

Guides to Study

1. How did the early uses of rubber differ from those of the present time?
2. What was the importance of Goodyear's discovery?
3. Why are tires cheaper now than twenty-five years ago?
4. Why is the Middle East a better place for gathering rubber than the Amazon Valley?
5. Why have American tire manufacturers established plantations of their own?

Research for Students

1. List the uses of rubber and state why it is used for each purpose.
2. Make a sketch showing how rubber trees are tapped. Another showing how the latex is hardened in Brazil. Describe each drawing.
3. Let some student look up the life of Charles Goodyear and report to the class.
4. What efforts have been made to find (*a*) new sources of rubber? (*b*) Substitutes for rubber?



Courtesy of the Tennessee Valley Authority

Downstream face of Wheeler Dam showing the two 45,000 horsepower generators (right center). This dam is 15½ miles above Wilson Dam in northern Alabama.

1. FROM HANDWORK TO MACHINES

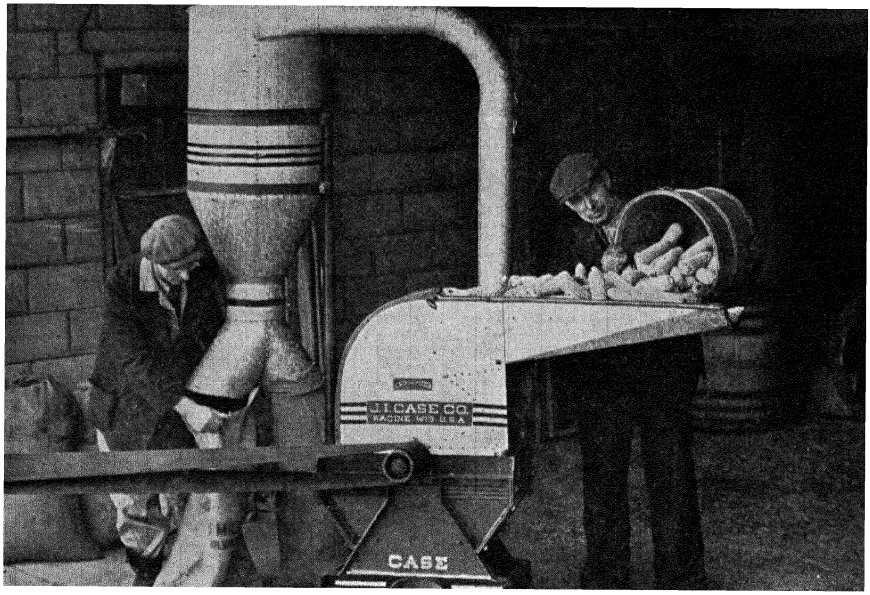
When manufacturing really was handwork. "To manufacture" means "to make by hand." Derived from two Latin words, the word *manufacture* tells exactly how things were made before machinery was invented. Very early in history men used such simple devices as the spinning wheel, the hand loom, the handsaw, the pulley, the plow, the cradle scythe, and many others; but we should hardly call any of these devices machines today.

Until after the Revolution most manufacturing was done in the homes. From the raw materials supplied by the farms all sorts of products were fashioned by handwork. Wool from the sheep and linen from flax were spun into yarn, woven into cloth, and made

into clothing, blankets, and other household articles. Hides were tanned and shoes were made by hand, often by a traveling shoemaker. Iron was smelted in many places with the aid of charcoal, and farm tools and implements were laboriously hammered out by local blacksmiths or by the farmers themselves. Timber and planks were hewed out with axes and even furniture was homemade. Some of the handmade articles of the colonial days are highly prized now on account of their beauty and durability. They are called *antiques*.

The coming of the machine. Gradually men began to invent machines to take the place of hand labor. Sawmills cut and fashioned lumber accurately and rapidly. Water power was used to turn the wheels of gristmills where the farmer had his wheat and corn ground into flour and meal. Soon the English spinning and weaving machines were introduced into the United States, and the newly invented steam engine drove our first locomotives and steamboats. The machine age was born; and manufacturing ceased to be handwork. Hand skill still has a place in the operation of machines and in special kinds of work; but machines do nearly everything today. The making and assembling of machinery involves both manual skill and machine power. Even electricity, the modern power, requires all kinds of machinery in its generation, transmission, and use. Thus, while machines have increased our production enormously, they have given employment to many thousands of people in their building and operation.

What machines do for us. Machines enter into practically every activity of our lives today. Foods of all kinds are grown, harvested, prepared, packed, and transported by some form of machinery. Textiles, clothing, shoes, and hats are almost entirely machine made. Building materials go through various machine processes; and machines play a large part even in the erection of large structures. Transportation as we know it is entirely a machine activity. From the first small, clumsy locomotives to our present streamlined trains, buses, and airplanes there has been a marvelous growth in the power and efficiency of engines and operating machinery. The same thing is true of the telephone, telegraph, and radio, all of which depend upon machines for their success. The X-ray in surgery, the motion picture in entertainment, the electric refrigerator, the washing machine, and the vacuum cleaner in household service are examples of machines which have greatly affected our manner of living and have made the machine age very different from the old days of hand labor.

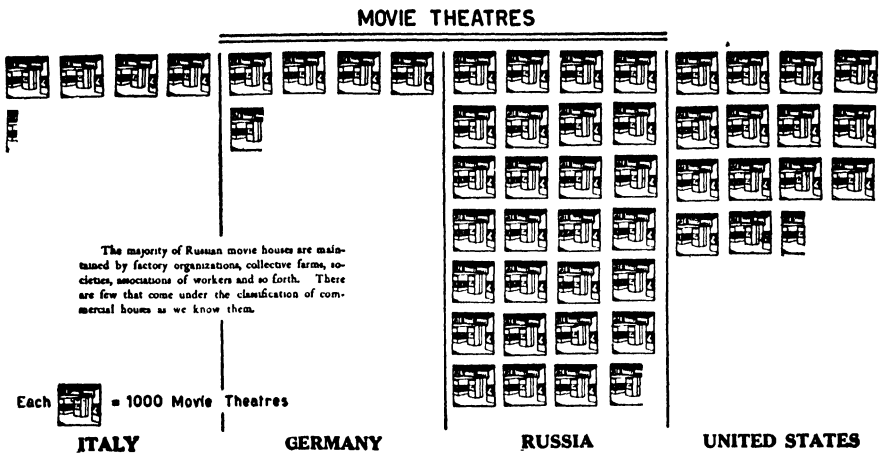


Courtesy of J. I. Case Co.

Electricity and gas-engine power are finding increasing uses on the farm. Whole ears of corn are being ground for animal feed. Experiments have proved that feed when ground produces more fat in beef cattle and more milk from dairy cattle.

Farm life in the machine age. Machinery has greatly lessened the labor of farming. Formerly long hours of constant and back-breaking toil were necessary to plant, cultivate, and harvest crops. Now the farmer has machines to do all these things faster and easier than he could do them by hand or even with animal power. The clothing, shoes, tools, and implements which used to be made on the farm are now bought either in the village store or from a mail-order house by means of an illustrated catalogue. They are all products of the mill and factory.

Thousands of farm homes now have electricity for the operation of household appliances, telephones to keep them in touch with the world outside, and radios to provide news and entertainment. Automobiles are common on farms today, and many farm families are able to see the latest motion pictures every week by going to the nearest town. Farm life is indeed different in the machine age. The farm boy is no longer a "hick" or a "hayseed." He is more apt to be a college graduate, an engineer, or a skilled mechanic. Farm women



From "Our Country, Our People, and Theirs"

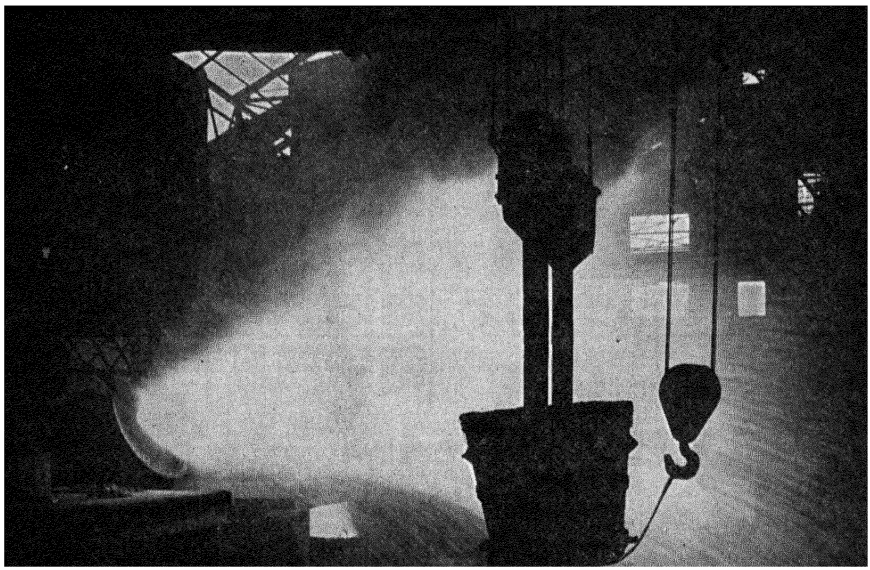
today have more leisure for self-improvement by reading and social intercourse, and they are as up-to-date as their city sisters.

The more machines, the more work. Machine production has shortened working hours and increased leisure time not only on farms but in cities and towns as well. The result of this increased leisure has been to create a demand for recreational and educational products. Automobiles, radios, books, magazines, motion pictures, athletic supplies, and other products have all benefited from this increased demand. This has given employment to thousands of workers in these industries. *(G. 64)**

The increased output of all kinds of machine products has greatly reduced the cost of these articles. This in turn causes greatly increased sales, making business better. This *mass production*, as it is called, is well illustrated in the automobile industry. Efficient manufacturing methods and large sales have brought the prices of cars down to a level that makes average family ownership possible.

While business conditions sometimes become poor, the people of the United States have amassed more wealth than those of any other nation. Our great buying power is shown by the following facts: With less than seven percent of the world's population, the United States consumes in an average year more than three fifths of the world's rubber; more than one fifth of the world's sugar; nearly three fourths of the world's silk; more than one third of the world's coal; more than two fifths of the world's pig iron; and about three

* *G. 64* means the graph on page 64.



The Bessemer blowing converter in action furnishes a brilliant pyrotechnic display while turning iron into steel. The huge ladle carries hot metal from the converter to the ingot molds.

fourths of the world's petroleum. Most of these products enter into our many manufacturing industries; coal and petroleum are our great sources of power. Not only our own people, but those of other countries, benefit from our machine production. All over the world American-made articles and American-made machines have brought modern conveniences within the reach of millions of people, and their sale has given employment to great numbers of workers in many lands.

Our debt to inventors. The world owes a great debt of gratitude to the men who have invented various types of machines and developed the resources of power and raw materials upon which our industrial progress has depended. Hargreaves and Arkwright in England invented spinning and weaving machinery which revolutionized the textile industries. Slater brought the plans for these machines to America and successfully set up similar mills here. Whitney invented the cotton gin and thereby made cotton fiber much cheaper to produce, thus changing cotton goods from a luxury for the rich to the cloth of the people. Watt made the steam engine

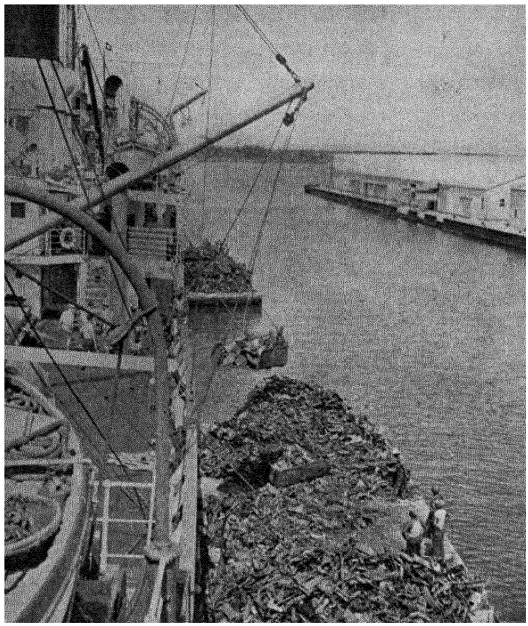
practical and gave us our first all-purpose power. Kelly and Bessemer gave us the modern process of converting pig iron into steel and inaugurated a vast industry. Edison was truly the electrical wizard, and many of his inventions are essential for our manner of living today. Ford and others made the automobile practical and reasonable in price. These are but a few of the men whose inventive genius has profoundly affected the industrial and domestic life of the world.

Factors That Control Manufacturing

Power. Without power modern manufacturing would be impossible. Machines must be kept moving. The principal sources of power are water, coal, petroleum, and electricity. Water power is sometimes used to operate machinery directly; but nowadays it is usually used to produce electric power. Coal and petroleum are used to make steam, which runs machines directly; but they are also used to generate electricity. Gasoline, made from petroleum, also operates machinery and produces electricity. Thus our manufacturers utilize water power, steam, and electricity. For all these we have abundant resources; and our great industries have grown up near these sources of power. Other countries are also well supplied with power resources. Great Britain has a vast supply of coal, as has Germany. Japan needs more coal, which may be one reason for its interest in the great mineral fields of eastern Asia. The United States, however, leads the world in the production of coal and petroleum, which gives us a great advantage in manufacturing (*G. 204, 207, 212, 215; l. 192, 205, 246, 388, 445, 457, 550, 561*).

Raw materials. Those substances which are used in making a manufactured article, such as cotton, wool, silk, rubber, wood, iron, copper, hides, and many other products of soil, forest, ranch, and mine are called *raw materials.* If the raw materials are near at hand, it is a great advantage. Thus the cotton mills of the South are close to the supply of raw cotton; the steel mills of the Middle West are near the Lake Superior iron mines; and the paper mills of New England have pulpwood forests near by. In Great Britain iron mines and coal fields are near the great steel-making cities; and in France silk is produced close to the silk mills (*l. 526*).

But it is not necessary to locate mills and factories near the source of raw materials. Railroads and steamship lines carry the raw materials from all parts of the world to manufacturing plants in many



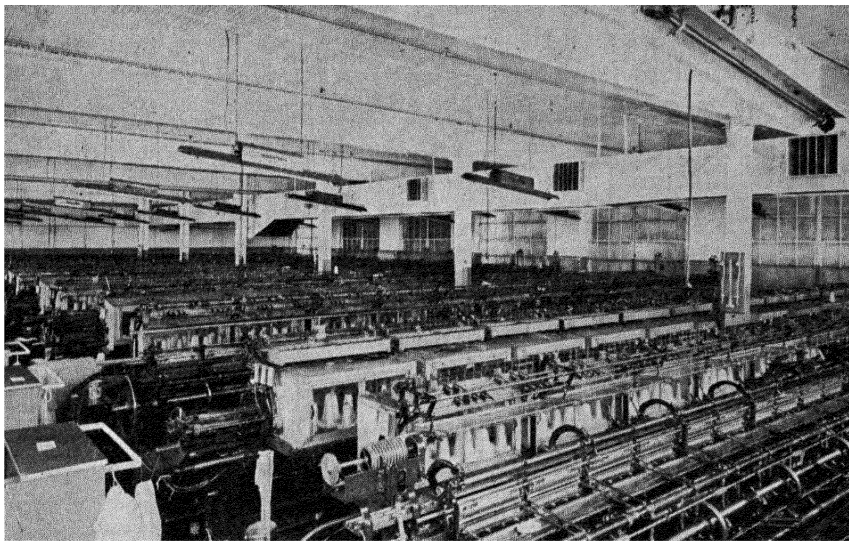
Courtesy of Miami News Service

A British freighter at Miami taking on board a cargo of scrap iron to be transported to the Far East. Raw material often travels far.

countries. Of course this long-distance transportation of raw materials adds to the cost of manufactured products; but in many cases it is unavoidable. For example, our automobile industry needs rubber for the making of tires. The tire factories are located mainly in and around Akron, Ohio; only a little raw rubber is produced in the United States. The rubber must be brought in from the East Indies, the Philippines, and South America. The same thing is true of our woolen and leather industries, for we do not produce enough wool or hides to supply our mills and tanneries. Likewise we export great quantities of cotton to supply mills in other countries. Manufacturing industries must have raw materials.

There must be a market. A manufactured article is useless unless it can be sold. There must be a market. This problem of markets is a difficult one for the manufacturer. Styles change, and manufacturers cannot afford to keep on making old-style goods because nobody will buy them. If too large a supply of any article is produced, there will be an unsold surplus, and the manufacturers will lose the money they have put into the making of these goods. A sudden or increased demand may cause a shortage of some goods, and manufacturers lose profits which they otherwise might gain. This is called *the law of supply and demand*, and businessmen watch it closely.

The demand may be entirely *domestic*, that is, confined to the country where the goods are produced; or it may be *foreign*, that is, the goods are sold in foreign countries. In the United States we



Courtesy of the Sherwin-Williams Co.

A hosiery mill at Valdese, North Carolina, where a modern lighting system and an air-conditioning installation protect the eyesight and add to the comfort of the workers

have a very large domestic market for our manufactures; but we have also gained great profits from our foreign markets. During recent years this foreign demand for our goods has been greatly reduced, which has hurt our industries. However, we still export enormous quantities of manufactured goods; and these exports have begun to increase again. The foreign demand for American products is due partly to the quality, attractiveness, and reasonable prices of our goods. Our farm, mine, and factory machines, our automobiles, our shoes, our textiles, and our prepared foods find ready markets in nearly all parts of the world.

Climate and manufacturing. Climate has a great deal to do with manufacturing. All the great industrial countries are in temperate regions. In tropical countries the hot climate makes working conditions difficult in mills and factories. (The owners of textile mills in our Southern States have introduced air conditioning to keep their mills cool.) It is difficult to find skilled workers in hot areas, and men from temperate regions do not wish to live in the uncomfortable climate of the tropics. The spinning and weaving of cotton

and linen also require considerable moisture in the air for the best results.

Tropical and subtropical countries produce many raw materials which are sent to temperate regions for manufacture. Cotton and rubber are two good examples of such raw materials. Can you name any others? In return for raw materials temperate countries send many manufactured products to the tropics. All hot countries import cotton goods for clothing. All kinds of machinery and equipment for mining, transportation, farming, and business are also imported by tropical countries. Many of the resources of these hot regions are being developed by the businessmen of temperate countries so that they may have a constant and plentiful supply of raw materials and a good market for their own products.

Labor and capital. All industries must have workers, or *labor.* They must also have money to buy raw materials and to pay for the labor used. This money invested in industry is called *capital.* Labor demands and should receive wages sufficient to enable men and their families to live decently. Our American industries pay higher wages to labor than any other country in the world. When our population was smaller and our industries were growing rapidly. it was sometimes hard to find enough labor. On account of the high wages offered, millions of workers came to the United States from foreign countries during the half century from 1850 to 1900. Without these European laborers our great industries could not have grown as they did. Now, however, there is little immigration; but the wages paid to our workers remain the highest in the world.

People invest their money, or capital, in an industry in order to make a profit. This profit depends upon a great many factors, such as the cost of raw materials and labor, the prices obtained for the product, tariffs, and other forms of taxation. When business becomes unprofitable, we have idle factories and much unemployment.

Many countries lack the money to finance their own industries, and in such cases foreign capital is often sent in to operate mines, railroads, and factories. In the early days of our own country British capitalists had large investments in the United States, as they still have in Canada and other parts of the world. Americans have invested many millions of dollars in the mines and industries of Canada. In South America and Mexico both the United States and Great Britain have large investments, particularly in oil and minerals. The profitableness and safety of such foreign investments depend upon

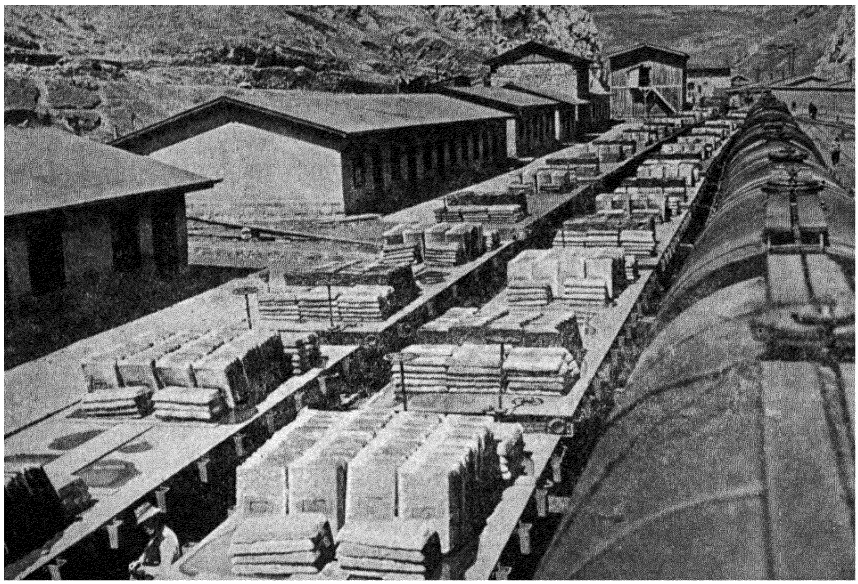


Photo by James Sawders

Freight cars being loaded with copper pigs from the smelter at Oroya, Peru. The Cerro de Pasco mines are owned and operated by citizens of our country. Each ton of these pigs carries 400 ounces of silver which is separated from the copper in the United States.

the stability and honesty of the governments in the countries where the industries are located. Unfortunately some governments occasionally do not allow foreign companies to operate successfully. This often results in a loss both to the companies and to the countries involved.

Guides to Study

1. What articles made by old-fashioned hand methods may be seen in your homes, in your vicinity, or in near-by museums?
2. What great advantages are there in the use of machines?
3. What have machines done for the farmer and his family?
4. What conditions are necessary for successful manufacturing?
5. What are the most important factors in determining the location of manufacturing centers? Give illustrations.
6. In what parts of the world are the leading industrial countries? Why is this so?
7. What has stable government to do with business?
8. Why are tariffs often levied on imported goods?

9. Why have new inventions often been destroyed by mobs of workers?

RESEARCH FOR STUDENTS

1. Collect pictures of simple tools and implements; also pictures or sketches of complex machines which now do the same kind of work.

2. Arrange a debate on the topic: Machines are responsible for most of our unemployment.

3. Compare conditions in the United States where machines are widely used with conditions in India or China where relatively little machinery is used.

4. Make a study of the Diesel engine and note the many uses to which it is put.

5. Make a list of other inventors who deserve to rank with those mentioned on pages 196-197.

2. THE POWER BEHIND THE MACHINE

Power in the home. Man took a long step forward when he invented machines and harnessed the great forces of nature—wind, water, and steam—to run them. It would be utterly impossible today to produce all the goods that we need without the use of power-driven machines. Power touches our lives at every point. Only a half century ago all housework was done by hand, that is, by human muscles. In those days very little power was used in homes, but factories were already well supplied. But, since we have learned how to use electric currents, millions of homes have been supplied with power. Electricity lights our rooms, cooks our food, and runs our washing machines, vacuum cleaners, sewing machines, and pumps. It toasts our bread, heats our flatirons, rings our doorbells, operates our oil-burning furnaces, and makes possible the radio, the telephone, the telegraph, and artificial refrigeration. Housework today is far easier and pleasanter than it was fifty years ago.

Power in the community. Outside the home the work of electricity is even more amazing and complex. It lights our streets, buildings, and signs; runs streetcars; operates trains; drives industrial machinery; and furnishes the spark that makes the gasoline engine run. It lifts elevators, hoists cargoes, operates mines, smelts ores, and extracts nitrogen from the air, thus giving us an abundant supply of nitrates for fertilizers. It operates searchlights and signals of all kinds, adding greatly to the safety of travel by sea, air, and land.

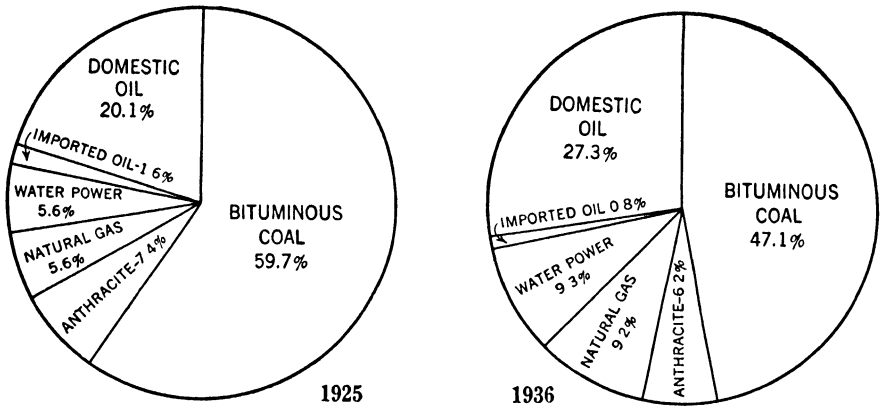


Photo from J. C. Allen

An electrically operated kitchen is one of the benefits conferred on both urban and rural housewives by the power developments in the Tennessee Valley.

Electric light and power have come into use in comparatively recent times. Many people now living depended in former years upon horsecars and horse-drawn carriages for local transportation. Their streets and homes were lighted with gas or kerosene lamps, and there was none of the many electrical devices so common today. This is indeed the *age of electricity*.

Sources of power. The great sources of power are the movement of air, the falling of water, the expansion of steam, and the explosion of gas or oil. Electricity in itself is not a primary power. It must be generated by water power or by steam or gas engines. Electricity, however, has a great advantage over other kinds of power because it can be transmitted for long distances over wires and because it has so many uses. The windmill and the water wheel operated our first simple machinery. Later steam engines came into use; and still later the gasoline and oil engine. Electric power has now become our most important driving force. No one can predict how much more useful it will be in the future.



How various fuels and water power compared in the production of the power used in the United States in 1925 and 1936

Water Power

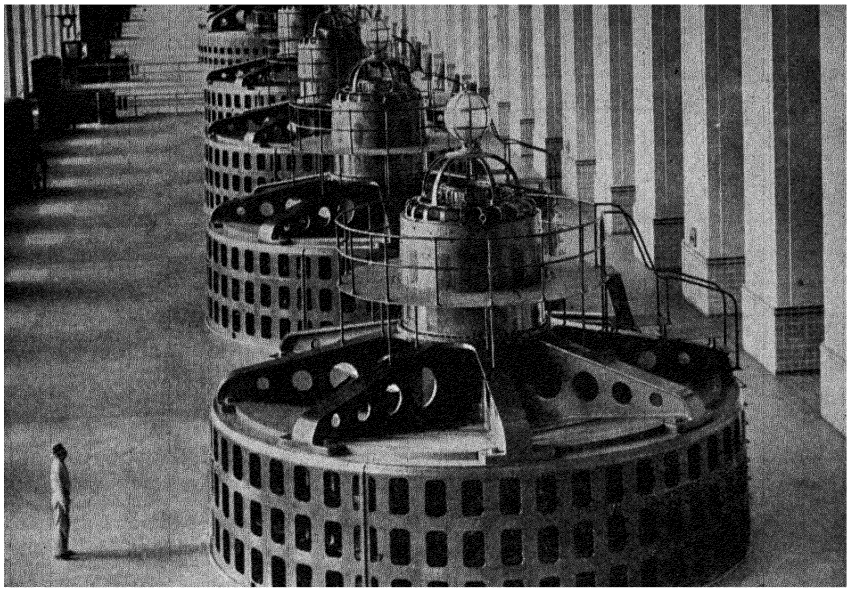
The water wheel. The first factories were located beside waterfalls, from which they got their power. As soon as such a factory was built, workmen gathered about it, and a settlement grew up. Gradually such settlements grew larger, and thus many of our industrial cities got their start.

The water wheel was a simple device. It had broad cleats or buckets around its rim, and the water striking these obstructions turned the wheel and thus transmitted power to the machinery in the mill. When the wheel was placed so that the water flowed over the top, it was called an *overshot wheel.* When the water flowed through a trough at the bottom, it was called an *undershot wheel.*

Water power by wire. Since the discovery of methods of using electricity for power, mills no longer find it necessary to remain close to rivers. Hydroelectric plants generate electricity at waterfalls and wires carry this electric current for long distances, giving power and light to many cities and towns. (*I. 192, 445*)

Instead of the old-fashioned water wheel, the modern electric plant uses the *turbine.* This is a specially designed wheel which usually lies flat at the bottom of a deep well down which a torrent of water falls. There are great turbines of this kind at Niagara Falls and at the great dams which the Government has built at different places. While the turbine is a great improvement over the old water wheel, the power still comes from the force of the falling water.

The great advantage of water power is its unlimited supply. As long as we have rain and running water in streams, we shall always

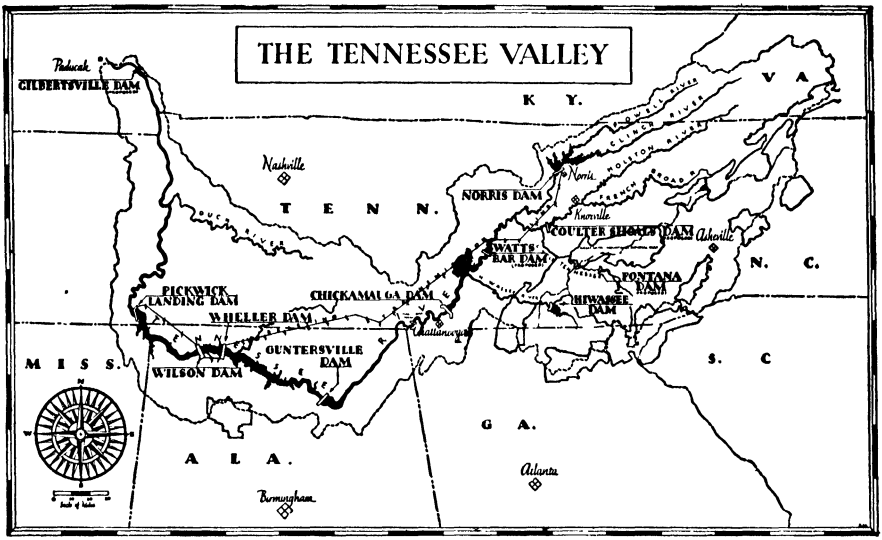


Courtesy of the Tennessee Valley Authority

The battery of generators at Wilson Dam in the Tennessee River

have water power. The same river may operate many turbines; and artificial falls are produced by means of dams across streams. Water power is much cheaper than coal or oil and is very widely used today.

Water power in the United States. Not all streams are useful for water power. Slow, deep rivers like the Mississippi and the Hudson are more suited for navigation. Rapid rivers, found usually in hilly or mountainous country, have more falls and, therefore, give more power. Such states as Washington and Oregon, with abundant rain and fast-flowing mountain streams, have the largest water-power resources. However, there is a vast supply of water power scattered over the United States. The states bordering the Atlantic, with their good rainfall and rugged surface, have developed hydroelectric power most extensively in order to supply their great manufacturing industries and their large cities. In the West there is an enormous amount of undeveloped water power because manufacturing is not so prominent in this part of the country. However, electric power is being used more and more in the West to operate sawmills, canneries, mines, railroads, farm machinery, and lighting plants. Even in the Middle West, where coal is plentiful, electricity is extensively



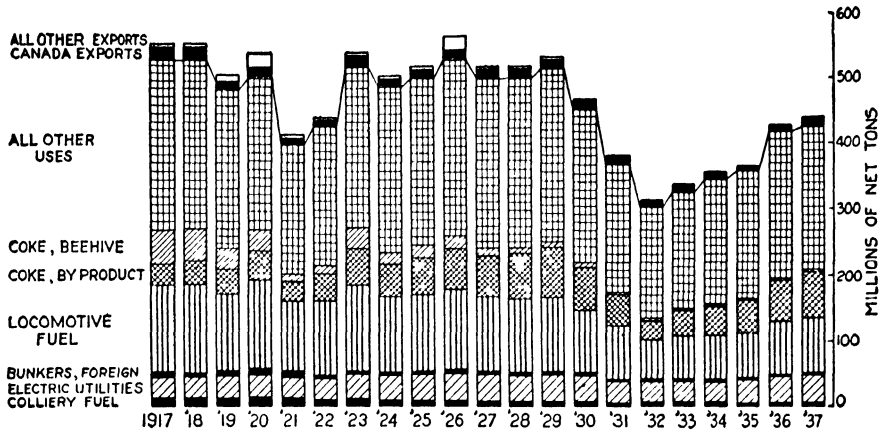
Courtesy of the Tennessee Valley Authority

The watershed of the Tennessee River and its tributaries covers an area of more than 40,000 square miles, including portions of seven states, and supports a population of 2,250,000 people. The dams aid in flood control, create a nine-foot channel for navigation, and permit the generation of electricity in vast quantities for industrial and domestic uses.

used. Great transmission lines of high-tension wire carry this power over great distances.

Approximately thirty-five percent of the electricity generated in the United States today is by water power. The great Government hydroelectric developments in the Tennessee Valley and the Far West will add enormously to our electric energy for domestic and industrial uses. The Grand Coulee plant when completed will furnish energy exceeding that of any other plant in the world.

Water power in other countries. European countries which have developed much water power are Italy, France, Switzerland, Norway, and Sweden. Italy uses hydroelectric power in the industries of the Po Valley. Switzerland's electric power draws trains over the Alps and through mountain tunnels. Norway with its electricity turns the nitrogen of the air into fertilizers and produces aluminum from imported ores. By exporting fertilizers and aluminum Norway is in a sense able to sell its water power to other lands. Sweden uses much water power for lumber and paper mills, and lumber, paper, and wood pulp are important exports of the country.



From Minerals Yearbook of the U. S. Department of the Interior

Tonnage of bituminous coal absorbed by the principal branches of consumption, 1917-1937

Canada finds its water power useful in lumber mills, in papermaking, for generating electricity, and for general manufacturing.

Coal

The importance of coal. It has been said that only food and water are greater necessities than coal. A businessman, arising in the morning, presses a button and his house is lighted by electricity, perhaps generated by coal. His house may be heated or his breakfast may be cooked by coal or by gas or electricity from the same source. He may ride to his business on a steam train using coal or on an electric car using power from a steam plant. His office may be in a factory whose machinery is operated by steam. His raw materials are carried to and his products from the factory on freight trains propelled by steam. What is true of the businessman is true in large measure of every man, woman, and child in the country. The life of each one of us is largely dependent upon coal. Coal is one of the greatest assets a country can have.

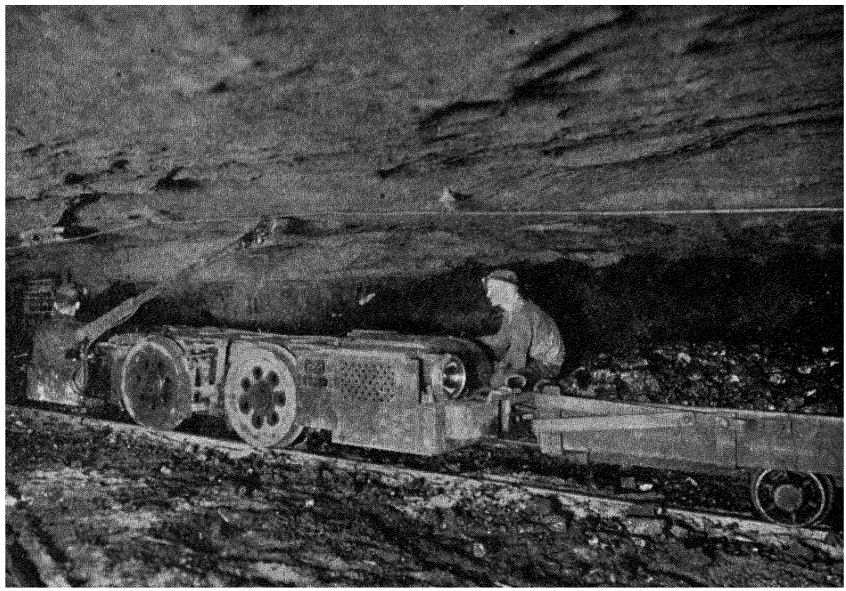
While water power is very valuable, there is not enough of it available to do all the work of the world. Steam still gives us most of our power, light, and heat. Coal is our greatest source of steam. Petroleum is more expensive, and its supply is more limited than that of coal. Some industries, like the smelting of ores, the making of steel, and certain other metal manufactures, must have coal. For



these reasons coal is certain to remain our most valuable source of power.

The origin of coal. Vegetable matter which accumulates in the bottom of swamps and marshes is known as *peat.* We may think of this as coal in its earliest stages. It is found in swamps in many parts of the world today. In Ireland peat is the most common form of fuel. The coal which we use today was formed from plants which grew in enormous swamps millions of years ago. When the plants, many of which were as large as our trees, fell into the water of the swamp, they were preserved from decay. When this material was subjected to the pressure of layers of rock which had been formed above it, lignite or brown coal was formed. Still greater pressure for a much longer time produced bituminous, or soft, coal. This in turn, under still more pressure, became anthracite, or hard coal.

The light, heat, and power which we get today from coal, petroleum, and natural gas really come from sunshine which fell on the earth millions of years ago. That sunshine was necessary for the plants which gave us coal and for the plants and animals from which



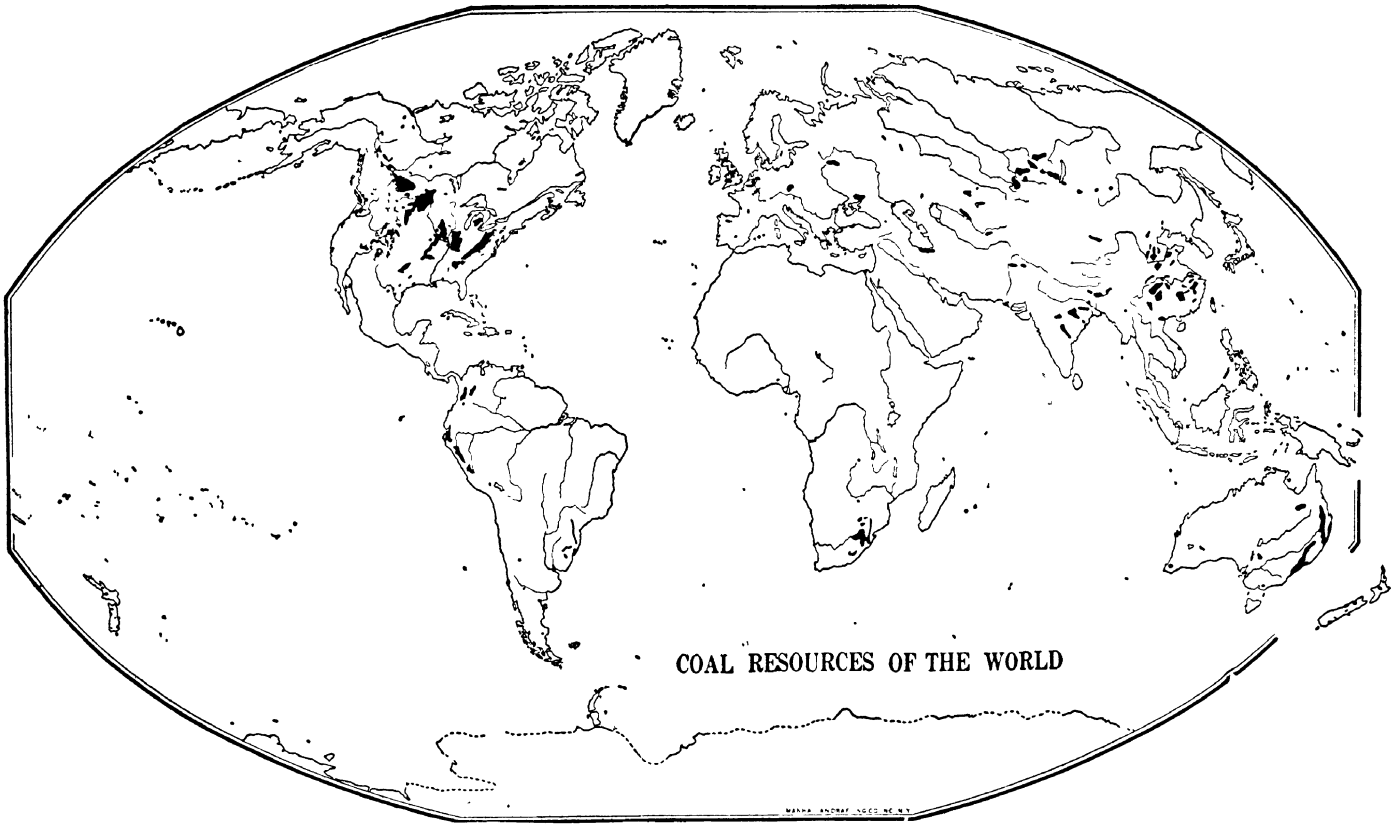
Courtesy of the Pittsburgh Coal Co.

An electric engine assembling coal cars in a mine to form a train to be drawn by the main haulage locomotive

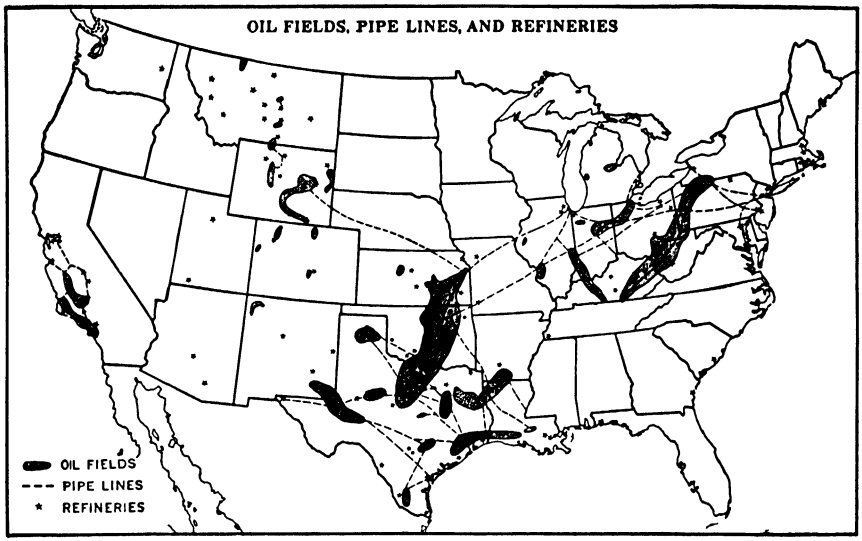
petroleum was formed. This sunshine of former times has been bottled up in the earth in the form of gas, oil, and coal for millions of years waiting for a scientific age to put it to use.

Our coal supply. There is a vast amount of coal beneath the surface of the earth, but it is very unevenly distributed among the different continents. Geologists can tell about how much coal there is underlying different regions, and they call these estimated deposits the *coal reserves.* The United States is believed to have nearly half of the world's coal reserves. We mine and use more coal than any other nation, and at times we even import a little. Factories, railroads, and steamships use this coal for power; from it we also get coke for smelting iron and gas for light and heat.

The largest part of our American coal is bituminous. About seventy-five percent of our coal is produced in the Appalachian region from Pennsylvania to Alabama. This coal is of excellent quality and is within easy reach of our great industrial centers and our Atlantic ports. In the Middle West there are also abundant supplies of good coal, which is used in the steel mills and factories of that section. Lignite, which is inferior to bituminous coal, is found in



Study this map in connection with the coal tables in the Appendix.

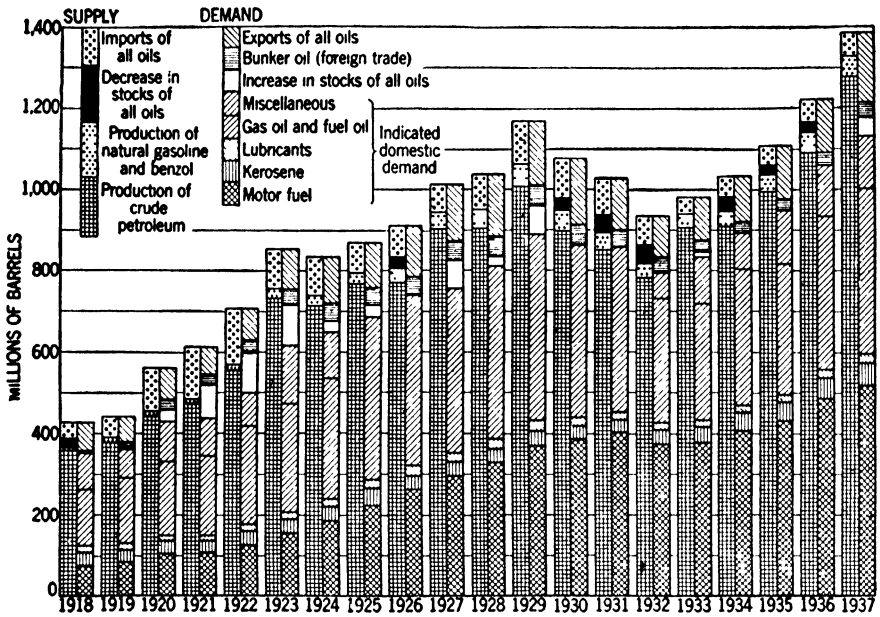


Montana, the Dakotas, and the Gulf States. Very little lignite is used in our country because we have an abundance of high-grade bituminous coal. Besides, the bituminous mines in most cases are much nearer the industrial centers and ocean ports. However, it is well to have these resources for future use.

The only anthracite area of any importance is in eastern Pennsylvania, and the mines there supply practically all the hard coal used in household heating and cooking. Recently we have imported some anthracite from Wales and some even from Russia. There is very little coal on the Pacific Coast, but the petroleum of California and the water power of the Northwest keep industry and transportation in this section well supplied with power.

Our great coal supply has enabled us to become the greatest manufacturing nation of the world. Water power and petroleum have helped, of course, and are growing in importance; but coal is still our greatest reliance.

Foreign coal resources. Europe is well supplied with coal although there are several countries which lack this important fuel (*M. 458*). Italy, Spain, Switzerland, and Scandinavia are thus handicapped; but they all have excellent water power available. Table 38 in the Appendix shows the coal reserves of the different continents. It is evident that coal is very unevenly distributed throughout the world. Table 39 shows the production of coal in several European countries. It is interesting to note that the three countries



From Minerals Yearbook of the U. S. Department of the Interior

Supply and demand of all oils, 1918-1937

producing the most coal are also the industrial and commercial leaders as well.

Petroleum and Petroleum Products

Petroleum in our lives. If there were no petroleum in the world, our lives would be very much changed. No automobiles, trucks, or buses could move; no airplane or dirigible could fly; motorboats, submarines, and motor ships would be helpless. There would be no oil-burning furnaces, and no tractors on the farms. We should have no gasoline, kerosene, benzine, naphtha, paraffin, lubricating oil, or any of the numerous by-products of petroleum. Millions of people would have no employment, for oil wells, refineries, filling stations, automobile factories, and hundreds of other lines of business now dependent on petroleum would no longer exist. Oil indeed keeps the machinery of modern life moving. Its complete loss would be a world-wide calamity. Fortunately new supplies of this liquid power are constantly being discovered, and nature seems to be very generous in this gift to mankind.

What petroleum is. The origin of petroleum is not fully determined. Scientists believe, however, that during early geologic ages

vast quantities of plant and animal remains were buried deeply among the rocks of the earth's crust. Chemical and physical changes in these materials are thought to be the causes of the formation of petroleum and natural gas. The oil and gas then collected in pools within the porous rocks and sands and were covered with layers of hard rock, sand, and clay. Oil is usually found mixed with gas and water, all under great pressure. If a hole is drilled through the clay, sand, and rock until it reaches the deposit of oil, the pressure causes the gas, water, and oil to spout or gush up through the hole, or *well*, as it is called. Such an oil well is called a *gusher*, and it may spout oil and gas high into the air until it is controlled by being led into pipes and tanks. Sometimes oil does not gush out but has to be pumped to the surface. Oil wells vary in depth from a few hundred feet to one recently driven down 15,004 feet before oil was encountered. Wells are even driven into the ocean bed, under water, and some of these submarine oil wells are great producers. Various scientific methods are now used to determine where oil is apt to be found. Oil as it comes from the well is called *crude*, and it contains a great many different substances, which are separated by a distilling process called *refining*.

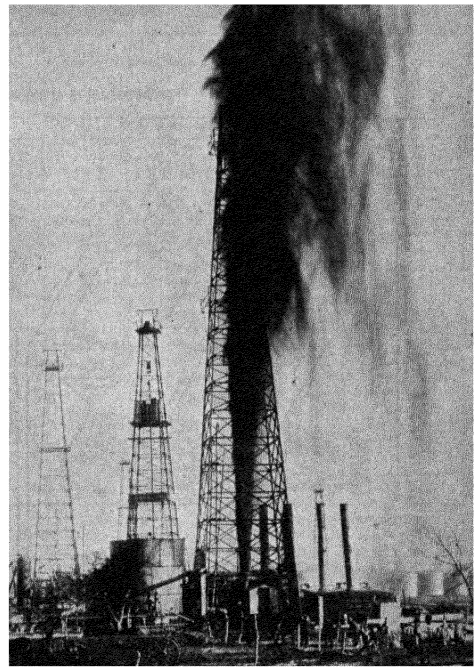
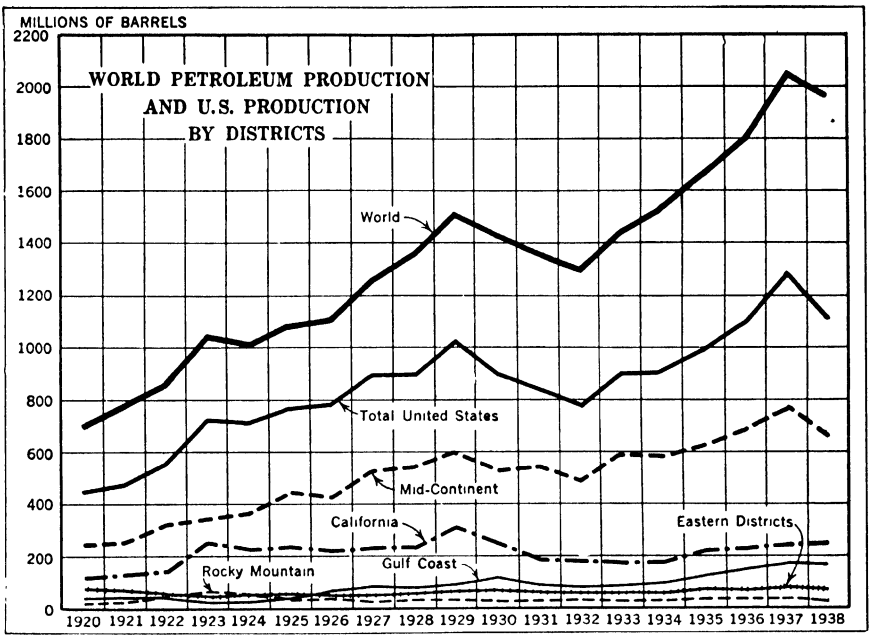


Photo from Ewing Galloway

An oil gusher in action

The history of oil. A small amount of oil was found by the early settlers seeping into salt wells and even in swamp water. Small quantities of this oil were sold as a medicine under the name of "Seneca Oil." It was soon found that this surface petroleum could be refined so as to produce an oil that could be burned in lamps. Before this time all light was obtained from candles or whale oil. These were expensive and not very satisfactory, and the new oil

SMITHSONIAN INSTITUTION MODEL
OF
OIL REFINERY



was in great demand. This led to experiments in drilling wells to get petroleum; and in 1859 Col. Edwin L. Drake first "struck oil" at Titusville in Pennsylvania. From that small beginning a vast industry has developed. Pennsylvania is no longer an important oil producer; the great oil fields of the South and West now produce more than sixty percent of the world's petroleum. The refining, transportation, and sale of petroleum and its many by-products are among our greatest sources of wealth. Our exports of petroleum products are exceeded only by our exports of raw cotton and machinery.

Many products, many uses. The *refining*, or distilling, of petroleum breaks it up into the products named in a previous paragraph (p. 212). Of these gasoline is most in demand. This is because of the invention of the internal-combustion engine, such as that used in automobiles, airplanes, and many kinds of machinery. Fuel oil is used in place of coal to drive locomotives and steamships and also in the Diesel type of engine for heavy-duty work. Oil heating is also becoming very popular. Lubricating oil is essential for all kinds of machines, none of which could operate without it. The other products of petroleum are used in many of the arts and industries and even in medicine. The colored crayons with which you color your maps are petroleum products.

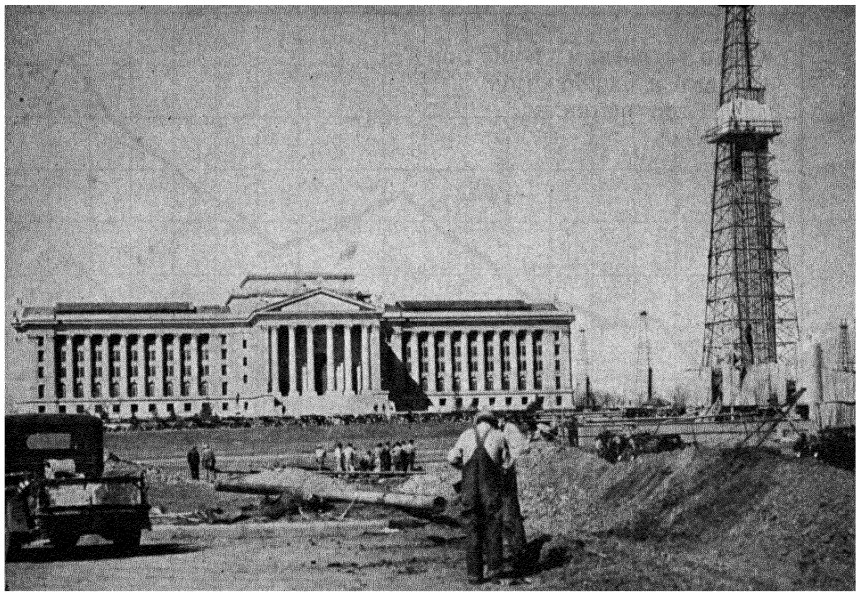


Photo by James Sawders

Oil derricks on the grounds of the Oklahoma State Capitol in Oklahoma City

Oil in the United States. The graph (p. 215) shows the petroleum-producing regions of the United States and the total world production. In the eastern field oil wells have been operated for more than seventy years, and production still continues, but not in very great quantities. Most of the eastern wells are in the bituminous-coal country on the Allegheny Plateau. The Mid-continent area includes the oil fields of Kansas, Oklahoma, Arkansas, northern Louisiana, and all of Texas except the Gulf Coast. Its production surpasses all other parts of the country at present. The California field is next in production, and a very small amount of petroleum is obtained from the Rocky Mountain region. Production is increasing in the Gulf field, especially in Louisiana, where oil wells are being sunk in the ocean bed and large returns are being realized.

Transportation of petroleum. There are more than four hundred refineries located in thirty-three different states of our country. Many refineries are located in the Eastern States so as to be near the great industrial centers and the Atlantic ports. The crude oil reaches these refineries in various ways. A great deal is pumped through long pipe lines, some of which extend nearly fifteen hundred

miles across the country. These pipes vary in diameter from two to twelve inches. Great pumps are located at points twenty-five or thirty miles apart, which force the crude oil through the pipes, over the mountains, and across the plains.

On the railroads tank cars also carry great quantities of oil to the refineries. Large ships called *tankers* bring cargoes of crude oil to the eastern ports and also carry both crude oil and gasoline across the ocean to foreign markets. American tankers are seen in almost every port of Europe, Asia, and Africa. From our refineries great fleets of tank trucks deliver both oil and gasoline to bulk and filling stations throughout the country.

World production of petroleum. As we have seen, the United States produces about sixty percent of the world's petroleum. The rest of the world is not able to supply its own needs but must buy from producing countries. We export annually about a quarter of a billion dollars worth of petroleum and petroleum products. There is very little oil in Europe, and the great industrial countries of that continent are forced to import almost their whole supply. Soviet Russia is second only to the United States in its yield of petroleum; but its oil areas are located far from the industrial centers. Rumania is the only other large oil producer in Europe and is able to export considerable gasoline and fuel oil. Other important petroleum-producing countries are Venezuela, Persia, Netherland India, and Mexico. Several great companies have concessions allowing them to develop these foreign oil fields. They pay a percentage of the profits, called a *royalty*, to the foreign governments, and in return they enjoy the exclusive right to produce oil there. The governments of the great powers are very much interested in these oil concessions since gasoline and oil are very necessary in their military and naval activities.

Natural gas and its uses. Natural gas is usually found with petroleum, but it may exist alone. When a pocket of gas is first tapped by the drill, the gas blows out with great force and may do considerable damage before it is controlled.

The great value of natural gas comes from the fact that it burns with great heat. While it is used to some extent for lighting, its greatest use is for fuel, both domestic and industrial. Ordinary illuminating gas is expensive because it must be made from coal. The coal is heated in *retorts* and the gas escapes, leaving coke as a by-product. Natural gas is much cheaper if it does not have to be piped



Courtesy of Caterpillar Tractor Co.

Laying a pipe line at the rate of two miles a day. This pipe line is to bring natural gas from Texas. The workers have reached the vicinity of Craigville, Indiana.

too far. At the present time natural gas is piped from Texas and Oklahoma to Chicago, Washington, and other large cities, as well as to Mexico and even as far as Canada. It is used in drilling oil wells, operating refineries, and generating electricity. Large quantities of gasoline are obtained from natural gas. Carbon black, used in the rubber industry, and in making printing inks, is made from natural gas and is its most important by-product. Natural-gas wells stop producing after five or six years; but new ones are constantly being brought in; so our use of this fuel is steadily increasing.

Helium. Another valuable gas is helium, which has come into prominence on account of its use in dirigibles. Hydrogen, the gas usually used in balloons, is very inflammable; that is, it burns easily and is very apt to explode. It was the explosion of its hydrogen gas which destroyed the great German dirigible, the *Hindenburg*, a few years ago. Helium is not quite so buoyant as hydrogen, but it does not burn, and hence it cannot explode. It is therefore the ideal gas for dirigibles. The United States has almost the only supply of this gas at present known and the Government controls its production,

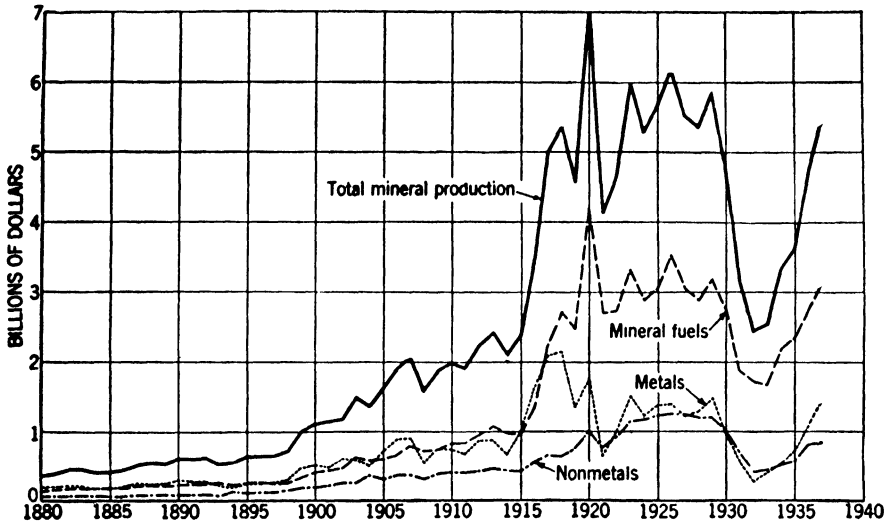
reserving it for use in army and navy dirigibles. Helium is said to have been discovered recently in France and in Trinidad, but it is still very rare.

Guides to Study

1. What does electricity do for you every day? How was the work done in each instance before the days of electricity?
2. Why is electricity not a primary power like falling water or steam?
3. What advantage has water over coal as a source of power?
4. What advantage has coal over water as a source of power?
5. In what parts of the United States is water power most extensively used? Why?
6. How can a country export water power? Give several illustrations.
7. Show that the power of today comes from the sunshine of ages past.
8. In what ways is a country with large deposits of coal better off than a country having little or none?
9. How does petroleum occur in the earth?
10. What products of petroleum are most useful? Why?
11. Why are many of the large oil refineries located along the Atlantic Coast?
12. Why is natural gas one of a country's valuable resources?

Research for Students

1. Locate some of the great industrial regions of the United States. Learn their sources of power—whether coal, water, or electricity.
2. Make a study of the way in which water power is harnessed. Find pictures or make drawings of old-fashioned water wheels and explain how they operate machines. Compare them with the turbine. (Consult dictionaries and encyclopedias.)
3. Make simple line graphs showing the relative amount of water power developed in a few of the leading countries (see Table 49 in the Appendix).
4. On an outline map of the United States shade heavily the chief coal-producing regions.
5. On the same map show in another color the location of the leading oil fields. Draw the pipe lines connecting fields and refineries.



From Minerals Yearbook of the U. S. Department of the Interior

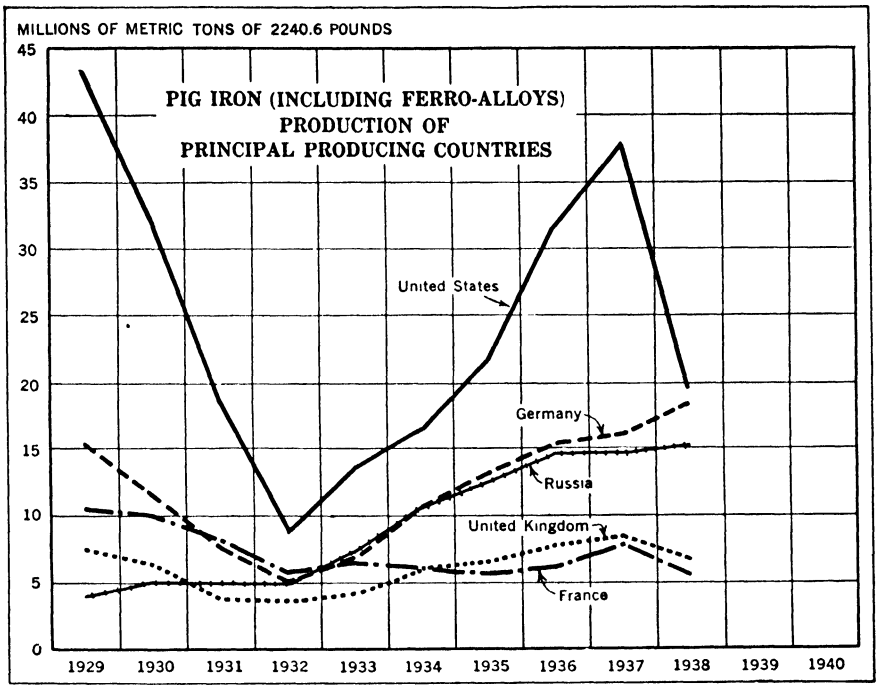
Mineral production of the United States, 1880-1937

3. MINERALS AND HOW WE USE THEM

Iron and Steel

Iron in history. Iron is mentioned in our earliest historical records. The Old Testament describes Tubal-cain as an ironworker. Ancient races like the Egyptians, Assyrians, and Romans made considerable use of iron and other metals. But even in medieval times iron was used chiefly for weapons and armor. Gradually various implements and tools were shaped from iron; but its use was very limited until about a century ago. Plows had only a small iron blade, and the first railroads ran on rails of wood covered with a thin strip of iron. Cogwheels in mills and even in clocks were made of wood, and so were spinning wheels and looms.

In these early days iron ore was obtained mostly from bogs and swamps and was smelted in wood or charcoal fires. Under such conditions the output of iron was small. Iron was made wherever the ore was found, and, when the supply was exhausted in one locality, the furnace was moved somewhere else. When coke began to be used for smelting, the output of iron immediately increased. The ore was transported to the coal-mining centers and the iron-making industry became localized there. As machines were invented



and as railroads were extended, more iron was required and the production soon grew very large.

Our dependence on iron. Iron and steel which is made from iron are indispensable in modern life. Every manufactured product that helps to feed, clothe, and shelter us goes through machines constructed almost entirely of steel. Furniture, household articles, vehicles, and conveniences of all kinds are either made from iron or steel or are produced by machines of steel. From the delicate compass needle and the compact works of a watch to the enormous bulk of a great steamship, iron and steel find constant use. The machine age would be impossible without this commonplace but marvelous metal. Neither water power, nor steam, nor electricity would be of much use without iron and steel in engines, machines, and buildings.

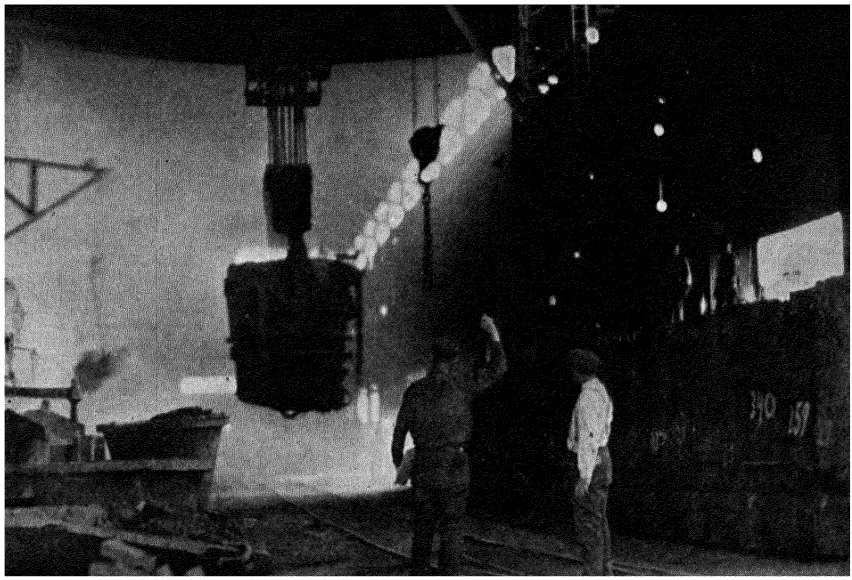
The qualities of iron and steel. When iron ore is smelted, or heated with coke and limestone, the liquid iron is poured out into molds where it hardens. In this form it is called cast iron or pig iron. The name *pig iron* is applied to these molds of iron because they resemble a number of little pigs lying side by side. Cast iron is run into molds to make stoves, heaters, and parts of machines

called *castings*. Cast iron is hard but very brittle; consequently it breaks easily. It contains a great deal of carbon. In order to make the iron less brittle so that it can be rolled and shaped into various forms, most of the carbon is burned out of it. Iron thus treated is called *wrought iron*. Such iron is also called *malleable iron*. It may be rolled into sheets of varying thickness, from which tanks, boilers, and other products are made. All sorts of ornamental ironwork are made from wrought iron.

Steel is harder than wrought iron, but it contains less carbon than pig iron. It can be cast or rolled like wrought iron, but it is far more durable. Tools, machines, girders, rails, engines, and steamships are mostly made of steel. By alternate heating and cooling steel can be tempered to varying degrees of hardness. When very hard, steel becomes brittle; but it then takes a very fine cutting edge and so is valuable for tools and implements of all kinds. A very important quality of iron and steel is that they can be magnetized, that is, electrically treated so that they will attract and hold other iron objects. This magnetic quality makes the compass possible. Great magnets are also used to lift heavy masses of iron and steel in loading and unloading ships and trains and in moving castings in machine shops. Thus we see that iron and steel fill a great variety of human and mechanical needs.

Special steels for special uses. Other elements added to steels produce *alloy steels* and give the desired qualities for the many uses to which steel is put. Tungsten is one of the most important of the metals added. The chief use of tungsten steel is in making hard-edge machine tools which work at high speed. The filaments in our electric lamps are made of tungsten. Chrome steel, that is, steel containing chromium, is used in making ball bearings, hard-edge tools, burglarproof safes, and stainless steel. A little nickel added to steel makes it much harder and tougher. Such steel is used in making armor plate for naval vessels and for parts of machinery. Everyone knows this metal in nickel plate and in coins. In fact, the metal has given its name to one of our coins. Canada furnishes nearly all the world's supply of nickel. Chromium has largely replaced nickel for plating.

Another of the substitutes for nickel is Allegheny metal. It is an alloy of the finest steel with chromium and nickel. This metal will not rust, tarnish, or scratch easily. The bright parts of some of the newer automobiles are made of Allegheny metal. One automo-



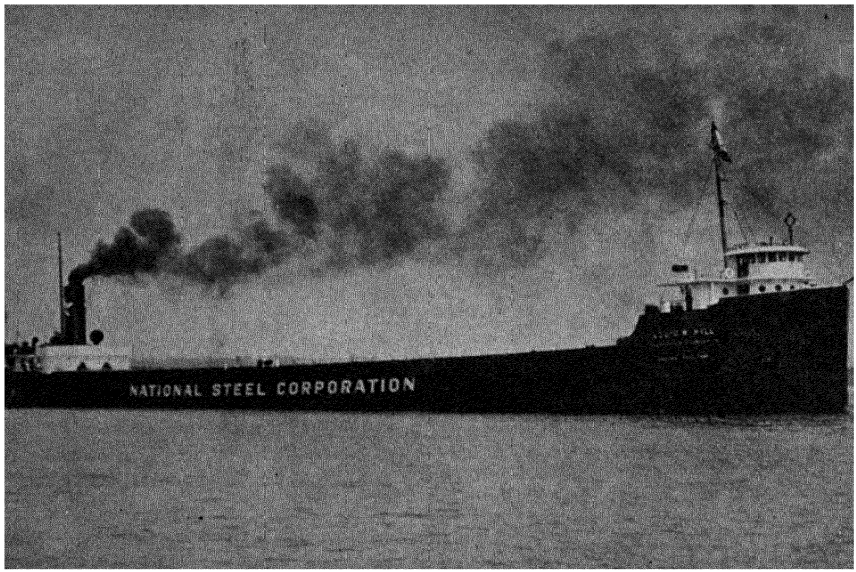
Courtesy of the Colorado Fuel and Iron Co.

Giant cranes carry the ladles filled with white-hot metal from the open-hearth furnaces.

bile manufacturer alone uses 1000 tons a month. The metal trimmings of the Empire State Building and the Chrysler Building in New York City—the two tallest buildings in the world—are of this metal.

The different parts of an automobile require different kinds of alloy steel. The frame of the car is often made of nickel steel; the valves are of steel containing chromium which resists burning by the hot gases; the steel of the springs usually contains manganese which makes them more elastic; and the ball bearings are of chrome steel which is noted for its hardness. The steel needed for parts of airplanes is also prepared according to the special use to which it is to be put.

Where iron is found. Iron is very common in the soil and rocks of the earth's surface. We are all familiar with the red rust which appears when iron is exposed to the air and moisture. This rust is caused by the oxygen of the air combining with the iron. The iron in the soil is thus oxidized and the resulting rust gives the soil and rocks in many places a reddish-brown color. Some rivers are discolored by iron-bearing soils. However, in order to be worth using



Courtesy of the National Steel Corporation

An ore carrier on the Great Lakes bringing ore from the iron mines of Minnesota to the mills of Pennsylvania, Ohio, and West Virginia. These carriers return loaded with coal for the Northwest.

for iron production, soils and rocks must have a large iron content. Such deposits are called *iron ore.* Nowhere is iron found as pure metal, unmixed with soil or rock. Sometimes iron ore is in hard layers, deeply imbedded in other rocks. In other places it is found in beds of loose soil very close to the surface. In the Mesabi Range in Minnesota great quantities of this soft iron ore lie only a few feet under the surface. The mining of this kind of ore is very simple, as it is just scooped up by great steam shovels (*I. 51*).

The making of iron and steel. The smelter is the place where the iron is separated from the other materials with which it is combined in the ore. This smelting is done by dumping iron ore and limestone into great furnaces of burning coke. The ore melts and the limestone attracts the rock and other impurities, leaving the pure liquid iron to be run into molds or to be converted at once into steel. There are two chief methods of making steel. The Bessemer process consists in forcing hot air through the liquid iron to remove its carbon. Sometimes more carbon has to be added to the steel to produce the desired quality of hardness. In the open-hearth method intensely

hot flames are driven into the mass of iron until a sufficient amount of carbon has been burned out. Open-hearth steel is considered the best, and this process is the most commonly used in the United States.

Iron production in the United States. The United States produces annually about a third of all the iron and steel made in the world, and more than twice as much as the production of any other country. This large production is due to our great supplies of iron ore and coal, all conveniently located. The ore at the western end of Lake Superior is carried by rail the short distance to the docks at the lake ports. From elevated pockets at the docks the ore drops through chutes into the holds of the ore freighters. These lake steamers are specially designed with great cargo capacity and numerous openings in the deck, called *hatches*, through which ore, coal, and wheat may be poured rapidly into the holds. It takes only a few hours to load one of these ships.

When the ore reaches the ports on the southern shores of Lake Michigan or Lake Erie, it is taken from the holds in great buckets which empty a whole shipload in a short time. On their return trips the lake steamers carry coal to the Northwest. This water route between the iron mines and the coal regions makes the transportation cost much cheaper than it would be if the ore had to be carried all the way by rail.

Pittsburgh as a steel center. Pittsburgh has several advantages for steel manufacturing. It is in the center of a great soft-coal region. This coal is made into coke for use in the smelters. Much of the coke comes down the Allegheny and Monongahela Rivers to Pittsburgh. Other coal is brought in by rail, but none of the fuel has to be carried very far. Thus the freight charges are low.

In the early days of the steel industry the iron ore was obtained from the small deposits near Pittsburgh. Farmers mined the ore on their lands in their spare time and hauled it to the smelters in the city. But the rapid growth of the industry soon made this local supply of ore insufficient, and ore began to come in from the Lake Superior region. The opening of the Soo Canal in 1885 gave a cheap water route direct to the Pennsylvania smelters. Thus Pittsburgh has an unlimited and easily secured supply of ore.

Another advantage which Pittsburgh enjoys is its position near the great industrial centers of the East. A great network of railroads connects Pittsburgh with these markets for its iron and steel products. The automobile, tractor, and other heavy industries of the Middle

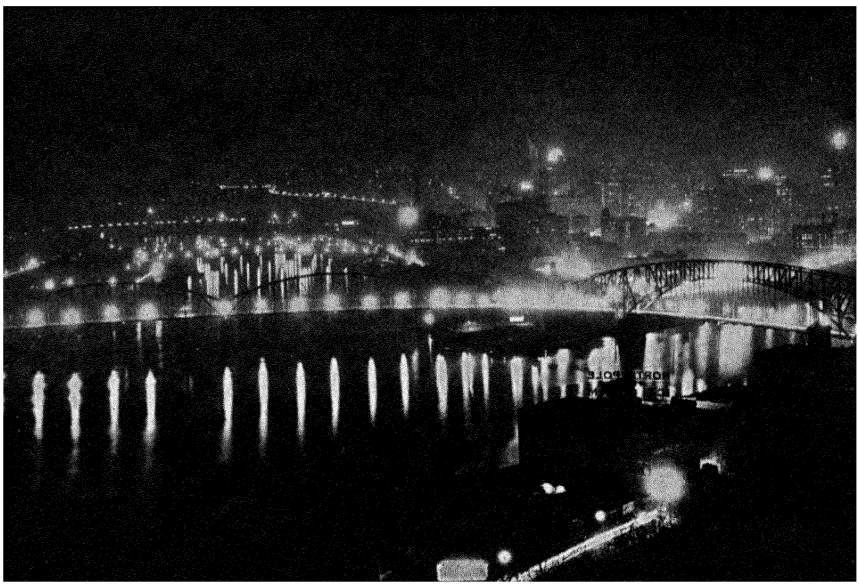


Photo by James Sawders

Pittsburgh—the steel city—at night

West also take great quantities of iron and steel. The deepening of the Ohio River has given Pittsburgh an excellent water route to the entire Mississippi Valley. Expert management and skilled labor have also helped to keep Pittsburgh our leading steel city.

The Great Lakes steel region. Several Great Lakes cities are prominent steel producers. Among these are Cleveland and Buffalo on Lake Erie, Gary and South Chicago on Lake Michigan, and Duluth on Lake Superior. These cities are much closer to the iron mines of Minnesota than is Pittsburgh; but they must get their coal from a greater distance. Since it requires more coal than ore to smelt iron, it is cheaper as a rule to transport the ore to the coal than to bring the coal to the ore. That is one reason for Pittsburgh's leading position in the steel industry. All the Great Lakes cities are at a disadvantage in this respect; but cheap water rates help them to get their coal at a low price. Also these cities are very close to the great industrial centers of Indiana, Ohio, and Illinois, where their steel is in great demand.

Birmingham, a Southern steel center. An important iron and steel region is located at Birmingham, Alabama. Less than seventy years ago the region was still a cotton field. Birmingham has unusual



Photo from Ewing Galloway

Molten slag flowing from the blast furnaces at Birmingham, Alabama, the great steel center of the South

mineral advantages. A thick bed of iron ore projects from one side of the valley for a distance of twenty-five miles while on the other side is an abundant supply of coking coal. The ore itself contains all the limestone needed for smelting. Labor is much cheaper there than in the North. Birmingham is too far south to compete with the northern steel centers for the markets of the northeastern United States, but it has the entire South for a market, an area comprising one third of the whole United States. Iron and steel from Birmingham moves to the coast through Mobile by way of the Black Warrior River, which has been greatly improved recently by the building of locks and dams.

What iron does for a nation. Gibbon, a great historian, said, "The control of iron soon gives a nation control of gold." But the control of iron requires also the possession of coal, without which the ore is useless. The nation which can make iron and steel has a great advantage. Equipment for farms, machines for mills and factories, rails and rolling stock for railroads, and ships for rivers, lakes, and ocean—all require steel. Iron and steel are also indispensable in time of war.

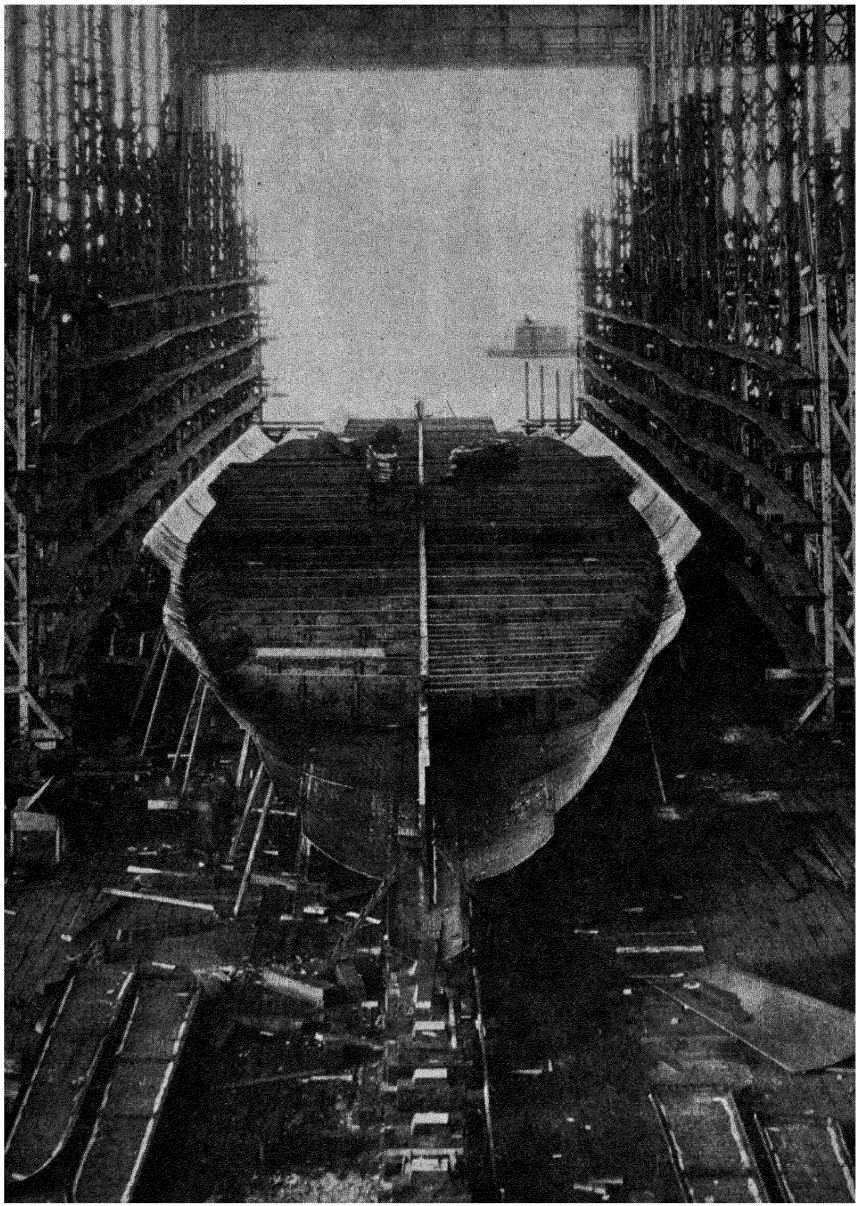


Photo from Ewing Galloway

A ship under construction at Camden, New Jersey. The Government and private capital are seeking to raise the merchant marine of our country to the high rank it held in the days of the Clipper ships.

The country with a large iron and steel production has a great commercial advantage. It can build its own ships and railroads. It can manufacture all sorts of articles, large and small, many of which become valuable items in foreign trade. Thus American-made products are sold all over the world. The profit from this world trade in iron and steel increases the demand in our own country for food, clothing, and many other articles. With the wealth which comes from manufacturing and trade, we are able to buy extensively from other nations, importing their products in exchange for our own. Iron is indeed a great source of wealth.

The world's iron. While iron ore is plentiful in Europe and is found in all continents, the United States has the two greatest deposits, in the Lake Superior and Alabama regions. Our iron ore with our large coal resources enables us to produce enormous quantities of pig iron and steel. Our manufacturing is so varied and so great that we annually consume a vast amount of iron and steel. They are used in making the machinery needed in our own country. With less than seven percent of the world's population, we operate more than half of the world's machinery. In addition we supply about forty percent of the total machinery exports of the world.

Next to the United States, France mines the largest quantity of iron ore but has not enough coal to take full advantage of its production. Germany produces much more pig iron and steel than France and is second to the United States in this respect, but it has had to import a great deal of iron ore. The annexation of former Austria and of the ceded Sudeten areas of Czecho-Slovakia greatly increases Germany's iron-ore resources. Germany's great coal region in the Ruhr Valley is the center of the steel industry. Great Britain ranks next to the United States, Germany, and France in pig-iron production, but like Germany it has had to import iron ore. Great Britain is rich in coal, which accounts for its prominence as a steel producer (*M. 455, 458; I. 457*).

Sweden, Russia, Spain, Brazil, Chile, India, China, and Algeria have large iron-ore deposits. Both Sweden and Spain export iron ore. Russia is rapidly increasing its use of iron ore and is developing the steel industry with considerable success. Russia is handicapped by the fact that the principal deposits of coal and iron are located far apart. Brazil has abundant iron ore, but little coal. Considerable pig iron is made in India, and production is increasing rapidly. China is believed to possess great reserves of both iron and coal, but

industrial growth has been very slow in this region. Japan has considerable coal, but very little iron ore. With its great industrial development, Japan is very anxious to get possession of ore-producing territory. On account of its abundant coal and lack of iron ore, Japan is sometimes called the Britain of the East. Can you see any points of likeness? (*I. 626*)

Guides to Study

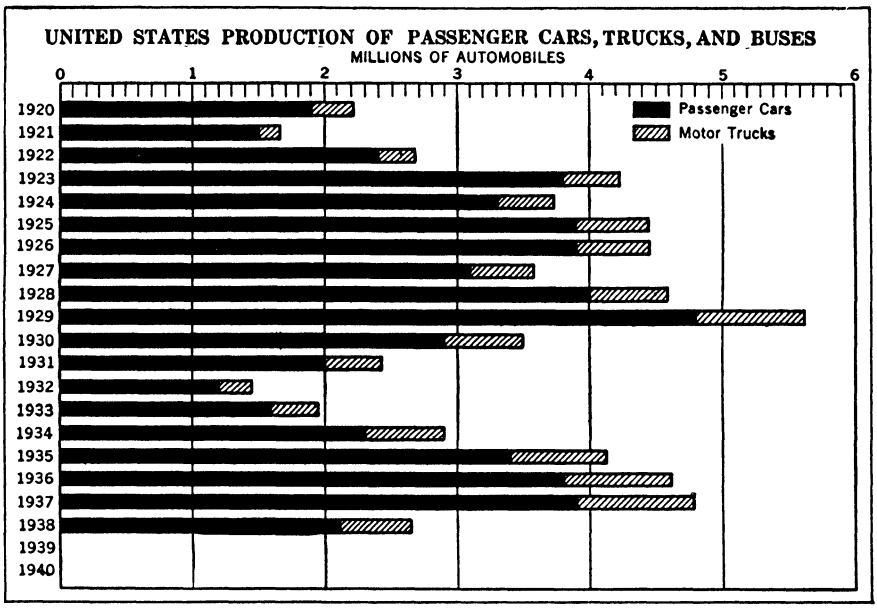
1. Why was so little iron used in ancient times?
2. How does iron help in providing us with food? Clothing? Shelter?
3. What are the uses of each of the different forms of iron? Give reasons for uses in each case.
4. What is gained by combining iron with other metals to form alloys?
5. How does iron occur in the earth?
6. How does the open-hearth process differ from the Bessemer process?
7. Describe the movement of ore from the Lake Superior region to Pittsburgh.
8. What advantages have the ports of Lake Erie for smelting iron and making steel?
9. In what ways is a country without iron handicapped?
10. What countries export iron ore? Why do they do so?

Research for Students

1. List all the ways in which iron and steel aid agriculture; manufacturing; commerce.
2. Collect pictures or make simple drawings of articles once made of wood but now made of iron.
3. Learn upon what countries we depend for metals to combine with iron in making alloys.
4. On an outline map of the United States locate the chief deposits of iron ore. Trace the routes followed by the ore to the smelting centers; the routes taken by the coal to the smelting centers.
5. Make a line graph showing the relative amount of pig iron produced by the leading countries. (See Table 42 in the Appendix.)

The Automobile Industry

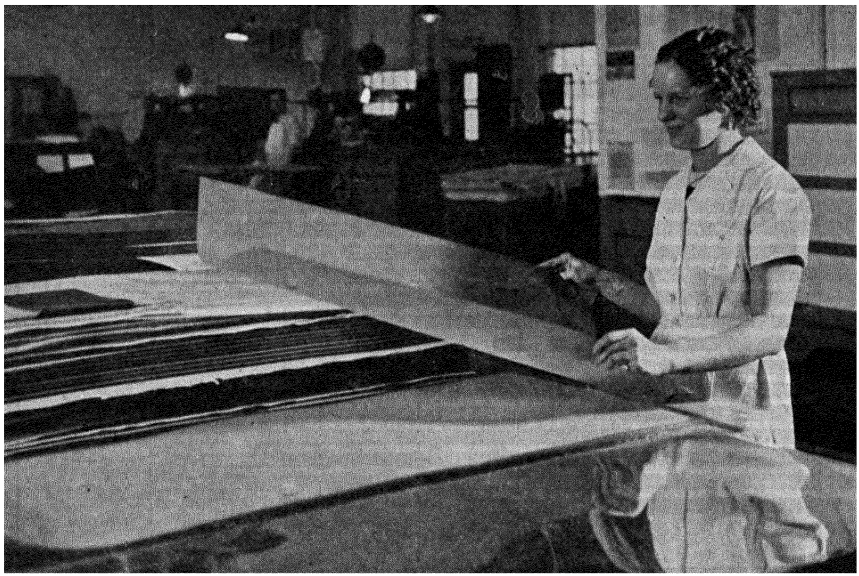
America leads. One of the greatest consumers of iron and steel in the United States is the automobile industry. There are more than 28,000,000 cars and trucks registered in this country, or almost



three fourths of the world's total. Passenger cars are not enjoyed by the rich alone. More than half of them are owned by people earning thirty dollars a week or less. One of every five Americans owns a car as compared with one of one hundred fifty-five persons in the rest of the world. Thirty years ago the automobile was a luxury; today it is a necessity for a large proportion of the people of our country.

An index of prosperity. This industry is closely related to the progress of the country as a whole. When many automobiles are being sold and used, many other industries are spurred to action. Someone has said: "The automobile is another name for iron, steel, and other metals, for rubber, textiles, gasoline, oil, highway materials, vacations, travel, buildings, paint, varnish, the five-day week, employment, traffic policemen, suburban communities, pleasure, and what not."

The automobile industry supplies one of the best markets for the farms and ranches of the country. One manufacturer alone uses each year the wool of 800,000 sheep, the hides of 30,000 cattle, the cotton grown on 433,000 acres, corn from 11,200 acres, and the flaxseed produced on 17,500 acres. These are only a few of the many products consumed by the industry. The manufacturers of

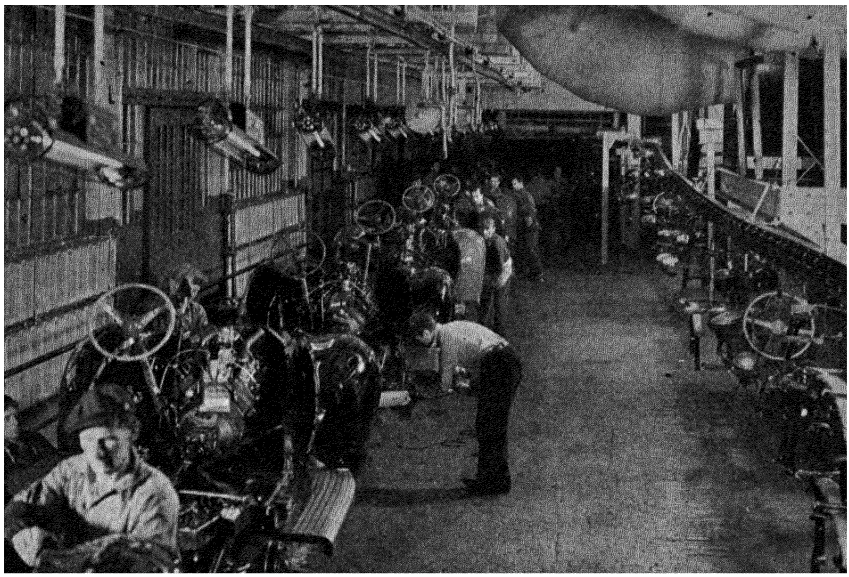


Courtesy of the E. I. du Pont de Nemours and Co.

A sheet of "Pyralin" cellulose nitrate plastic is used as a binder between two plates of glass to form the "safety glass" now used in all automobile windshields and windows (see p. 266).

automobiles make use of eighteen percent of all the steel the country produces besides seventy-three percent of the plate glass, six percent of the hardwood lumber, seventeen per cent of the copper, thirty-six percent of the lead, twelve percent of the aluminum, twenty-eight percent of the nickel, and three fourths of all the rubber imported. Furthermore the industry supplies several million carloads of freight for American railroads.

The growth of the industry. The first steps in automobile manufacture were taken in France, but the rapid development of the industry took place in the United States. The great centers are all in the Middle West, the most important being Detroit. This region offered many advantages. Iron and steel plants were not far away; there were also great forests near at hand to supply the necessary lumber. There too were many workmen skilled in the making of bicycles and carriages. Indeed many carriage makers turned to the manufacture of automobiles. There too were the men who became leaders in the development of the American automobile. Among these were Duryea, Olds, Buick, and Ford. To Henry Ford, prob-



Courtesy of the Ford Motor Company

Precision machinery producing interchangeable parts made possible the *assembly line* by which mass production of automobiles is accomplished.

ably more than to any other man, belongs the credit for the development of the low-priced car.

The assembly line. In a little shed back of his house Henry Ford built his first automobile in 1893. It was an experiment as were all the cars of those days. In 1903 he organized the Ford Motor Company. It was his aim to produce a car at a price so low that it would be within the reach of many people. He did this by making a small car and by organizing his factory so that the cost of manufacture was reduced to the lowest terms. He decided to make only one type of motor and said jokingly that a customer could have any color of car he chose so long as it was all black.

Mr. Ford was the first to make use of the assembly line along which a part being constructed moves from workman to workman. The engine is kept moving from the time of casting. As it moves, part after part is added until the completed car moves off under its own power. As a rule a workman uses only one tool. The part which he adds is placed beside him so that he is not obliged to leave the space assigned to him. This procedure is possible only when each part is made so accurately that it will fit any car. When Mr.

Ford first attempted this, it was believed that parts could not be made with such precision.

The assembly line as introduced by Mr. Ford can of course be used only when articles are made in very large numbers. Experience has shown that by this method the time and cost required for making any part of a car and finally the whole car is greatly reduced. This method by reducing prices has brought the automobile and many other products so made within the reach of a vast number of people.

American cars and trucks in foreign lands. Automobiles, trucks, and parts stand high among our exports. Assembly plants have been established in a number of foreign countries. Parts are sent to those countries and there brought together to form the completed car or truck. Our own great demand for cars calls for mass production. This in turn makes possible manufacture at low cost. Then, if foreign tariffs are not too high, our manufacturers can compete successfully with cars of foreign make. At present the countries to which we are sending cars and trucks in largest numbers are the Union of South Africa, Australia, Mexico, Belgium, Argentina, Canada, and Japan.

Guides to Study

1. Why are more automobiles used in the United States than in any other country?
2. What other industries depend upon the automobile industry? Give reasons in each case.
3. Why do the great factories center in the Middle West, especially about Detroit?
4. What is meant by the *assembly line?*

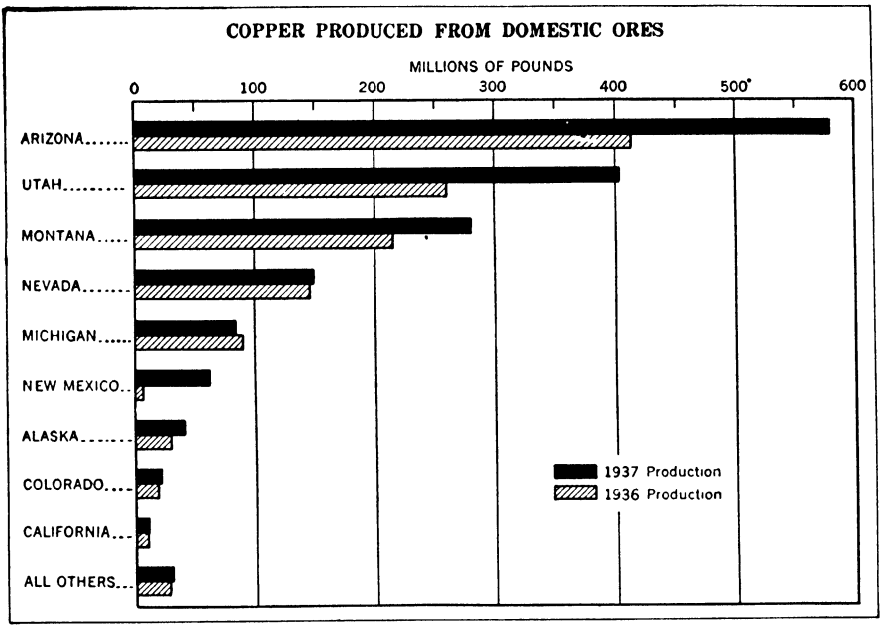
Research for Students

1. Assign to a group of students a study of the history of the automobile industry.
2. Study the Diesel engine and its rapidly increasing use in trucks and buses.

Other Metals and Minerals

Copper

The uses of copper. Copper ranks next to iron as the world's most useful metal. It is indispensable in the use and transmission of electricity. This is because it is an excellent conductor of electricity.



Consequently all electrical machines, appliances, and transmission lines use copper wire, which is flexible, durable, and inexpensive. Copper is an important part of all automobile ignition systems. Another important use for copper is in the making of alloys, which are mixtures of different metals. Brass, for instance, is an alloy of copper and zinc. It is used in hardware and forms a part of many machines, clocks, and implements. Bronze, an alloy of copper and tin, also has many uses; it was known by ancient peoples before iron came into general use.

The early American colonists first used copper for kettles and for covering the bottoms of their wooden ships. The chief use for brass in those days was to make brass buttons, which were very common on men's clothing. Copper was first mined in the United States in the Connecticut Valley, and the brass industry which started in the Naugatuck Valley in Connecticut still leads in the value and variety of its products. Bridgeport, Waterbury, and the surrounding towns manufacture a third of the brassware and a fifth of the watches and clocks made in the United States.

Copper regions of the United States. When the demand for copper became so great that the Eastern States could not supply a sufficient quantity, the metal was imported from Chile and Cuba.

Later copper was found in a pure state in Michigan, and soon other Western States discovered valuable deposits. The leading states in copper production are now Arizona, Utah, Montana, and Nevada. Arizona alone produces about one third of the total production of the United States.

World production of copper. While the world production of copper varies greatly from year to year, it is much larger today than it was fifty years ago. Can you see any reason for an increased demand for copper? At present the United States produces about one third of the world's copper. Other leading countries in copper production are Chile, Canada, Rhodesia, and the Belgian Congo. The United States not only produces more copper than any other country; it also does a great business in refining copper ore brought from other countries. Much of this ore is partially refined before coming to our refineries, which are located in the large eastern coast cities, near our great industrial centers. From these refineries copper is sent to our own manufacturing cities and is also exported to the industrial centers of Europe.

Lead

One of our most useful metals is lead. *White lead* is a compound used in paints; and *red lead* is used to protect iron and steel from rust. Practically all ironwork is painted with red lead before the finishing colors are applied. In plumbing lead pipe and solder play important parts. Pewter is an alloy of tin and lead and was formerly used extensively for tableware. This old pewter ware has become so scarce that it is prized as antique and is now being imitated by the reproduction of old designs. Other uses for lead are in type metal, in bullets and shot, in storage-battery plates, in protective cable covering, and in various electrical appliances.

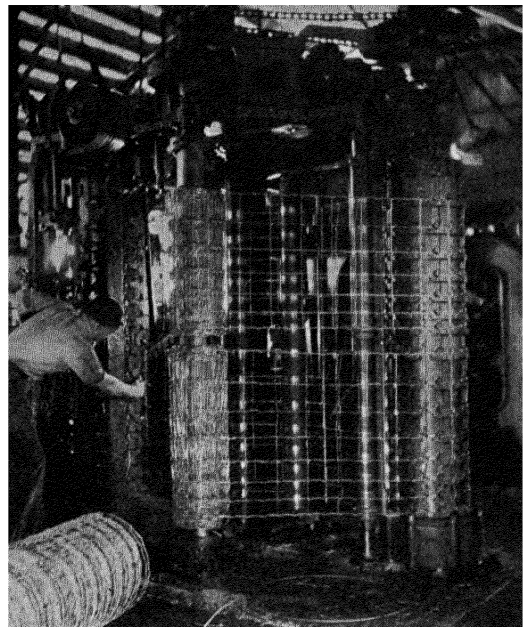
Our leading lead-producing states are Missouri, Idaho, and Utah. The United States produces more lead than any other country, its output amounting to about one fourth of the world total. Lead is also produced in large quantities in Australia, Mexico, Canada, and Germany. Lead is frequently found in combination with other metals, such as silver and zinc.

Zinc

Zinc is particularly useful in galvanizing. This process consists in coating the surface of iron or steel with molten zinc. The zinc

prevents the iron from rusting and therefore makes it weatherproof. Galvanized-iron sheets are used to cover many temporary buildings and storage sheds. Enormous quantities of galvanized wire are used in fences and screens. Brass is an alloy of zinc and what other metal?

Our chief zinc-producing states are Oklahoma, Kansas, New Jersey, Montana, Utah, and Idaho. Zinc is often found near copper and lead. The United States produces about 30 percent of the world's zinc. Other leading countries are Belgium, Canada, Germany, Poland, and Australia. We import some zinc ore from Mexico, and our exports of refined zinc go largely to Great Britain, Canada, and Japan.



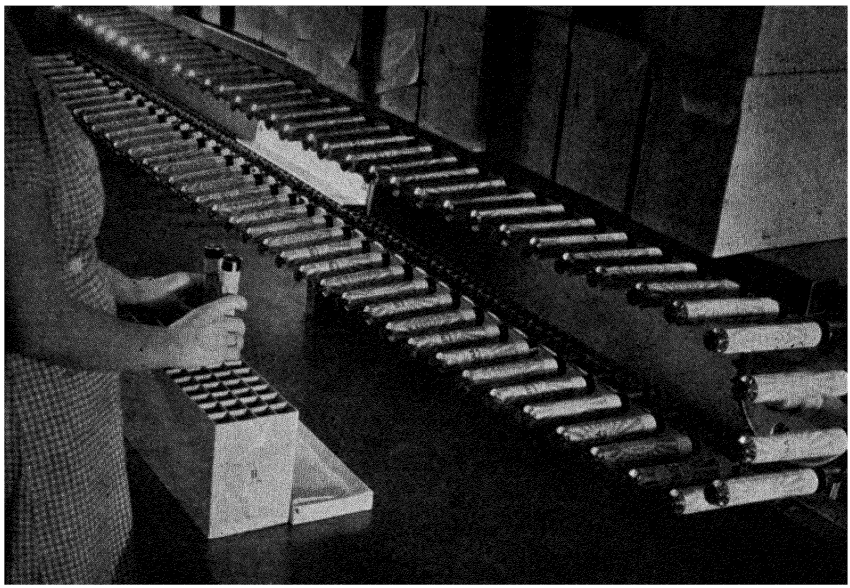
Courtesy of the Colorado Fuel and Iron Co.

Galvanized iron fencing is woven on this ponderous loom for the use of Western farmers and ranchmen. This one mill has produced enough wire fencing to girdle the globe six times.

Tin

The use of tin in making bronze has been known since ancient times. It is said that the Phoenicians, a Mediterranean people, ventured as far as the British Isles in quest of this valuable metal. The mines of Cornwall in England were for a long time the chief source of tin. British Malaya, Netherland India, and Bolivia now account for two thirds of the world's supply.

Tin is used chiefly as a coating to cover thin sheets of iron or steel which are then called *tin plate* and are used in making cans for food products. Terneplate has some lead mixed with the tin coating and is used principally as roofing material. Tin is used in automobiles in the engine bearings and in the solder connecting the radiator tubes.



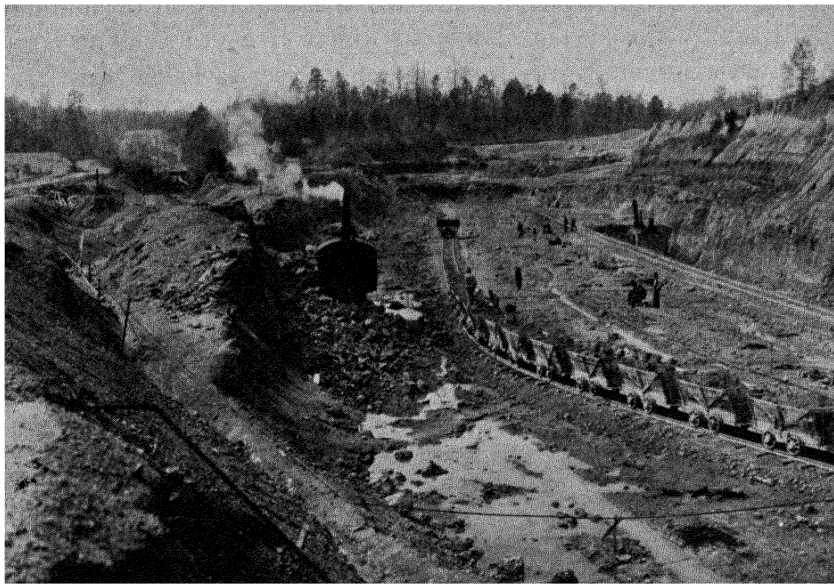
Courtesy of the Sherwin-Williams Co.

The assembly line in a tooth-paste factory where automatic machinery does nearly all the work

Tin foil and collapsible tubes, like those which contain toothpaste, require many tons of tin annually. Tinware is of course familiar in every household, although aluminum ware is rapidly taking its place. Tin is very expensive, costing at times more than $1000 per ton, and the supply is limited. For this reason great care is taken to use it as sparingly as possible, and tin scraps and waste are reclaimed and melted up for remanufacture.

Aluminum

Aluminum is now in very common use. Kettles and pans of all kinds are made of this light, silvery metal, and they are very reasonable in price. Such articles wear longer than those made of tinned iron, and they will not rust. Aluminum is also an excellent conductor of electricity and enters into the construction of many electrical appliances. On account of its light weight it is extensively used in the bodies and engines of automobiles, airplanes, and dirigibles. The new streamlined trains are mostly of aluminum construction, which adds to their speed and carrying capacity. Various alloys contain aluminum to reduce their weight. Aluminum foil now com-



Courtesy of the Republic Mining and Manufacturing Co.

Mining aluminum ore at Bauxite, Arkansas. This state produces more than 400,000 long tons of the ore mined in our country.

petes with tin foil; powdered aluminum is used in paint; and even knitting needles are made from this metal. New uses are constantly being developed.

Aluminum is a new metal as far as its common use is concerned. It is very widely distributed in rocks and soils, but until recently it was very expensive to extract the metal from the ores. As late as 1850 aluminum cost thirty dollars per pound, and very little was produced. When cheaper methods of production were found, the price fell rapidly and in recent years this metal has sold as low as twenty cents per pound. This low price of course caused a greatly increased demand for aluminum and accounts for its widespread use today. Most of our aluminum now comes from a mineral called *bauxite.* This is a bulky substance from which much of the waste is removed before the ore is sent to the aluminum plants. These plants treat the purified ore and from the crude bauxite is obtained alumina, an oxide of aluminum. The leading city for this work is East Saint Louis, which receives the bulky bauxite by rail from near-by states and from British Guiana and Surinam by way of the Mississippi River. Aluminum is separated from alumina by means of an electric current.

The amount of electricity needed to separate one ton of aluminum would supply the average home for thirty-five years. The largest aluminum plants in North America are at Niagara Falls, New York; at Massena, New York, on the St. Lawrence River; at Alcoa, Tennessee; at Badin, North Carolina; and at the Shawinigan Falls of the St. Maurice River in the province of Quebec. These places all have abundant water power for the generation of electricity (*I. 388*).

The United States produces more than one fourth of the world's output of aluminum. Other countries in order of production are Germany, Russia, Canada, and France. All these countries are able to generate cheap electric power although some possess little or no bauxite. The countries leading in the production of bauxite are France, Hungary, the United States, Surinam, Yugoslavia, and Italy. The United States and Canada import considerable quantities from British Guiana and Surinam.

Guides to Study

1. Why has copper more uses than it had fifty years ago?
2. What properties of copper make it useful for many different purposes?
3. What are the principal uses of lead? Zinc? Tin?
4. Why is aluminum much cheaper than formerly?
5. Great Britain has a monopoly of world trade in tin. Explain.

Research for Students

1. On an outline map of the United States print the words copper, lead, zinc, and bauxite in the states noted for the production of each.
2. Collect and bring to class advertisements and newspaper clippings illustrating the uses of the metals studied.

Quarry Products

Building stones. From the earliest times stone has been used for building purposes. Dwelling houses, temples, towers, monuments, and walls built of stone are found nearly all over the world. Where lumber is scarce, stone buildings are more common. In some parts of the world such stone structures have stood for many centuries and are among the earth's wonders.

Granite. Granite is a very hard rock. It is tough and durable and will support an enormous weight. Some varieties are very beautiful when polished. For these reasons granite has many uses. Large

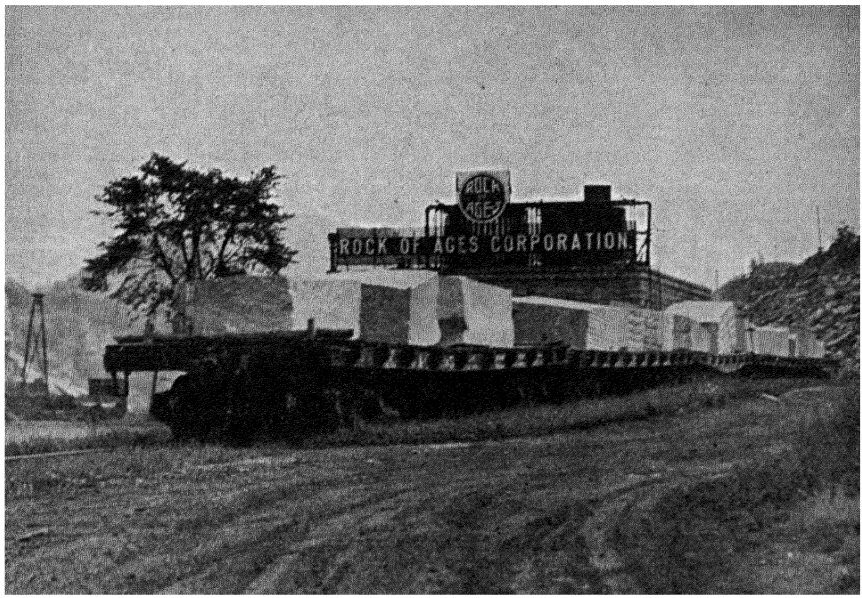


Photo from Philip Gendreau

Flatcars being loaded with granite blocks at a Barre, Vermont, quarry

buildings, bridges, monuments, and walls are frequently built of this stone. The leading granite-quarrying states are Vermont, Massachusetts, Maine, Minnesota, and Georgia.

Limestone. Limestone is a rock most commonly formed from fragments of shells and corals. It is extensively used in building, in the smelting of iron, and in making lime and cement.

Lime. When burned in kilns, limestone is changed into lime (quicklime) which is used in making mortar for plastering walls and for bricklaying. Farmers also make use of it as a soil conditioner.

Cement. When certain kinds of limestone are burned in kilns, they become cement. Limestone is often mixed with clay or shale and then burned and ground to a fine powder. When powdered cement is mixed with water, it sets or hardens into a rocklike mass. Certain kinds harden under water and thus become useful for building tunnels and for constructing foundations for bridges. The use of cement has greatly increased in recent years. It is used in building bridges, foundations, walls, sidewalks, and roads. In many ways cement takes the place of lumber and thus helps to conserve our forests. For many of its uses cement is mixed with gravel and stones and is then known as *concrete.* Our great irrigation and power dams

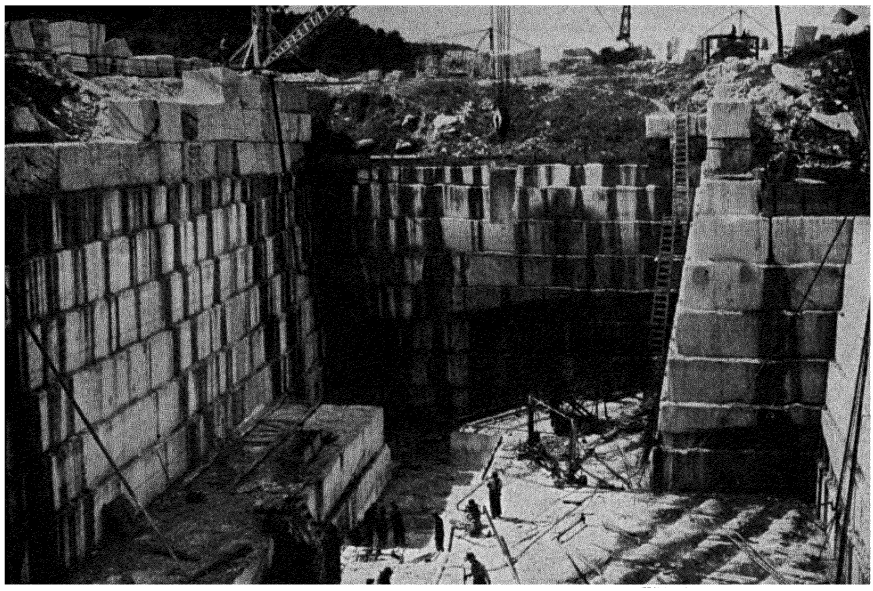


Photo from Ewing Galloway

A marble quarry at Tate, Georgia. In some years this state leads in the value of marble quarried. Its chief rivals are Vermont and Tennessee.

would hardly be possible without the use of cement. More than six and one half million tons of cement were used in building Boulder Dam on the Colorado River (*I. 345*).

Marble. A highly crystallized limestone that takes a higher polish than ordinary limestone is called *marble*. It is used as a building stone both on the outside and on the inside of buildings. Like granite it is also used for monumental purposes. Carrara marble (p. 546) has been made famous by Italian sculptors. The chief marble-producing states are Vermont, Georgia, and Tennessee.

Clay. The decay of rocks produces clay. It becomes very sticky when wet and can then be molded into various shapes. When dried, clay becomes very hard. One of its earliest uses, and still one of the most important, was for making bricks. Buildings, fences, chimneys, steps, and walks require vast numbers of bricks in their construction. Hollow tiles made of clay are used in most of our large buildings for inside walls and ceilings. Decorative tiles take the place of shingles on roofs. All these clay products have one great advantage for building purposes: they are fireproof.

At first bricks were shaped in wooden molds and dried in the

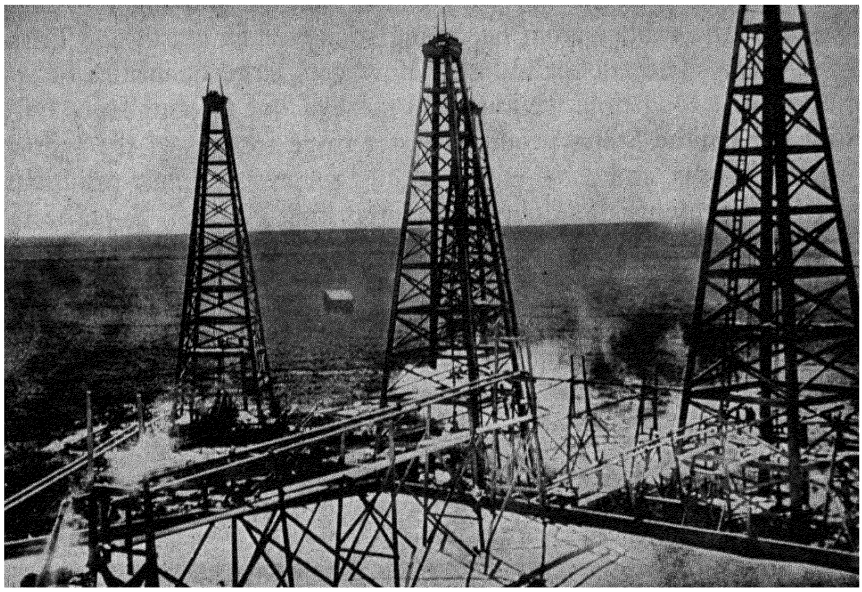


Photo from Ewing Galloway

Sulphur production at Freeport, Texas. Molten sulphur, 99.98 per cent pure, flows through pipes to the vat where it crystallizes. There are few manufacturing industries that do not make use of sulphur or its compounds.

sun. Now they are cut from sheets of clay by machines and baked in ovens, called *kilns*. The red color of most bricks comes from the iron in the clay. Many colored and fancy bricks are made for special purposes. Brickyards are found in many parts of the United States, but New York, Illinois, and Pennsylvania lead in brickmaking.

Pottery, porcelain, and chinaware are made from clays of fine quality, which are not so common as the brick clays. Pottery clay must often be brought long distances to the factories. In fact we import some *china clay* from England, Germany, and France. Our chief pottery works are at Trenton, New Jersey; at East Liverpool, Ohio; and in West Virginia. We import fine pottery and chinaware from France, Germany, Great Britain, Czecho-Slovakia, and Japan. China clay is also used for sizing paper, and considerable is imported for use in our New England paper mills.

Sulphur. This substance in its various forms is very valuable to mankind. It is an important tissue-building element in many of our foods. Sulphur is also used in making matches, gunpowder, and dyes. Without sulphur there would be no rubber industry as we now know

it. Goodyear discovered that the addition of sulphur to rubber prevented the rubber from becoming sticky when warm and brittle when cold. The rubber industry now uses large quantities of sulphur. For a long time we imported most of our sulphur from Italy. Now the United States produces about three fourths of the world's output. Texas and Louisiana are our greatest sulphur-producing states. The mining of sulphur is an interesting process. Superheated steam is forced down through pipes to the sulphur beds. The steam melts the sulphur and compressed air forces the liquid sulphur to the surface where it is dried and is then ready for use.

Various acids containing sulphur are very widely used in refining petroleum and in the manufacture of dyes, dynamite, fertilizers, and wood pulp.

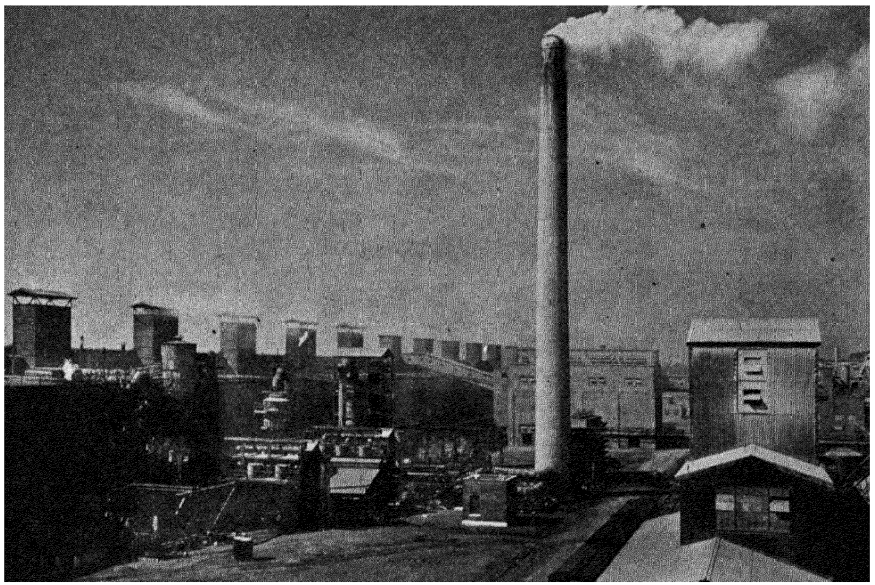
Guides to Study

1. Why are stones used more extensively for building purposes in some parts of the world than in others?
2. How is quicklime made? What are its principal uses?
3. How is cement made? What are its uses?
4. Describe the manner in which bricks are made; pottery.
5. It has been said that a country's progress in civilization may be measured by the quantity of sulphur and sulphur compounds used. Explain.

Mineral Fertilizers

Why fertilizers are needed. All growing plants take certain elements from the soil in which they grow. These elements are called *plant food*, and each crop reduces the supply of plant food in the soil. If good yields are expected from farm or garden land, the plant food taken out by successive crops must be replaced. Substances added to the soil for this purpose are called *fertilizers*. Various kinds of animal manures and decayed vegetation are excellent for fertilizing the soil.

As a substitute for natural fertilizers farmers now use manufactured material called *commercial fertilizers*. These contain varying quantities of nitrogen, potassium, and phosphorus, which are among the most essential plant foods. Nitrogen increases leaf and seed growth; potassium helps to develop fruits; and phosphorus strengthens roots and hastens growth. Other elements are needed by plants, but these three are the most important and the most in need of replacement in the soil. Commercial fertilizers are superior to natural fertilizers in one respect: they can be varied so as to sup-



Courtesy of the Tennessee Valley Authority

Fertilizer plant at Muscle Shoals, Alabama, where the Government is manufacturing superphosphate for the American farmer. Originally built for the manufacture of munitions during the World War, this plant is rebuilding the worn-out soil of a vast area.

ply exactly the right amount of different plant foods. Thus there are special fertilizers for potatoes, grass, grains, fruits, and other crops. To supply the chemicals needed in commercial fertilizers our manufacturers depend considerably on other nations.

Nitrogen. For many years most of the world's nitrogen came from the sodium-nitrate beds of Chile. Outside that country very little natural sodium nitrate has been found. On account of the limited supply of nitrogen deposits there would be danger of a complete lack of commercial fertilizers when these deposits were exhausted. However, there is an unlimited amount of nitrogen in the air; and today more and more nitrogen is being extracted from the air by the use of electricity. Norway, having a great supply of hydroelectric power, now leads the world in the production and export of nitrogen compounds. German chemists have made many improvements in the methods of nitrogen extraction.

Ammonia, which is a by-product of coke manufacturing, also contains nitrogen, and its use in commercial-fertilizer production is

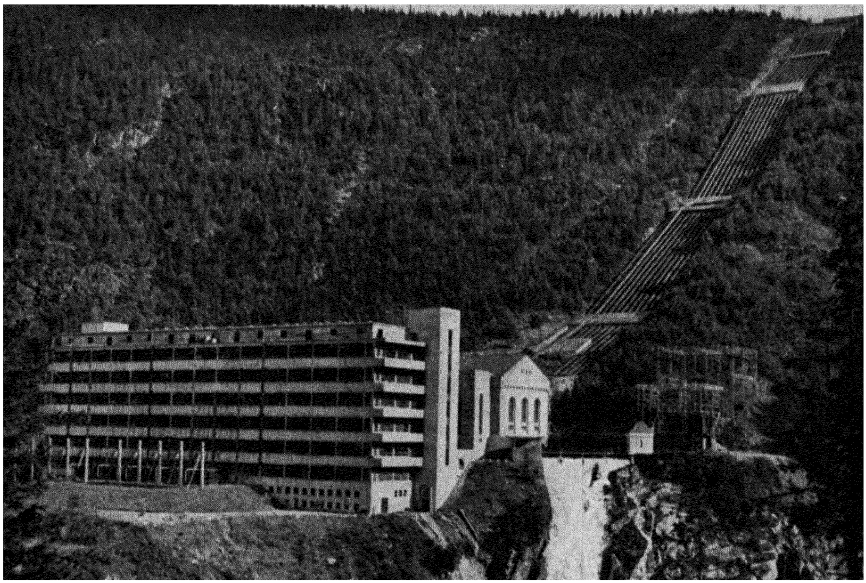
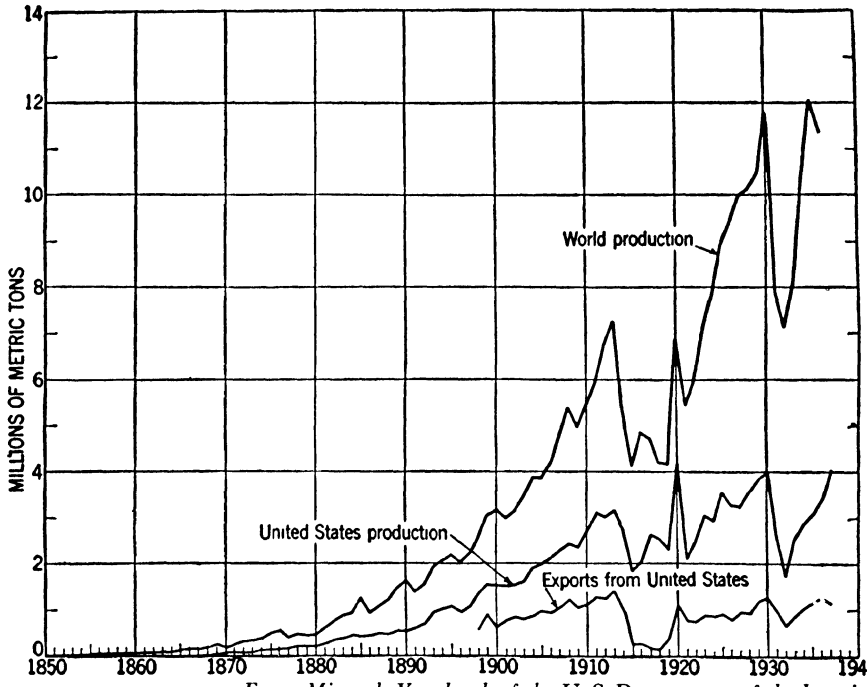


Photo by James Sawders

Hydroelectric plant at Rjukan, Norway, which supplies power for making nitrogen compounds in the industrial plants of the neighborhood as well as for manufacturing industries at Notodden, one hundred miles away. This plant is owned by a combine of interests from several countries, but its operation is directed entirely by Americans.

increasing in the United States. We produce so much coke that it would easily be possible for us to secure all the fertilizer needed in our country from ammonia. We also have great supplies of hydroelectric power which could be used in making nitrogen compounds. We still obtain nearly one half of our nitrogen from Chile; but we are no longer dependent on this foreign supply. Nitrogen compounds are also used in explosives and consequently are important in time of war. It is therefore a great advantage for any country to have its own sources of supply. Germany was aided greatly in the World War by its ability to extract nitrogen from the air.

Potash. Potash exists in nearly all rocks and soils, but it is almost always in an insoluble form. That is, it cannot be dissolved so that plants can use it. Chemists have so far been unable to make this insoluble potash available as a fertilizer. Until quite recently the only large deposits of soluble potash were in Germany and in Alsace. Some potash has been obtained from old lake beds in Cali-



From Minerals Yearbook of the U. S. Department of the Interior

Marketed production and exports of United States phosphate rock compared with world production, 1850-1937

fornia and other Western States, and a small amount has been recovered by treating kelp, a kind of seaweed, found along the Pacific Coast. While the amount of potash imported from Germany and France is still large, it is decreasing in quantity as we are discovering and developing our own potash resources. The states engaged in potash production are California, New Mexico, Texas, and Maryland.

Phosphates. Chemical compounds which contain phosphorus are called phosphates. They are indispensable as plant food. Bones contain phosphorus and ground-up bones, called *bone meal*, are highly prized as fertilizers. Formerly great quantities of buffalo bones were gathered on our western plains and used for this purpose. Now the bones and other waste from slaughterhouses and meat-packing plants are converted into fertilizers. Fish meal, prepared from the waste of fish canneries, is also rich in phosphates. The Japanese, having comparatively few farm animals, use great quantities of fish as fertilizer. The American Indians knew the value of fish as a plant food, and they taught the Pilgrims to place a fish or

two in each hill of corn that they planted. Phosphates are also found in the *slag*, or waste material, of iron smelting. This slag is ground into a fine powder which greatly enriches the soil. Common coal ashes also contain some phosphate. But our most plentiful supply of phosphates comes from the skeletons of prehistoric animals found in certain rocks. In order to make the phosphate in these rocks soluble, so that it may be taken up by plant roots, the rock is treated with sulphuric acid. It is then known as superphosphate and is familiar to all users of fertilizers.

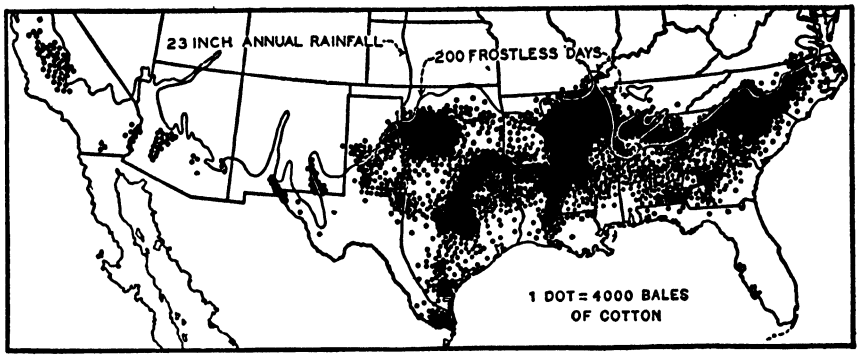
Fortunately the United States has an abundant supply of phosphate rock. No other country is so well supplied. Florida, Tennessee, and South Carolina produce most of our phosphate at present, but there are vast beds of this rock in Montana, Idaho, Utah, and Wyoming which have scarcely been touched.

Guides to Study

1. Why should farmers use fertilizers?
2. What are the different ways in which compounds of nitrogen are obtained for use in fertilizers?
3. The air is full of nitrogen and the soil contains much potash. Why then must these substances be prepared and in some cases transported thousands of miles for plant growth?
4. What are the different sources of phosphates?
5. Many of our leading plants for manufacturing commercial fertilizers are along the Atlantic Coast. Why are Atlantic ports good places for those plants?

4. TEXTILES OLD AND NEW

Man's need of fibers. Food, clothing, and shelter have always been the primary needs of the human race. Man's efforts to provide for these needs have given rise to his great occupations. The earliest clothing used was made from the skins of animals, from grasses, and from the bark of trees. No great variety of wearing apparel was possible with these simple materials and we may feel sure that not much attention was given to style of dress. With the discovery of fibers suitable for textiles people gradually learned how to spin and weave. This new knowledge did much to solve the clothing problem. We do not know when men first learned to use fibers but the search for new ones is still going on.



Fibers to be useful must be fine, strong, and flexible but never brittle. The most valuable ones now in use are cotton, wool, linen, silk, and rayon. These are the most valuable for clothing and for household uses. Others such as jute, hemp, and sisal are not used for clothing but serve as the raw material for many articles used in agriculture and industry. We owe much to the people of long ago who discovered the use of fibers and learned how to spin and weave them.

Cotton

Raw cotton. The cotton plant bears a seed pod called the *boll*, in which the seeds are wrapped in closely packed fibers. When the boll ripens, it bursts open and exposes the mass of white fibers. These fibers are known as *raw cotton.* Being light and easily spun into yarn and thread, cotton makes an ideal textile material.

The uses of cotton. The chief use of cotton is for clothing, and for this purpose it is woven into a great many different kinds of cloth. Some are thick and heavy, while others are thin and delicate. Cotton is also mixed with other materials, such as wool, silk, and rayon. Cotton is used for many other articles besides clothing. Sheets, curtains, table covers, and many other household necessities are made largely of cotton. It also enters into the manufacture of floor coverings, tires, rubber hose, paper, and rayon. Recently wide strips of cotton fabric have been used in building roads. List all the uses for cotton which you can find.

The history of cotton. Cotton is not mentioned in the Scriptures, which often refer to silk, wool, and linen. The ancient Greeks, Egyptians, Chinese, and Hindus had some knowledge of cotton and wove rich fabrics from it. In those days and even as late as the eighteenth century cotton was a very expensive article. The separa-

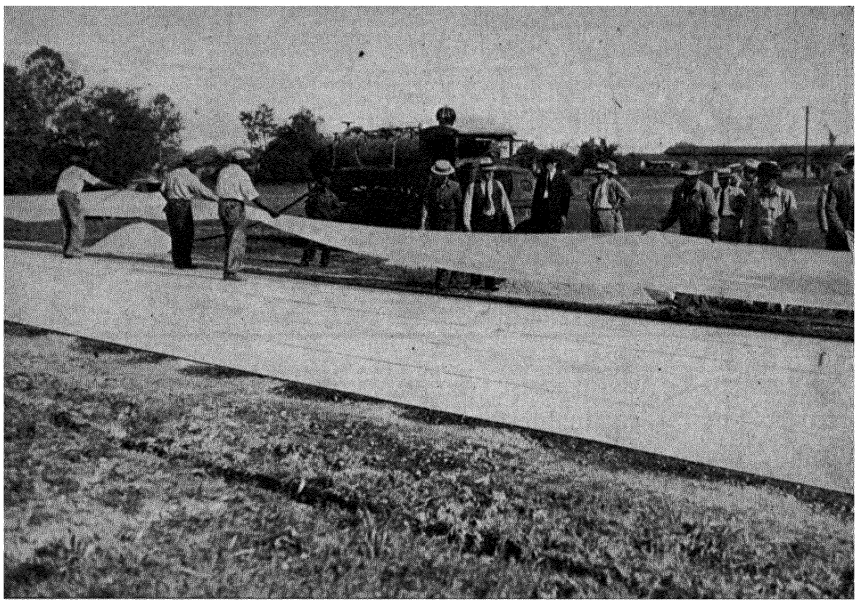


Photo from Pictures, Inc.

Several Southern States have been experimenting with the use of a heavy cotton fabric as a base in highway construction with the idea of improving road building and of finding a new use for our surplus cotton.

tion of the fibers from the seed was a slow and costly process requiring skilled hand labor. In colonial days cotton was not in wide use, even in the southern colonies where it was raised.

The invention of the cotton gin by Eli Whitney in 1793 reduced the cost of cotton by the rapidity and economy with which this new machine stripped the fiber from the seeds. The cotton gin was one of the most revolutionary inventions ever made. By reducing the cost of the raw cotton, it made cotton cloth much cheaper and thus immediately boomed the sale and use of this fabric.

The invention of spinning and weaving machinery in England at about the same time and the use of steam power in the mills, combined with the sharp drop in the price of raw cotton, made Great Britain the leading cotton-manufacturing country of the world. The increased use of cotton also brought wealth to the Southern States, which still lead the world in the production of this fiber.

The Cotton Belt. The region known as the *Cotton Belt* extends from North Carolina southward and westward to Mexico. In this vast area cotton is the leading crop because both soil and

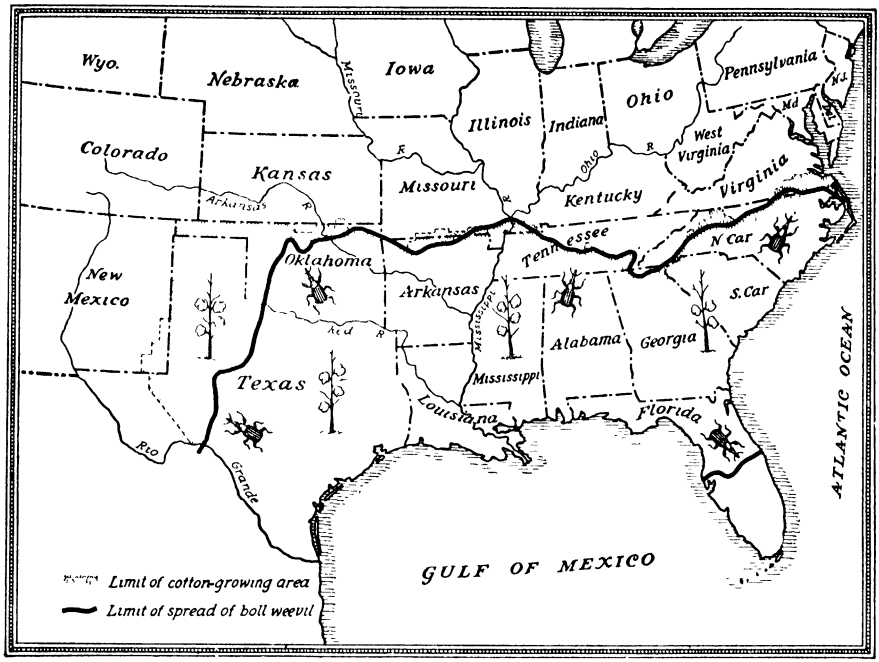
climate are nearly ideal for its growth. More than fifty percent of the cultivated land in this region is devoted to cotton. Corn acreage is second to cotton, and fruits and vegetables are raised in large quantities. The Cotton Belt is limited on the north by a growing season too short for cotton; on the east by sandy soil and heavy rainfall; on the south by swampy lands and too much rain at harvesttime; and on the west by lack of sufficient rain. In sections where cotton has been planted on the same land year after year, commercial fertilizer is used to insure a good crop. More fertilizer is used in the Cotton Belt than in any other section of the country.

A more recent development in cotton growing was the production of long-staple cotton in Arizona and Southern California. This type of cotton originated in Egypt. Seeds are imported and by selective breeding an American variety has been developed which is considered superior to any other. Long-staple cotton is used in the manufacture of automobile tires, airplane wings, sewing thread, and wherever great strength is needed. More than 1,000,000 bales of cotton are used annually in the manufacture of tires.

Cotton culture. Cotton seeds are planted in March and April and the growing plants are given frequent cultivation. The plants blossom in early summer and in August and September the bolls begin to ripen and break open. The ripe bolls are carefully picked by hand since blossoms and green bolls may be on the plant at the same time that picking begins. A mechanical picker has recently been invented which is said to be quite successful. The chief difficulty is to pick the fibers from the ripened bolls without injuring the blossoms and green bolls and without mixing too much trash with the fiber.

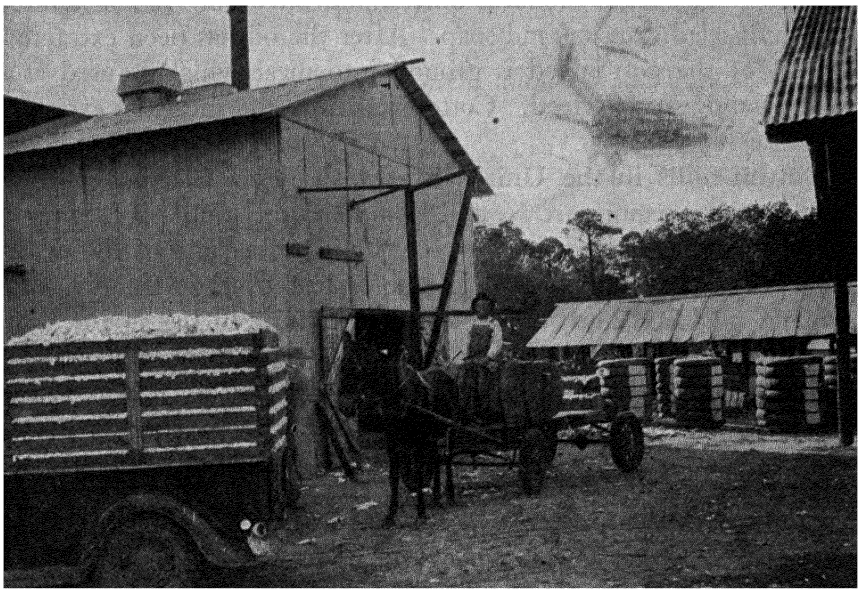
The boll weevil. Like other crops cotton suffers from insect pests. The worst of these is the *boll weevil.* This beetle punctures the squares or bolls to deposit its eggs that produce the larvae which destroy the buds or bolls. The boll weevil is hard to kill because it is hidden inside the boll. Spraying with calcium arsenate destroys the adult insects, which feed on the foliage and are killed by the poison which the spray deposits on the leaves. The only other ways to combat these pests are by hand picking and by burning infested plants.

The boll weevil gets a monument. In some ways the boll weevil has proved a blessing to the cotton grower. It has compelled him to turn to other crops not injured by the weevil. Some



plantation owners have learned that by raising peanuts, corn, and other crops that can be fed to hogs and cattle greater profits can be made than by raising cotton; that is, the Southern farmer is gradually turning from a single crop to a variety of crops. Single-crop farming makes the farmer dependent upon others for meat, dairy products, and vegetables. By producing these foods for himself, he does not have to pay for their transportation from other places. Moreover if the cotton crop fails or if the price is very low, he still has food and other sources of income. The people of one county in the South have erected a monument to show their appreciation of the prosperity which the boll weevil has brought them.

Overproduction. In recent years, especially since the beginning of the depression of 1929, the cotton grower has found it impossible to secure a market for all his cotton. An oversupply, or surplus, also causes a fall in price; thus the planter suffers in two ways. To overcome this difficulty the Federal Government has tried in various ways to induce the cotton grower to plant less cotton. The lesson taught by the boll weevil applies to the problem of overproduction. By growing other crops in place of cotton, not only is the supply of cotton reduced, but other needed products are obtained.



Courtesy of Caterpillar Tractor Co.

A cotton gin at Oak Park, Georgia. A cotton empire was made possible by Eli Whitney's invention. The invasion of the Mexican boll weevil once threatened its extinction. Now the Government, the chemist, and the industrialist are warring on the Southern farmers' growing surplus.

Cotton ginning. Before the cotton is put through the gin, it must be dried in order to prevent the fibers from being cut by the machine. In the gin the fibers are quickly separated from the seeds and are then pressed into bales, each weighing about 478 pounds. These bales are covered with burlap and bound with iron bands. The bales are then shipped to American mills and to foreign markets. Bales for the export trade are further compressed under great pressure and are thus reduced in size so as to take up less space.

The gin leaves a downy coating on each seed. This fine material, when removed by special machinery, is called *linters*. Linters are used in the manufacture of smokeless powder, cotton batting, rayon, and many other articles.

Cottonseed products. Cottonseeds were formerly thrown away as useless, and the large accumulations of this waste material often became nuisances. But many uses have now been found for cottonseed, and its by-products are worth more than $200,000,000 annually.

Cottonseed is first pressed and the oil obtained is refined and used

in making substitutes for lard, butter, and olive oil. It is also used in making salad dressing and soap. After the oil has been extracted, the rest of the cottonseed is ground into meal which is used as a fertilizer and as cattle feed. Cottonseed cake and meal are exported for cattle feed.

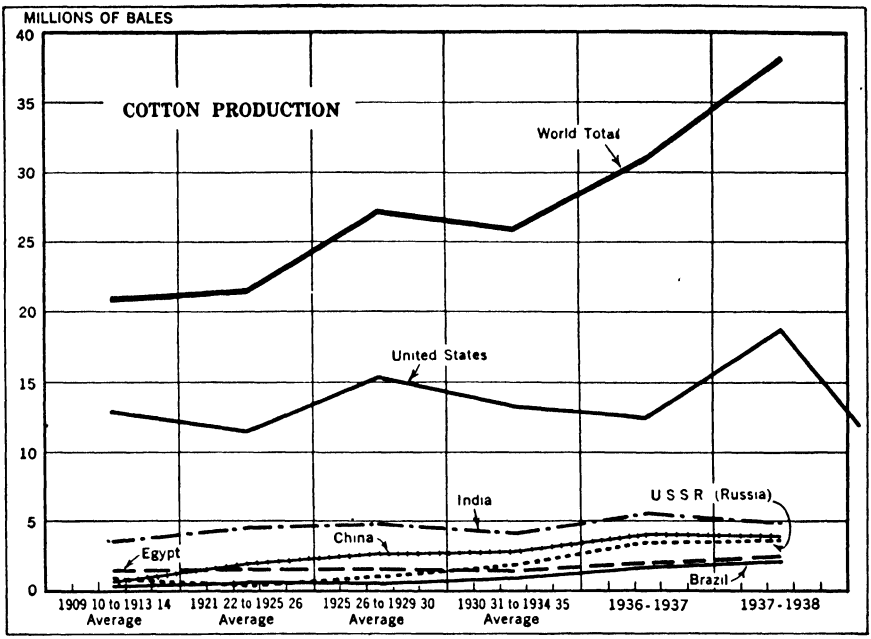
Cotton mills in the United States. Our two leading cotton-manufacturing regions are New England and the southern Piedmont. The industry developed first in New England because of the excellent water power and the skill of the early settlers in spinning and weaving. At first most of the cloth was made in the homes, but, when machines came into use many mills were built at various points along the rivers. Such textile centers as Lowell, Lawrence, Manchester, Woonsocket, Pawtucket, New Bedford, Fall River, Lewiston, and Providence owed their importance to good water power and to favorable locations near the coast.

In recent years the South has made rapid progress in cotton manufacturing. North Carolina, South Carolina, Georgia, Alabama, and Texas now have great cotton mills which are well supplied with water power and are close to the sources of raw cotton. These Southern States also pay less for their labor than the Northern mills. As a result the South is now consuming more raw cotton than New England.

Some of the largest textile mills of New England have been forced to go out of business because they were unable to compete with the South and with foreign countries with very cheap labor. Much of the abandoned floor space of the huge New England mills has been taken up by a variety of new and smaller industries. Some of the mills now manufacture rayon in place of cotton.

Cotton in commerce. The United States produces about two fifths of the world's raw cotton and sends one half of its product to foreign countries. Japan has taken about one fourth of our raw-cotton exports in recent years and Great Britain is our next largest customer. India and Egypt are also great cotton exporters, sending most of their product to Europe. Brazil is rapidly increasing its cotton production. (*I. 625*)

The cotton goods made in the United States and in most of the European countries are sold in the countries where they are produced. Great Britain, however, sends its cotton goods all over the world. Here in the United States we use many fine English cotton fabrics, such as gingham, lawn, muslin, dimity, and broad-



cloth. Japan and India also export cotton goods. Japan is now the greatest importer of raw cotton and is second only to Great Britain in cotton-goods exports. Japanese goods compete with British and American cotton products even in Europe and the United States. This competition of course reduces both British and American trade.

Wool

The uses of wool. The chief quality of woolen cloth is its warmth. For that reason woolen clothing is preferable to cotton in cold seasons and cold countries. Wool is woven in many different ways and makes very beautiful and durable fabrics. Besides its use for clothing, wool is used for shawls, scarfs, bedding, rugs, and carpets. It is the most ancient textile known.

The early woolen industry. In the early days of our country practically every farmer kept some sheep and used the wool to make homespun cloth. This continued until the introduction of cotton-manufacturing machinery led to the use of similar machines in making woolen cloth. Gradually woolen mills took the place of the home industry, and the old spinning wheels and hand looms were discarded. These old implements are very rare today and are eagerly sought by collectors of antiques.

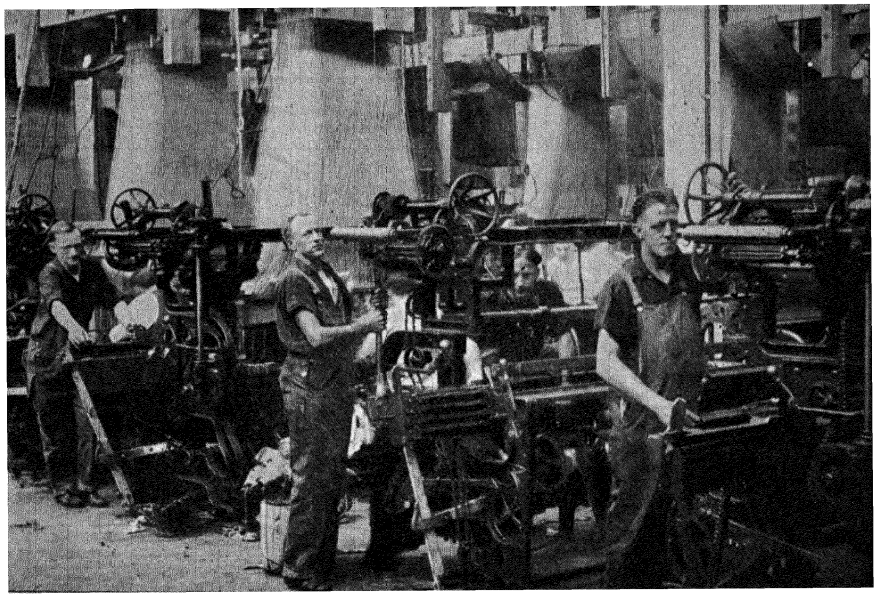


Photo from Philip Gendreau

Interior of a rug-manufacturing plant in Philadelphia. The Jacquard looms operate automatically and require little attention from the workers.

The first woolen mills were in New England and that section still leads in woolen manufacturing in the United States. Philadelphia and other cities of Pennsylvania have become important centers for the manufacture of carpets and rugs. At first New England supplied its own raw wool, but as the demand increased great quantities were shipped in by rail from the West where sheep raising has become a great industry. Today our mills require so much wool that about one third of the supply is imported, mostly from Australia, Argentina, and South Africa.

Silk

An Oriental textile. Silk culture began in China and was kept a secret for centuries. After the Japanese learned the secret, they became the world's greatest silk producers. They not only use scientific methods, but they have an unlimited supply of very cheap labor. Italy, France, Spain, and other Mediterranean countries produce some raw silk, but Japan produces four fifths of the world's total, with China still second, but far behind (*I. 612, 632*).

Silk manufacturing. While the United States produces no raw silk, we lead all other countries in silk manufacturing. Our excellent machines, skilled labor, and large buying population account for this. Pennsylvania, New Jersey, and southern New England lead in silk manufacture. In Europe Italy and France are the largest producers of silk fabrics. American imports of raw silk come mostly from Japan, a small amount also coming from China and Italy. We take almost two thirds of Japan's entire production. In addition to our imports of raw silk we also buy silk piece goods and products made of silk.

Is the silkworm losing its job? Today the chemist can produce a finer and better thread than can be made by the silkworm. The mulberry tree is giving place to the spruce tree and the cotton boll from which the chemist makes his silklike rayon. The people of the United States are using about two thirds as much silk as they did ten years ago while the amount of rayon used is nearly four times as great. Because of the smaller demand for silk the price has dropped from five dollars per pound to less than two dollars. At the same time because of greater production and improved methods of manufacture the price of rayon is about one half what it was ten years ago.

When silk was in great demand, shipments from Japan were rushed from Pacific ports eastward to New York on strongly guarded trains which were given right of way over fast passenger trains. Now the greater part of the silk moving to New York comes by water, taking longer and slower but cheaper route through the Panama Canal.

Rayon. The rapid increase in the use of rayon is due mainly to the constant improvement in quality. Even an expert cannot distinguish some of the new rayon fabrics from real silk. Aside from appearance many rayon fabrics possess qualities which make them superior to silk. For example, unlike a silk fabric, rayon can be successfully laundered again and again. It lends itself to the production of a greater variety of textures, ranging from the sheen of silk to the soft dull texture of wool. Rayon also takes dyes more readily, gives more beautiful shades, and holds colors better than silk. The objectionable gloss common to earlier rayon has been overcome by improved methods of manufacture. Because of its many excellent qualities rayon has earned a well-deserved place in the textile family and is no longer a substitute. Just as rayon has displaced silk

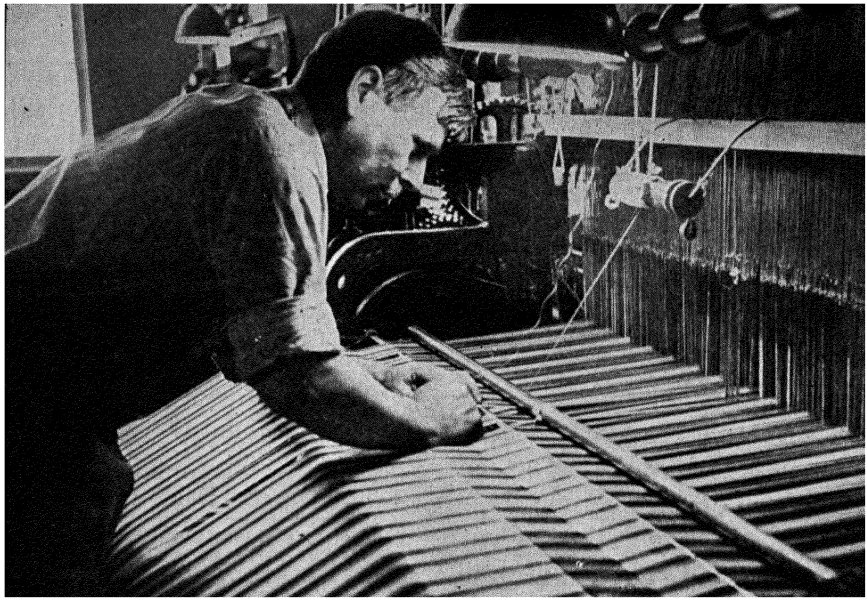


Photo by I. Janowitz

Weaving rayon in a plant at Paterson, New Jersey. This city for years has been the leading silk-manufacturing center of the United States. It is maintaining its supremacy by adding rayon manufacturing to its industries.

in many of its uses, so it is making further inroads in fields formerly restricted to long-staple cotton. Two leading rubber manufacturing companies are marketing passenger-car tires made of rayon and it is claimed that these tires will give considerably more mileage than those constructed of cotton fabric. Rayon tires are also being used on trucks because it has been found that they generate less internal heat, one of the causes of tire deterioration.

Rayon fiber is also combined with silk, cotton, wool, and linen. Farsighted textile manufacturers were quick to see the competition that they would have to meet from this new textile. They met this competition by turning to rayon itself and made in their own plants fabrics of rayon or of rayon and other material combined. Some who did not make this change have found it difficult to continue in business.

In making rayon, wood pulp or cotton linters are treated chemically by what is known as the *viscose process*, whereby a semi-liquid substance is produced. This is forced through a nozzle with

very tiny openings, thus producing the threadlike fiber. World production has increased to an annual output of almost two billion pounds. Raw silk comes from regions where labor is very cheap and where the climate is suitable for the growth of mulberry trees. Rayon centers have developed in regions where textile industries were well established and where chemical research was well advanced. The cheap labor of Italy and Japan has favored the production of rayon in those countries. Japan now leads the world in rayon production, followed by Germany, the United States, Great Britain, Italy, and France. Japan took world leadership away from the United States in 1936 in rayon production by producing 320,000,000 pounds of the total world production of 1,319,000,000 pounds. In 1937 both Japan and Germany surpassed the United States, Japan's production being 509,105,000 pounds of a total world production of 1,805,740,000 pounds. Japan has achieved preëminence in this industry in spite of the fact that basic raw materials must be imported. Late in 1938 two new synthetic fibers were announced as successful competitors of raw silk and of rayon. One of these is called *nylon* and its producers claim that from it filaments much finer than those obtainable from raw silk can be spun and that the resulting yarns would be as "strong as steel." It is expected to supply eventually the material for sheer silk hosiery of which nearly 40,000,000 dozen pairs were produced in this country in 1937. If it is as successful as the sponsors hope it will be, it may destroy Japan's diminishing silk market. Unlike rayon which is a cellulose product, the three basic materials from which nylon is reported to be derived are coal, water, and air.

Linen

A plant fiber. Linen is made from the fine fibers obtained from the stem of the flax plant. Fabrics of linen have been known since the earliest times. Ancient Egyptian mummies are found wrapped in fine linen cloth. For many centuries this fabric has been used for clothing and for fine table coverings, scarfs, and other household purposes. In colonial days flax was grown in the United States for its fibers, which were spun and woven by hand, the same as wool. Before the invention of the cotton gin little cotton was used and linen served many purposes for which we now use cotton. When cotton and woolen mills became numerous, linen was no longer made in the homes, and we have never been able to develop linen manu-

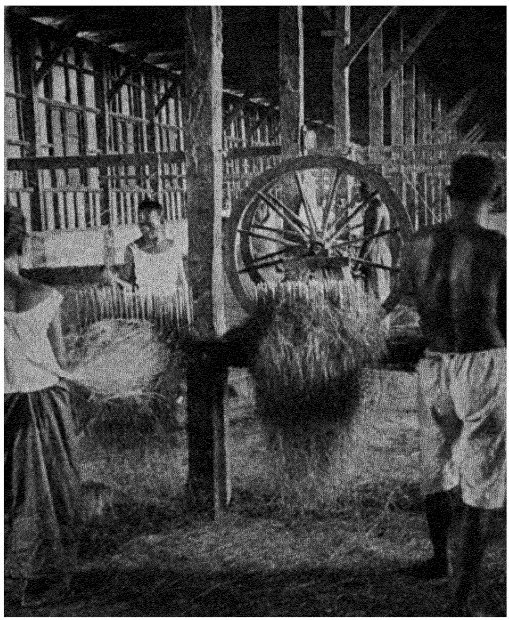


Photo by James Sawders

Cleaning hemp fiber in a Manila rope factory

facturing as we have manufacturing of cotton and woolen textiles. Flax is now grown in the United States chiefly for its seed, from which linseed oil is made. The paint industry requires large quantities of linseed oil, and we do not produce enough flaxseed to supply the demand. A large amount is imported from Argentina. Our flax acreage is declining, partly because this plant takes a great deal of strength from the soil and is therefore not profitable except in areas where new lands are available. At present Russia grows far more flax than any other country, a large part of which is exported in the form of fiber to Belfast in Northern Ireland, which is the greatest linen-manufacturing city in the world. Czecho-Slovakia also manufactures a great deal of linen. In Russia some linseed oil is used in foods. *(I. 462, 506)*

Other Fibers

Jute is useful. Jute is so common that we do not realize its importance. All burlap is made from this coarse, strong fiber. Burlap bags, sacks, bale coverings, and furniture wrappings are all jute products. Finer qualities of jute are made into rugs, carpets, draperies, and even wall coverings. On account of its cheapness jute is used all over the world for the shipment of bulky products.

Jute growing. Like linen, jute comes from a plant stem. The plants grow to a height of over ten feet and are very strong and heavy. Nearly all the world's jute comes from India, where it grows on the delta lands of the Ganges and Brahmaputra Rivers. Formerly the fiber was all exported to Europe, but now India has many jute

mills and leads in the production of burlap. The United States imports a large amount of burlap and some fiber as well.

Hemp, abacá, and sisal. *Hemp* is somewhat like jute but is stronger and more durable. It is produced chiefly in Russia, although our Central States grow some. Its principal use is for rope, twine, and cordage.

Cánapa, a species of hemp grown in the Po Valley of Italy, produces a fiber that when woven resembles coarse linen. The fiber is also used in combination with cotton or wool to produce material for clothing. In its efforts to reduce imports, the Italian government is requiring the people to make all possible uses of the fibers of this plant as a substitute for imported fibers (*I. 540*).

Abacá is also called *Manila hemp*. It grows in the Philippine Islands and makes excellent rope and twine.

Sisal comes from the henequen plant in the Yucatan Peninsula. In what country is that? Sisal also is used for cordage (see page 396).

Guides to Study

1. What is cotton? Of what use is it to the cotton plant?
2. Why was cotton not more generally used in ancient times?
3. How did the invention of the cotton gin help the South? New England? Old England?
4. Why did the early colonists use linen instead of cotton?
5. What advantages have the Southern States for raising cotton?
6. Why has the growing of cotton always required a good deal of cheap labor?
7. How has the boll weevil affected the growing of cotton? What has the weevil taught the South?
8. How is the Southern farmer trying to meet the problem of overproduction?
9. What uses are now made of linters and cottonseed? How does such use affect the value of the cotton crop?
10. Why does the United States manufacture more silk goods than Japan?
11. Why has the route taken by raw silk from Japan to New York changed in recent years?
12. Why is the use of rayon increasing from year to year?
13. Why does the United States import nearly all the linen goods used?
14. State the uses of each of the following fibers: jute, hemp, Manila hemp, sisal.

RESEARCH FOR STUDENTS

1. Report to the class the story of the invention of the cotton gin.
2. Study the life of Eli Whitney as it applies to the industries of New England.
3. On an outline map of the United States shade in the cotton-growing areas. Print names of ports from which cotton is shipped. Print names of cities noted as cotton-manufacturing centers both in the North and in the South.
4. What are the disadvantages of a single-crop type of farming? How is the South trying to overcome this difficulty?
5. Make a line graph showing the relative importance of cotton-growing states. Another showing the relative importance of the four leading countries.
6. How do the processes through which wool passes differ from those necessary to prepare cotton for use?
7. Japan leads in the production of silk. It also leads in the production of rayon which is displacing silk. Why do the Japanese aid in the destruction of one of their own industries?
8. Why is rayon displacing silk?
9. Consult reference books to find out the source and uses of: ramie, or China grass; sunn; coir; kapok; raffia.

5. NEW FRONTIERS IN AMERICAN INDUSTRY

Our country's wealth. From the days of the earliest settlers to the present day the accumulated wealth of our country and its unrivaled progress in industry and commerce have been due very largely to its almost unlimited resources. The seeker for virgin soil, for expanse of forest, and for mines of coal, iron, and other metals has always been rewarded. Even today prospectors for oil constantly search for new pools and our future supply depends in large measure on their success.

American frontiers of the past. The movement in the United States for the adventurer or for the pioneer seeking new lands, new homes, and new opportunities has been westward and ever westward. And almost without exception each new frontier, each new margin of agricultural and industrial growth, yielded rich returns to the pioneers.

The new pioneer and the new frontier. But conditions have changed; there are no longer new land frontiers with undeveloped re-

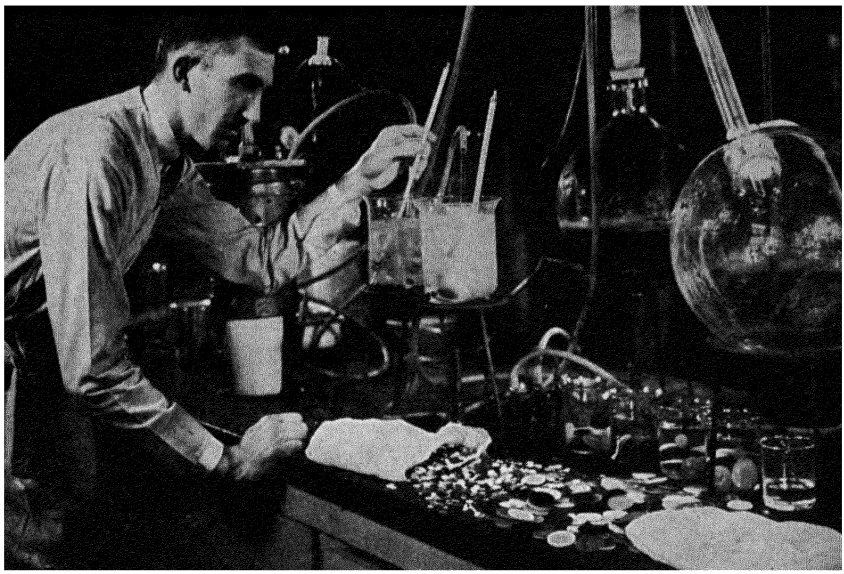
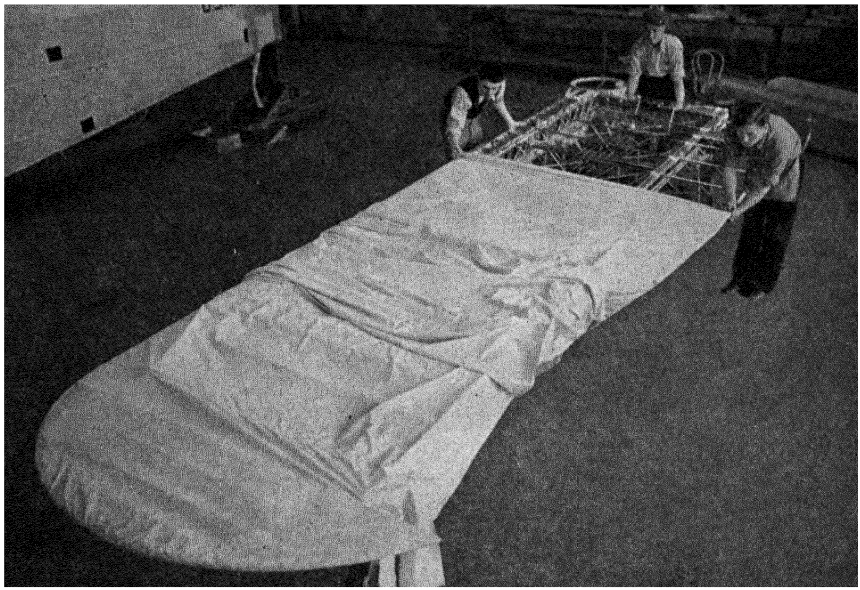


Photo from Philip Gendreau

While they are largely responsible for the development and perfection of plastic products, one of our newer inventions, the chemists periodically test the materials and the finished products to insure the high standards required by manufacturers and purchasers. Nearly all large industries now employ a staff of research workers—chemists and engineers.

sources. We have pushed westward to the Pacific and northward and southward to the limit of our political boundaries. Where then can we find new sources of wealth? The answer is *in making greater use of the resources we already have.* The pioneers of today find their new frontiers in the laboratories of colleges and universities and in the research departments of our great industries. The microscope, the test tube, and other scientific equipment are taking the place of the ax, the rifle, and the plow of the earlier pioneers. The results achieved today are even more wonderful than those of yesterday. We shall make a brief study of some of the later inventions and discoveries and note the effects which they have on the life and work of our people and the world as a whole.

Frontier industries of yesterday. Some of the greatest industries of the present day owe their existence to invention and scientific discovery. The automobile industry is the product of many inventions and it had hardly made a beginning in 1900. Now it is one of



Courtesy of the Sherwin-Williams Co.

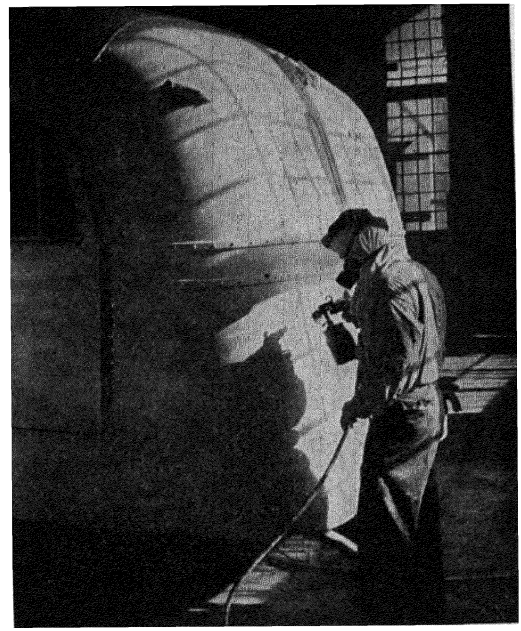
Applying fabrics to an airplane wing frame

our giant industries giving employment to hundreds of thousands of workers. The airplane, another product of invention and research, has made a place for itself in peace and in war which requires many large factories for its production. The moving picture has been made possible by years of painstaking study and experiment. It too is one of the great industries developed since 1900. It gives employment to many workers, pays fabulous prices to its stars, and entertains and educates millions of people. The telephone industry, based chiefly upon inventions made in the last century, has shown its greatest growth since 1900. The Bell System alone has assets of more than $5,000,000,000 and gives employment to about 400,000 persons.

Frontier industries of today. The industries already discussed which are the outgrowth of inventions and research are well established. There is no doubt of their value or their continuance. Other industries which we shall study are much younger. We cannot tell whether they will endure or how important they will become. They must make a place for themselves by meeting the needs of a large number of people and by competing successfully with older industries and with other new endeavors.

Some of these new products and industries have already been

studied or at least mentioned in earlier sections. One of these is paper from the pines of the South and the development of a large paper industry in that part of the country. Of the success of this movement there seems to be little doubt. This new industry for the South you will recall is due to chemical research. Another new industry discussed in the section on "Rubber" is the making of synthetic rubber. Only the future can tell just how important this industry will become.



Courtesy of the Sherwin-Williams Co.

Spraying quick-drying lacquer on a bus body. Oils from foreign lands and our own chemists have produced paints, lacquers, and varnishes such as existed only in dreams a few years ago.

Products made of cellulose. The chief sources of the cellulose or nitrocellulose used in making rayon and other products which we shall study are wood pulp and cotton linters, the tiny hairs left on the cottonseed after ginning. Some of the products of cellulose are well established and might well be included under that group of industries which have made themselves secure. Rayon, for instance, one of the products of cellulose, has made a large place for itself in the textile world. The lacquers, which coat our automobiles and many other articles, are firmly fixed in the industrial and commercial world. Both these products like all the commodities derived from cellulose owe their beginnings and value to the work of the chemist.

Cellulose lacquers, their origin and value. Lacquers owe their beginnings to an accident which occurred in the making of smokeless powder. In the process of manufacture too much of a certain substance was added. The batch was spoiled for smokeless powder but the accident pointed the way for the production of an entirely new substitute for paint.

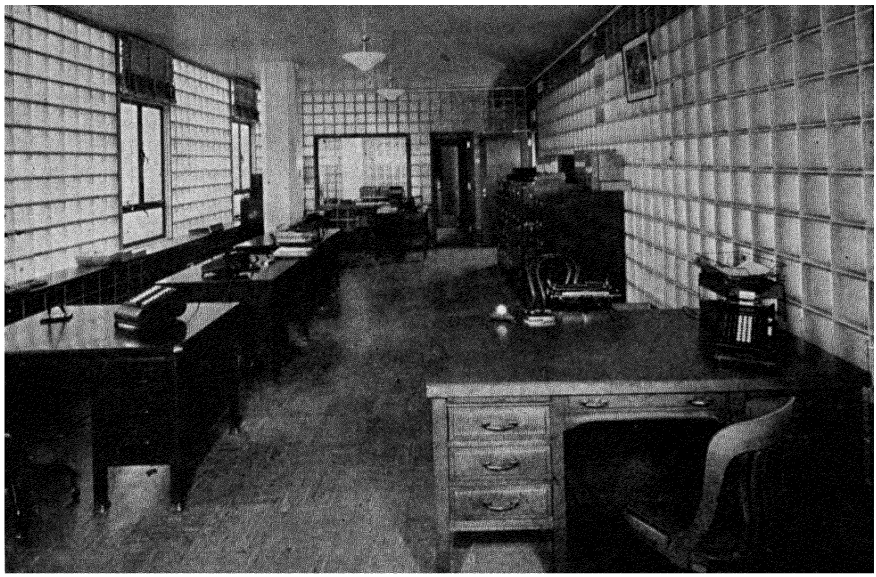
Lacquers have distinct advantages over the older paints. The surface is quickly covered by spraying. Drying is a matter of minutes whereas paint may require several days. Lacquer gives a firm, hard, durable surface, much more lasting than paint. Someone has said that the enamel on an automobile now lasts longer than the car itself. The use of lacquers has greatly speeded up the finishing of automobiles. Several coats may be applied with very short periods between for drying. It is estimated that the use of lacquers saves the automobile industry many millions of dollars.

Artificial leathers. For years fabrics have been coated with vegetable oils in the making of oilcloths and linoleums. Today fabrics are also impregnated or filled with a variety of substances including lacquers and rubber latex. The result is a material closely resembling leather. It is not eaten by insects or other animals, is waterproof, and is very durable. It may be embossed with a great variety of attractive designs. It is used in the automobile industry, in making upholstery, for washable tablecloths, and as bookbinding material. It is used to some extent in the manufacture of shoes.

Cellulose plastics. We think of a plastic as a soft substance which may easily be molded into any shape. Upon cooling it becomes hard, retains its shape, and is very durable. Plastics may be made from a variety of raw materials. One plastic or resin known as *Bakelite* has proved to be very useful in insulating electrical equipment. It has a number of other uses. Plastics having an almost unlimited number of uses are now made of cellulose having its origin in wood pulp or cotton linters. The steering wheel of the automobile is no longer wood but a plastic. So are also the knobs on the instrument panel and the gearshift.

Other uses are for buttons, brush handles, and for parts of many toilet articles. These articles can be produced in any color, thus adding to their attractiveness. Plastics are also used for cementing veneers to other woods and as an adhesive to hold thin sheets of wood together in the manufacture of laminated woods. One use of woods made in this way is for making school furniture such as the backs of chairs. A very thin transparent plastic between thin sheets of plate glass provides safety glass now used in practically all automobiles, buses, and railway passenger cars and very generally required by law (*I. 232*).

It is possible that in the near future much of the automobile body will be made of some kind of plastic, thus reducing the weight and



Courtesy of U. S. Advertising Corporation

Glass blocks are finding an increasing structural use in modern buildings because of their superior appearance, light-diffusing quality, insulating value, and economy of maintenance.

the cost. German manufacturers, it is said, plan to place on the market a great number of small, low-priced cars, in the making of which the use of iron and steel will play a very small part.

Cellophane from cellulose. Nitrocellulose in jellylike form is forced through small holes to form rayon. When forced through a narrow slit, it forms after hardening a tough membrane resembling transparent paper, known as *Cellophane.* Cellophane might well appropriate the slogan used by the plate-glass industry. "See what you buy." As we all know, it protects food from dirt and insects, keeps fabrics clean, and renders most articles on sale more attractive. This is a new product, widely used, and rendering excellent service to both buyer and seller.

New uses for glass. Rapid progress is being made in glassmaking, thus increasing greatly its usefulness. Bricks made of glass have several advantages over ordinary brick, stone, or cement. Hollow glass bricks admit light but are not transparent. They keep out the heat of summer and the cold of winter. In manufacturing plants where much light is needed large window space of ordinary glass

makes heating difficult. Glass bricks are being used in the construction of certain walls in dwelling houses and industrial plants.

Glass may be spun into long, fine, flexible fibers resembling cotton or wool. Such fibers are extensively used in insulating refrigerators and the walls of buildings. Woven or matted glass fibers are used for heat insulation in the construction of motors, locomotives, and warships. Over three hundred miles of glass thread can be made from a little mass of molten glass weighing only a quarter of an ounce. Fine threads of glass are spun into cloth which is used as fire curtains and for waterproof draperies.

Frontier products in the home. Boys and girls in the schools of today would be greatly amused if the telephone, the electric light, and the radio were referred to as *new* devices. But let them ask their grandparents or perhaps their parents whether they are old or new. Other and really newer features are appearing in many homes at the present time. Oil and gas are taking the place of wood and coal for heating. If coal is used, the fire may be tended by an iron fireman, or mechanical stoker. The electric refrigerator takes the place of the iceman, and the vacuum cleaner and the washing machine serve as housemaids.

This is also the day of air conditioning. When in complete operation, air conditioning implies the circulation throughout a building of clean air at the desired temperature and containing the proper amount of moisture. Besides homes, office buildings, and factories many railway trains are conditioned so that the cars are supplied with clean air, cool in summer and warm in winter. Ocean liners and the vessels of the United States Navy are gradually being air-conditioned. Air-conditioning equipment designed and manufactured in the United States is being installed in buildings in tropical South America. The government buildings of those countries offer the best markets. At least one automobile manufacturer is advertising his car as air-conditioned. If this proves a success, we may be sure that car will not long be the only air-conditioned car. (*I. 199*)

Research helps to make us independent. The importance of these new products and industries, the result of invention and research, can hardly be overrated. Nearly all, either directly or indirectly, aid in the conservation of our resources. They also help to make us independent of foreign countries. Twenty years ago this country was dependent upon the outside world for many essentials now provided by home industries. At the time of the World War



Courtesy of Popular Science

Hydroponics, or the science of raising fruits and vegetables without soil, is more than a fad. Tank farming is teaching valuable lessons on the food requirements of plants which will benefit the soil farmer, to whom we must look for our food for many years to come.

we looked to Germany for nearly all the coal-tar dyes used. Now we supply our own needs and export to other lands dyes valued at more than $6,000,000. We are finding new sources of nitrogenous compounds, and so we are less dependent upon the natural deposits of Chile. At one time all the camphor used in the country came from abroad, chiefly from Japan. Now from the turpentine of southern pines is obtained a camphor equal in every way to that imported. Thus a new market is provided for this forest product. Synthetic rubber makes us less dependent upon the Middle East and Brazil. Thus we see that synthetics are rapidly displacing the natural products both of our own and of other lands. (*I. 190*)

New uses for farm products. There has been organized in the past few years the Farm Chemurgic Council, the purpose of which is to find new uses in industry for farm products. As such new uses are discovered, both the farm and the factory will gain. Farmers in New Hampshire, supported by the State Department of Agriculture, are finding new markets by raising crops for which the coun-

try has in the past depended in part upon foreign countries. Among these new crops are herbs needed for medicinal purposes and for flavoring, such as sweet basil, peppermint, sage, catnip, digitalis, and others. Pyrethrum flowers used in insect powders and imported to the value of nearly a million dollars are now being raised in New Hampshire and in other states.

The raising of plants without soil is another new and rather promising experiment in agriculture. Plants are raised with roots in water, sand, or sawdust and fed with chemicals. This method is often referred to as tray agriculture. The little island of Wake with practically no soil is to raise vegetables by this method for passengers and crews of transpacific clipper airplanes.

New industries endanger the old. As inventions and scientific discoveries present new products and establish new industries, there is difficulty in marketing old-style products and the older industries are endangered. The producer can never be sure of a future market for his goods. Some new products made from quite different materials and in new and scientific ways may take away his market. His only hope is in keeping well abreast of the times and in adapting his business to the new conditions. Even the banker runs the same risks. The business to which he lends money or in which he invests it is never secure. As with the businessman, so it is with the banker; if he keeps in step with the march of progress, he is likely to succeed; if he does not, he is almost sure to fail. Nevertheless the new frontiers and the new pioneers are here to stay. As they make greater and more effective use of our resources, we and the whole world will gain.

Guides to Study

1. What is meant by a *frontier?* Give illustrations. What is meant by *pioneer?* Give illustrations.
2. Why must the frontiers and the pioneers of today be different from those of the past?
3. Show that the automobile, the airplane, and the moving picture are products of a new frontier.
4. What proof is there that cellulose is taking a large part in the industries of the present time?
5. How has the use of lacquers benefited the automobile manufacturer? The automobile owner?
6. Why is the use of plastics a great forward step in manufacturing?
7. What other raw materials are being displaced by plastics?

8. What qualities or characteristics explain the usefulness of cellophane?

9. How does research help to make a country independent?

10. How may new discoveries and new industries affect foreign trade?

11. How do new products and new industries affect the old?

12. How do inventions and scientific discoveries affect the businessman? The banker?

13. Why is a great effort being made to find new uses for farm products?

Research for Students

1. Make special studies and reports of a few of the early pioneers, such as Daniel Boone, Sam Houston, and others.

2. By inquiry and discussion decide who are some of the new pioneers in the life of the present time.

3. Only a few of the new products and industries are mentioned in the text. Consult newspapers, magazines, and friends and list other pioneer industries and products.

4. Make a list of the old occupations that have suffered because of the invention and use of the automobile. List the occupations that have gained and the new ones that have arisen because of the use of the automobile. What changes have taken place in the commerce of the country as a result of the development of motor-driven vehicles?



Courtesy of the Denver and Rio Grande Western Railroad

The Cliff Palace in the Mesa Verde National Park, in southwestern Colorado. This is the largest and most elaborate of the prehistoric ruins in the park and is visited by thousands of tourists.

VACATIONING BY LAND AND BY SEA

Life in the open. The ancient Greeks knew well the value of recreation. In order that the youth of the country might develop strong and supple bodies, gymnastic exercises, such as running, wrestling, and other vigorous outdoor sports, were a part of their regular training. Contests, such as the Olympic Games, were the proving grounds where these able-bodied young men competed for their laurels and a marble statue in the hall of fame. Like our athletic contests of today the Grecian contests stood for friendly rivalry and taught people to become "good sports," that is, to meet victory or defeat in the proper spirit. Recently the Olympic games have



Photo from Philip Gendreau

Winter vacationists engaged in skiing at Ticonderoga, New York. So important have winter sports become that the railroads run special trains to accommodate those who must journey to participate in the various pastimes.

been revived and world-wide contests are held first in one country and then in another. Such contests encourage wholesome sports and strengthen international friendship.

Most schools, towns, and cities of today have their playgrounds, where young people especially can play games in the open air, have a good time, and develop strong, healthy bodies. On the outskirts of the towns there are probably golf clubs, tennis courts, and hockey fields for the grownups. All towns and cities should have such opportunities. "All work and no play makes Jack a dull boy." Playgrounds for young and old alike are desirable.

Countries also have their playgrounds—places to which people go in summer or winter for rest, recreation, and amusement. In summer sea, lake, and mountain of the Northern States invite the tired city worker to swim, sail, motor, or hike. In winter the Southern States offer the climate of summer to those who wish to escape the cold and snows of the North. Those who prefer the cold and snows of the North to the warmth of the sunny South can find there

opportunities for snowshoeing, skiing, skating, and playing ice hockey. The cool seasons too are the best times for hunting the fox, deer, moose, and caribou. Thus we find many lovers of sport moving north even in winter.

These playgrounds both of summer and of winter give to the visitor rest, recreation, and health. What does the visitor give in return? Is he invited to come again? Yes indeed, most cordially and to bring as many friends as possible. Newspapers and magazines carry advertisements telling of the many advantages offered by each playground. Why is the visitor wanted? He is wanted because he brings prosperity to many people. If he comes by train, the railroads profit; if by automobile, wayside filling stations and garages gain. He must have food and a place to sleep. The hotels, restaurants, and wayside cabins are kept busy. He may buy land and build a cottage or a summer home. This aids real estate. If at the shore, he needs a boat, perhaps a yacht, and thus boatbuilders are given employment. Farmers in the vicinity find an excellent market for their products. Stores of all kinds find business greatly increased during the season when visitors are present. Banks may handle four or five times as much money as at other times of the year. During this busy season streets are crowded, parking places are scarce, and everybody is busy. When the season is over, streets are almost deserted, hotels and cottages are closed, and business is very dull.

Florida for the winter. This state now attracts tourists from all other states and from Canada during the winter. Florida's first and most famous tourist was Ponce de Leon who sought there the fountain of perpetual youth. Although he failed to find such a fountain, thousands of other tourists in more recent years have found there a climate which has given them better health, greater vigor, and longer life. The State Bulletin says that there are no ice-coated roads, no frozen radiators, and no blizzards. There life in the winter is much like life in the North in the summer. Florida has more than a thousand miles of coast with many fine beaches which offer ample opportunity for bathing, yachting, and fishing. On the land golf, tennis, polo, and motoring are popular pastimes. In short, outdoor life can be enjoyed throughout the season. A few of the names of resorts well known even to people who have never visited Florida are Miami, Palm Beach, St. Petersburg, and St. Augustine, the oldest city in the United States.

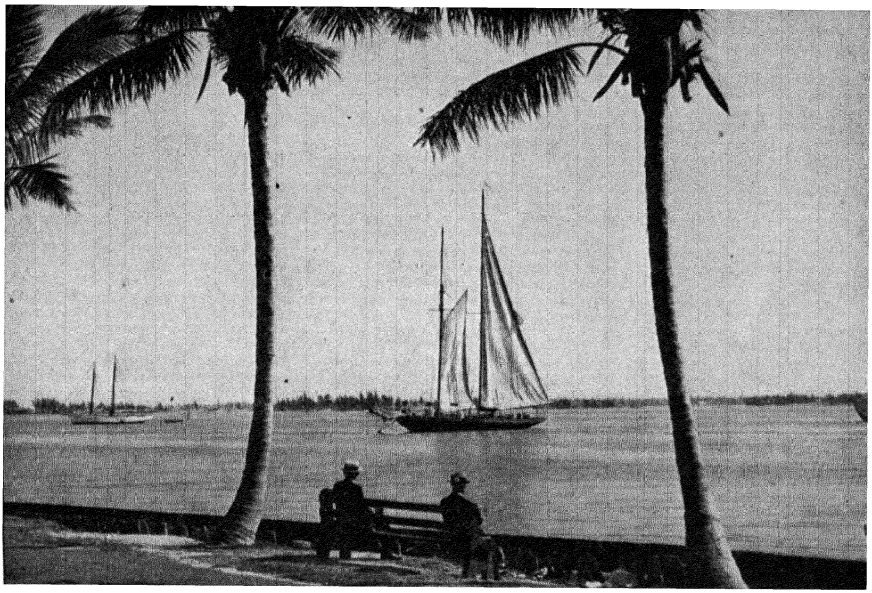
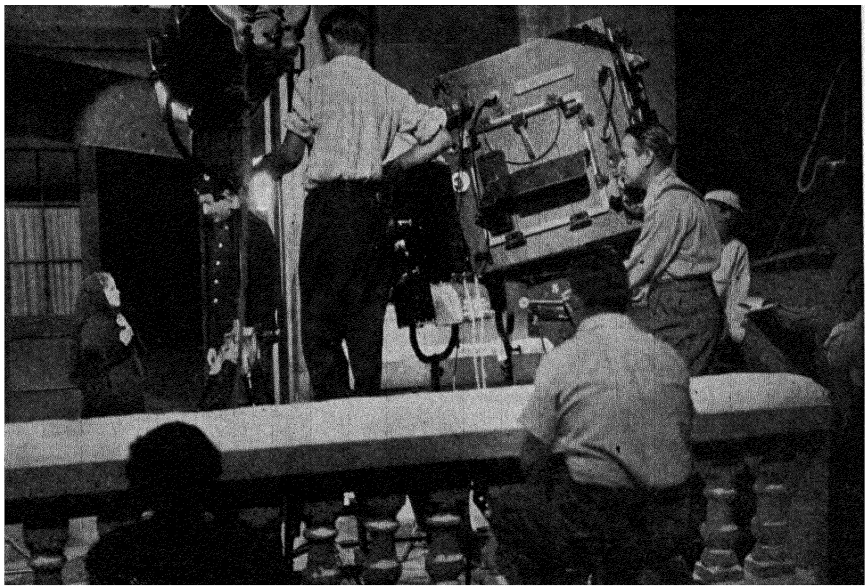


Photo by James Sawders

One of America's winter-vacation resorts—Biscayne Bay at Miami, Florida, on whose placid waters lie at anchor pleasure craft of visitors and residents

Florida's prosperity depends very largely on its tourist trade. About two million people visit the state each year and spend more than $200,000,000 before returning to their northern homes. Nearly one fourth of this money is paid to the hotels which entertain the greater number of the visitors. Other tourists engage apartments and set up housekeeping for themselves, and still others live in trailers during their stay. Whatever the form of shelter, all must be fed and clothed and their automobiles cared for. Nearly a third of the $200,000,000 goes to retail stores and ten percent to garages. Restaurants receive nearly a fifth of the money spent. Of course there is a great demand for meats, vegetables, and fruits, and so the farmer and the fruitgrower prosper. When times are hard and the state has few visitors, everyone from the banker to the restaurant waiter, the garage helper, and the lowliest farm hand suffers accordingly.

The "gold rush" of today. The "forty-niners" on foot with plodding ox teams through the mountain passes, or on slow sailing vessels around Cape Horn, rushed from all parts of the country to mine California's gold and take it back home with them. Today



Courtesy of 20th Century-Fox Film Corporation

Interior of a film studio in Hollywood shows Shirley Temple being photographed in "The Little Princess." The film industry attracts thousands of visitors and applicants for jobs to Southern California.

people from all parts of the country rush to California by means of fast trains, automobiles, airplanes, or fast steamships taking their gold or money with them and leaving it there. We know very well what called the people to California in 1849. What is it that leads more than a million and a half people in a single year to go to that state now and to spend $240,000,000 before they go home? The best answer to our question is climate. Southern California with its mild winters and cool summers with continuous sunshine makes outdoor life possible the year round. Here, as in the case of Florida, tourists come in winter to avoid the cold and snows of northern climes. They come too to gain health offered by sunshine, dry air, and an outdoor life. Near at hand in southern California are the shores of the Pacific Ocean, Catalina Islands, snow-capped mountains, barren deserts, spouting oil wells, endless groves of oranges, lemons, dates, and figs, and extensive vineyards producing raisins, grapes, and wine. A distinctly foreign atmosphere is given by the old Spanish missions which have influenced the architecture of all the Southwestern States. Last but not least of the magnets which

draw visitors to the state is Hollywood, the home of the moving picture. Indeed Hollywood is there because of the great variety of scenery at its very doors and because picture taking in the open air is seldom hindered by clouds or storms.

These and other attractions make the tourist trade one of California's greatest industries. Tourists visit the state the year round, about twice as many coming in the summer as in the winter. As in other wide-awake states, the attractions of California are advertised widely by railroads, hotels, chambers of commerce, and organizations of citizens. As we learned when studying Florida, business of all kinds profits from the tourist trade, including the farm, the railroad, the hotel, the store, and many others. It is a good investment for businesses of all kinds to help in increasing the number of visitors from other parts of our country and from other lands.

The lure of the homeland. Our Eastern States were settled first. It was from these states that pioneers moved westward and ever westward until the whole country was settled. But the old homes in the East were never forgotten. As soon as time and money permitted, their former homes were visited by those who moved west and later by their children and grandchildren. Every summer trains, automobiles, and airplanes bring millions of people to the mountains, lakes, shores, and old homes of northeastern United States. The Adirondacks of New York, the White Mountains of New Hampshire, and the almost unlimited shore lines of New England, Long Island, and New Jersey call millions of people to play and to rest. For many years Bar Harbor, on Mount Desert Island, and Newport, Rhode Island, have been noted for their summer homes of the wealthy. But with the passing of the years more and more people with small cars and much less wealth visit all parts of the New England States. Cars bearing plates from every state in the Union and a few from Hawaii and many from Canada are noted on the highways every summer. The wayside cabins and private homes as well as hotels provide places to spend the night. Wayside lunchrooms provide food; so the tourist may travel cheaply and visit many places of interest. There are many places of historic interest which everyone wishes to see, such as Plymouth Rock, Bunker Hill, Concord and Lexington, and the "Old North Church" (Christ Church) from which Paul Revere received his famous lantern signal. Some of the oldest colleges of the country are located in the East. Harvard and Yale are not only visited by tourists from all parts of the coun-



Devil's Lake, Wisconsin. This state attracts thousands of tourists every year who prefer fresh water to salt water. Fish are abundant in the lakes and wild life abounds in the forests.

try, but they number among their students young men from all the states. Besides those tourists who merely drive through the states stopping at hotels, homes, and cabins, there are many thousands who own or rent summer cottages at the beaches, in the mountains, or beside the lakes. It is estimated that more than 3,000,000 people visit the resorts of New England alone and spend in those states more than $500,000,000.

The businessmen of New England realize the importance of this tourist business. Every year more and more money is spent in advertising. Money for advertising is contributed by railroads, oil companies, hotels, real-estate firms, manufacturers, banks, telephone companies, and by the states themselves. The people who travel and who rent cottages are enjoying a period of play and rest. For the hotelkeeper, the garageman, the filling-station operator, the farmer, and the shopkeeper, it is a *busy* season. Everybody is rushing day and night to supply the needs of the visitor who is here today and gone tomorrow. Directly or indirectly all the people of vacation states are learning that the tourist trade is one of their most important industries.

States bordering the Great Lakes. The North Central States may be far from the ocean but the shores of the Great Lakes and of numerous other lakes afford beaches for swimming and open water for boating and fishing. These waters also temper the heat and thus offer refuge from the hot days of summer to the many city dwellers of adjoining states. The beauties of the autumn foliage attract thousands of automobilists and "color tours" are becoming more and more popular. The income to Michigan alone from the tourist industry is estimated at more than $400,000,000 a year and Wisconsin is a close second.

The tourist industry the country over. The tourist trade is being appreciated as never before. Practically every county of every state in the Union has become recreation conscious. It was only in February, 1937, that our Federal Government established the United States Tourist Bureau as a part of the National Park Service of the Department of the Interior. Thirty-six states are spending more than $4,000,000 a year to induce Mr. and Mrs. Tourist to visit them and spend their money. Pennsylvania appropriated $500,000 for a two-year period to make known the attractions of its mountains and forests. The state of Washington appropriates $250,000 a year for a similar purpose. Oklahoma recently voted $100,000 and many other states smaller sums for the purpose of letting the people of the whole country know their attractions and opportunities for a vacation.

Our National Parks reserved by the Federal Government because of beauties and wonders of nature of the several regions are visited by more than 7,000,000 people each year. A few of the most noted parks of the West are the Yellowstone with its hot springs and geysers, the Colorado Canyon with its mile-deep gorge and brightly colored walls, and Glacier Park with its mountain peaks and glaciers. Some of the eastern parks, including the Shenandoah and the Great Smoky Mountains, although not possessing the great natural wonders of the West, are visited by much larger numbers due in part to the fact that they are nearer the more thickly settled parts of the country. Besides the parks there are National Monuments and Military Parks which include famous battlefields, such as Gettysburg. All these reservations together are visited by more than 15,000,000 people a year. (*l. 359*)

Practically every state has one or more special features which bring visitors within its borders. New Jersey has its beaches with

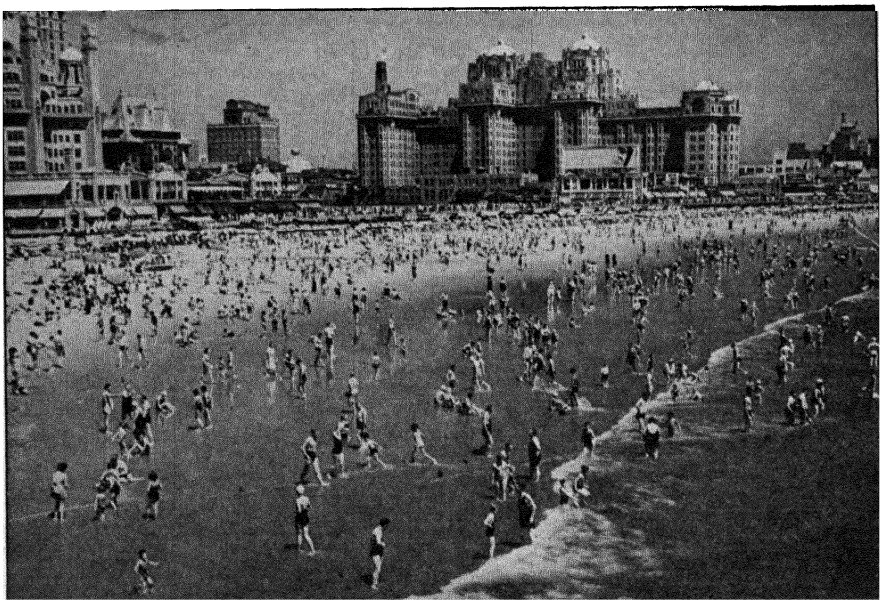


Photo by James Sawders

The smell of the sea and the expanse of sand draw countless vacationists to Atlantic City in the summertime. Fine hotels, conventions, and holiday festivities make Atlantic City the world's most renowned year-round resort.

Atlantic City a national resort; in North Carolina are the Great Smoky Mountains; in Colorado and other states, the grandeur and beauty of the Rockies; and in Kentucky, the wonderful Mammoth Cave.

We visit our neighbors. We have seen how important recreation and travel are in our own country. It is estimated that our home tourist trade is third among the great industries of our country. The tourist trade of Canada stands even higher; it is second on its list of industries. Unlike ours Canada's tourists are largely from other countries, chiefly from the United States. In summer citizens of the United States find in Canada attractions similar to those of northern United States. Shores of the ocean, bays, and numerous lakes give relief from the city's heat and provide the usual water sports. Canada is also noted for its winter sports because of the abundance of snow and ice. Game is abundant, and hunting and fishing lure sportsmen from the United States as well as from the cities of Canada. Among other Canadian attractions are the ancient customs preserved

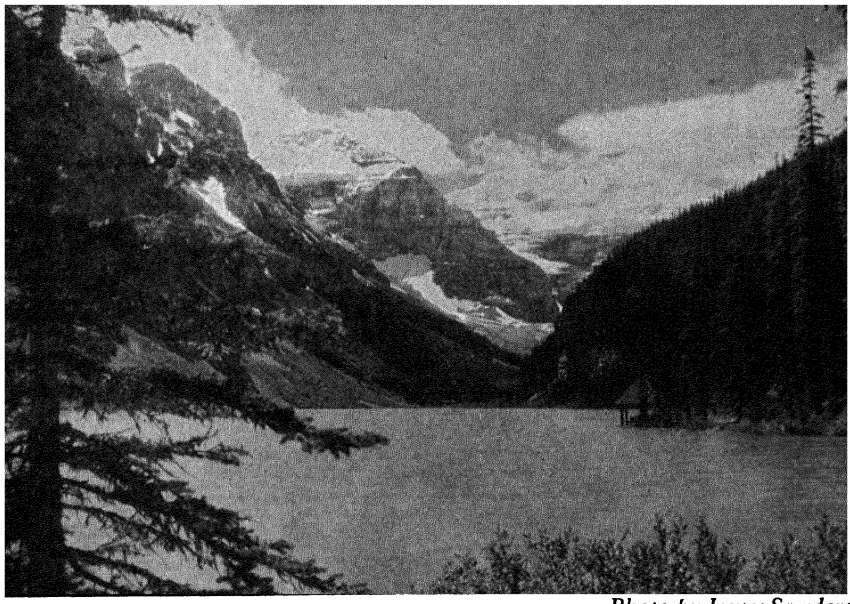


Photo by James Sawders

Lake Louise and Banff are the goals of thousands of travelers who visit western Canada each year to enjoy the magnificent scenery and the invigorating climate.

in some of the country districts and famous shrines, such as St. Anne de Beaupre. In recent years hundreds of thousands of people from the United States have each summer motored to Canada to see the famous quintuplets at Callander, Ontario.

Like the United States Canada numbers among its attractions beautiful scenery of seashore and mountains. Many travelers consider the Canadian Rockies more beautiful than the Alps. The peaks, glaciers, and lakes of these mountains attract many tourists. Visitors to Canada's National Parks including Banff and Lake Louise in the Rocky Mountains number nearly 750,000 people. (*I.* 379)

Canadians appreciate the importance of their tourist trade especially that from the United States which alone brings into the country from $200,000,000 to $300,000,000 a year. The sum which Canadians spend in the United States is of course very much less. Records show that in a recent year more than 13,000,000 people crossed the United States-Canadian border. The Canadians show how highly they value the tourist by the effort they make to increase the number of visitors to the country. By advertising in newspapers

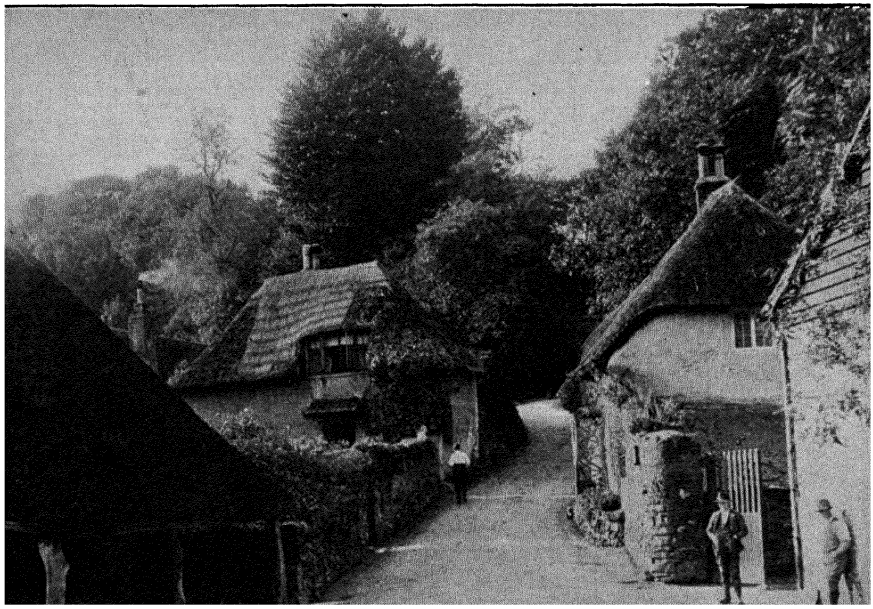


Photo by James Sawders

Cockington—one of the quaint and picturesque villages of Devon near Torquay in southwest England

and magazines and by distributing booklets and circulars they spend more than $1,500,000 to induce residents of other lands to visit them. The amount of money spent and the number of tourists help us to understand the great value of Canada's tourist business.

We go abroad. Americans are the world's greatest travelers. We are not satisfied until we have seen as much of the world as our time and money will allow. We may or may not "see America first." In years when business is good and people can afford to travel, 500,000 people from our country cross the Atlantic to visit European countries. The principal countries visited are the British Isles, France, Germany, Italy, and Switzerland.

Why do so many people go to Europe? There are a number of very important reasons. European countries are the homelands of nearly all American people. Those who migrated to America and their children and grandchildren are eager to visit the old homes across the water. The very roots of our civilization are found in European lands. We go there to see those lands, their walled cities and ancient fortresses, their beautiful cathedrals and palaces, and their centers of art, music, and literature.

Each country has so many attractions that there is space to mention only a few. *The British Isles* are the old home of many of our people and the land of our language and the source of much of our literature. In all the countries of these islands visitors enjoy the scenery, the places of historic interest, some of them famed in song and story, and the literary centers of England, such as the Lake District and the home of Shakespeare. The pomp and splendor of ancient ceremonies, displayed especially at the times of coronations of kings and queens, draw people by the thousands from our country as well as from all parts of the world.

France is a land of art and museums, fine architecture, and luxuries. It still maintains many quaint customs in the rural districts. France has been closely related to American history. The French gave us assistance in the Revolutionary War; our soldiers fought on French soil during the World War, and many lie buried there. The French language is taught in all our high schools and colleges. Paris, a center of world fashion, is visited by students of art, architecture, and music, by American buyers of wearing apparel of all kinds, and by countless other Americans interested in the beauties of Paris and the gaieties of Parisian life.

Italy offers many inducements to the foreign traveler. Nearly every city has places of historic interest—palaces, museums, cathedrals, and arenas where gladiators fought. Rome and the Vatican, the home of the Pope and the center of the Roman Catholic Church, welcome many visitors; Venice with its canals and palaces; Florence noted for its churches and art collections; Genoa, the birthplace of Columbus; Milan with its beautiful cathedral and painting of the "Last Supper"—all invite the traveler to come and tarry awhile. The beautiful shores of France and Italy known as the Riviera are visited both in summer and in winter by tourists from all parts of the world. The Italian Tirol likewise draws thousands of travelers. (*I. 538*)

Germany receives many visitors from America. The Rhine with its terraced vineyards and ruined castles, each with its story of Robber Barons of past centuries, is a route followed by most tourists. Rural homes and ancient customs make the Black Forest of southwestern Germany a place of interest. Old Universities harking back hundreds of years arouse the interest of all. Visits to walled towns, including Nürnberg and Rothenburg, and to famous and beautiful cathedrals, such as the cathedral at Köln (Cologne), are events never to be forgotten.



Photo by James Sawders

Guests at St. Moritz, Switzerland, engaged in curling on the ice links—one of the pastimes of this mountain resort

Switzerland with its high Alps, glaciers, waterfalls, and beautiful lakes possesses scenery unexcelled anywhere else in the world. Recreation takes the form of mountain climbing, skiing, skating, and tobogganing. The pure air and bright sunshine of the high mountains are most invigorating. Many find there better health, renewed vigor, and happiness in the sports and games afforded by the mountain slopes and their mantles of snow and ice.

Other European countries visited are *the Netherlands*, the land of canals, cleanliness, and thrift; *Norway*, the land of fiords and the midnight sun; *Spain* with its troubadours, bullfights, and sunny summers; *Belgium*, with its battlefields, including Waterloo as well as those of the World War; *Greece*, with its centers of historic interest and its treasures of sculpture and architecture.

To the American traveler the European countries are sources of interest, inspiration, and happiness. From a visit to those countries the traveler gains knowledge of European life past and present which can be had in no other way. Such knowledge leads to sympathetic understanding and to tolerance which makes for international friendliness. To the people of European countries the foreign

tourist brings prosperity. The benefits are similar to those from tourists in our own country. In a prosperous year American tourists spend more than $300,000,000 in European countries.

As in our own country, every effort is made by Europeans to maintain and to increase the number of visitors. Extensive advertising is carried on, especially in the United States, which supplies the greatest number of tourists. As many as fourteen of the countries of Europe advertise in American newspapers and magazines. Tourist agencies of foreign countries are to be found in all our large cities. Offices are also maintained for this purpose by European railroads and steamship lines. They carry on extensive advertising to reach the American tourist in addition to that of the national tourist bureaus. It is estimated that France and Germany each spend $1,200,000 a year to bring travelers to those countries. When advertising is reduced, travel falls off.

The tourist trade is one of the great industries of many European countries. The money spent by tourists makes up a large part of the national income. This income may be used to buy goods from foreign countries. When much money is received from travelers, then there is much money to be spent for imports. Thus we see that the tourist trade does much to increase international trade. The tourist trade both at home and abroad is a rapidly increasing industry.

From ship to shore. Besides the ocean travel to Europe there are many cruises in which the travelers live for the greater part of the journey aboard the ship. From Atlantic ports of the United States there are cruises southward to the Bermuda Islands, the Bahamas, Cuba, Jamaica, and other islands of the West Indies. Other ships call at ports of Central America and northern South America, then pass through the Panama Canal, and visit ports along the western coast of South America.

Still other cruises call at Mediterranean ports in fall and winter and at ports of Norway and the Baltic countries in summer. There are also world cruises lasting from three to six months or perhaps longer. Many of the cruises are made on transatlantic liners which thus find employment in fall, winter, and spring when European travel is light. It would be impossible to build and maintain great liners like the *Queen Mary* and the *Normandie* if it were not for passenger traffic between North America and Europe and the patronage afforded by cruises to various parts of the world. While the money spent on world and other cruises is not nearly so much as



Photo by James Sawders

A Bermuda sunset—vacationists set sail off Gray's Point in that well-known holiday paradise.

that spent in European travel, yet the returns from cruises from the United States alone is more than $25,000,000 a year. This money is used of course to cover one's expenses on the ship and to pay for necessities and entertainment in the countries visited. Such travel becomes a profitable industry to shipowners and to the business of the ports visited.

Guides to Study

1. What is the value of the sports connected with your school, town, or city?

2. What important recreational centers are there in your state or your section of the country? Who is benefited by these centers?

3. From how many other states do automobiles come to your state? (Make a list of number plates.) At what time of the year do they come? Why?

4. What attractions does your state offer to the citizens of other states? What is being done to make these attractions known to the people of other states? Why?

5. To what other parts of the country do the people of your vicinity go for sports or change of climate? Why?

6. Do the people of your town or city go abroad for pleasure? For business? For study? Who is benefited by the money they spend on these journeys?

Research for Students

1. Make a list of the sports associated with the schools and colleges of your vicinity.

2. Make a collection of folders and advertisements from newspapers and magazines describing the attractions of your state or your part of the country.

3. Obtain folders and advertisements telling of the recreation centers of other parts of the country and of other countries.

4. Write to the National Park Service, Washington, D. C., for booklets describing the beauties and wonders of each of our National Parks.

5. Report: Which of the National Parks I would like to visit.

6. Report: Why millions of our people go to Canada each year?

7. Report: Why the people of Canada welcome visitors?

8. Make a list of the ways in which a tourist industry benefits a state or a country.

9. Who pays for the advertisements in newspapers and magazines calling attention to different recreation centers? How can they afford to spend large sums for this purpose?

10. On a desk outline map of the United States shade in green the centers visited by tourists in summer. Shade in red those visited in winter. Shade in yellow those visited in both summer and winter.

11. On a desk map of the world trace the routes followed by ships carrying tourists to Europe. Trace routes followed by ships making cruises to the Caribbean; to the coasts of South America and Africa; to the shores of the Mediterranean; and routes followed by ships sailing around the world.

12. How do European countries profit by tourist trade?



Photo by James Sawders

The forest of downtown Manhattan–the skyscrapers of lower New York's business district from the Manhattan Bridge. The Brooklyn Bridge and the busy East River waterfront are in the foreground.

1. WHY COUNTRIES TRADE

Commerce and progress. Backward nations have little trade with other lands. Their wants are few and their buying power is small. Wants and needs increase with civilization. Progressive peoples are not satisfied only with that which they themselves can produce. Moreover, what were once luxuries have become necessities, and the desire for luxuries becomes ever greater.

Fruits of other lands, beverages, finer clothing than that made at home, raw materials for home factories–all these and many others must be imported. Imported goods must be paid for with exports or in some other way, and markets must be found for surplus products. The exchange of goods between countries or between different parts

of the same country is called *commerce*. Human needs have become so great and modern life so complex that commerce is absolutely necessary if the industrial life of a people is to go on. Commerce is made necessary by differences in climate, by differences in the natural resources of countries, and by differences in the people themselves. In this section we shall study some of the reasons why goods are sent from one part of the world to another.

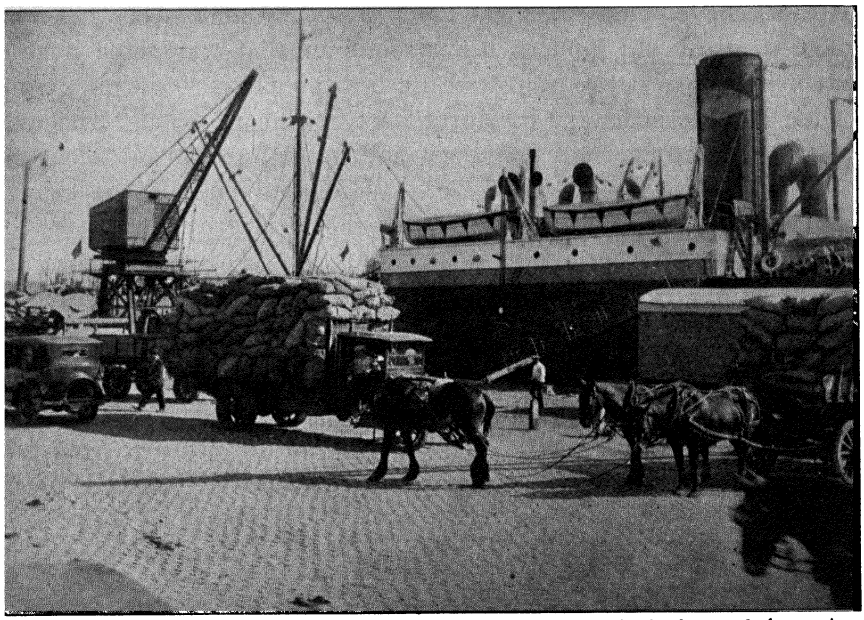
Differences in climate. People in northern United States and Canada cannot grow their own oranges, bananas, coffee, cocoa, rubber, and many other tropical or subtropical products. On the other hand people in hot lands as a rule do little manufacturing. Their manufactured goods are obtained from cool regions where people can work all day in mills and factories without too great discomfort.

Cattle and sheep are often raised in semiarid lands, where cultivation of the soil would not be profitable. The animals or the animal products are then sold to more densely settled regions where farming or manufacturing is carried on.

Before the days of mechanical refrigeration ice frozen on the lakes and rivers of northern United States was transported in slow sailing vessels as far as Calcutta. Thus we see that differences in climate make necessary the exchange of goods of many kinds.

Resources—many or few. Countries differ in the kind and extent of their resources. Australia and New Zealand have abundant grasslands and therefore ship to other lands great quantities of meat, wool, butter, and cheese. Great Britain has rich deposits of coal which it uses in manufacturing wool from Australia and cotton from the United States. Thus Great Britain has a surplus of textiles and other manufactured goods which it exports to Australia, New Zealand, and many other countries. The Andean countries of South America are rich in copper, tin, and nitrates. Other countries lacking those minerals look to the Andean countries for a part at least of their supply.

Resources—used or unused. If a country makes use of its resources, it will have a surplus to send abroad. Argentina makes use of its grassy plains and exports meats, wool, and hides; Belgium makes use of its coal as a fuel for factories and produces a surplus of manufactured goods. Brazil has huge deposits of iron ore but as yet they are but little used. When more railroads are built and manufacturing is developed, then the iron ore will probably be mined. The great forests, mineral deposits, and agricultural lands of the United States



Courtesy of the National Department of Agriculture of Argentina

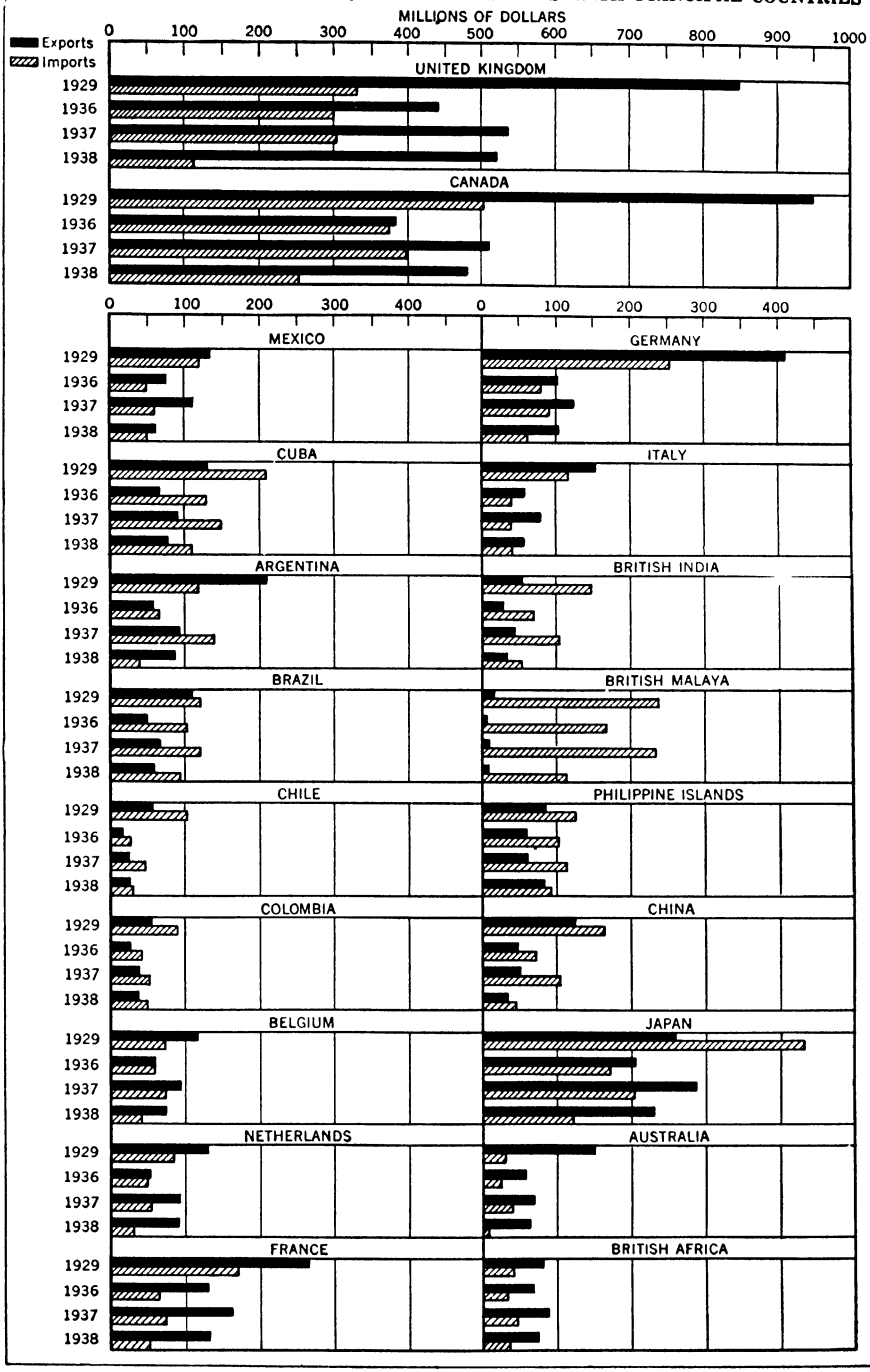
Loading wheat from the pampas on the docks at Buenos Aires, capital and principal port of the Argentine

were almost untouched until Europeans came to this country and until people learned to use machines. Thus we see that countries which have learned to develop their resources will have the products of their industries to sell while undeveloped countries will sell mainly products in their natural state.

Advantages of location. The commerce of a country is greatly favored if other countries can easily be reached. Great Britain has a very favorable location. Just across the English Channel lie Germany, the Netherlands, Belgium, and France—all industrial countries having many goods to sell and needing many articles which they cannot provide for themselves. Australia and New Zealand on the other hand must send the products of their farms and ranches halfway around the world to find a good market. Accessibility to other commercial regions is not only a great help to a country's foreign trade but almost a necessity.

Tariff walls. A tariff is money paid to the government of a country on goods imported from foreign countries or exported to foreign countries. The tariffs of our country are levied only on goods imported. Tariffs are placed on imports for two reasons: one

VALUE OF FOREIGN TRADE OF THE UNITED STATES WITH PRINCIPAL COUNTRIES



to provide the government with revenue to meet expenses, and the other to increase the price of the imported article. If the price of an import is increased by tariff, then it is easier for an American producer of a similar article to compete with it.

This is a time in which tariff walls have been set up by practically all countries. Each nation wishes as fully as possible to provide for its own needs. The reason is that if the article is produced at home, then home labor is employed; if on the other hand the article is imported, the people of another country are benefited both by the employment of labor and by the profits of the industry. Moreover, in case of war the less a country depends upon others for goods, the safer it is.

As a result of tariff walls each nation is finding it more and more difficult to market goods abroad. It is often the case that, in order to sell goods in a foreign land, a country must agree to buy a certain quantity of goods from the purchasing nation. No nation, however, can be wholly independent or self-sufficient. Differences in climate, in resources, and in the people themselves make it necessary that foreign trade be carried on.

The benefits of foreign trade. Trade with other countries enables a country to make the best use of its resources. It can exchange a surplus of one commodity for products which it lacks. It can sell the particular skill of its own workers for that of another country. Great Britain could not support its large population without foreign trade. That country sells the labor of its people in exchange for food and raw materials. France sells the skill and fine taste of French workmanship to people who appreciate fine things and who are unable to produce goods of equal quality.

Foreign trade also makes for progress. Exchange of goods is accompanied by an exchange of ideas. Without such interchange of ideas the progress of the past could not have taken place. Exchange of goods and ideas helps nations to know one another better and should lead to more friendly relations. The world of today needs nothing more than peace and goodwill among the nations.

Guides to Study

1. Why do countries exchange goods with one another?
2. What goods are exchanged because of (*a*) differences in climate? (*b*) differences in resources? (*c*) differences in the people themselves?
3. What has location to do with a country's trade?

4. Why have cities on our Atlantic Coast a better location for trade than ports on the Pacific Coast?

5. Why does the United States levy a tariff on imported goods?

Research for Students

1. List the world's greatest commercial nations. Why is their commerce large?

2. Make a list of goods used in your vicinity which have come from foreign countries? Why was each imported?

3. Learn and report to class what products of your section of the United States are (*a*) exported to foreign countries; (*b*) are sent to other parts of the United States.

4. Appoint a committee to make a study of the products of your vicinity which are protected by a tariff. What is the benefit of such a tariff?

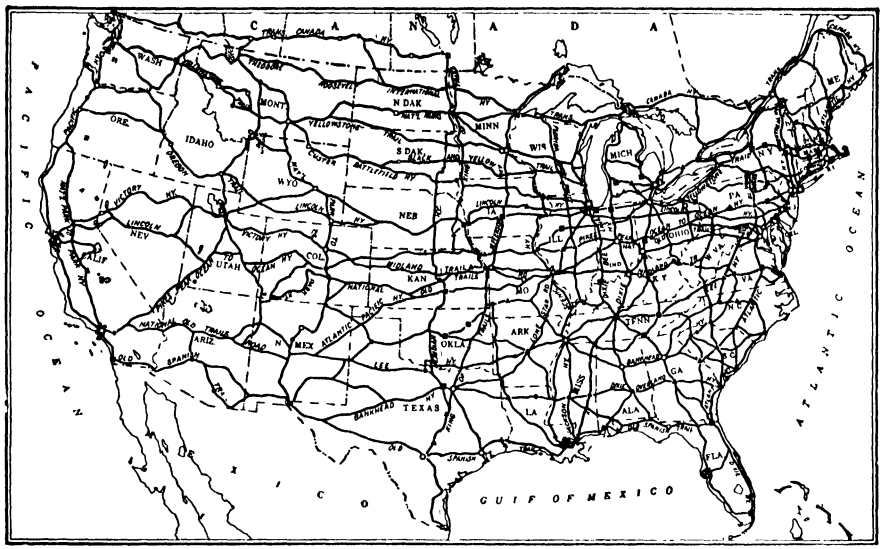
2. CONQUERING SPACE AND TIME

From Trail to Railway

Early trails. Early roads in all countries were dirt roads, that is, the people rode their horses and drove their wagons over land surfaces on which little or no work had been done. It is often said that the many winding streets in the city of Boston were once cow-paths. The simplest route between towns was a trail over which people walked or rode on horseback. These roads at first were so poor that the only way the traveler could make sure that he was following the right path was by carefully watching for the blazed trees on either side of the way.

Up to 1800 there were few roads in the United States. As settlements spread over larger areas, the need of roads became greater. Roads were widened and improved by covering the ground with planks or in swampy places with logs. Over these improved highways a horse could draw several times as much as he could over an ordinary dirt road. Many of the improved highways were constructed by individuals or companies and toll was charged for their use. Even today some of our most expensive bridges are financed by the payment of tolls by those who use them.

Superhighways. Highways have been improving as people demanded better roads. In the last twenty years of the past century came the bicycle demanding smoother roads. The bicycle was fol-



lowed by the automobile and the truck requiring hard level surfaces capable of supporting heavy loads. Roads have been widened, hills leveled, hollows filled, and bridges constructed. Even in farming regions where population is sparse, good roads are necessary for the farmers' cars and trucks.

Modern highways are being constantly improved. Funds are provided by towns, cities, states, and the Federal Government. Grassy parkways divide the highways with sometimes several lanes on either side. National automobile routes extend from Canada to the Gulf of Mexico, and from the Atlantic to the Pacific.

The American railroads—ribbons of steel. In this day of automobiles, buses, and trucks we are likely to think that the railroad is a relic of the past. That is not true. Railroads are absolutely necessary today both for carrying passengers and for transporting freight. It is true that the railroads have suffered through competition with the newer means of transportation, nevertheless the business of the country could not go on without them. The farmer, the manufacturer, the merchant, and all other workers rely on the railroads to transport their goods. The development of the great resources of our mines, forests, and agricultural lands would have been impossible without the railroads. We may take short trips or even long journeys in automobiles or buses, yet on many occasions the traveler turns to the railroad for rapid, safe, and comfortable



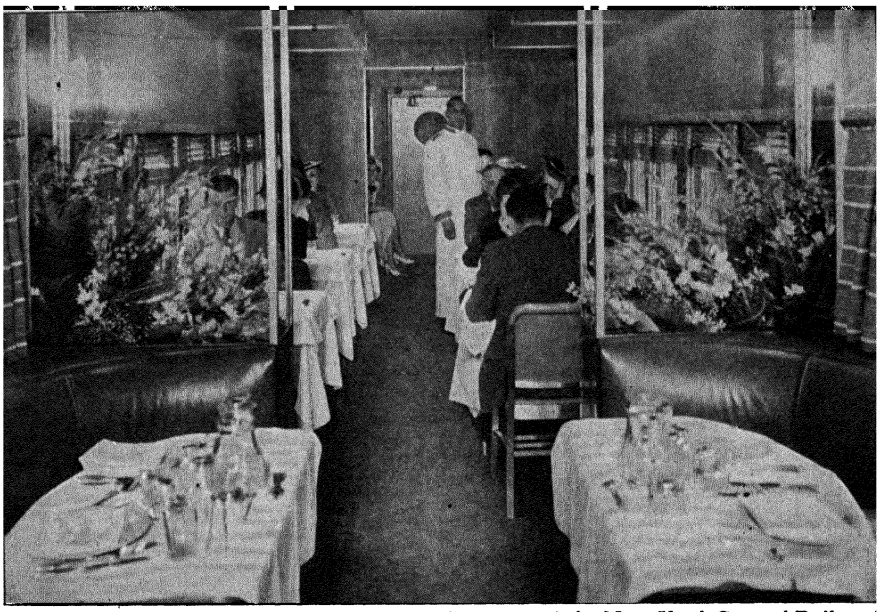
Photo by James Sawders

Pausing for a last look at Old Mexico on the Pan-American Highway somewhere between Monterrey and Laredo

transportation. The transcontinental railroads are keeping well abreast of the times. Streamlined trains now make the run from coast to coast in less than two and one-half days. The regular schedule of the Twentieth Century Limited between New York and Chicago is sixteen hours. Owing to the use of alloy steels, the train weighs one third less than the trains of former years. Cars are furnished with a train telephone system and radios.

Our country is well equipped with railway lines. No other country has so many miles of tracks. Nearly one fifteenth of the income of the people of the United States is paid to the railroads for transportation service. In the densely settled Northeast there is a veritable network. West of the 100th meridian there is an abrupt change and from that meridian to the Pacific Coast only a few lines cross the Rocky Mountains.

The railroads are great consumers of raw materials. They compete with the automobile in the amount of iron and steel used. Other metals such as copper, nickel, and aluminum are also needed in considerable quantities. In our study of forests we learned that great quantities of lumber are used for railroad ties and, to some extent,



Courtesy of the New York Central Railroad

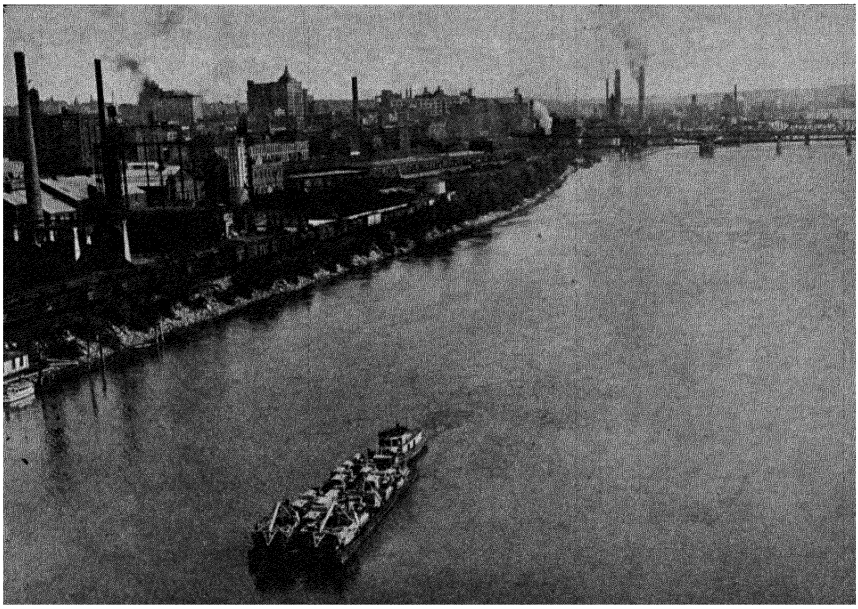
Dining in luxury on *The Mercury*, one of the New York Central's streamlined trains

in the manufacture of rolling stock. When the railroads prosper, their demands for raw materials and labor help to make the whole country prosperous.

From Raft to Steamship

Rivers—natural highways. Rivers serve as guides for people traveling on foot in a strange land. They usually mark the easiest route of travel in a rugged or mountainous country. For these reasons the early settlers who discovered new territory usually moved into it with their families and goods along the river courses and all lots had a frontage on the water. The first settlers of the Middle West often floated their products to market on rafts or flatboats down the smaller streams to the Ohio and Mississippi Rivers and on to New Orleans. There the goods were sold and the rafts broken up and sold for lumber because the barges could not be forced up stream against the current. It was not until the coming of the steamboat that river traffic moved in both directions.

The first successful steamboat. Robert Fulton in 1807 was one of the first men successfully to propel a boat with a steam engine.



Courtesy of Caterpillar Tractor Co.

A towboat pulling a bargeload of farm machines, tractors, and highway machinery on the Mississippi River at St. Louis

On his first trip he sailed his boat, the *Clermont*, from New York City to Albany in thirty-two hours. To be sure other steamboats had been built and had moved through the water for short distances. But it was really Fulton and the trip of the *Clermont* which proved steam navigation to be possible. Even Fulton had tried again and again without success. But perseverance won and a great advance was made in water transportation. Within a few years after the success of the *Clermont*, steamboats were in use on the Ohio, the Mississippi, and other large rivers.

River traffic in the United States. Steamboats, however, found it very difficult to compete with the railroads. Railroads move more rapidly, and, since they reach out to all parts of the country, there is less handling of goods and less frequent changing from one type of travel to another. The Federal Government has spent millions of dollars to improve our rivers and encourage their use, but with rather poor success. Especial efforts have been made to increase the river traffic of the lower Mississippi and the Ohio. The Black Warrior River in Alabama has been dredged to give Birmingham better connection with the Gulf of Mexico and the Atlantic Ocean.

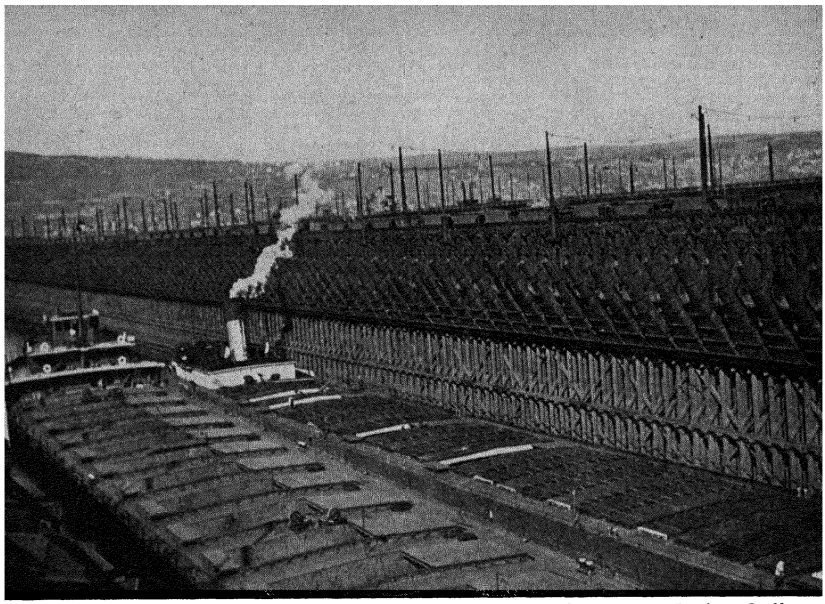


Photo from Ewing Galloway

The Duluth ore docks where big ships are loaded by automatic machinery with ore from the Minnesota mines

Canals and Lakes

The Erie Canal—the first great ditch in America. The Erie Canal helped greatly in opening up the West, in opening up a great market for the East, and in stimulating the growth of manufacturing all along its route. For fifty years or more it carried many people and much produce between the East and the West. With the coming of the railroad its use rapidly fell off. Since the widening and deepening of the canal by the State of New York, however, its usefulness has increased somewhat for the transportation of heavy and bulky articles, such as gravel, coal, and building stone. It is now known as the New York State Barge Canal.

The Great Lakes—the world's largest inland waterway. The Erie Canal owed its usefulness to the fact that it was the first connecting link between the Atlantic Ocean on the east with the Great Lakes on the west. Early French explorers, trappers, and pioneers found the Great Lakes a great help in their wanderings westward from the headwaters of the St. Lawrence. These great bodies of water play a large part in solving the transportation problems of the

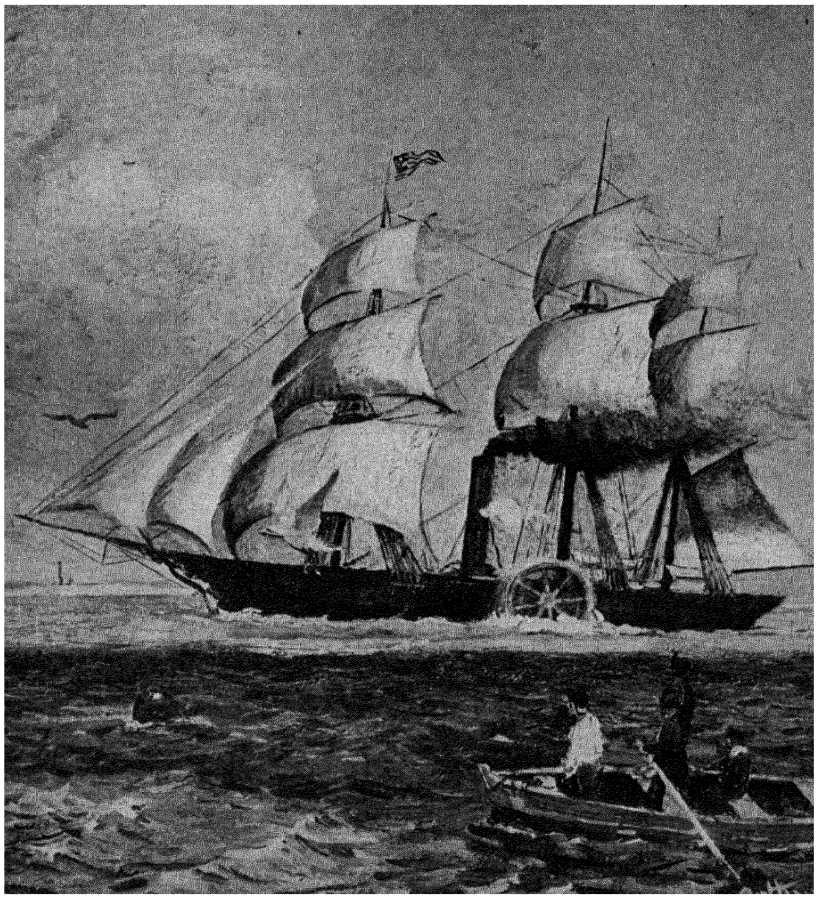
Middle West. Great quantities of iron ore, lumber, and wheat move east and south over their waters. Easy and cheap water transportation bring the iron mines of Minnesota and Michigan near to the coal of Pennsylvania and West Virginia. Duluth, Chicago, Cleveland, and Pittsburgh become almost next-door neighbors. Cheap transportation of ore reduces the cost of iron and steel. Grain moves east to Buffalo and that city leads all others in flour milling. Ore-bearing ships return to Duluth laden with coal for the iron and steel plants of that city. These lakes of course serve Canada as well as the United States. Unfortunately all shipping on the Great Lakes is held up by the cold of winter. The leading ports bordering the lakes are Chicago, Detroit, Cleveland, Toledo, Erie, Buffalo, Milwaukee, and Duluth.

Canals of the Great Lakes. Rapids separate Lake Superior from Lake Huron making a canal with locks necessary. As ore- and coal-carrying ships increased in size, the locks of the Soo Canal were made wider, longer, and deeper. This is the busiest canal in the world. Although it is open only eight months of the year, the tonnage passing through the locks is greater than that of the Panama and Suez Canals combined. On the average a ship passes every eighteen minutes. There has been an almost constant demand for bigger lake ships and larger locks.

The Welland Canal enables ships to pass around Niagara Falls. This canal has been recently enlarged to accommodate ocean-going ships. It is expected that sometime in the future ocean vessels will ascend the St. Lawrence and sail over the Great Lakes to all important lake ports. A treaty has already been signed by representatives of the United States and Canada, but it awaits confirmation by the Canadian Parliament and the United States Senate. The treaty provides for construction of dams and locks along the St. Lawrence, thus making that river above Montreal navigable for large ocean-going ships. Several million horse power of electricity would be developed which no doubt would be shared by the two countries.

From River and Lake to the Ocean

Steamers cross the ocean. When the steamboat first appeared, a Dr. Lardner of London stated positively that no steamboat would ever be able to cross the ocean and that he would write a book to prove it. He wrote the book and it was brought across the Atlantic to America—on a steamboat. In 1819, the *Savannah*, an American



From a painting by Stanley M. Arthurs

The *Savannah*, the first steamship to cross the Atlantic Ocean, arrives at England's shores.

steamboat, sailed from New York to Liverpool in twenty-six days. Since that time the size of ocean-going steamships has constantly increased. Rival companies strive to build ships larger and faster than those of their competitors. Today floating palaces, such as the *Queen Mary* and the *Normandie*, cross the Atlantic in about four days.

Merchant marine at home and abroad. The ships of a country which carry merchandise are known as the country's *merchant marine*. Great Britain leads all other countries in the number of its merchant ships. Other countries in order are the United States,

Japan, Germany, Norway, the Netherlands, France, Italy, and Sweden. A large merchant fleet is a great help to a country in a number of ways. It is not dependent upon other countries to carry its goods. This is particularly important in time of war. A fleet large enough to carry goods of other nations as well as those of the homeland is a source of income to a country. Employment is given to sailors, to shipbuilders, and to business houses which control the ships.

The American merchant marine. The American merchant fleet was in its prime in the days of the famous Yankee clipper ships from 1830 to about 1860. The ships of no other country could compete with the clippers. Fast and profitable voyages were made to South America, around Cape Horn to California, and to the Far East especially to China. The shipbuilders, shipowners, and sea captains amassed large fortunes. Many captains were able to retire at the age of thirty. With the coming of steel ships and steam the American merchant marine rapidly declined. During the War between the States the fleet suffered greatly. Some of the vessels were used as warships, and many were captured and destroyed.

Since those years strenuous efforts have been made to restore our merchant fleet to its former high position, but with no great success. Even now two thirds of our freight and ninety percent of our passengers are carried in foreign ships. The Federal Government has spent millions of dollars in attempts to encourage shipping and shipbuilding. The last bill to aid American shipping was passed by the Congress in 1936. It created a Maritime Commission of five members appointed by the President. The commission is authorized to supply government funds to aid in the construction and operation of ships. One of the first undertakings of the commission is the construction of a great ocean liner comparable to the *Queen Mary* and the *Normandie*.

Wings over Land and Sea

The unexpected happens. In 1903 Simon Newcomb, a famous scientist, considered aerial flight to be one of the problems with which man could never hope to succeed and recommended that all attempts to grapple with it be given up. Despite this prophecy, however, Charles A. Lindbergh in 1927 made a solo nonstop flight from New York City to Paris. In 1937 Russian fliers made an uninterrupted flight from Moscow over the North Pole to southern California, a distance of more than 6200 miles. Previous to this time both the north pole and the south pole had been reached by aviators. In 1938

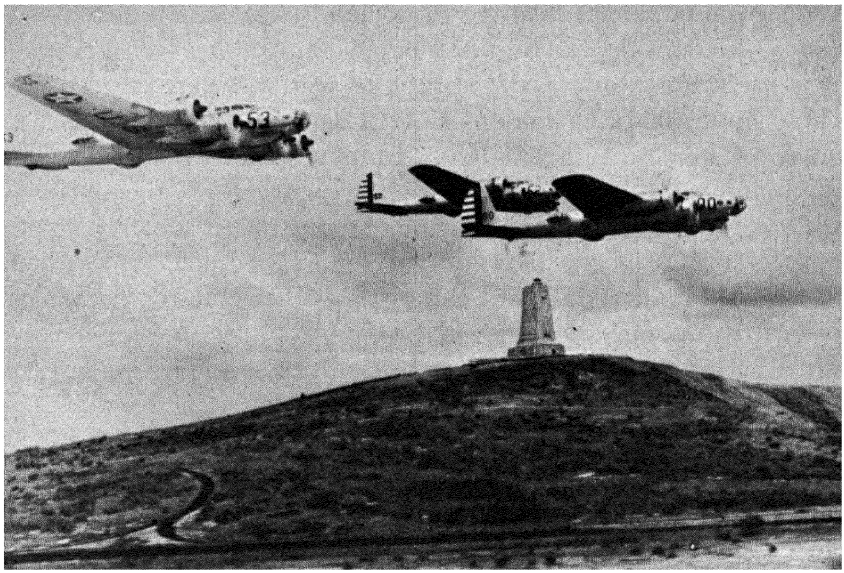


Photo from McLaughlin Air Service

Airships flying in formation over the Kitty Hawk Memorial to Wilbur and Orville Wright

American fliers piloted planes from Miami to Buenos Aires in twenty-eight and a half hours of flying time, making only one stop at Lima, Peru. In July, 1938, Howard Hughes and four companions circled the globe, a distance of 14,824 miles in three days, nineteen hours, and thirty-five minutes.

Back of these long flights there had been a slow but gradual progress in aviation. For many years man had dreamed of flying through the air. Ascents had been made in balloons and in crude airplanes but little success had been achieved before the experiments of Orville and Wilbur Wright. Their first experiments were with gliders, aircraft which were suspended by currents of air. Later gliders were large enough to support a man and could thus, to a small degree, be balanced and controlled.

In 1903 the Wright brothers flew their first powered plane equipped with a gasoline engine made by themselves. This was the first time in history that a self-propelled plane had made a successful flight. Their longest flight on this first day lasted less than a minute but they knew that the "age of the flying machine" had come at last. Flights became longer and the heights reached became greater. To-

day thanks to the Wright brothers and other experimenters the airplane, which now carries mail, passengers, and freight, is a necessity. Airplane routes cross all continents and bridge the Atlantic and the Pacific. There is regular passenger and mail service between the Pacific Coast of the United States and the Far East, and it is expected that within a year or two at most there will be regular airplane service across the North Atlantic.

Airplanes in the life of today. During the year ending June 30, 1938, airplanes in the United States carried more than 1,200,000 passengers. The China Clippers flying over the Pacific carry 2000 passengers per year. In addition to mail they also carry within a year's time seven and a half million pounds of express. In the country as a whole there are 60,000 miles of airways under regular schedule over which fly nearly four hundred planes. Airplanes are especially useful in time of emergency. Medicines and serums are taken to remote regions and food is carried to wrecked or stranded people. On many occasions the airplane has been the only means of locating travelers, mountain climbers, and even wrecked planes in inaccessible regions. The airplane has also been used to sow grain, to dust cotton fields with poison, and to aid in the prevention and spread of forest fires.

The aircraft industry. The manufacture of airplanes has become one of our great industries. The cost of manufacture is due more to skilled labor rather than to distance from sources of raw materials. For this reason the location of airplane-manufacturing centers is not easily explained on a geographical basis. The leading centers of manufacture are in California, New York, Maryland, and Ohio. Countries having little opportunity for transportation by rail or water are good customers for our commercial planes. Among these are the countries of South America and Asia. There are regular flights over the Andes from Chile to Argentina and across the deserts of southwestern Asia. Wars now going on and the feverish preparation for possible conflict call for the manufacture of many airplanes in addition to those needed for commercial purposes. Many airplanes made in America are now being exported to the Far East and to the countries of western Europe.

Messengers with the Speed of Light

The telegraph—electricity writes. One of Shakespeare's characters promised to put a girdle around the world in forty minutes.

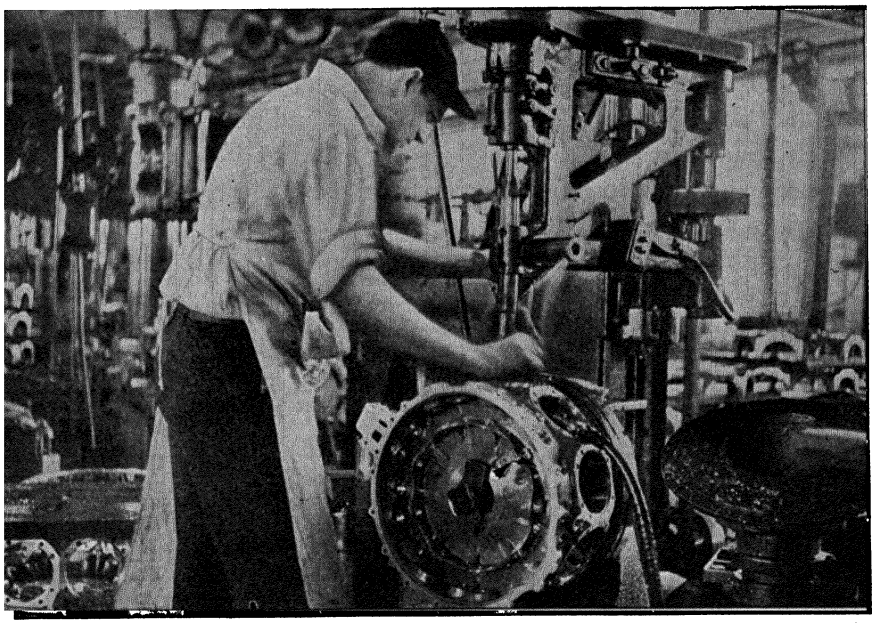


Photo by I. Janowitz

The manufacture of airplane engines is an important industry in Paterson, N. J. The parts of an engine must be accurate to within one ten-thousandth of an inch, thus making possible the use of interchangeable parts.

Today we call that slow. Light and electricity travel the same distance in a third of a second. When man trained electricity to do his bidding, he found a messenger that moves with the speed of the lightning's flash. From earliest times there was felt the need of sending messages long distances in the shortest time possible. Signals were flashed from hilltop to hilltop by means of fire, smoke, or by means of arms of wood waved from the top of a pole. Messages were sent from ship to ship and ship to shore by flags. When a feudal lord wished to wage war against an enemy, he sent a runner with a flaming torch to one of his villages. The torch was grasped at once by another runner who took it to the next settlement. This was kept up until all the lord's warriors were called together.

Up to the time of Samuel F. B. Morse there had been little advance in rapid communication. Messages were at that time sent by men on foot or on horseback or in horse-drawn vehicles. Morse first became interested in the telegraph when he learned that a current of electricity could be interrupted at any point along the wire. He devised a crude instrument and a system of dots and dashes which is

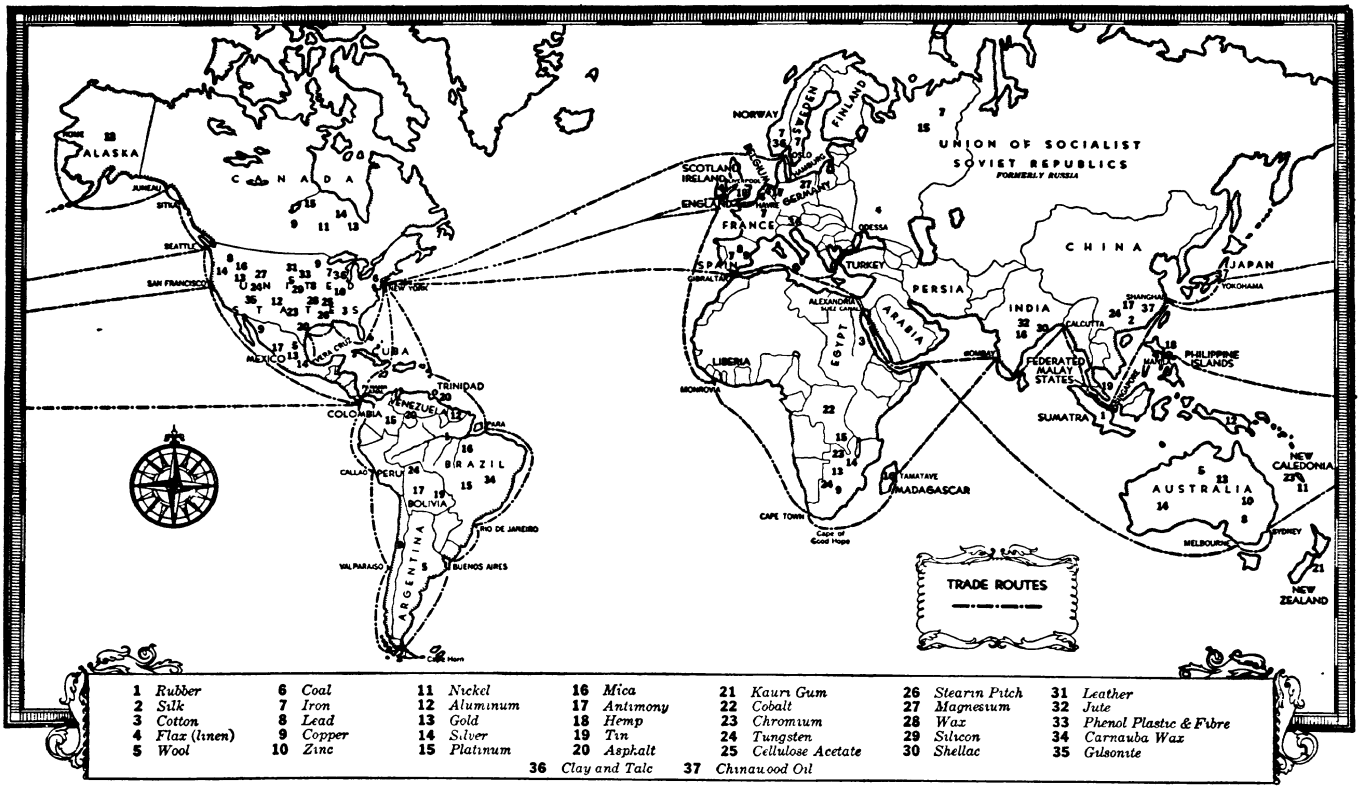
practically the Morse code used today. He had no money, however, with which to construct telegraph lines. Years of effort were spent in trying to induce the governments of European countries to advance funds. Finally in 1843 Congress appropriated $30,000 to construct a line from Baltimore to Washington.

Many people found it hard to believe that a message could be carried by wire over long distances. A train dispatcher in Pennsylvania refused to carry out an order received by telegraph until the order was brought to him by messenger. Within a few years telegraph companies were organized in various parts of the country. Nearly all these were united in 1857 to form the Western Union. During Morse's life his system was put to use in many of the countries of Europe and in Australia as well as in the United States.

Since Morse's day telegraph lines have been extended until all countries of the world have been connected by wires over the land and by cables under the seas. After repeated failures England and the United States in 1857 were connected by submarine cable. Queen Victoria and President Buchanan exchanged messages. In laying this line two steamers loaded with cable met in mid-ocean, joined the ends of their wires and then sailed in opposite directions, laying the cable as they sailed. But in about two months the line failed to work, and it was not until 1866 that a new one was laid and messages were again sent across the Atlantic. Before inventing the telegraph, Morse, who was visiting in England, wrote to his mother in America, saying, "I wish that in one instant I could tell you of my safe arrival, but now we must wait four long weeks to hear from one another." The Atlantic cable was Morse's dream come true, and Morse had done much to make that dream a reality.

Since 1865 many other cables have been laid across the Atlantic. In 1902 a cable was laid under the Pacific Ocean. This cable is about 8000 miles long and in some places lies six miles below the surface of the ocean. Early failures in laying Atlantic cables led to the making of stronger and better cables and thus made the spanning of the Pacific possible.

The telephone—electricity speaks. The telegraph made it possible for an operator to cause an instrument many miles away to make dots and dashes on a strip of paper or to produce sounds. Either the dots and dashes or the sounds could be at once translated into words. The Bell telephone carried the words themselves from speaker to listener.



Courtesy of the Western Electric Company

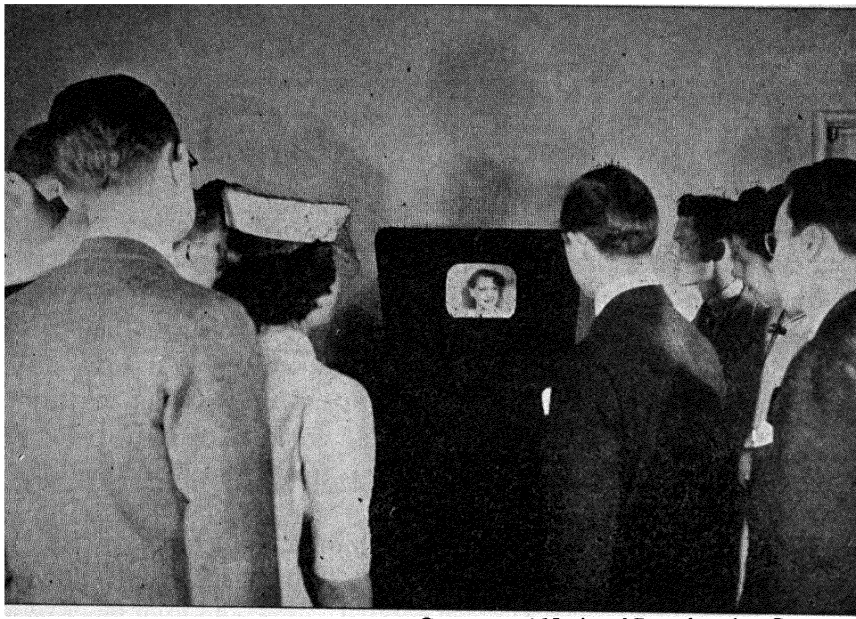
This map shows how the telephone industry is dependent on our own and foreign lands for the materials it requires.

Bell was born in Edinburgh, Scotland, but came to the United States when about twenty-five years of age. The first words carried were spoken by Bell in his attic workroom in Boston to a room two floors below. The completed instrument was first shown at the Centennial Exposition in Philadelphia in 1876. It received little notice until it attracted the attention of the emperor of Brazil and Sir William Thomson, a noted English scientist. The Englishman pronounced it the most wonderful thing that he had seen in America.

Many improvements had to be made before the telephone became the useful instrument that we know today. Exchanges had to be planned so that one telephone could be linked up with any one of hundreds or even thousands of other instruments. Other inventions had to be made before the human voice could be carried from the Atlantic to the Pacific. In January, 1915, this feat was accomplished. Mr. Bell in New York spoke the same words to Thomas Watson in San Francisco that he had spoken to him as his assistant from the attic in Boston. Mr. Bell's words were, "Mr. Watson, please come here. I want you." Mr. Watson replied, "It would take me a week now." Since then other improvements have been made until the telephone in our homes can be connected with those in almost any country in the world.

Wireless—electricity broadcasts. In April, 1912, the new steamship *Titanic*, then the largest vessel afloat, was steaming at full speed to make a record voyage across the Atlantic. Without warning, the vessel crashed into a huge iceberg and more than half of those on board perished. Upon landing in New York the survivors went in a body to the hotel where Guglielmo Marconi, the inventor of wireless, was staying and there cheered the man who had made possible their escape from death. The damaged ship had sent out wireless calls for help, and ships sailing near by had been able to save hundreds of lives. Without the wireless all would have been lost. This was not the first time wireless had been used for this purpose, but it was the first time that so many lives had been saved in mid-ocean.

Marconi, an Italian, was the first to transmit messages without wires. At first the distance between the two instruments was very short. But by patient experimenting distances were gradually increased. In 1899 his messages spanned the English Channel and four years later wireless messages were being sent across the Atlantic. Since that time all countries have been united by the wireless telegraph and the wireless telephone. From Marconi's discoveries has



Courtesy of National Broadcasting Company

Television has at last been achieved by the ingenuity of man. Commercial production of receiving sets may result in a development as great as that produced by the radio industry

come the radio with receiving sets in practically every home. An address made by the President of the United States is heard all over the United States and in foreign countries. The king of England speaks and his subjects scattered all over the world listen. Telephonic communication by means of wireless is carried on across the oceans, also from ship to shore, and between airplanes and the earth. We can be made to hear such conversations over our radios.

No other commodity pays so high a price for transportation as news. News dispatches from the war in China cost one dollar and fifty cents per word. The cost of sending 2000 pounds of coal across the Pacific Ocean is but a trifle more. The high price for news is the price paid for speed. Before the days of the telegraph years passed before a ship was given up for lost. Now it is a matter of days or a few weeks at most. If a ship is equipped with radio and danger threatens, news of it is found in our newspapers within a few hours or is announced over the radio even quicker.

Pictures of persons and events are sent by wireless from place to place, even across the oceans. Illustrations used in newspapers and

magazines are often sent from distant places in this way. Such a picture is known as a *radiophotograph.* In a few places pictures of moving scenes are broadcast with sound, and both pictures and sound are recorded on receiving sets in the home. The process whereby distant objects whether still or moving are made visible on a screen is known as *television.* (*I. 61*)

Guides to Study

1. Why was toll charged for the use of many of the early roads and bridges. Why are there no toll roads today?
2. What competition do the railroads have now that they did not have in former years?
3. A map showing the distribution of railroads in a country is really a population map. Explain.
4. List all the ways in which rivers aid communication and transportation.
5. Why does river traffic in the United States find it difficult to compete with railroads?
6. What cities are benefited most by transportation on the Great Lakes? Give reasons for each city.
7. What does it matter whether the goods of a country are carried by its own ships or by the ships of other countries?
8. Why does our merchant marine find it difficult to compete with that of Great Britain, Japan, and other countries?
9. What evidences are there of the progress of aviation since 1903?
10. What are the greatest contributions that the airplane makes to the life of today?
11. List the steps in the development of means of communication from earliest times to the present.
12. What inventions have been responsible for the great advances made in transportation and communication?

Research for Students

1. Find pictures of early locomotives and railway cars. Compare them with pictures of modern streamlined trains.
2. Make a graph showing the railway mileage of the United States as compared with other countries. (See Table 50 in the Appendix.)
3. On an outline map of the United States trace steamer lines across the Great Lakes. Print names of lakes and names of leading ports. Locate all canals and connecting waterways between the lakes. List products moving over each route in each direction.
4. On a map of the world trace routes over which airplanes are flown regularly. What new routes are being considered?

5. Bring to class pictures which have been transmitted by wireless. Keep in touch through newspapers and magazines with all advances made in television.

3. GATEWAYS AND GREAT CROSSROADS OF OUR COUNTRY

Doorways of the coast. The United States has ready access by sea to all parts of the world. The Atlantic ports face Europe and Africa, and by way of the Mediterranean and the Panama Canal extend their routes even to the Far East. The ports of the Gulf Coast have similar advantages and all ports of our eastern and southern coasts are favorably located for trade with all parts of South America. Ports of the Pacific are especially well placed for trade with Asia, Australia, and the western coast of South America. By way of the Panama Canal these ports also carry on a profitable trade with ports of our Atlantic and Gulf Coasts and with Europe.

Boston. This port is primarily the gateway of New England. Its imports are mainly raw materials for New England's varied industries and foods for one of the most densely settled parts of the country. Boston's exports are not large since many of the manufactured products of the surrounding region move west and south to all parts of the United States. Textiles, boots and shoes, and hardware are among New England's leading products. For their production cotton, wool, hides and skins, and rubber must be imported. The manufacture of paper is an important New England industry, and for its mills wood pulp is imported from Canada and Scandinavia. Boston has large sugar refineries and secures its supplies of raw sugar mainly from Cuba. In addition to its traffic in goods, Boston is a leading port for foreign travel. About 100,000 people enter or leave its port each year.

New York. This city next to London is the largest city in the world. The history of London dates back about 2000 years while New York has made its astonishing growth in a little more than 300 years. Only unusual advantages would enable a city to grow at this rapid rate. It has an excellent location at the mouth of the Hudson River where there is an excellent harbor with miles of water front. Even before the days of the railroad, the port was connected with the Middle West by way of the Hudson River, the Erie Canal, and



Photo from Philip Gendreau

A partial view of Boston's harbor. Raw materials from foreign lands for the city's various manufacturing industries enter here. Boston is also an important port for coastwise shipping.

the Great Lakes. Later this route along the Hudson and the canal proved to be a very easy one for railroads, thus bringing to New York more Western trade than went to any other city of the coast.

The region which the port of New York serves, its *hinterland*, is really the whole United States. Products of all kinds from all parts of the United States leave the country by way of this port, and imports coming here are distributed throughout the length and breadth of the land. So great is the demand for water front along which docks can be built that the facilities for handling freight and passengers have been extended to Long Island and even to the shores of New Jersey. On the Jersey side of the river are great plants for refining petroleum and copper.

A small part of the port of New York has been set aside as a *free port*. To this area on Staten Island goods may be admitted duty-free provided they are not sold in the markets of this country. In the free-port area the products may be cleaned, refined, reassembled, and otherwise prepared for their final markets. The value of the free-port privilege is to permit goods to enter the country and be

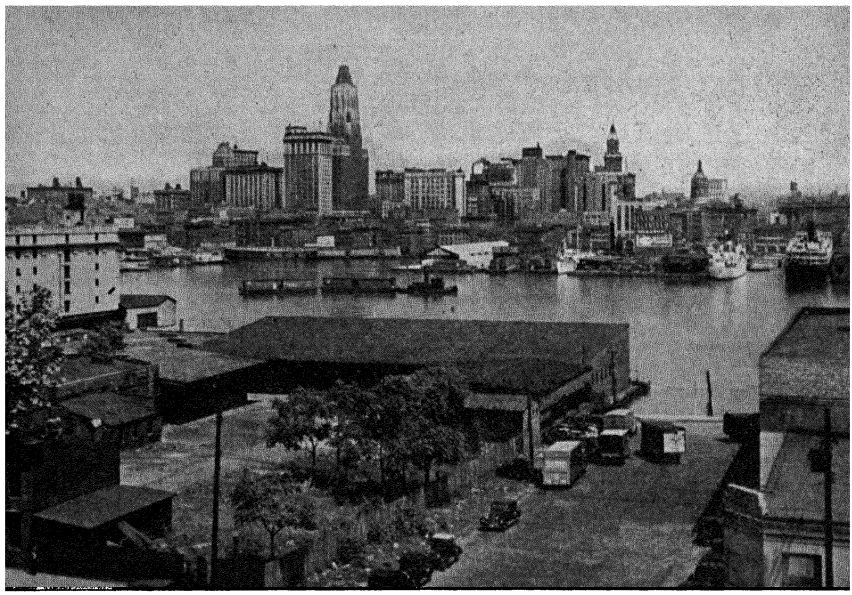


Photo by James Sawdey

Baltimore's harbor and impressive skyline. This city is the leading corn-exporting port of the Union. It also has the largest coal-loading pier in the world.

reshipped to foreign lands without the payment of tariffs when they enter the United States.

New York is well located for coastwise trade both to the north and to the south and by way of the Panama Canal with Pacific ports. Because of its many advantages the commerce of the port is almost equal to that of all of our other ports combined. Because of its great importance as an industrial and commercial center, New York is doubtless the world's greatest banking and financial city. (*I. 288*)

Philadelphia. This city has an excellent harbor on the Delaware River and is so placed that it serves as the port for Delaware and southern New Jersey, as well as Pennsylvania. Its nearness to the great coal fields of Pennsylvania and West Virginia has helped to make its hinterland one of the greatest industrial areas of the country. Among the leading exports of this port are products of petroleum, manufactures of iron and steel, and grains from the Middle West. (*I. 256*)

Baltimore. This port is located on the Patapsco River near the head of Chesapeake Bay. Its nearness to coal fields has led to the

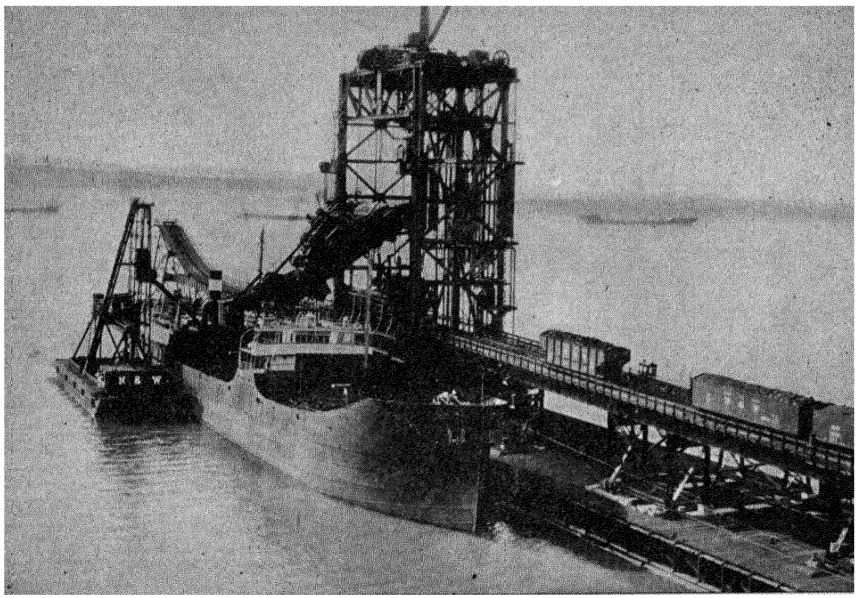


Photo from Philip Gendreau

Giant electrically operated coal pier owned by the Norfolk and Western Railway at Lambert Point (Norfolk), Virginia

smelting of iron and the refining of copper. These industries in turn have influenced the commerce of the port. Partially refined copper is brought here from Chile, Peru, Cuba, and other countries, and, after being refined, it is distributed to local and foreign markets. Iron ore comes from Chile and Cuba because transportation by water is cheaper than by rail from the interior of our own country. Grain and other farm products from the Middle West are shipped through Baltimore to foreign countries. It is also one of the leading ports through which Canadian grain passes on its way to Europe when St. Lawrence ports are closed by ice.

Surrounding Baltimore are many market gardens and truck farms. These farms together with the oyster beds of Chesapeake Bay make Baltimore one of the leading canning centers of the country. Agriculture in Maryland and other near-by states calls for quantities of fertilizer. Baltimore meets this need by importing nitrate from Chile and potash from Germany and by receiving phosphate rock from Florida—all of which it uses in the manufacture of fertilizers.

Norfolk, Portsmouth, and Newport News. These cities are all located about the fine harbor of Hampton Roads, a channel through

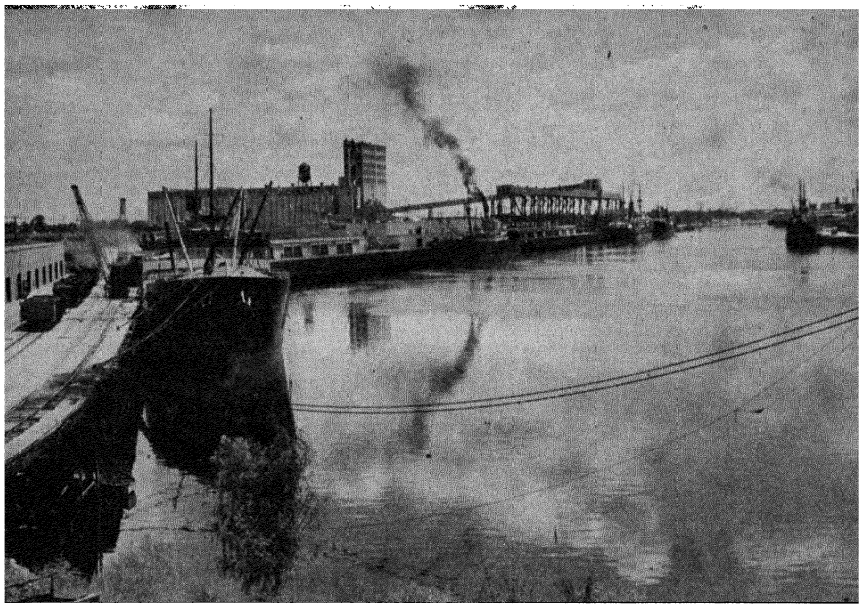


Photo from Ewing Galloway

The Houston Ship Canal which has made this Texas city one of the chief ports of the country. It exports a vast quantity of cotton and oil and their products, lumber, wheat, and fruits.

which the James and other rivers reach Chesapeake Bay. Norfolk is the leading coal-shipping port of the Atlantic Coast. Other important exports leaving the country from the ports of Hampton Roads are cotton, tobacco, lumber, and naval stores.

Other Atlantic ports. Charleston, South Carolina, and Savannah, Georgia, are the leading ports of the South Atlantic Coast. Their leading exports are cotton and lumber. Because commercial fertilizers are extensively used on the cotton lands and truck farms of the South, raw materials for the fertilizer plants are received through these ports.

New Orleans. Located one hundred miles from the mouth of the Mississippi River, New Orleans is the leading port of the Southern States. It is connected by river and rail with the whole Mississippi Valley. Cotton and grain are exported to European countries. From this port southern pine goes to Europe and many countries of South America. The leading imports are bananas from Caribbean countries, sugar and molasses from Cuba, and bauxite from Surinam on its way to St. Louis for partial refining. Large ferryboats carrying

ninety-five loaded cars ply between New Orleans and the ports of Cuba.

Houston. As a result of almost miraculous growth this city has come to be the leading port of Texas and one of the chief ports of the United States. Its rapid development was due to the construction of a ship canal fifty miles long connecting the city with the Gulf of Mexico, thus making Houston an ocean port. The canal tapped an exceedingly rich hinterland producing great quantities of cotton, grain, beef, and petroleum. These products serve as raw materials for a great manufacturing industry. Its industrial plants consist of petroleum refineries, cotton compresses, rice mills, textile mills, fertilizer works, and meat-packing plants. The exports of Houston are mainly petroleum products, cotton, and grain. More than six thousand ships enter and leave the port each year. In amount of tonnage Houston ranks fifth among all American ports.

Galveston. This city is located on a low, level island near the mainland of Texas. It is protected from tropical hurricanes by a sea wall seventeen feet high and more than five miles long. Railroads connect the city with the mainland so that inland freight can be brought directly to the docks. The commerce of Galveston and Houston is very closely related and the exports are much the same since both ports serve the same region. No other port in the world handles so much sulphur as Galveston. (*I. 243*)

Mobile. This port is located on the Mobile River about thirty miles from the Gulf. Its hinterland is both agricultural and industrial. It has water connection by means of river and canal with Birmingham and might be thought of as the port of Birmingham. The principal products leaving the port are iron and steel from Birmingham, lumber, and naval stores. Among its industries is a large paper mill for making strong wrapping paper. Pulpwood is obtained from the pine forests of the South. (*I. 121*)

San Francisco. This city is situated on San Francisco Bay, which is connected with the Pacific Ocean by a narrow strait, known as the *Golden Gate*. Across this strait there has recently been constructed a suspension bridge having a span longer than that of any other bridge in the world. Another great bridge connects San Francisco with Oakland across the bay.

San Francisco has for its hinterland the Great Valley of California, an exceedingly rich agricultural region. This city is in large measure a port for all the Pacific States with their wealth of forests,

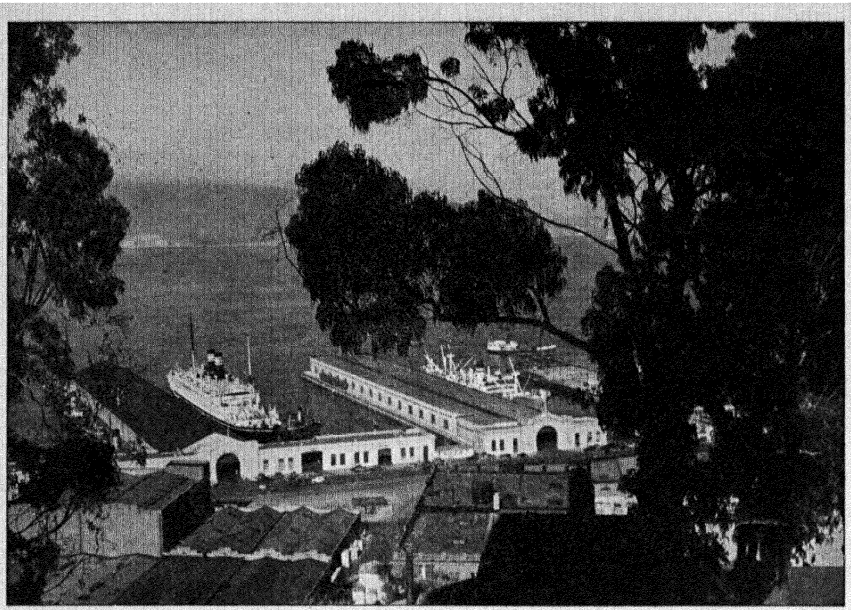


Photo by Charles Phelps Cushing

Part of the water front of San Francisco framed by the trees on Telegraph Hill

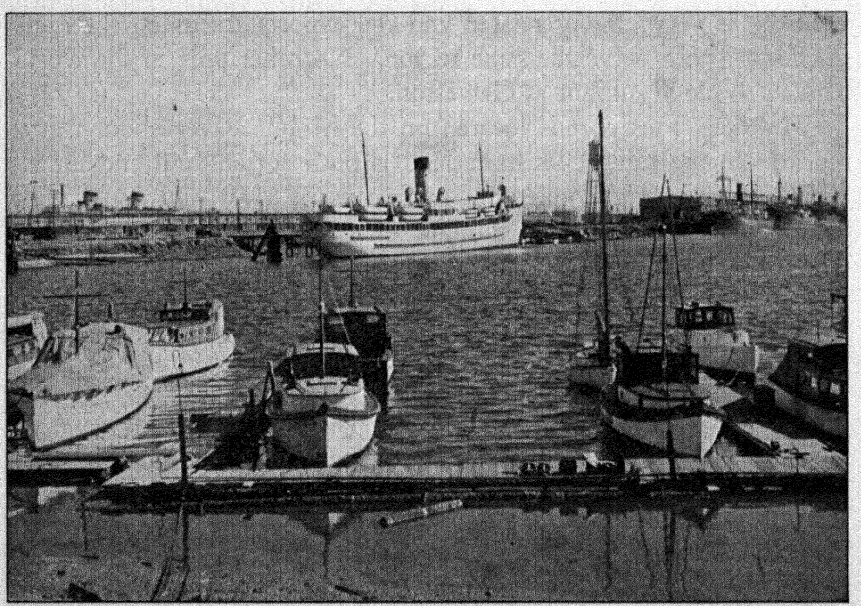


Photo by James Sawders

Shipping in the harbor of Los Angeles from which fruits, petroleum products, and lumber are sent to the markets of the world

petroleum and other minerals, extensive fisheries, and a great variety of agricultural products. Its location is also favorable for trade with the Far East, with western South America, and with Atlantic ports by way of the Panama Canal.

San Francisco's leading outward shipments are canned and dried fruits, refined sugar, ores of metals, products of petroleum, and lumber. Cargoes entering the harbor include canned pineapples and raw sugar from the Hawaiian Islands, vegetable oils from China and the Philippines, and lumber from North Pacific ports. The city is a distributing center for fertilizers, lumber, and manufactured articles to the farming sections of California and adjacent states.

Los Angeles—an inland port. The harbor of Los Angeles at San Pedro is twenty miles from the city itself. To provide themselves with water front, the citizens purchased a strip of land one fourth of a mile wide extending to the Pacific Coast. Thus the leading city of Southern California became a seaport. It is now the chief commercial city of that part of the state. Los Angeles is near extensive oil fields and is in the midst of a great fruit and vegetable region. It ships petroleum products in great quantities to all parts of the world. Fruits—fresh, canned, and dried—are sent to all parts of the United States and to foreign countries. The leading commodities received by water are crude oil, lumber, equipment for the oil fields, and fertilizers. The motion-picture industry of the Hollywood district has aided in the growth of the city and has added to the commerce of its port. (*I. 95, 276*)

San Diego. This city has a first-class harbor on the southernmost shores of California. Its latitude and its location near the sea protect it from the heat of the summer and the low temperatures of winter. Its mild climate, like that of much of southern California, makes the region a favorite health resort. The Federal Government uses this port as a base for many of its activities. Here are located the largest naval base on the Pacific Coast and aviation schools for both the Army and the Navy. Airplanes, airplane motors, and other equipment are manufactured here. The commerce of the port is largely coastwise.

Seattle. This is the leading port of Puget Sound. Seattle is located between the sound and Lake Washington, which is connected with the sound by a canal. Thus the port has an extensive water front, a part bordering the salt water of the sound and the rest the fresh water of the lake. It lies in a region rich in forests and

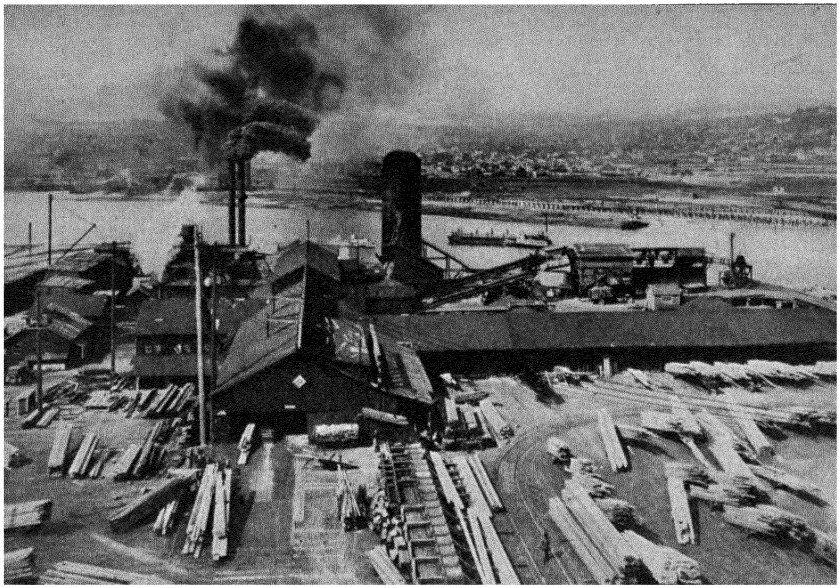


Photo from Philip Gendreau

Lumber from the magnificent forests of Washington being loaded on shipboard at the port of Seattle

fisheries. Its location favors trade with Alaska, with the Far East, and with Pacific ports to the south. Outward shipments consist largely of lumber, wheat and flour, canned fish, apples, and other fruits. Among the goods received are the products of Alaska; lumber and newsprint from Canada; silk, soybeans, bean oil, canned fish, and other products from the Far East; burlap and bagging from British India; and sugar from the Hawaiian Islands. Much of the raw silk which formerly came here now passes directly to New York through the Panama Canal. Seattle is in the midst of a region having an abundant supply of hydroelectric power. The manufacture of paper is one of Washington's leading and rapidly growing industries.

Tacoma. This city is the center of a great lumber and paper industry. It ships more lumber products than any other of our ports. Tacoma has one of the largest copper smelters in the country. It receives ores from Peru, Canada, Japan, and from other states of our West.

Great crossroads of our country. Thus far we have learned something of the gateways of our coasts. These gateways, or ports, aid in the shipment of goods from one part to another of our own

country; they also lead out to the ports of all other continents. We shall next study very briefly a few cities which have grown up at what may be called *great crossroads.* Country towns and villages often grow up where the main roads cross. There we find the country store, the post office, and perhaps the school and the church. People find it convenient to have their homes near such a center and so the town grows.

In a similar way great cities are situated in places convenient for communication with other parts of the country. They can easily get the goods that they need, and they can as easily send their products to other markets. Some of these cities developed on the shores of lakes, such as Buffalo, Chicago, and Cleveland. Others, like St. Louis, grew up where river routes converge. Still others, like Denver, are located near mountain passes which were crossed by early trails and later by the railroads. We can give space only to a few of the most important ones. You will find it interesting and profitable to study as many others as you can.

Chicago. This city is, next to New York, the largest city of the United States. It has made a marvelous growth from its settlement about a hundred years ago to a great industrial and commercial center with an estimated population of 3,500,000. An inland city could hardly have greater advantages. Its location at the southern tip of Lake Michigan permits communication by water with all the states bordering the Great Lakes. Lying in the center of a great plain making easy the construction of railways, it has become the greatest railway center of the world. It is also the center of the major airway lines of the country and has no less than twenty permanent airports. (*I. 67, 136*)

The resources of the great region of which Chicago is the center are almost unlimited. It is in the heart of one of the most extensive wheat, corn, and cattle areas in the world. Bordering the shores of Lake Superior are rich deposits of iron and copper and not far away in Pennsylvania and West Virginia are the country's greatest deposits of bituminous coal. Smaller deposits of coal are to be reached in Illinois itself and other neighboring states. During its period of rapid growth Chicago was able to draw upon the great forest reserves of the Great Lake Region; but these are now approaching exhaustion.

Such resources have made Chicago a great industrial center. Among its leading industries are meat packing, flour milling, and the manufacture of farm machinery, railway equipment, and other prod-

ucts of iron and steel. These products are distributed to all parts of the United States and to many foreign countries. If the Great Lakes to Ocean Waterway should be completed so that large ocean-going steamers could reach Chicago, no doubt the commerce of that port would be much greater than it is today.

At the present time ships drawing not more than fourteen feet of water can pass up the St. Lawrence above Montreal. In the past few years small ocean-going vessels from Germany, Norway, and the Netherlands have reached the harbors of Chicago, Cleveland, and Detroit. The ships of one Norwegian company sail regularly between European countries and ports on the Great Lakes.

St. Louis. This river port is on the western side of the Mississippi River about twenty miles south of the mouth of the Missouri and one hundred twenty-five miles upstream from the mouth of the Ohio. Thus, in the early days of exploration and settlement, St. Louis was the one center connecting with all three river valleys. For this reason it early became a fur-trading center. Trading in furs and the preparation of skins have continued until today St. Louis is one of the leading fur-trading centers of the world. In other respects its resources and industries are much like those of Chicago. Among its great industries are meat packing, flour milling, and the manufacture of hardware and shoes. It is second only to Chicago as the country's leading railroad center. (*I. 297*)

Because Missouri leads all other states in the production of lead, St. Louis stands high in the production of white lead, which is used in mixing paints. It also manufactures supplies for plumbers and steam fitters. Just across the river in Illinois is East St. Louis, an important manufacturing center (see page 136).

Kansas City. This city in Missouri is closely associated both industrially and geographically with Kansas City, Kansas. These two with North Kansas, Independence, and smaller suburbs make up Greater Kansas City with a population of more than 650,000. In early days this area was the head of water transportation on the Missouri River. Thus it became a terminus for both water and land routes. For more than a hundred years this section has been a distributing point for goods to the great Southwest over the Santa Fe Trail and later by means of the railroads. Kansas City is the center of a great grain and cattle region. It leads all other cities as a winter-wheat market and as a point of distribution of agricultural implements. It is also the chief market for *feeder cattle;* that is, cattle are

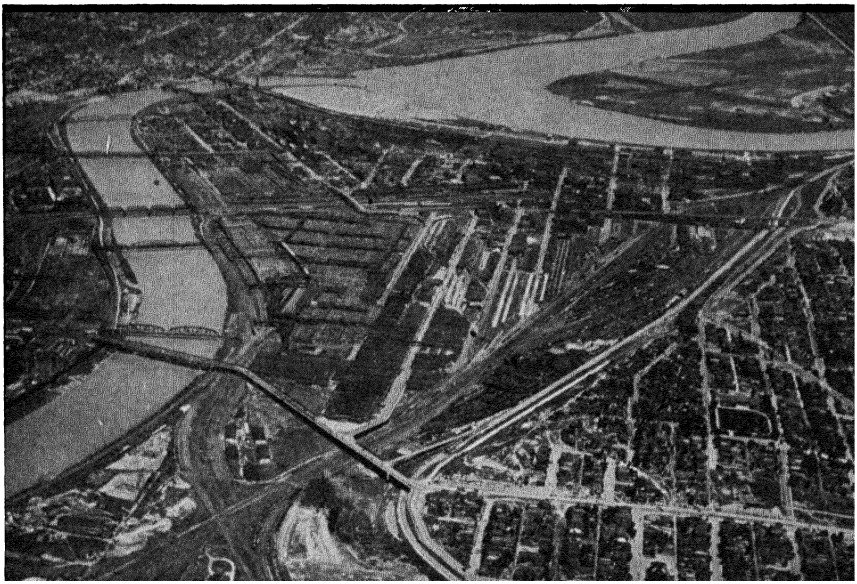


Photo from McLaughlin Air Service

Airplane view of Kansas City's transportation arteries

brought here from the ranches of the plains and sold to farmers of the Corn Belt for fattening. As a livestock center Kansas City is second only to Chicago. The milling of flour and the distribution of seeds to farmers are important activities.

Denver—a mile-high city. This city is located on the western edge of the Great Plains near the foothills of the Rocky Mountains and about a mile above sea level. The city is only eighty years old having begun its existence as a mining town about 1858. Forty-niners on their way to California found gold in the stream gravels near Denver and settled there.

The city is surrounded by country having a great variety of resources. The Rocky Mountain region for which it is the chief distributing center supplies a variety of minerals. Agricultural and grazing lands extend over the Great Plains to the east and in sections of the mountain region to the west. Coal is mined in Colorado, and power is obtained from mountain streams.

Denver is an important manufacturer and distributor of supplies and equipment for mining camps throughout the mountain region. Other leading industries are meat packing, flour milling, and the manufacture and repair of railroad equipment. The Moffat tunnel



Photo from McLaughlin Air Service

Airplane view of Denver showing its railroad facilities which care for its transportation of people and merchandise

recently completed places Denver on a direct route across the country.

Guides to Study

1. What ports of the United States are not discussed in the preceding section of the text? For what is each important?
2. What advantages has Boston over other New England ports?
3. Why is the commerce of New York greater than that of any other port?
4. How does nearness to coal fields aid the industries and trade of Philadelphia and Baltimore?
5. What are the leading exports of the South Atlantic ports? Why?
6. How would you expect the export trade of New Orleans to differ from that of Galveston and Houston?
7. What advantage has San Francisco over other ports of the Pacific Coast?
8. Why is the commerce of the Pacific Coast of the United States much less than that of the Atlantic Coast?
9. In what sense may Chicago, St. Louis, Kansas City, and Denver be considered at crossroads? What other factors determined their location?

10. What products used in your neighborhood may have been distributed from Chicago? Why?

11. What industries of Chicago are benefited by the water transportation of the Great Lakes?

Research for Students

1. On an outline map of the United States locate with dot and printed name all the cities mentioned in the foregoing section. Trace and draw steamer routes from New York to other large ports on the east, the south, and the west. Trace routes on the Great Lakes. Draw railway lines from New York to Albany, to Buffalo, to Chicago. Draw railway line from New York to Boston; also to Philadelphia, then to Pittsburgh, then to Chicago, then to Denver, Salt Lake City, and San Francisco. Draw other main railway lines connecting the chief cities at crossroads.

2. Contrast the products passing through Atlantic ports with those passing through Gulf and Pacific ports and account for differences.

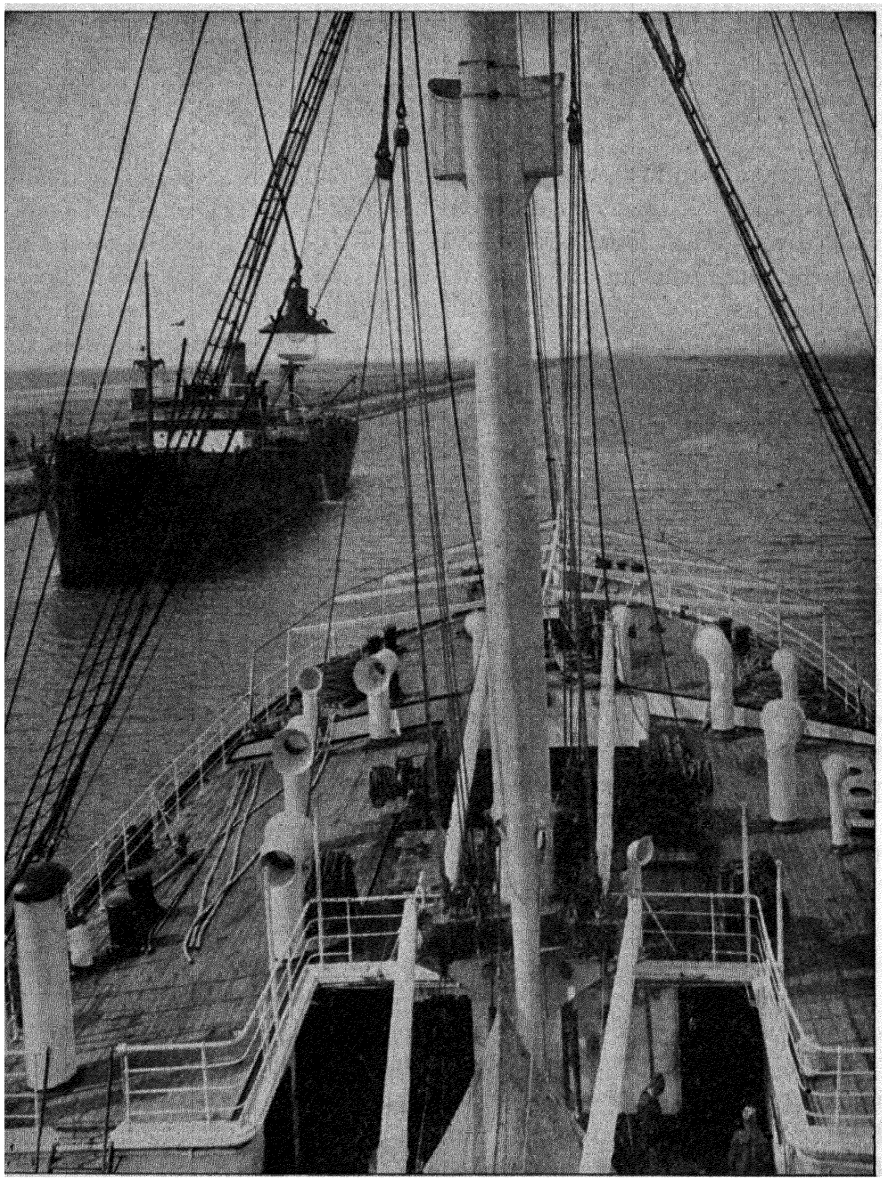
3. Examine and collect advertisements from newspapers and magazines to show some of the leading industries and products of our great cities.

4. Prepare a report to be given to the class on one or more of the following topics: (*a*) The settlement and growth of any one of our great cities; (*b*) Why New York has more trade with the Middle West than has Boston or Philadelphia; (*c*) Why the commerce of New York is greater than that of San Francisco.

5. Topic for debate: A good harbor is of more advantage to a port than a good hinterland.

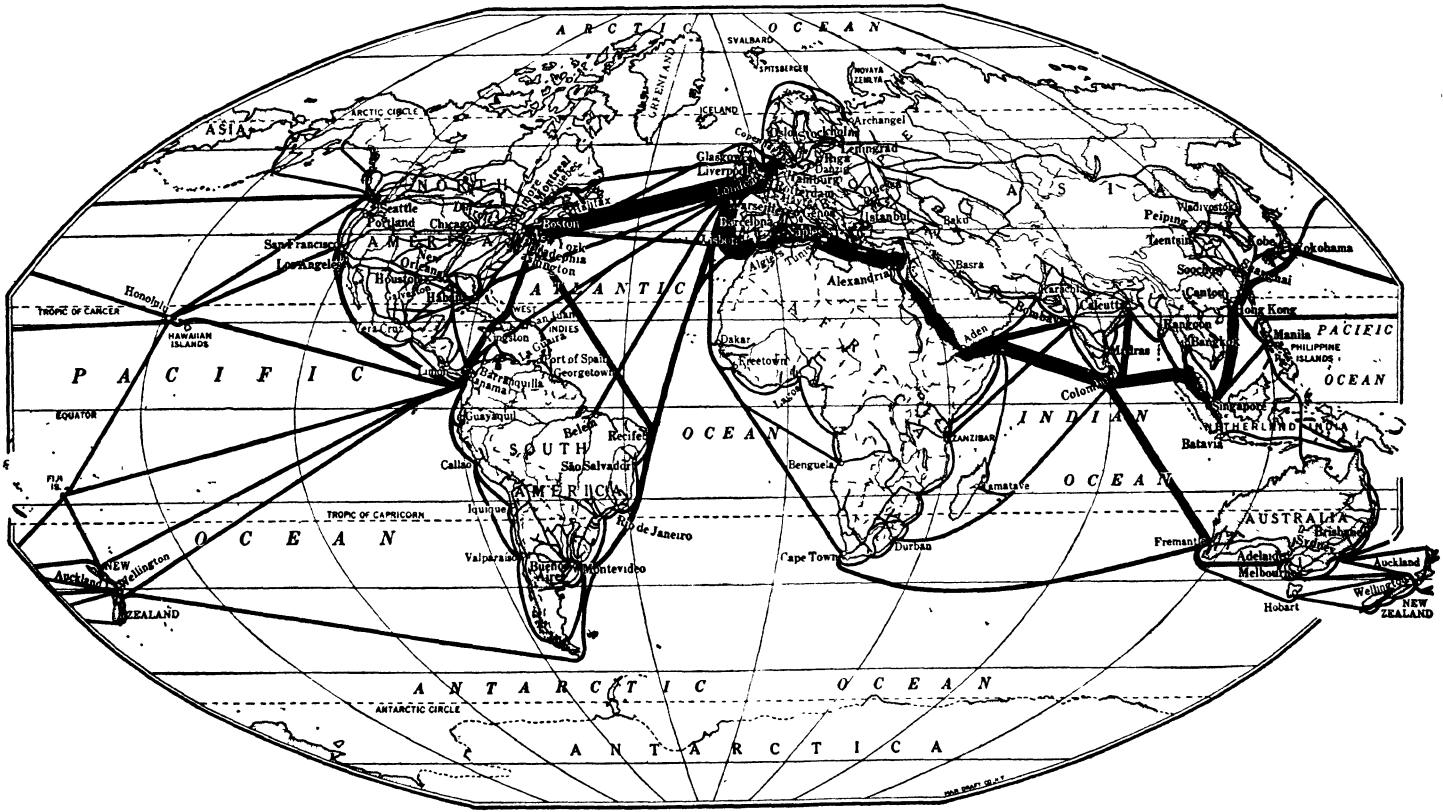
4. OCEAN HIGHWAYS AND WORLD TRADE

World highways. The great lanes of trade connect the leading commercial countries of the world (see map p. 325). One of the busiest lanes connects western Europe and the United States. Other highways of the Atlantic run south from the United States and Europe to eastern South America and the Caribbean. Another important route runs from western Europe through the Mediterranean and the Suez Canal to India, southeastern Asia, and Australia. Across the broad Pacific other lanes of trade form crossroads at the Hawaiian Islands and skirt the coasts of North America and Asia. Still others radiate from the Panama Canal in all directions. As we study these

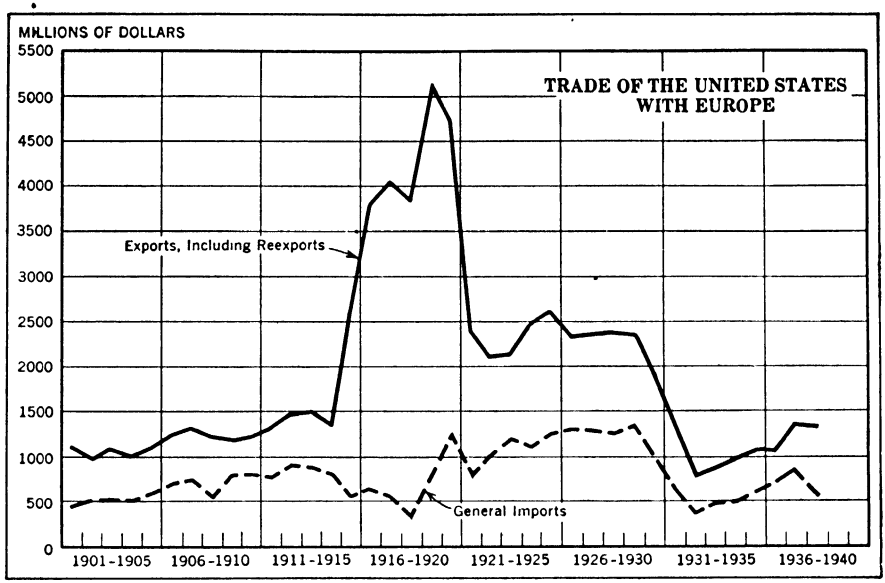


Keystone View

Ships of all nations meet and pass in the Suez Canal—the lifeline of trade between Europe and Asia.



The ocean is a highway—The width of the bands, representing trade lanes, is proportional to the value of the commerce carried.

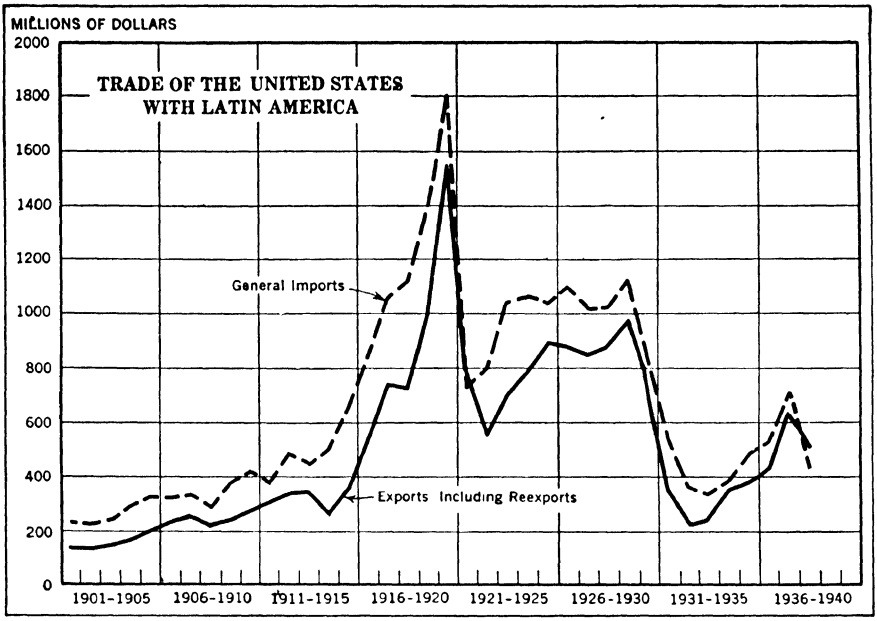


world routes, we shall be able to mention only a few of the more important products carried over each highway.

Trade of the North Atlantic. Great Britain leads all other countries in the value of its foreign trade. Then follows in order the United States, Germany, and France. Following Japan come Canada, Belgium, and the Netherlands. Thus we see that seven of the eight leading commercial countries lie on opposite sides of the North Atlantic Ocean. Great quantities of foods, raw materials, and manufactured articles of all kinds are constantly moving in both directions along this, the world's greatest ocean highway. Ships of every maritime nation are engaged in this carrying trade.

The United States exports to European countries raw cotton, petroleum and its products, automobiles and parts, lumber, and a great variety of other products. Ships from Canada take to European countries, especially to the mother country, grains, meats, dairy products, lumber, and minerals.

Returning westward across the Atlantic the cargoes moving to Canada and the United States consist of fine cottons, woolens, and linen goods, products of the age-old industries of England, Ireland, France, and Belgium. From England also come tea from India and tin and rubber from Singapore. Germany besides iron and steel and wood pulp sends potash, dyes, and other chemicals, the products



of its scientific laboratories. France sends westward fine silks and rayon, the latest creations in styles of clothing, furs, perfumes, and jewelry. Mediterranean Europe helps load the westwardbound ships with wines, olive oil, olives and other fruits, silk and rayon, and the handiwork of artistic French and Italian workmen.

Southern highways of the Atlantic. The Atlantic routes just studied run east and west. Other and less important lanes of the Atlantic run in north-south directions. These routes connect European countries and the United States and Canada with the countries of eastern South America, the Caribbean countries, and the Panama Canal.

Northward over these ocean paths pass ships laden with meats, wool, and hides from the ranches of Argentina and Uruguay. The densely settled industrial countries of Europe, especially Great Britain, need the meats and the wheat from Argentina. The tanneries of the United States demand large numbers of hides and skins together with quebracho from Argentine forests to help tan them. Brazil contributes coffee and some rubber and cocoa for northern markets. Back go the ships laden with iron and steel and textiles from Europe, and with petroleum, lubricating oils, automobiles, trucks, and farm machinery from the United States.

Caribbean lands and Mexico are rich in minerals and tropical products. European and American capital draws oil from the wells of Venezuela and Colombia and mines bauxite in the Guianas and gold, silver, and copper in Mexico and Central America. Plantations also largely financed and managed by Americans ship northward sugar from Cuba and bananas from Colombia, Central America, and the West Indies. Southward to the Caribbean move the textiles and other manufactures of northern countries.

East to the Indies. Through the Mediterranean Sea and the Suez Canal is another route over which a large part of the world's commerce moves. This water route is used mainly by the countries of Europe in their trade with southern and eastern Asia, Japan, the East Indies, Australia, and New Zealand. The route to the East is of special value to Great Britain since it offers a direct route to some of its most valuable colonies. A few of the products moving west are the textiles of Japan, the tea and jute of India, and the rubber and tin of the Malay Peninsula and the East Indies. Australia and New Zealand send their wool, mutton, and dairy products. These regions of the East are excellent markets for manufactured goods. India is Britain's best market for cotton goods. Iron and steel and machinery are purchased in large quantities for the mills and factories of India, China, and Japan.

Around the Cape of Good Hope. Not all the European ships pass through the Mediterranean and the Red Sea. The first all-water route was established by Da Gama when he discovered the route around the Cape of Good Hope. Ships using this route today avoid the payment of canal tolls at Suez. Some of them trade with ports all along the coast of Africa and then continue to India or Australia. The ports of West Africa ship palm oil, cocoa, and mahogany; South Africa furnishes gold, diamonds, wool, and fruits; East Africa supplies cotton, coffee, sisal, and cloves. All these ports receive a great variety of manufactured goods from European countries and the United States.

The Suez Canal—"the ditch in the desert." The route around the southern point of Africa was the only water route to the East until 1869 when the Suez Canal was opened. It is at sea level a little more than one hundred miles in length. Although it is operated by the English, the greater part of the stock is owned by the French. It is a vital part of Great Britain's route to India. The tonnage passing through it is a little more than that of the Panama Canal.



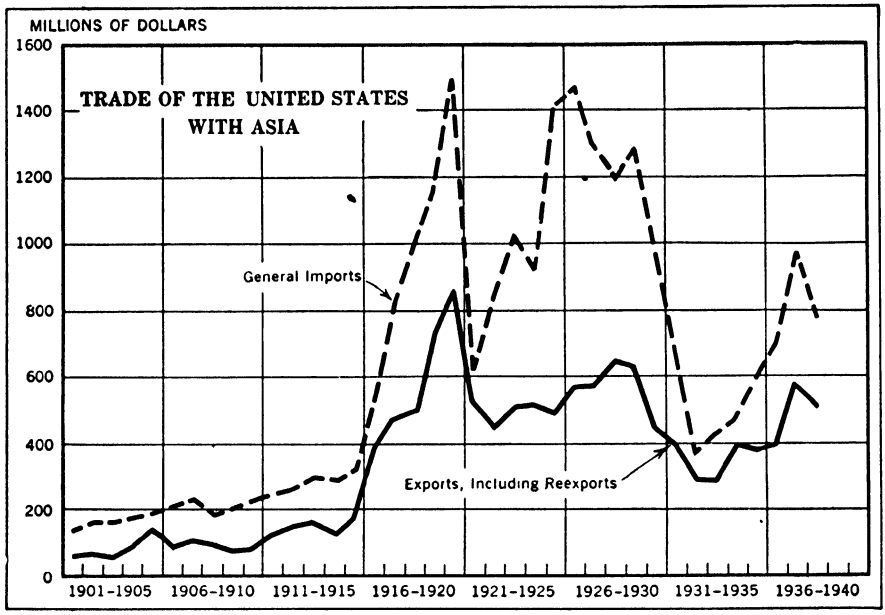
Photo by James Sawders

The *Santa Barbara* in the Gatun locks in the Panama Canal

Routes of the Pacific—the Panama Canal. The traffic lanes of the Pacific are joined to those of the Atlantic by the Panama Canal. The United States obtained rights to construct the canal from the French who had attempted to build it but were unable to complete the work. A treaty was also made with the government of Panama whereby that government granted in perpetuity the use of the Canal Zone, a strip five miles wide on each side of the canal route and extending across the isthmus.

The canal was constructed primarily to connect the eastern and western coasts of the United States. It is of course of great service to the countries of western South America, to western Europe, and to countries bordering the Pacific Ocean on the west. The canal shortens the route from New York to San Francisco about 8000 miles and New Orleans to San Francisco about 9000 miles. In time of war it enables one navy to defend all coasts of the United States.

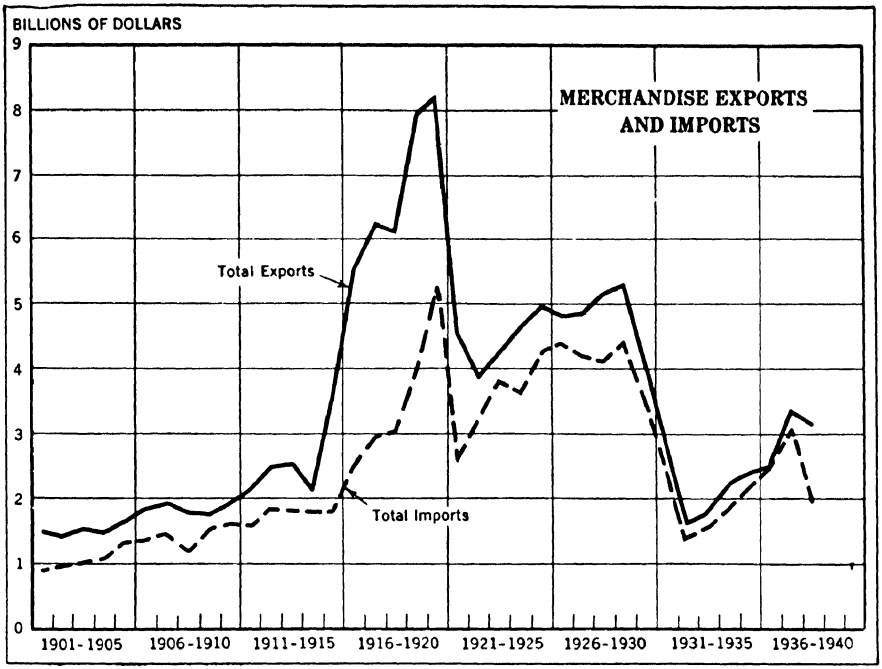
The principal products passing through the canal from west to east are grains, gasoline, sugar, lumber, and fruits. Moving in the opposite direction are products of iron and steel, a variety of manufactures, and cotton. The volume of goods moving east is about three times as great as that moving west.

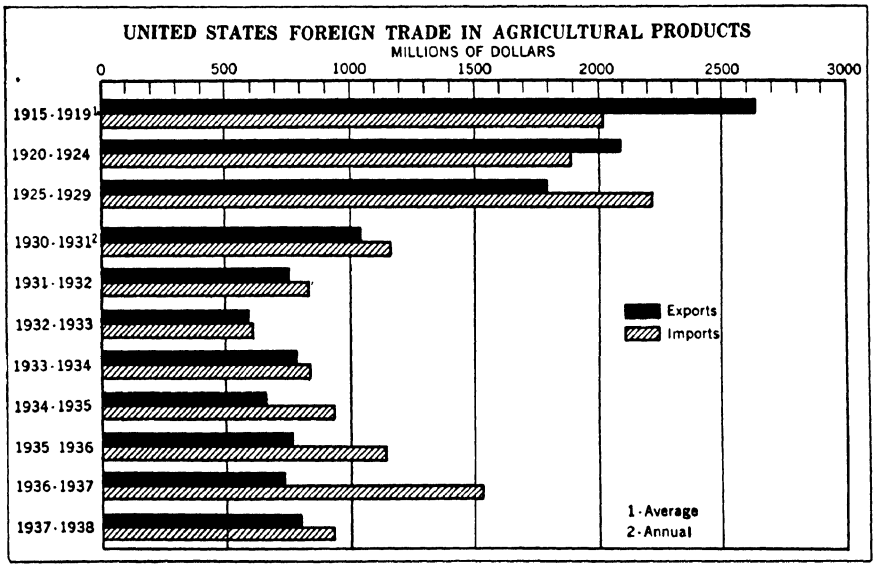


The United States has obtained rights to construct another canal connecting the Atlantic and the Pacific through the country of Nicaragua. This route if constructed will be through Lake Nicaragua and the San Juan River. The plan will be carried through if the Panama Canal proves inadequate to handle the interocean traffic. The distance between east and west ports of the United States would be shortened by several hundred miles.

West to the Orient. Across the Pacific the richest cargoes pass between the United States on the east and China and Japan on the west. Japan is our best customer for raw cotton and we are that country's best customer for silk. Formerly the silk was landed at Seattle, Vancouver, and San Francisco and taken by fast trains known as "silk specials" to New York. You have already learned (p. 257) that silk now comes by ship through the Panama Canal. The competition of rayon is partly responsible.

From the Orient also come tung oil and tea from China and soybean oil and pottery from Japan. To the countries of the Orient besides raw cotton we send lumber, gasoline, kerosene, and much iron and steel. Ships on their way east call at the Hawaiian Islands and add to their loads sugar and canned pineapple. These ships also accommodate many tourists who visit Hawaii, Japan, and other countries of the Far East or who are on their way around the world.


BILLIONS OF DOLLARS
MERCHANDISE EXPORTS AND IMPORTS
Total Exports
Total Imports
0
1
2
3
4
5
6
7
8
9
1901-1905
1906-1910
1911-1915
1916-1920
1921-1925
1926-1930
1931-1935
1936-1940


UNITED STATES FOREIGN TRADE IN AGRICULTURAL PRODUCTS
MILLIONS OF DOLLARS
0
500
1000
1500
2000
2500
3000
1915-1919[1]
1920-1924
1925-1929
1930-1931[2]
1931-1932
1932-1933
1933-1934
1934-1935
1935 1936
1936-1937
1937-1938
Exports
Imports
1-Average
2-Annual

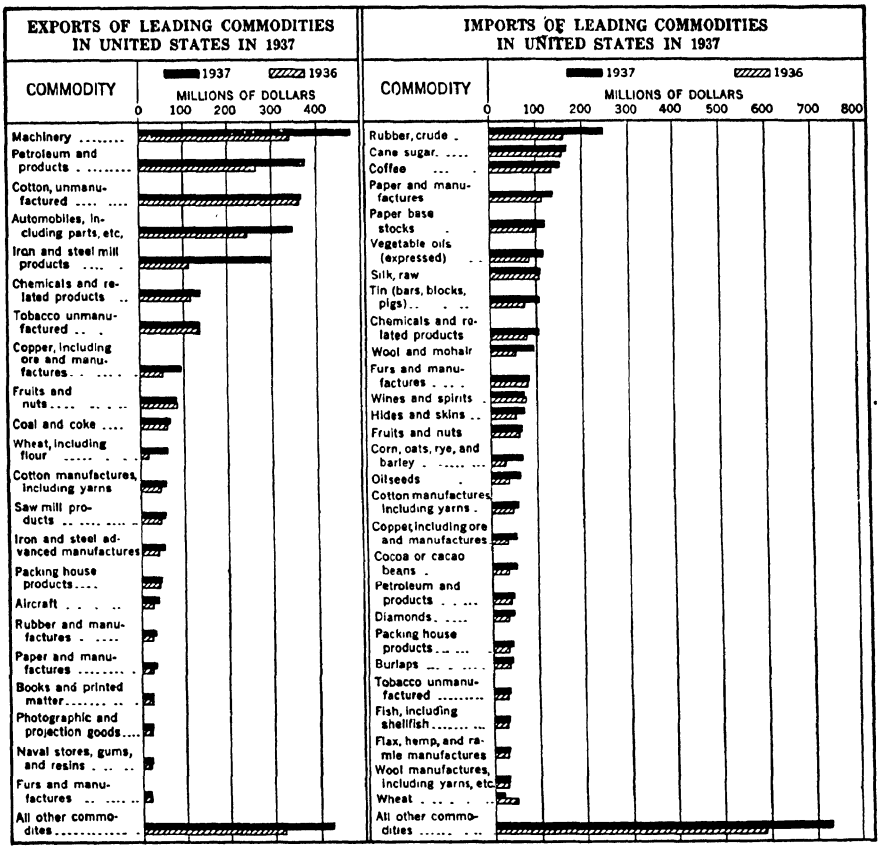
Ships taking the southwesterly route from the United States to Australia and New Zealand carry farm machinery and tractors for the farms of those countries besides gasoline and lubricating oil. On the return trip besides wool they bring rabbit skins which are dressed and made into fur coats that sell under the trade name of lapin, the French name for rabbit.

Around the Horn. Before the opening of the Panama Canal in 1914 ships could make the complete voyage from the Atlantic to the Pacific only by going around Cape Horn. The winds in the vicinity of the cape are very strong westerlies, known as the *roaring forties.* Owing to the strong winds and the narrow straits this part of the trip was dreaded. Ships sailing eastward from Australia and New Zealand as well as those sailing from the southern ports of western South America avoid the cost of tolls and add but little to the length of the voyage by sailing around the Horn. (*M. 325*)

A fleet of sailing ships, known as the *grain clippers,* have for years vied with one another to carry the Australian wheat crop to England in the shortest time. On the outgoing journey they sail south over the Atlantic to the Cape of Good Hope, then east to Australia where the ships are loaded with wheat. They again sail east around Cape Horn to the Atlantic, then north to the British Isles, thus completing the journey around the world. Sailing as they do in an easterly direction in the southern hemisphere, the ships have the benefit of strong westerly winds of the southern latitudes. The grain clippers make this trip around the earth each year when the Australian wheat is ready for shipment. The whole world watches to see which ship makes the homeward voyage in the shortest time.

The commerce of the United States. *Our leading exports.* Our exports are the products of our farms and ranches, of our mines and forests, and of our mills and factories. Note the graph of leading exports and relate each one to the great resource from which it comes. The countries to which we send exports of greatest value are in order the United Kingdom, Canada, Japan, and Germany. A study of the graph may help us to understand why we send most exports to those countries.

Our chief imports. Our imports consist largely of foods and beverages which we cannot produce or which we cannot produce in sufficient quantities. To these must be added raw materials for our numerous mills and factories. The countries supplying imports of greatest value are in order Canada, the United Kingdom, Japan,



British Malaya, and Cuba. A study of the graph of imports and of our trade routes will help us understand why these countries lead.

Reasons for the importance of our commerce. No other country except Great Britain has a foreign trade greater than ours. Our place in the commercial world is due largely to a wealth of natural resources. Although the climate of the entire country is temperate, yet there is a wide range of climatic conditions from the lands of cotton, sugar cane, and citrus fruits in the South to the spring-wheat regions of the North. Furthermore our people are energetic and progressive and have made good use of the country's resources.

The Federal Government aids commerce. Officers, known as *consuls*, represent our government in all foreign countries. It is their duty to be familiar with all matters which will help to increase our trade with the country to which they are appointed. They also collect and send to Washington information which may be of value to American businessmen in any way. Besides maintaining offices in

foreign countries our Department of Commerce has offices in all important cities of the United States. From these offices our businessmen may gain information of the trade conditions in any part of the world.

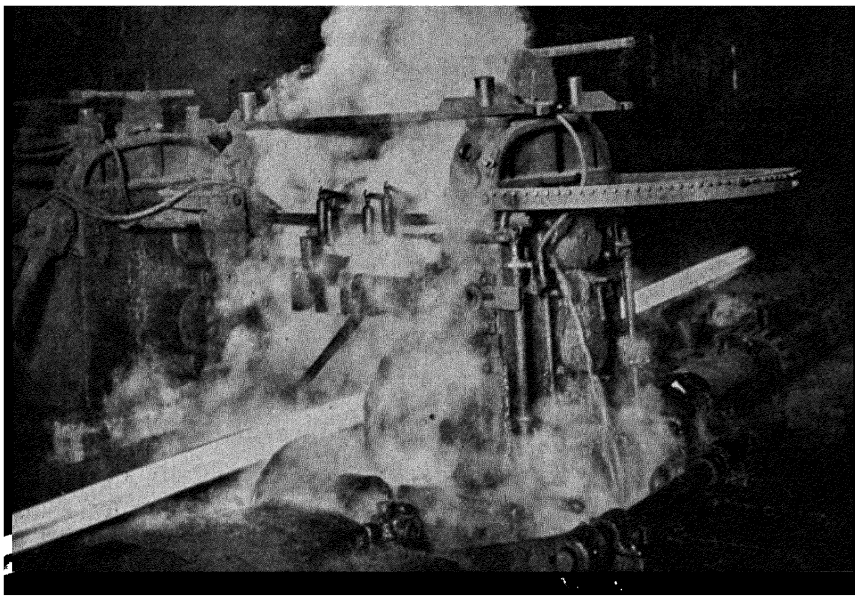
The War Department maintains lighthouses, marks channels, dredges harbors, and. as far as possible, makes the rivers navigable. This Department also collects and publishes information having to do with the trade between one part of the country and another and between the United States and foreign countries.

Guides to Study

1. Which are the leading highways for ocean commerce? Account for the importance of each.
2. Why is the commerce of the South Atlantic less important than that of the North Atlantic?
3. Why is the commerce of the Pacific routes of less value than that of the Atlantic?
4. What products are characteristic of each of the great lanes of trade?
5. What countries find the Panama Canal of little use? The Suez Canal?
6. In making certain voyages a captain might be in doubt as to whether to take the Panama route or the Suez route. Explain.
7. Why do the grain clippers sail around the world?
8. What are the leading imports of the United States? The leading exports?

Research for Students

1. On an outline map of the world trace the great routes of trade. Number them in what you think is the order of importance.
2. Make a list of the chief products moving in each direction over each route. Try to explain the reason for the direction in which each product moves.
3. On a map of Central America trace the route of the Panama Canal. Trace the probable route of a canal across Nicaragua. Which do you think is the better route? Why?



Courtesy of Carnegie-Illinois Steel Corporation

Rolling a rail in a steel plant at Braddock, Pennsylvania

1. PROBLEMS OF FACTORY AND FARM

Growth brings problems. The growth of our country has been very rapid. A hundred years ago the population was less than 20,000,000 people living chiefly along the Atlantic seaboard. We now have a population of more than 130,000,000 scattered over the country from coast to coast and from the Canadian border to Mexico. In the earlier period there were few mills and factories, and these were very small. The ever-increasing population has had to be provided with food, clothing, and shelter. The growing railroad systems have required many rails, cars, and locomotives; large mills and factories have called for large buildings and a great deal of machinery. With new inventions came new industries, such as the automobile industry, the radio, and the airplane. The great demand

for goods of all kinds has led to the speeding up of production. Businesses of all kinds have become bigger and bigger.

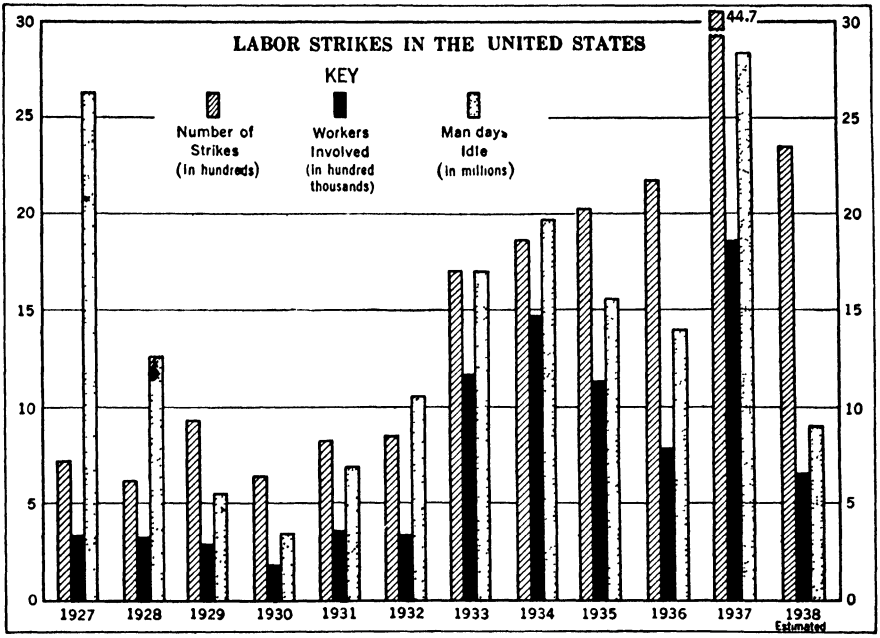
A rapidly growing boy often outgrows his clothes. A rapidly growing country outgrows old ways of doing things. The farmer finds that the methods used by his father do not bring him success. Capital and labor find that old ways of dealing with each other are no longer satisfactory. Our people fear that the great resources of the country are being used up too rapidly and that more thought should be given to future supplies. These are only a few of the many troublesome problems that the people of today have to think about.

Problems of Labor and Capital

Strikes and lockouts. When industry was young, the manufacturer had only a few helpers or employees. Often they were his neighbors and even members of his own family. When questions of wages or of the length of the working day came up, the owner could discuss the problems with each employee face to face. Now business organizations have become very much larger and are owned not by one man but by a company or corporation with many shareholders. The employees of a single corporation have increased to thousands of men and women or even hundreds of thousands. Today, when questions of wages or hours arise, employer and employee can no longer meet face to face. Some way has to be found for a few workers chosen by the others to confer with the officers of the company. These two committees meeting together try to settle the problems in a way satisfactory to the company and to the workers.

When employers and employees cannot agree upon some plan, then strikes or lockouts are likely to occur. The refusal of men to go to the factories to work is called a *strike.* The refusal of a company to permit the employees to work is called a *lockout.* In either case the mill or factory is usually closed, and there are sometimes riots, resulting in damage to property and even in loss of life.

The closing of a plant brings losses to many people. It causes loss of income to the owners and loss of wages to the workers. The effects are felt by many others besides owners and workers. Goods made by the factory may be sorely needed by the public. If employees of a railroad system do not work, people cannot travel and food and other supplies are not transported. There may arise actual



danger that the food supply will be cut off. The public feels the effects of a strike or lockout in still other ways. Unemployed workers must often be supplied with food and other necessities, and these must be paid for by the public. Often greater police protection is needed, and this causes greater expense to the people as a whole.

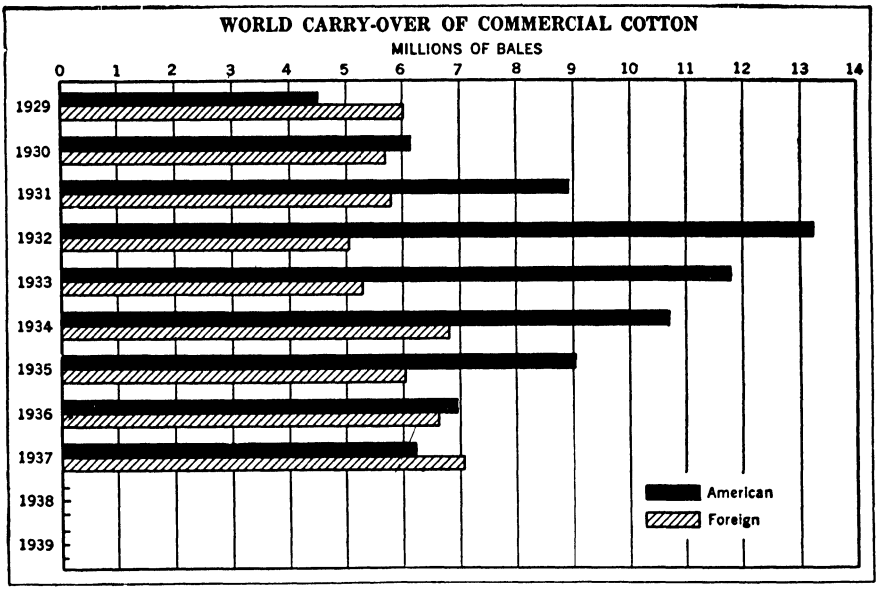
Since strikes and lockouts result in loss to the corporation, to the employees, and to the public at large, it is to the advantage of all to have all differences settled by conferences of owners and workers. Federal and State Governments use every means to have all differences between capital and labor settled peaceably. The Federal Government has a Department of Labor with a Secretary who is a member of the President's Cabinet.

Problems developing out of the relations of capital and labor are certain to arise from time to time. Upon their prompt and fair settlement depend the peace and prosperity of the country. National resources, machines, great leaders, and skilled workers do not of themselves bring a people comfort and happiness. The people must work together in harmony, and disturbing questions arising among different groups must be approached and settled in a spirit of fairness and friendliness.

Unemployment. The increase in the number and size of mills and factories affects employees in still another way. Industrial plants have grown as new inventions have been made and new machines built. An invention is valuable because more and usually better work can be done with it than can be done by hand. Not so many workers are needed as before. Some of the workers must if possible find something else to do. Some cannot find work and fear still further unemployment because of the new machines. This often leads to rioting and the destruction of property. Hand spinners and weavers in England smashed the new textile machines of Arkwright and Hargreaves. The electric light was opposed by gas companies and by men who went about the streets each evening lighting gas lamps. Men who worked in the sugar fields of Cuba threatened to prevent the use of the new machines for cutting sugar cane (*l. 104*).

Unemployed people cannot buy goods. Although employees are thrown out of work, more and cheaper goods can be made by machines than by handwork. But those who lose their jobs on account of machines cannot buy goods no matter how cheap they are. Then if goods cannot be sold, there is less work for men and women operating machines. For example, if a machine is used for cutting sugar cane which will do the work of one hundred men, then men will be thrown out of work. Those unemployed men cannot buy shoes or clothing. The factories making shoes and clothing cannot sell so many goods; so they lay off some of their help. So the unemployment of one group leads to the unemployment of others. The problem is to find work for all so that all may become buyers. The greater the number of buyers, the greater the demand for goods. As more goods are needed, more workers are needed to help make goods. Business will prosper most when everyone is employed and with his wages can buy goods made by other workers. Here is one of our great problems—to keep every worker employed so that his demand for goods will keep all industries busy.

The government helps. When strikes and lockouts occur governments—city, State, and National—are concerned. The same is true of unemployment. Government must give aid to the unemployed. It endeavors to do much more than that. It uses every effort to find or make work. New roads are built, old roads are repaired, new buildings are constructed, and many other kinds of work are either supported by the government or are encouraged by

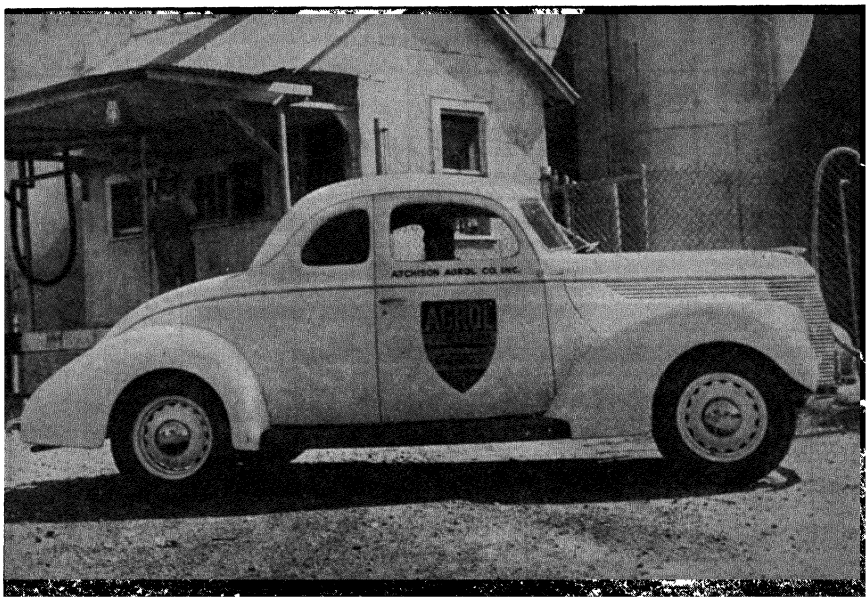


the government. Such additional work helps unemployment in two ways: it gives to workers wages with which to buy necessities, and it creates a greater demand for goods of all kinds.

Farm Problems

The farmer needs help. Our country's problems are not limited to those of the mills and factories. The farmer has problems in which all the people of the country are interested. The farmer has to run many risks. There is danger from frosts, severe storms, droughts, and sometimes floods. Insects must be fought and plant diseases combated. Prices may be low and there may be little demand for his crops.

Surplus crops. There are several reasons for surplus crops. Agricultural lands have been increased by irrigation and dry farming. New farm machinery and the use of tractors have led to the cultivation of larger areas. Even with fewer workers on the farms there has been an increase in farm production with the use of machines and gasoline engines. Then the World War stimulated farm output. Food was needed by our own soldiers and by the Allies. Semiarid lands best suited to grazing which never should have been used were plowed up for wheat land. With the close of the war markets declined and the farmer was left with surplus crops on his



Courtesy of the Atchison Agrol Co., Inc.

Gasoline and alcohol are blended here for fuel for internal-combustion engines used as power plants for farms or in running automobiles and trucks. Blended fuel is in common use in many foreign lands.

hands. In recent years too there have been surplus crops and very low prices.

Farm products in industries. One way to meet the troublesome question of farm surplus is to find new uses for farm products and by-products. There is always a demand for raw materials for industries. Some of these demands have been met for many years. The flax plant supplies oil for paints, linoleums, and other uses. Cottonseed oil, a by-product of the cotton plantations, provides raw material for making margarine. In addition to its use as food in the form of grain for man and animals corn yields oil and starch for use in cooking and corn sugar for making candy and as a substitute for cane sugar. The fiber of the cornstalk is used for making fiberboard. After the juice is removed from sugar cane, there is left a fiber which was long used as fuel. It is now pressed into wallboard and for this purpose is used in large quantities. The soybean furnishes many useful products. Casein from milk produces a woollike textile. The humble peanut can be made to provide a large number of products. Cellulose products and plastics are in their infancy.

Industry offers great possibilities in providing markets for the

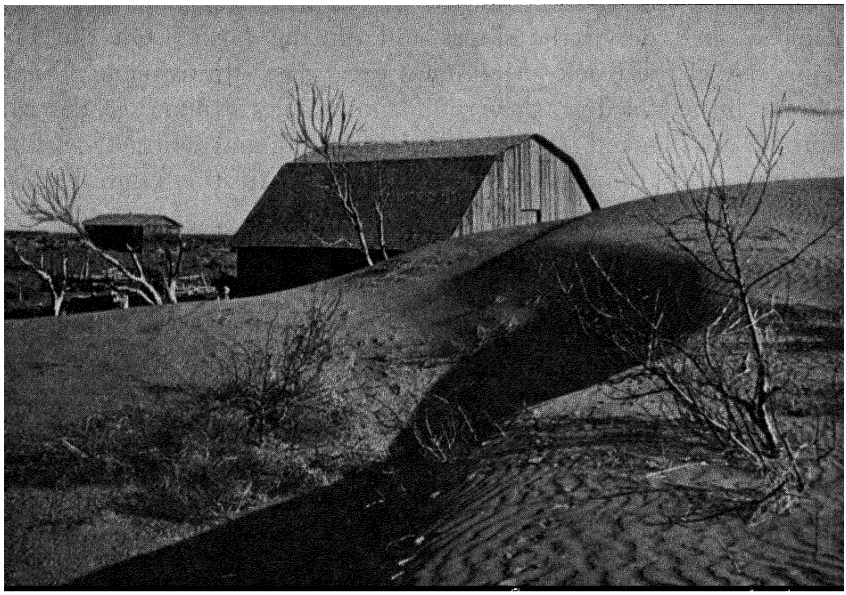


Photo by Rothstein from the Farm Security Administration

The winds of the dust bowl have piled up large drifts of soil against this barn in one of our Midwestern states.

farm products of the future. As forests are used up, we must look to farm products more and more for raw materials for paper and rayon. From corn and other crops alcohol can be obtained as a substitute for or to blend with gasoline as a motor fuel. Agrol, a fluid for blending with gasoline, is already being extensively produced at Atchison, Kansas, for use in automobiles, trucks, and tractors. The chemist will find many other uses for the products of the farm and thus help the farmer to solve the problem of surplus crops.

Because of low prices and lack of markets many farmers have not been able to make their farms pay. Some have been unable to pay the interest on borrowed money and have, therefore, lost their farms; that is, the farm has been taken by the person or bank to whom the money was owed. As we have already learned, all other industries depend upon agriculture. When the farmer is not prosperous, there is loss of business for industries, railroads, banks, and merchants.

Wind erosion. Low prices and poor markets are not the farmers only problems. He must prevent wind and water from carrying off the soil upon which the value of his farm depends. Wherever the

wind blows, soil is being blown away; wherever rain falls, soil is being washed down the slopes and off the farm. On the High Plains east of the Rocky Mountains great dust storms occur. Fences become buried in dust, drivers of automobiles cannot see the road, railroads are blocked so that trains are halted, and worst of all farms are practically ruined. The southern part of the High Plains is known as the *dust bowl.*

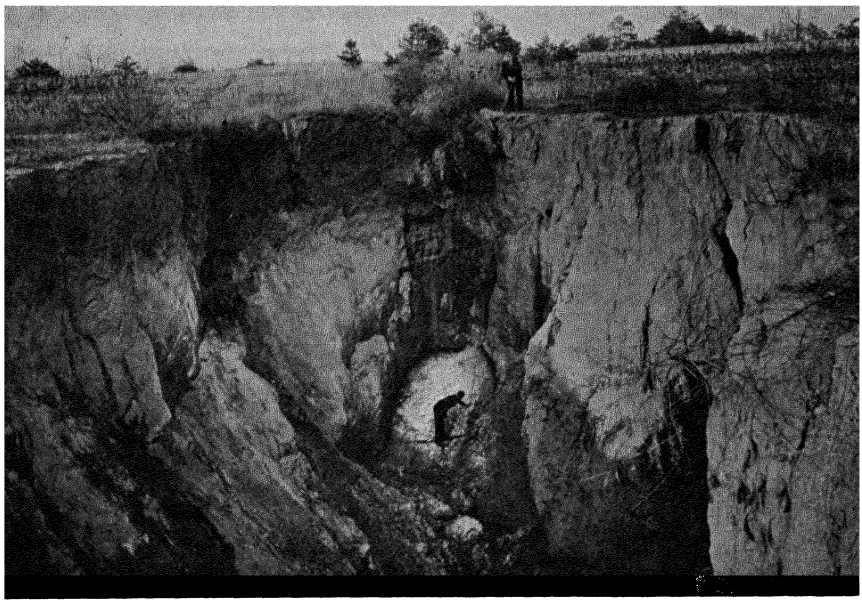
In the spring of 1934 housewives all along the Atlantic seaboard noticed an unusual film of dust on their furniture. Out of doors the air was full of floating dust. The sky was so hazy that the light of the sun was dimmed as by a great forest fire. Radio and newspapers explained the mystery. Violent dust storms in the dust bowl were lifting the soil and actually carrying it several thousand miles to the eastern coast. The farms of the dust bowl were being blown away.

This region is subject to dust storms for several reasons: first, the rainfall is very light; second, the region has been overgrazed, that is, the cattle have removed the grasses until there is no protection from the wind; and, third, much land has been plowed which should have been left covered with grass. These are the areas which were abandoned by wheatgrowers when the demand for wheat fell off.

Loss of soil by wind erosion must be prevented wherever possible. Land in semiarid regions best adapted to grazing should not be plowed. Plowing removes the thin cover of grass whose roots hold the soil in place. Where the protecting coat has been removed, grasses or other crops with traveling roots should be planted to hold the soil in place. Unless wind erosion is checked, hundreds of square miles of farm and grazing land will be made useless.

Water erosion. Like wind erosion rain erosion is going on everywhere. Fifty years ago in one of our southern states water running from the eaves of a barn made a little gully by washing away the soil at the corner of the barn. Later rainstorms made the gully deeper and wider. The barn was undermined and toppled over into the gully. After a time the house too fell in and then the schoolhouse. Other gullies from the hillside entered the first gullies. Some of them were more than a hundred feet deep. The farm was ruined, and the farmer and his family had to find a new home.

Farm lands destroyed in this way can never be restored. Of course rain erosion does not go on so rapidly in many parts of the country, but it is taking place everywhere that rain falls. Such erosion should be checked as much as possible. This can be done



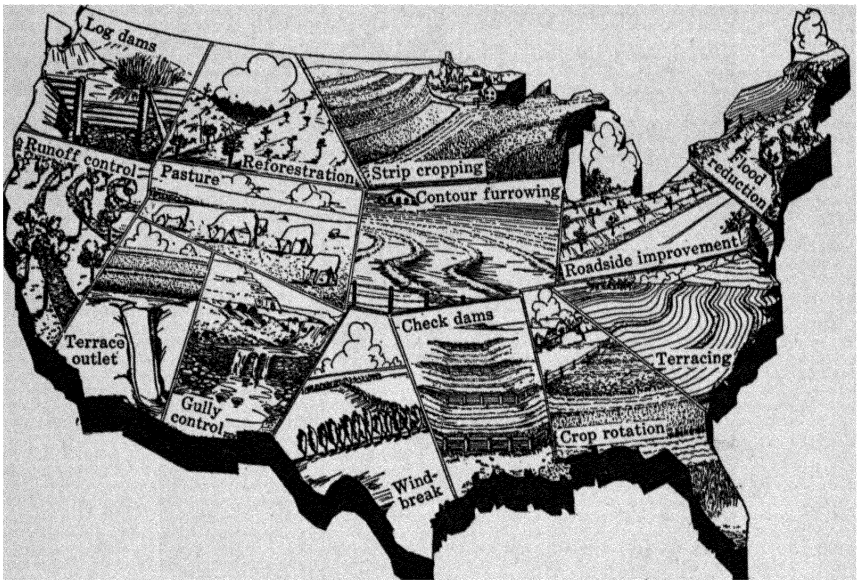
Courtesy of Caterpillar Tractor Co.

The destructive effect of water erosion is shown by this gully 38 feet deep at the point measured which was started by an unprotected terrace outlet. It is estimated that an average of 80 tons of soil per week has been washed away for a period of eight years.

by plowing the land so that furrows will hinder the flow of water. Gullies can be dammed and the hillside terraced.

The Federal Government and the farmer. Because the welfare of all depends upon the farmer, the Federal Government tries to help the farmer in every possible way. It has established banks from which the farmowner can borrow money at low rates of interest. It has bought up surplus crops so that the farmer would not be obliged to sell at ruinous prices. It has tried to advise the farmer and at times compel him to limit the area planted so that there would not be a great surplus that would reduce prices. The Federal Government is keenly interested in helping the farmer conserve his soil by checking rain erosion. We look to the soil for so many of the necessities of life that our government cannot allow it to be wasted.

These are only a few of the ways in which the Federal Government tries to help the farmer. The farm problem is the country's problem. Everyone is interested because upon the welfare of the farmer the welfare of the country rests.



Water erosion may be prevented in the various ways indicated in this map prepared by the U. S. Department of Agriculture.

To meet the difficulties arising in industry, on the farm, and in other fields, the influence of the Federal Government is coming to be felt more and more. Opinion is divided as to the wisdom of further government control. Some think the manufacturer and the farmer should be free to conduct their work in their own way. Others believe that best results can be secured by the government which is interested in the welfare of all and which is better able to view the problems from a country-wide and even world-wide point of view.

Rivers—Servants or Masters

The need of control. From earliest times rivers have been one of man's greatest helpers. They have served as highways; they have watered fields and have given him power for mills and factories. On the other hand as rushing torrents they have overflowed farm lands, destroyed crops, animals, and homes, and taken many human lives. One of our great problems is to keep our rivers within bounds, compel them to do our work, and prevent them from doing harm. In the past hydroelectric plants as a rule have been con-

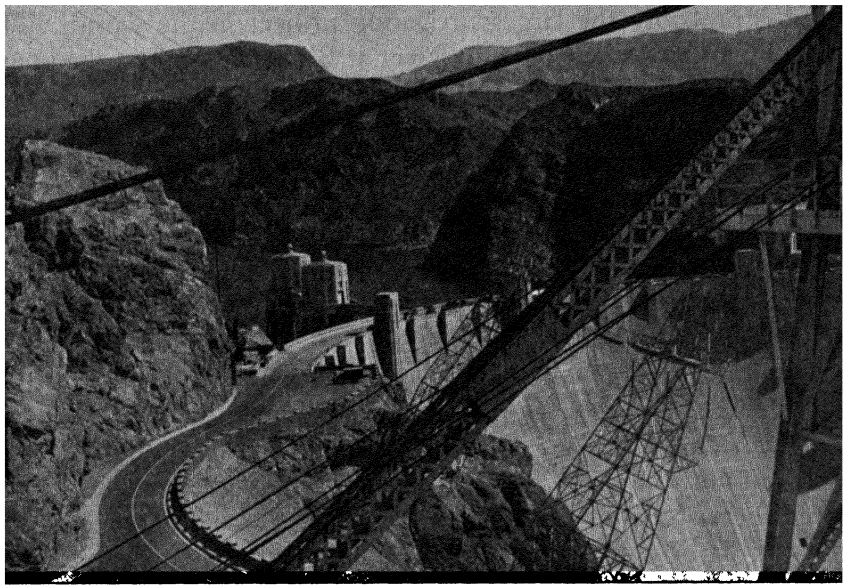


Photo by James Sawders

A view of Boulder Dam from the Nevada side. Water from the reservoir will make the desert blossom as the rose.

structed by private capital. In recent years the Federal Government has entered the field and has undertaken the building of some of the world's largest power plants. We can study only a few of the recent government projects for harnessing our rivers.

Grand Coulee Dam. A giant undertaking of the Bureau of Reclamation is the construction of the Grand Coulee Dam across the Columbia River about ninety miles from Spokane, Washington. This power plant will be the largest source of electric energy in the world and will furnish more than six times as many kilowatts as the great Dnieper plant of Russia. The reservoir formed by the dam is the largest artificial lake in the world and raises the level of the river even at the Canadian border. The electricity generated is used in part to pump water 280 feet from the river to an old canyon dug by the Columbia River thousands of years ago when the river was turned from its course by a glacier. The water stored in the old canyon will be used for irrigation. Only one tenth of the great volume of the river will be used for irrigation purposes; another tenth gives the power to raise the water to the upper lake. The land to be irrigated is about equal to the area of the state of Connecticut.

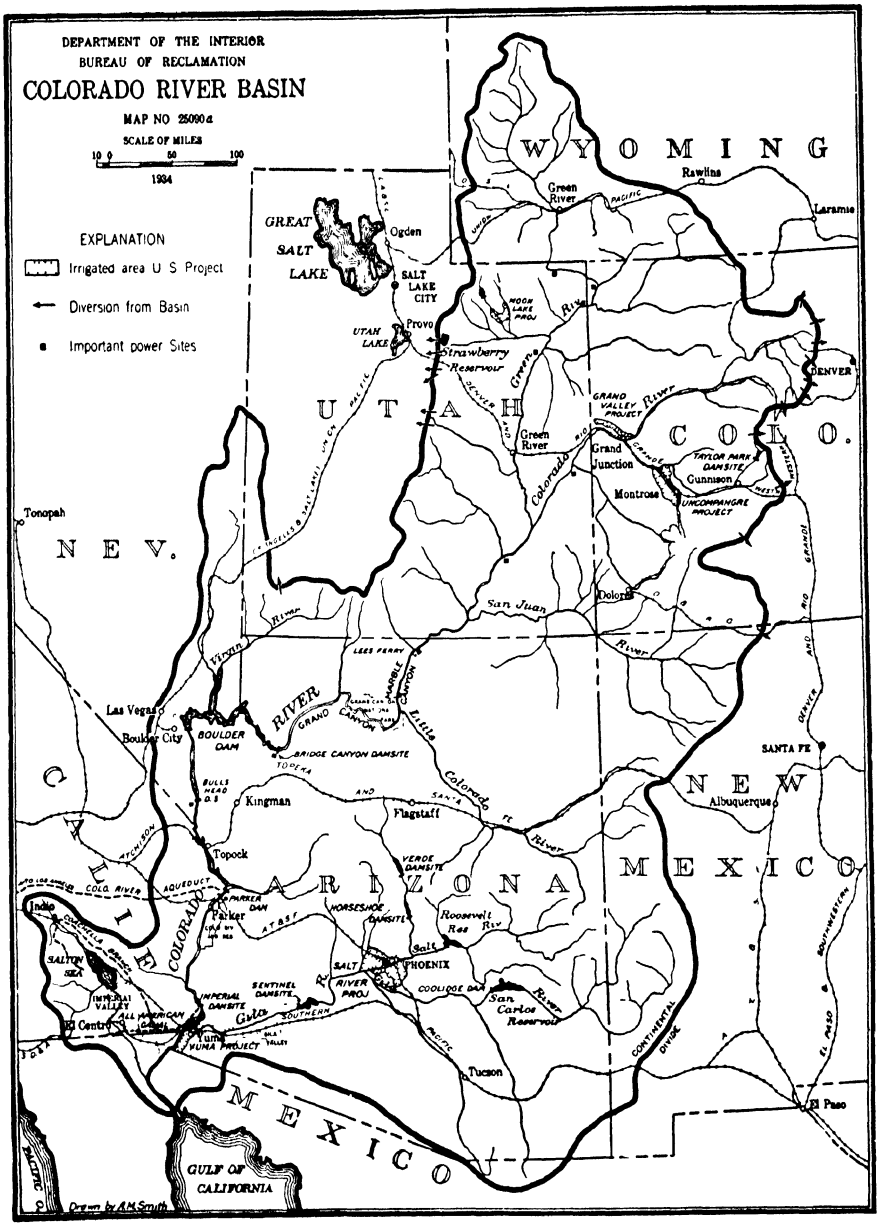
Boulder Dam project. The Boulder Dam project recently completed is probably the largest irrigation project in the world. The dam is built across the Colorado River at Black Canyon on the boundary line of Arizona and Nevada. The Colorado is America's most dangerous stream. Along many miles of its course it flows through canyons in places a mile in depth. The course of the river can be followed along the canyon floor only at great risk. Men have lost their lives in attempts to explore the path of the river as it rushes madly between towering walls of rock. Below the canyons in times of flood the river breaks through its banks and floods farm lands for miles around.

Taming the river. Boulder Dam is an attempt to bring the river under control, to check its mad rush in time of flood, and to make use of its tremendous power which for centuries has gone to waste. Floods cannot now pass the 727-foot dam, the highest in the world. Instead the water is held back to form a lake 115 miles long. Power houses at the base of the dam generate electricity to light streets and homes and turn factory wheels in cities 250 miles away. The lake supplies vast quantities of water to irrigate lands in several states, the most important areas lying in and near the Imperial Valley of southern California. A group of thirteen cities have united to construct an aqueduct 250 miles long from Parker Dam 150 miles below Boulder Dam to Los Angeles and neighboring cities.

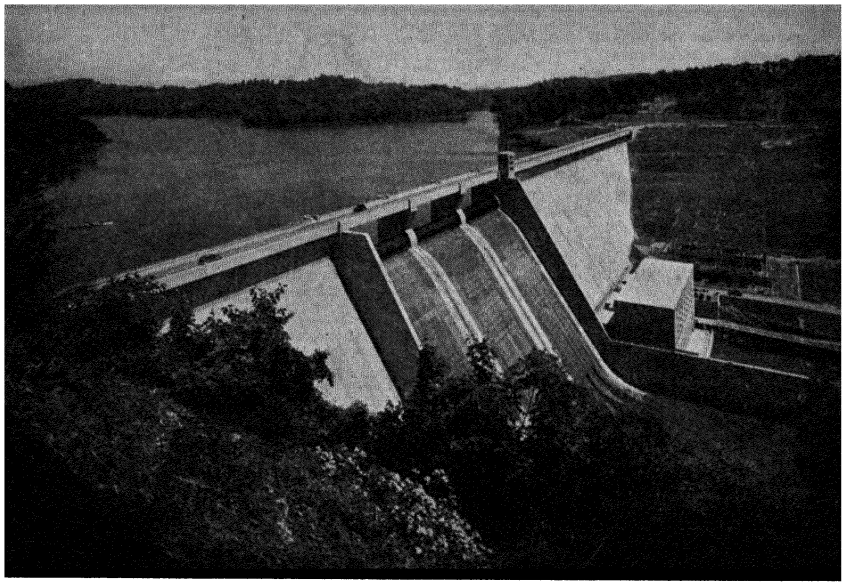
Irrigation water for the Imperial Valley will pass through an All-American Canal from Imperial Dam near the Mexican border to the Imperial Valley. In the past water for the Valley followed a canal running for many miles through Mexican territory before reaching the American farm land. A branch canal will extend to the Coachella Valley lying to the north of the Imperial Valley.

The great lake above Boulder Dam is known as Lake Mead. This calm lake presents quite a different picture from the tumbling waters as they rushed through the canyon before the dam was built. The lake has already become a great recreational center. Nearly half a million people come here each year to view the wonderful dam and the great lake. The lake has been stocked with fish and this offers an additional attraction to those who fish for sport. Truly the Colorado River has been tamed.

Development of the Tennessee Valley. No project either public or private has aroused the interest of all the people of the country as has that begun in the Tennessee Valley in 1933.



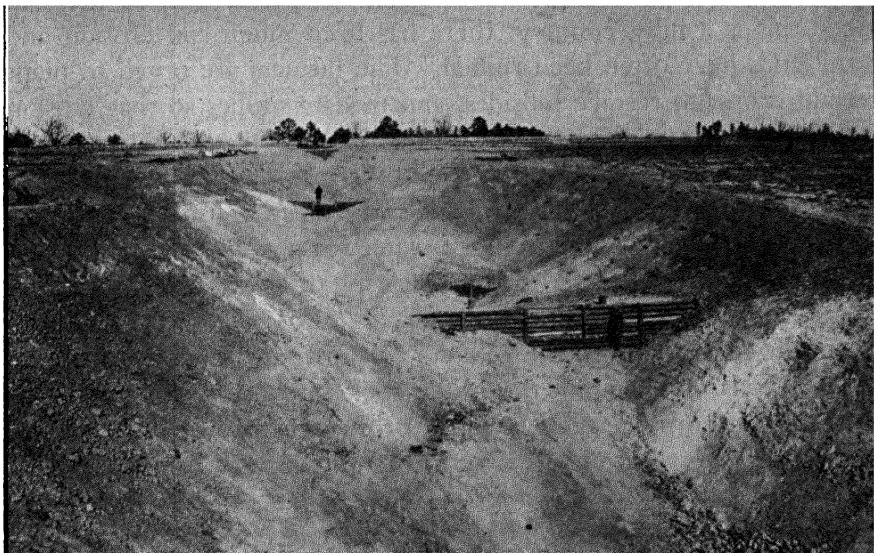
Study this map with Plate 3 which will show you the mountains, valleys, and other physical features of this section. Trace the course of the Colorado River and locate the various dams mentioned on page 346.



Courtesy of the Tennessee Valley Authority

Norris Dam on the Clinch River in northeastern Tennessee is a part of the flood-control project carried on by the Tennessee Valley Authority. By closing the spillway gates the reservoir level can be raised fourteen feet. In the January, 1937, flood the gates were closed to prevent the water from reaching the swollen Ohio and Mississippi Rivers (*M. 206*).

During the World War the United States needed large quantities of nitrates to make explosives. Like all other countries it had depended on Chile for a large part of this supply. To make itself less dependent, the Government built a large electric-power plant at Muscle Shoals on the Tennessee River in Alabama. Nitrogen compounds were to be made from the nitrogen of the air by the use of electric power. Before the plant was finished, the World War came to an end. The plant lay idle for years. Congress could not decide whether to sell it or to make use of it under government control. To settle this problem and to further other plans of the Federal Government, the Tennessee Valley Authority, commonly referred to as the TVA, was established. Let us see what the TVA hopes to accomplish in this great area drained by the Tennessee River, an area equal to that of the state of Ohio. It intends to provide the region with abundant electric power at low rates. Power will be generated at several dams: the Muscle Shoals Dam, now called the



Courtesy of Caterpillar Tractor Co.

Log dams have been built to stop soil erosion and honeysuckle and trees have been planted along the smooth banks to hold the soil in place. This is the badly eroded gully shown on page 343, now being reclaimed.

Wilson Dam, the Norris Dam on Clinch River, a branch of the Tennessee, and the Wheeler Dam a little upstream from the Wilson Dam, all together providing about 370,000 horsepower (*I. 192, 205*).

This abundant and cheap power is for use in the sparsely settled countryside as well as in the cities and towns of the region. The rates are so low that the farmer can use the power to saw wood, churn butter, pump water, heat the incubator for hatching eggs, and do many other farm chores. In the home electricity furnishes light, heats the flatiron, runs the washing machine, the vacuum cleaner, the dishwasher, and the refrigerator just as it has long done in the city home. All these devices help to make farm life easier both out of doors and in the house.

The dams already mentioned and several others help to raise the level of the water in the river so that the Tennessee is made navigable nearly its entire length. The dams also check the flow of water and thus help to prevent floods in the valley in time of heavy rainfall. Other dams will be built as they are needed to improve transportation and to prevent floods.

Another purpose of the TVA is to prevent erosion of the soil. Since this is a hilly country, there has been much soil erosion and farm lands have often been ruined. The farmers are urged to plant certain crops, to terrace hillsides, and to dam gullies so that erosion will be lessened as much as possible. Soil erosion not only removes the very best soil, but the silt carried by streams and rivers fills river channels and storage basins. In this way transportation is hindered, and the basins cannot hold so much water for power. (*I. 344*)

Another aim of the TVA is to make use of electric power to provide fertilizer for the farmers (*I. 245*). Phosphate rock, a basis for fertilizer, is found in the valley. Chemists are trying to find the best methods of changing the crude rock into useful fertilizer. In brief the Authority intends to bring prosperity to the people of the Tennessee Valley through a wise use of the natural resources.

Guides to Study

1. What are some of the troublesome problems which our country has to solve?
2. What are some of the questions arising between capital and labor?
3. What are the best ways of settling disputes between capital and labor?
4. What are the disastrous effects of strikes and lockouts?
5. What are the chief causes of unemployment?
6. How does a country gain by having as many people as possible employed?
7. What are the causes of surplus crops?
8. What can be done to help the farmer sell all his farm products and get a good price for them?
9. How can wind erosion be prevented?
10. How do methods of cultivation help to prevent water erosion?
11. Why should all the people of the country be interested in saving our soil wherever it may be?
12. How can the Federal Government help the farmer?

Research for Students

1. Make a list of the industries in which labor troubles are likely to occur.
2. Appoint a committee representing employees to make a list of demands to present to the employers. Appoint a committee to represent officials of the company. Have the demands discussed before the class by the two groups.

3. Learn the ways in which State and Federal Governments try to settle labor troubles.

4. Show that all the people of a city and perhaps all the people of a country suffer when large numbers of employees are out of work.

5. Arrange an exhibit of farm products used as raw materials in manufacturing. How does such use help to settle the farm problem?

6. Write to the Bureau of Reclamation, Washington, D. C., for information on erosion and irrigation and power projects.

7. Locate on a map of the United States Boulder Dam, the Tennessee Valley, Muscle Shoals, and the Grand Coulee Dam.

8. On a map of the Boulder Dam Project locate the dams, the power lines, the All-American Canal and the aqueduct.

2. CONSERVATION—AN EYE TO THE FUTURE

Paying our debts. We owe much to past generations.

> "All the good the past has had
> Remains to make our own time glad."

We cannot repay past generations, but we can do much to make life better for the generations to come. We would not care to be like the homeowner whose house was surrounded by beautiful shade trees which his grandfather had planted. A neighbor said to him, "You are very fortunate in having so many fine trees. There is still room, why don't you plant some?" The homeowner who was no longer a young man replied, "What good would they ever do me?" So the conservation of our resources may not add to our own welfare, yet it means much to the generations that follow us.

Our forests are being cut much faster than trees are growing. Our farm lands are all in use; there are no new areas to be cultivated. Oil and coal have been used with little regard to future needs. Upon our resources and upon the well-being of our citizens depend our great industries and the comforts of our homes. Besides caring for our soil resources we should give very careful attention to our forests and mineral resources, especially petroleum, coal, and iron.

Conservation of Forests—an Absolute Necessity

Lumber for the future. The people of the United States are destroying their forests four times as fast as they are being replaced

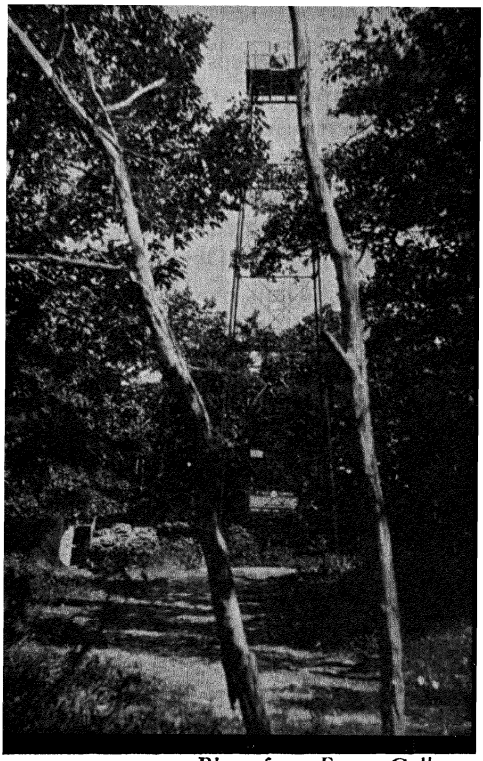


Photo from Ewing Galloway

A 50-foot tower that provides a perch for the lookout in Pennsylvania's state forests. From his lofty seat he can detect a forest fire several miles away and give the alarm.

by growth. Where is our lumber supply of the future to come from? There are at least two ways in which our future supply of lumber can be assured. One is to stop the tremendous waste of forests and lumber. The other is to keep the forest lands working by growing new trees for future use.

Protection from forest fires. Let us first see how waste can be stopped. The greatest enemy of the forest is the forest fire. Each year forest fires sweep over areas as large as the states of New Hampshire and Vermont. This great waste can be almost wholly prevented if sufficient attention is given to safeguarding the forests from fires. Many fires are due to sparks from locomotives and lumber mills and to the carelessness of hunters, trappers, picnickers, and brush burners. Most of these can be prevented if proper care is exercised. The Federal and State Governments attempt to prevent fires and to check them as soon as possible when they have started. Watchtowers are scattered over forest areas, and, as soon as a fire is detected, warnings are sent to stations prepared to fight the fires with men and equipment. In dry seasons hunters and pleasure seekers are forbidden to enter the forests. The burning of forest waste should be done after a heavy rain or a fall of snow when the danger of a conflagration is much less.

Avoidance of waste. Another way of conserving our forests is the prevention of waste in lumbering and in preparing the lumber for use. Formerly much of the waste material was burned. Now



Photo from Ewing Galloway

A squad of the CCC (Civilian Conservation Corps) men engaged in reforestation of a burnt-over forest area in the state of Washington. Only by growing trees as fast as we destroy them can we preserve this great natural resource for future generations.

some is used for fuel and some in making small articles, such as laths, handles for tools, and toys. Waste pieces of wood are ground up and made into composition boards for partitions. Other wood not used for lumber is made into charcoal or distilled for wood alcohol. The amount of sawdust has been lessened by the use of thinner saws. Mixed with other substances, sawdust is used to some extent as feed for cattle.

Treatment with preservatives. More attention than ever before is being given to the treatment of lumber with chemicals to prevent decay and destruction by insects. The wood treated is chiefly that used for railroad ties, bridges, piling for wharves, foundations for buildings, and telephone and telegraph poles. Such treatment with creosote or other chemicals adds years to the lasting quality of the wood.

Care of forest lands. The second method of providing for the future is to keep forest lands busy growing trees for the future. Formerly lumber companies stripped the land of its trees and then

abandoned it. More and more lumber companies, the owners of paper mills, and operators of other wood-using industries are providing for their future needs by caring for cutover lands and by planting trees, or *reforestation.* Many of the states have foresters whose duty it is to have general oversight of the forests within the state and to encourage the protection and conservation of forests in every way possible. The trees are protected from insects and diseases which do much damage to them. More than thirty states now have forest nurseries that distribute young trees to citizens for planting.

Substitutes for wood. As the price of wood and lumber increases, search is constantly made to find substitutes. Buildings have long been constructed of brick and stone. In recent years concrete, artificial stone, and steel enter largely into the construction of our larger buildings. Even laths may be of metal, and shingles may contain large proportions of asbestos or asphalt, or they may be of slate, metal, or tile. Wire in various forms is widely used in place of wood for fences. You have already seen in your study of containers that paper, cardboard, and cloth have to a considerable extent taken the place of wood.

National forests. The main purpose of National forests is to point the way in providing for our future needs of lumber. They were first established in 1901. The President of the United States was given authority to place under the control of the National Government portions of the public land for growing timber. From time to time this has been done and our National forests now cover more than one hundred and sixty million acres, an area nearly as large as Texas. A National forest does not mean a forest area on which trees are not to be cut. When a part of a National forest is ready for cutting, the standing timber is sold to the highest bidder. The lumbering is done under the supervision of government foresters. Each forest is so managed that cutover lands are constantly providing a new growth of trees. Every effort is made to prevent fires. Every National forest is an object lesson in the scientific care of trees and land.

Saving Our Minerals

A robber industry. When forests are destroyed by the lumberman or by fire, the trees may grow again if seedlings are planted or if the forest area is properly cared for. Unlike the forests minerals

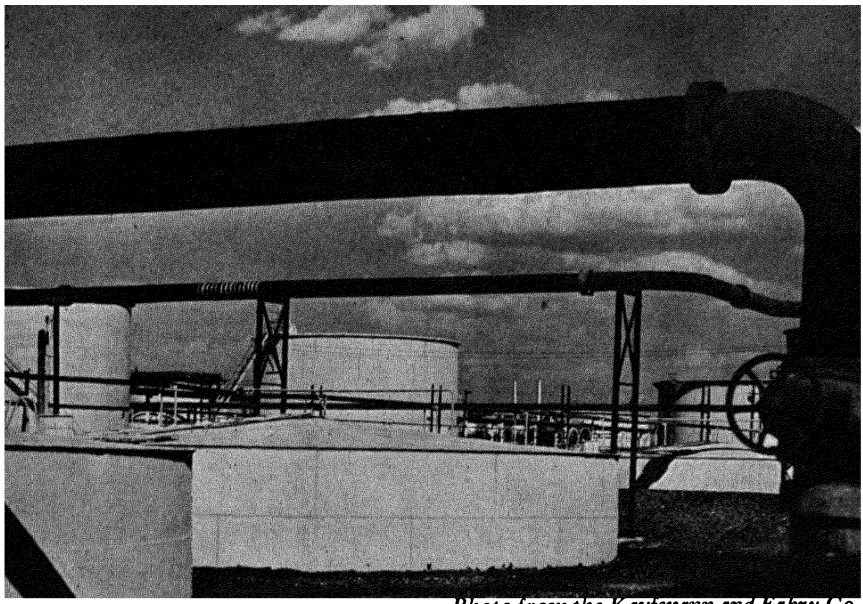


Photo from the Kaufmann and Fabry Co.

Part of a large oil-refining plant at Whiting, Indiana, showing a section of the refinery in the background

once used can never be replaced. Mining has been well called a *robber industry*. Man takes nature's savings of past ages from the earth and never returns them. Even though mineral deposits cannot be restored, much can be done to make our supplies last as long as possible.

Saving petroleum. No one knows how long the world's petroleum supplies will last. It is not easy to estimate the underground stores. All experts are agreed, however, that with the rapid increase in consumption it will not begin to last so long as coal. The length of time it will last is probably a matter of decades rather than centuries. What then can be done to save as much as possible of this supply for future use? A great deal of waste takes place in the oil fields. More oil is taken from the earth than is really needed. Each owner is eager to turn his oil into cash. Owners fear that, if they do not drain the oil from their own wells, it may flow into the wells of other owners near by.

When the market is glutted with oil and the price is reduced, wells which yield only small quantities are shut down and the oil remaining in the earth can never be used. By taking from the



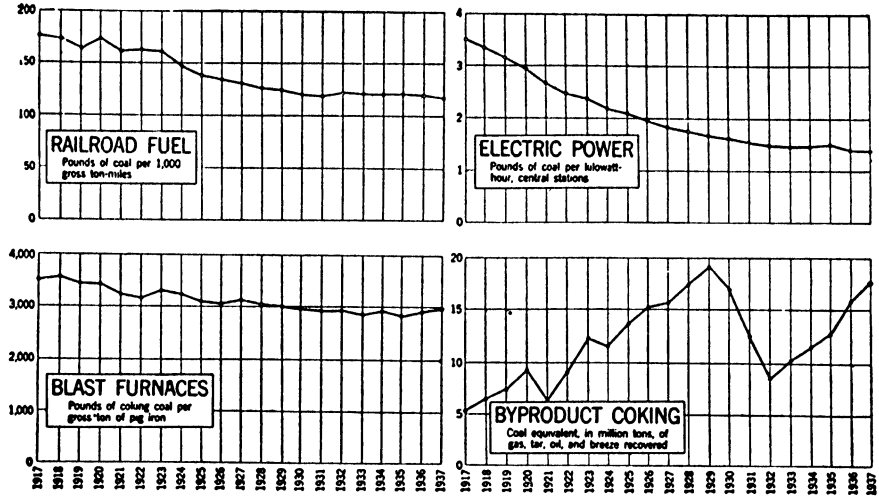
Courtesy of the Pittsburgh Coal Co.

One of the methods of conserving coal is to use wood mine props instead of the huge columns of coal that were once allowed to stand as a support for the roof of a horizontal shaft.

ground only what oil is needed for the present will help to meet future demands.

The oil supply of the future will be greater as experts learn better ways of finding deposits below the surface. In the early days of the industry the "hit or miss" method was used. A well was drilled and, if oil was found, the owner was lucky. Now geologists study regions with great care and give close attention to the kind of rock through which the drills pass. With the help of experts oil deposits are much more readily located. Oil is also saved if the owners of wells in a region agree to draw the oil slowly and maintain the pressure in all the wells. Oil will then flow for a much longer time. If this is not done, much oil remains in the earth and is lost.

Methods of refining also offer opportunities for saving our soil supplies. Gasoline is the one product of petroleum for which there is the greatest demand. Refiners are constantly seeking methods of obtaining more gasoline from a given amount of crude oil. One method known as the *cracking process* yields twice as much gasoline



From Minerals Yearbook of the U. S. Department of the Interior

Trends in fuel efficiency in the United States, 1917-1937

as the older methods. Refining methods of the future will no doubt enable refiners to obtain larger proportions of the more useful by-products from crude petroleum.

As oil wells become exhausted, we shall be obliged to look elsewhere for sources of liquid fuel. Rocks known as *oil shale* of which the United States and the rest of the world have large resources contain much oil. These rocks when subjected to varying degrees of heat yield the various products now derived from liquid petroleum. Such products, however, are not so cheap as when obtained directly from crude oil. German chemists have shown that gasoline can be obtained from coal and lignite, or brown coal. Very small quantities are obtained from coal in the United States but at present this is done only in an experimental way.

Conserving coal. No doubt our reserves of coal are much greater than those of oil. We do not as yet feel so much concern for our future supply of coal. Yet we must keep in mind the fact that the supply is limited and that there is no way of replacing it. Coal can be saved by more careful methods of mining. Props of wood are used in place of great pillars of coal once left to support the mine roof. Thin layers of coal have been left in the ground because it was not so profitable to work them as thicker layers. When more thought is given to future supplies, mining methods will be more efficient than they are today. Fortunately not so much coal is being used as in former years. Modern locomotives use less

coal than older types. Iron is smelted and steel made with less coal than formerly. The electricity which comes into our homes and lights our streets if generated with steam has required the use of less coal than that of twenty years ago. Furthermore, more and more of the electricity used for light and power is being generated by water power. This is a great saving of coal. Water power is not consumed; the supply is never exhausted. One of the best ways of saving coal is to harness as many rivers as possible.

Iron for the future. We cannot live in an iron age without using vast quantities of iron. This metal differs from coal and oil because it can be used more than once. Iron once used when broken up to be remelted is known as *junk*. Old bridges, locomotives, steel ships, automobiles, and many other iron products yield large quantities of iron to be used again. The junkman by gathering up iron waste helps to make our supply of iron last longer. Besides the thousands of tons of old iron used in our country in the manufacture of steel, we export scrap iron by the shipload to Italy, Japan, and other countries whose iron deposits do not provide enough for their needs (*I. 198*).

Not all iron can be saved for repeated use. Rust, the great enemy of iron, is ever at work. For that reason iron and steel are preserved with coats of paint or thin layers of zinc giving what is known as *galvanized iron* (p. 236). Stainless or rustless steel is made by combining with the iron small quantities of chromium and other metals. The prevention of rust seems to be the best means of conserving our supplies of iron and steel.

Saving Other Resources

Wild life. In addition to petroleum, coal, and iron there are many other resources which must be used with great care. There was once a plentiful supply of lobster along our northeastern coasts. Because the numbers have been greatly reduced, it is necessary to import large numbers from Canada. Alaskan seals were in danger of extinction until laws were passed protecting them. Fish hatcheries are established beside lakes and along the shore so that the supply of fish for food and sport will be maintained. Wild animals, such as deer, moose, grouse, and many others, are protected by closed seasons when they cannot be hunted. In some states deer may be hunted for only one month of the year, or the closed season may last several years. These are only a few of the many valuable re-



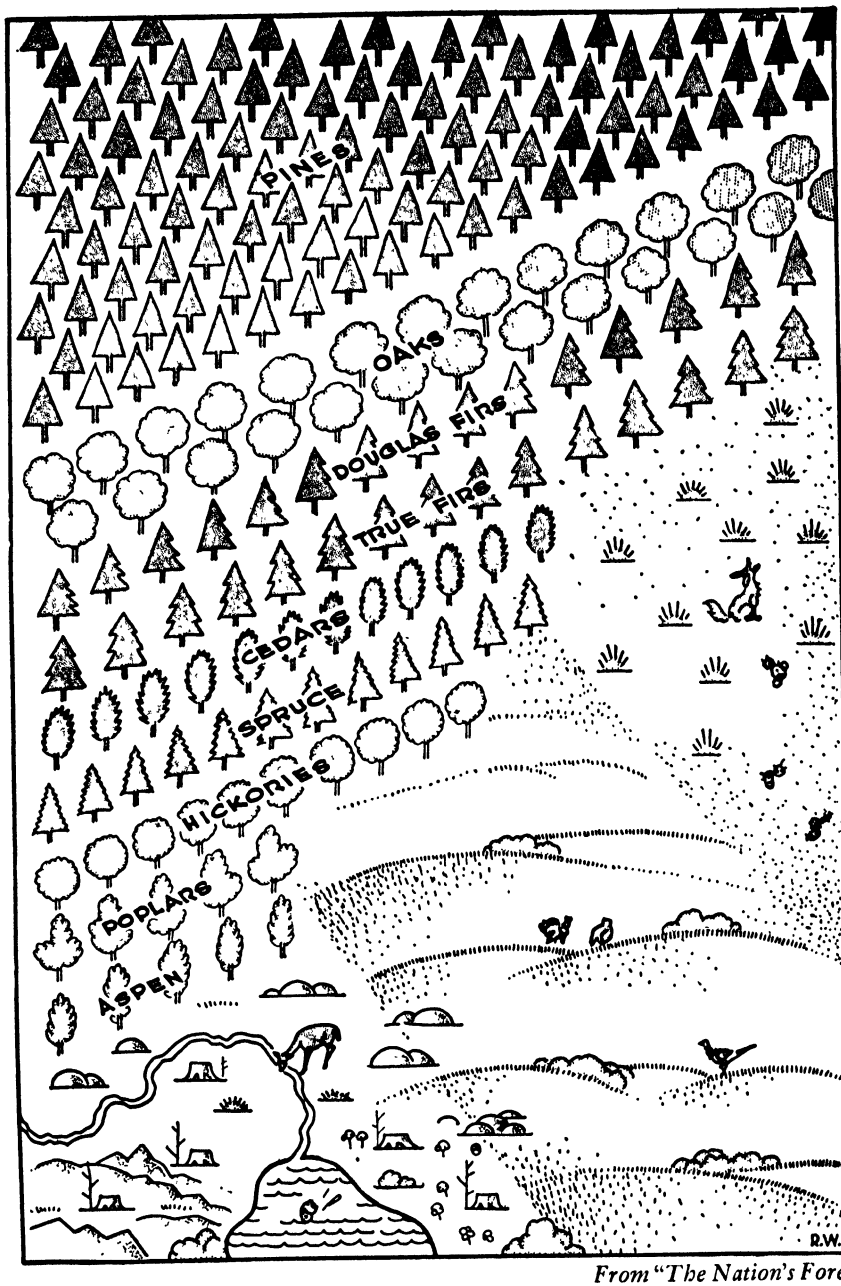
Photo by James Sawders

Preserving the wild life of the country in our national parks and forests and in game preserves and refuges is a debt we owe to our descendants.

sources which must be conserved for our own use and for the future as well.

The conservation of health. A country's greatest resource is its people. The health and education of citizens is of far more importance than lands and minerals. Ill-health brings suffering, loss of employment, and expense. In case of a severe epidemic a whole region may be paralyzed. In 1348 a disease known as the *Black Death* swept over all Europe. More than half the people of England died. Ordinary duties could not be performed. Crops rotted in the fields and cattle roamed over the land uncared for. Many years later French engineers failed in their attempts to construct a canal across the Isthmus of Panama mainly because they could not cope with yellow fever which killed their workmen by hundreds. After it was proved that the germs of yellow fever were carried by mosquitoes, General Gorgas under the direction of the United States Government destroyed the mosquitoes and then no such difficulty was encountered in constructing the canal.

Such experiences as these force upon people a realization of the importance of health. Gradually it has been learned that even health



From "The Nation's Forests"

"Every citizen owns an acre and a half of national forest and trimmings like this."



Photo from Ewing Galloway

Ellis Island is the landing place for foreigners who are seeking homes in the United States. They are detained there until the Government health authorities are assured of their physical fitness. This school is maintained at Ellis Island for children who are taught English and other elementary subjects pending admission to this country.

can be conserved. We have found the causes of many diseases, how they are carried from person to person, and in large measure how they may be prevented and cured. Jenner, an English country doctor, discovered the method of vaccination by which smallpox has been brought under control. Pasteur taught the world how to fight disease through the destruction of germs.

During our Spanish War more soldiers died of typhoid fever than were killed in battle. Now the use of serum has practically eradicated the disease. It has been found that cleanliness brings health. Sewage and other waste must be properly disposed of. Water, food, and air must be kept pure.

What State Governments do. Epidemics of yellow fever, smallpox, and other diseases have compelled governments to take measures to protect the health of all the people. Ravages of yellow fever led the state of Louisiana in 1853 to establish a State Board of Health. Later other states followed its example.

State Boards of Health provide hospitals, inspect food, and enforce laws protecting the health of workers in factories and of children in the schools. The State Boards also distribute serums to prevent the spread of diseases of various kinds. Circulars are published and distributed so that the people of a state will know how to care for their health and safety. Departments of Public Safety license drivers of automobiles and trucks and enforce laws of the highways and in this way reduce the number of accidents. Thus State Governments protect the health and safety of the public.

The Federal Government's interest in health. The Bureau of Public Health is a division of the Federal Government. It prevents the transportation of impure foods and drugs from one state to another. The health of all immigrants is carefully inspected before they are permitted to enter the country. The Bureau enforces laws prohibiting the importation of diseased animals into the country. The Federal Government is responsible for the health of its soldiers and sailors. Hospitals are maintained for the care of the sick and the wounded. These are only a few of the many interests the Federal Government has in the health of the people.

Guides to Study

1. In what ways have our ancestors contributed to the life of today?
2. Why should we conserve the resources of our country?
3. In what ways are our forest lands being depleted?
4. What efforts are being made to make our forests last as long as possible?
5. What are National forests and for what purposes have they been set aside by the Federal Government?
6. Why is mining called a *robber industry?*
7. Why is health the most important of our resources?

Research for Students

1. Make an exhibit of pictures showing regions where forests have been destroyed.
2. Appoint a committee to learn and report to the class the ways in which forests influence floods and erosion.
3. Find pictures showing observation towers and airplanes protecting forest areas from fires.
4. Make a study of the possible sources of motor fuel for the future, such as alcohol, coal, oil shale, etc.

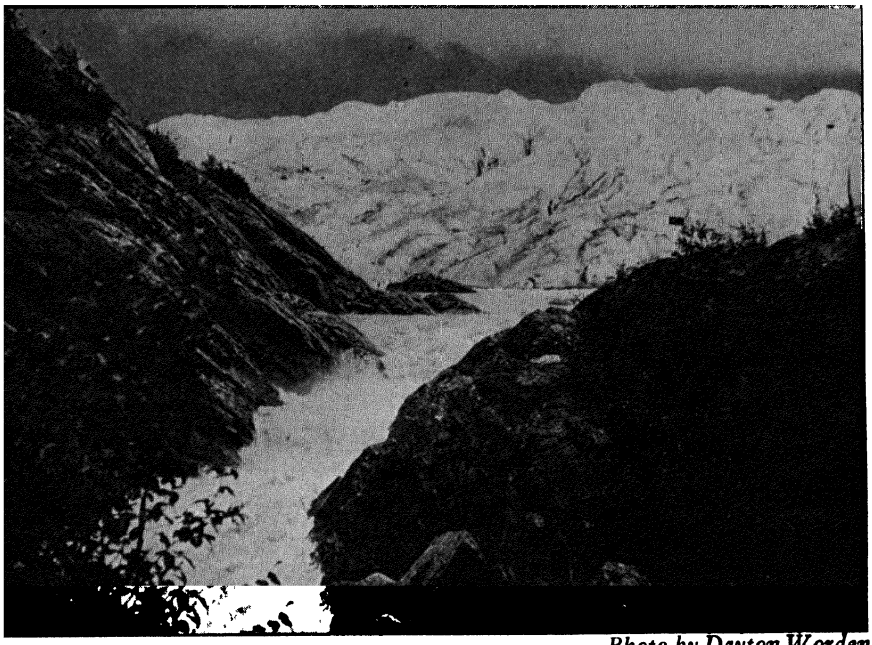


Photo by Dayton Worden

The Mendenhall Glacier near Juneau, Alaska

HOW OUR POSSESSIONS HAVE BEEN INCREASED

Our far-flung domain. Our country is made up of forty-eight states which are not only united under a single government but constitute a single land mass stretching from the Atlantic to the Pacific Ocean and from Canada to Mexico and the Gulf of Mexico. Besides this great land mass circumstances have led to the United States' possessing a number of smaller land tracts widely scattered through the world. These dependencies of ours consist of the two territories of Alaska and Hawaii and the dependencies of the Philippine Islands, Puerto Rico, Guam, American Samoa (Tutuila, Manua, etc.), the Virgin Islands of the United States, other small islands, and the Canal Zone. Locate Alaska, Puerto Rico, and the Canal Zone on Plate 1; Philippine Islands and Guam on Plate 6; and the other possessions on your wall map.

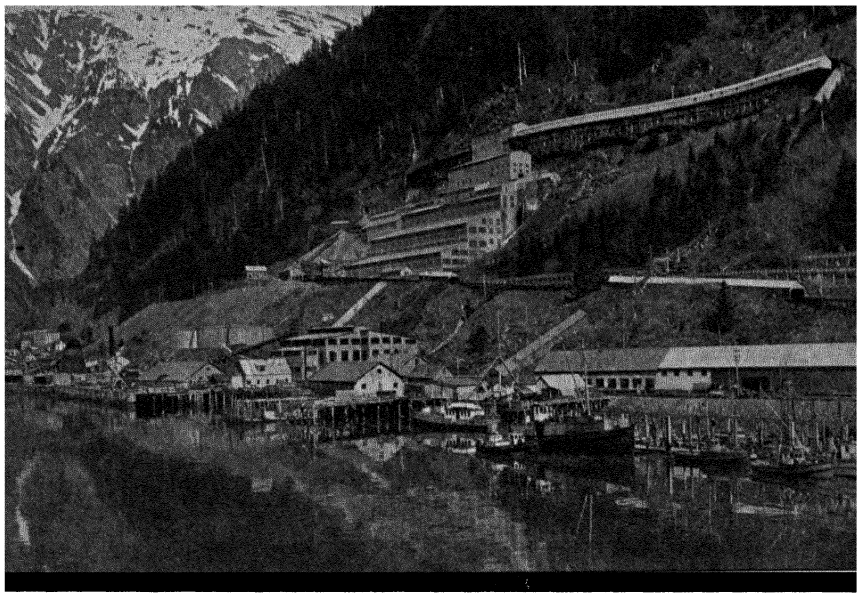


Photo by James Sawdei

This quartz-crushing plant of the Alaska Juneau Mining Company is the largest quartz mill in the world.

Alaska—Ours by Purchase

The wealth of Alaska. In 1867 Secretary Seward bought Alaska from Russia for $7,200,000. We thus acquired a tremendous area, over twice the size of Texas or about twelve times that of New York State. So ignorant of this region were the rank and file of our citizens that the purchase was scornfully referred to as "Seward's icebox." Was this deal really a bad bargain? Time has shown the overwhelming assets of Alaska. Its gold, copper, fur, timber, and fish have yielded hundreds of millions of dollars to the United States. The population, made up of whites, Indians, and Eskimos, at the time of the last census (1930) was 59,278.

Wealth in fisheries. Fish are Alaska's most valuable product. For several years the value of the catch has been $50,000,000 or more. This is more than five times the value of the annual yield of gold, silver, and copper. Salmon are by far the most valuable product. Canned salmon worth from $30,000,000 to $45,000,000 are sent into the markets of the world every year. Halibut in large numbers are frozen and shipped to all parts of the United States.

Wealth in mines. From 1880 to the present time Alaska has produced gold, silver, and copper to the value of more than $750,000,000. There is much coal, but not all of it is of good quality. Coal mining is expensive and so is not extensively developed. There is not enough coal produced to meet the needs of Alaska. In the future, however, coal and other valuable minerals may be extensively mined.

Wealth in forests. While Alaskan forests cannot compare with the superb forests of Washington and Oregon, they are bound to be of growing importance in the future. Small paper and pulp mills have already been operated, and extensive new plants have been established near Juneau and Ketchikan.

Wealth in furs. The Pribilof Islands in the Bering Sea are the principal breeding grounds of the fur-bearing seal. To prevent extermination of these animals by open-ocean hunting, by which great numbers of mother seals were taken, our country made a treaty with Great Britain, Japan, and Russia in 1911 to regulate the taking of the seals. The United States now determines the conditions under which the male seals may be taken on the Pribilof Islands. These wise restrictions have saved the herd from destruction and should safeguard it in the future. In fact, the seals have increased from 215,000 to nearly 1,500,000.

There are many valuable land fur-bearing animals in Alaska, such as the fox, raccoon, mink, marten, muskrat, and beaver. Many of these are being raised in captivity; in fact, *fur farming* is becoming an important business.

Wealth in reindeer. In 1891 the United States imported into Alaska a small herd of ten animals and during the next ten years additional importations brought the number up to 1280. Lapps were brought in to teach the Eskimos how to care for these animals. In about thirty-five years this relatively small number had increased to more than 1,000,000. Reindeer live upon mosses and wild grasses. Even in severe winter weather they uncover the moss under the snow with their large hoofs and thus find food. In northern Europe reindeer are useful for travel and transportation. Our Alaskan reindeer may be thus employed in the future. Reindeer meat has been exported to the United States and to Canada. This industry may be greatly expanded in the future.

Wealth in crops. In some parts of Alaska good crops can be raised. Southeastern Alaska is well watered and comparatively warm



Photo by B. Telkamp from Gendreau

This colonist in the Matanuska Valley, Alaska, is preparing the fertile ground for a crop. Snow-covered peaks form the background of this picture.

because of the southwesterly winds from the Pacific. The farmer here can work with hope of reasonable profits as markets become available. It was to this part of Alaska that the Federal Government transported colonists from the United States and formed the Matanuska settlement.

Wealth in tourists. Another resource of Alaska is its many attractions for summer visitors. Cruise steamers ply through ocean passages well sheltered by coastal islands. The Yukon River offers a fascinating route through the interior. There are mines and canning factories to visit; Indian villages with their amazing totem poles to explore; and shops with tempting souvenirs of Indian baskets and jewelry of gold nuggets or walrus teeth mounted in gold. Salmon runs, where the fish fight their way up steep waterfalls to the upper reaches of the river, are breath-taking sights. A dazzling glacier, with a huge mass of ice falling with a roar into the sapphire sea, is a vision of power and beauty the tourist will remember forever.

Our Domain in the Far East

The Philippines—ours by conquest and purchase. As a result of the Spanish-American War the United States took over the Philippine Islands and paid Spain $20,000,000 for them. When the islands came into our possession, the inhabitants were but half-civilized. The islands were densely populated, mostly by people of the Malay race. Today they have an estimated population of 13,300,000. The United States has greatly helped the condition of the Filipinos. Their health has been improved, their industries developed, and their government stabilized. Best of all has been the establishment of schools patterned after our own system.

Important crops. The islands have a hot, moist climate well adapted to the growing of rice. This grain is the leading crop in the islands. It seems to have been the principal food of the people ever since the islands have been known to Europeans. Once rice was exported in quantity, but for many years now not enough has been produced for native use. Other crops bring greater profits. Nearly half the rice is grown on the central plain of Luzon. Among the mountains much rice is grown on terraced hillsides. These terraces were built hundreds of years ago.

Sugar is an ancient crop in the Philippines and today ranks second in value among the agricultural products. More than half the sugar is grown on the island of Negros in the middle of the group. Proper methods of fertilization, cultivation, and cane selection could greatly increase the sugar output.

Coconuts. Until the Americans came into possession of the islands, coconuts, used mainly for food, were of little value commercially. Today copra and coconut oil are among the most valuable exports of the Philippines. Copra is produced in large quantities and is shipped to many parts of the world for the manufacture of oil. One product of coconut oil is glycerine, used in the making of smokeless powder. The World War greatly stimulated this industry. Coconut oil has many other uses, and large mills for its manufacture have been built on the islands. The United States buys from the Philippines nearly all its great coconut output.

Manila-hemp fiber is one of the best-known products of the Philippine Islands where it is called *abacá*. Its great strength makes it useful for ropes and twine and gives it a large demand in the cordage business of the world. Over forty percent of it comes to our

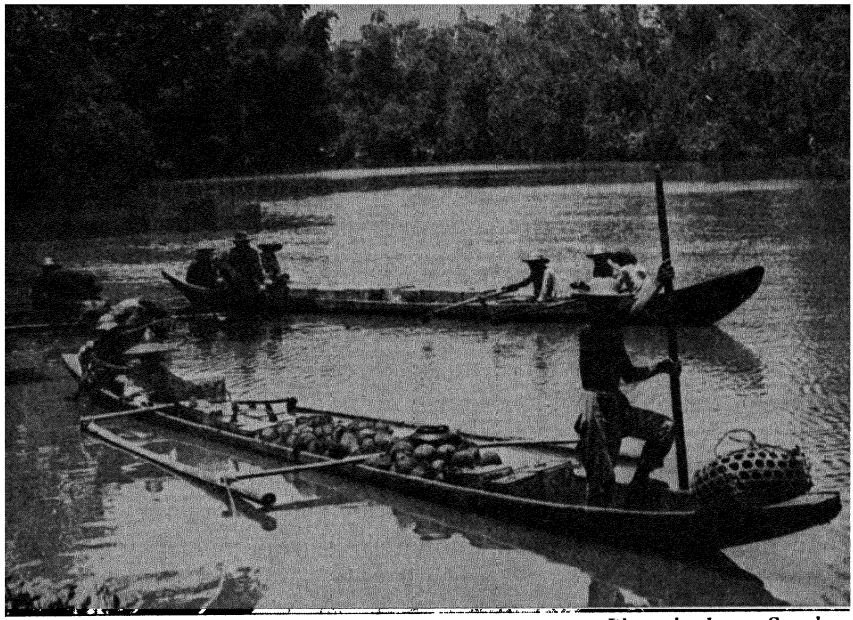


Photo by James Sawders

Native outrigger canoes carry coconuts down the Imus River to the Philippine ports.

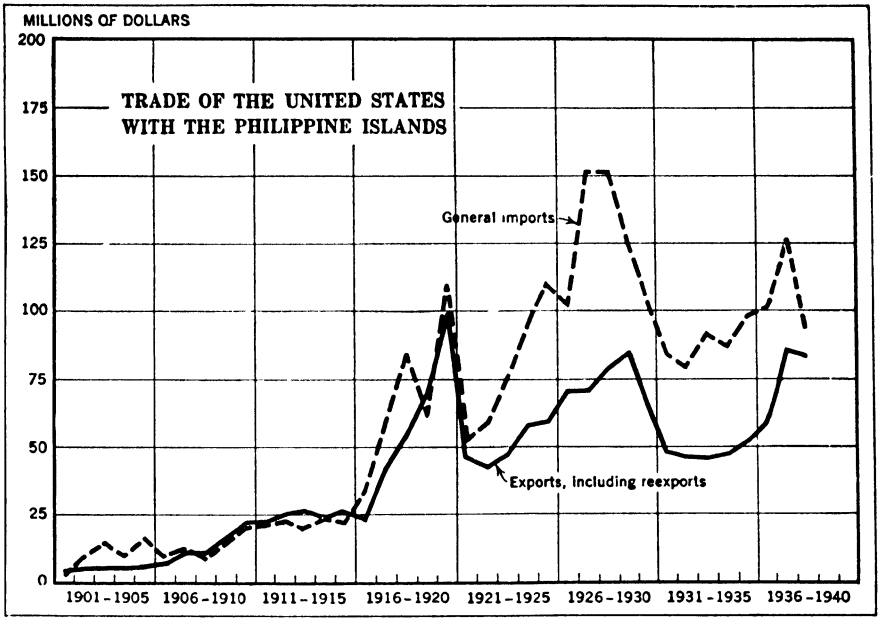
own country. The manufacture of hemp cordage by modern machinery in the Philippines is assuming importance as an industry.

Tobacco. For several hundred years tobacco has been raised in the Philippines. At the present time its annual value is more than $7,000,000. Cigar and cigarette manufacturing is an important industry of Manila.

Other products. Other Philippine crops of importance are corn, bananas, sweet potatoes, cocoa, coffee, peanuts, and pineapples. Rubber plantations are being established, for it is thought that the islands may become important producers of this product.

Transportation. Trade between the islands is carried on by a fleet of nearly 200 cargo and passenger vessels. In 1898, when the United States acquired the islands, there were 120 miles of railroad. There are now nearly 900 miles. There are also 10,000 miles of improved highways.

Oversea commerce. Since the United States took possession, foreign commerce has increased nearly ninefold. In recent years our country has taken about seventy percent of all Philippine exports and has furnished more than one half of the imports of the islands.

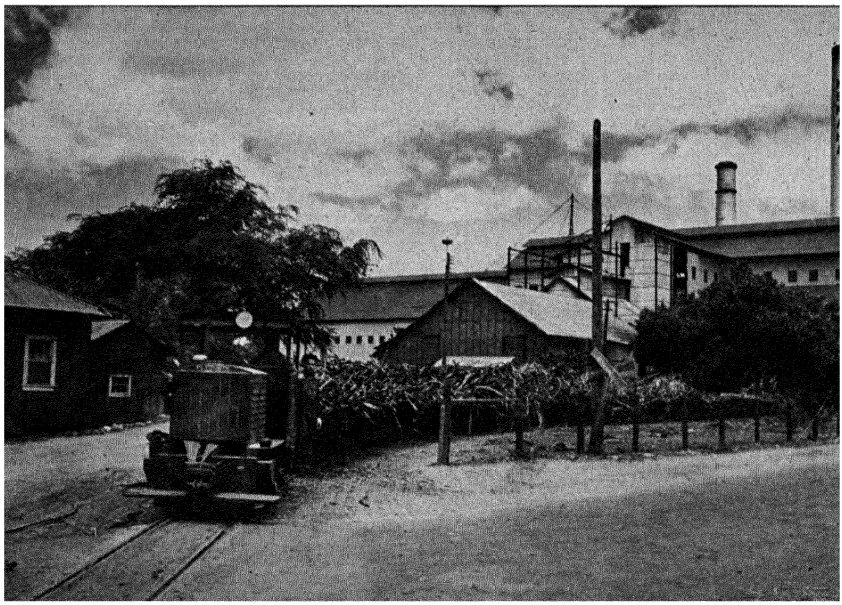


With the exception of rice the imports are chiefly manufactured articles, such as cotton goods and iron and steel products. The leading exports are sugar, abacá, coconut oil, and copra.

Hawaii—Ours by Petition

Hawaii, a territory of the United States, is a group of volcanic islands lying just south of the tropic of Cancer and near the middle of the Pacific Ocean. The population, numbering 368,336 in 1930, is largely Oriental, more than half being Japanese or Chinese. About one person in six is a native Hawaiian. Many Americans and other Caucasians have settled there and have greatly aided Hawaiian progress. In recent years the territory has been very prosperous, largely because of the natural resources of the islands, the enterprise of the people who have made their homes there, and the investment of money from the United States.

At the crossroads of the Pacific. Hawaii lies in the path of some of the chief steamship lines (*M. 325*), and its harbors are important as coaling and naval stations. The relationship of these islands and the Philippines to the United States gives our nation additional interest and influence in all matters relating to the development of the lands of the Pacific.

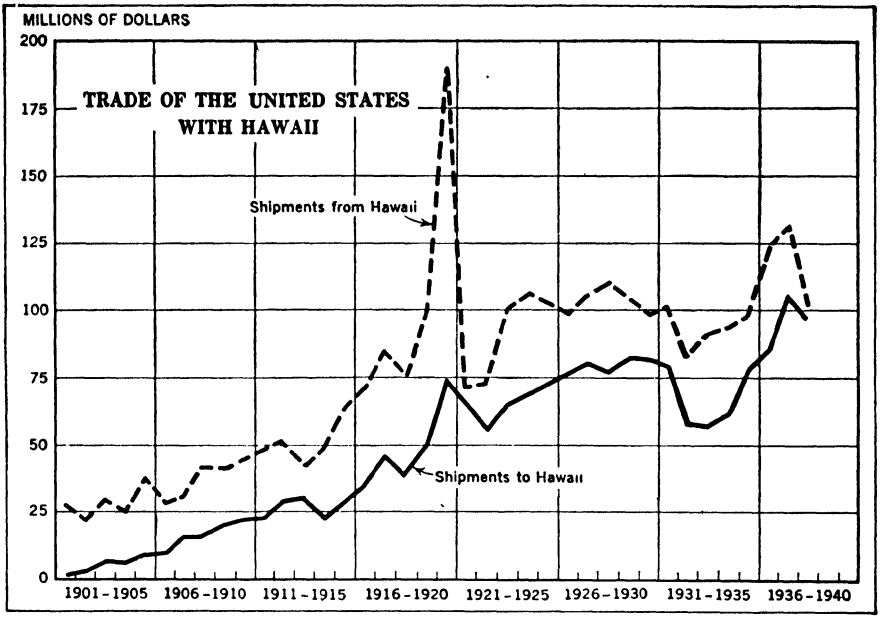


Courtesy of Caterpillar Tractor Co.

Sugar cane being hauled by railroad from the fields to the sugar mill on the island of Kauai, Hawaiian Islands

Outstanding products. The islands lie in the path of the warm northeast trade winds which bring moisture to the eastward side of the islands. The chief Hawaiian products are sugar and pineapples. In the early days many Americans who went to the islands made large fortunes from sugar plantations. In later years pineapple plantations seem to offer similar opportunities. Climate and soil here are especially suited to these crops. The islands supply more than three quarters of the world's pineapple crop. About 90,000 acres are devoted to the commercial production of this fruit.

Sugar is by far the more important crop at present. Growers have the advantage of being able to ship to the United States without payment of tariff. Sugar and pineapples do not encroach upon each other's territory to any great extent. Cane does not grow to advantage above 1000 feet elevation while pineapples grow well up to 2000 feet. Territory which formerly had been thought of as waste land is now covered with flourishing pineapple plantations. This is a great gain commercially over former conditions. Nearly all the sugar exported is raw sugar; only a small amount is refined. Nearly all the pineapples are canned. The making of raw sugar and



the canning of pineapples and pineapple juice account for three fourths of the manufacturing on the islands.

Trade. Over ninety percent of the commerce of Hawaii is with the United States. It is larger than the population would seem to indicate because of the productiveness of the islands and the large buying power of the people. For the last five years the exports have amounted to $335 per inhabitant annually and the imports to nearly $275. Imports are largely foodstuffs, jute bags for sugar, nitrate from Chile, cotton and silk goods from the Orient, special goods from Japan for the Japanese, and meats from Australia and New Zealand.

Tourists. The islands are most picturesque. Every year more and more tourists are being lured to these bright shores to enjoy the flowers, the water sports, especially the surfboard riding, and the haunting native music.

Puerto Rico—Ours by Conquest

This is one of the most beautiful and fertile islands of the West Indies. It was acquired by the United States in 1898 as a result of the Spanish-American War. It lies nearly five hundred miles east of Cuba and about fifty miles east of Hispaniola. Its area is

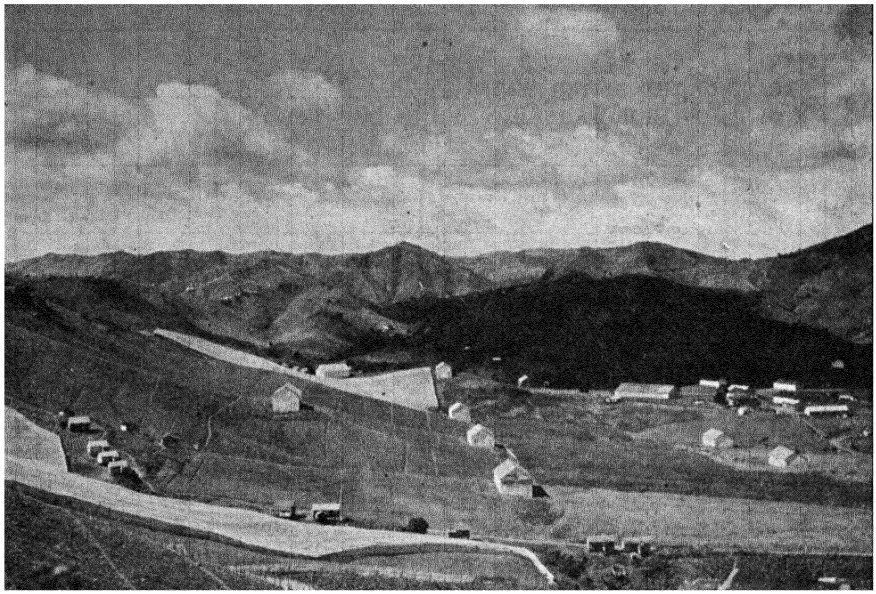


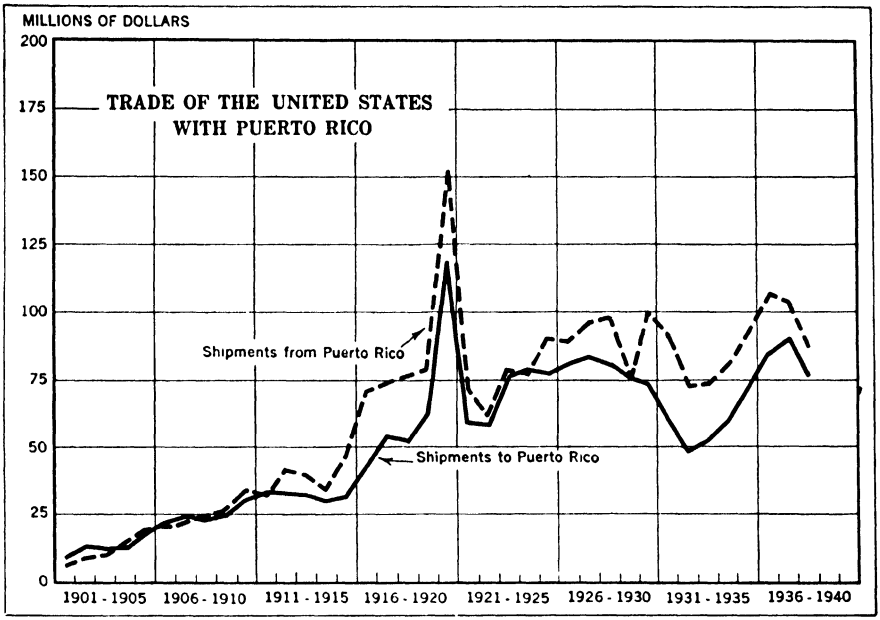
Photo by James Sawders

Tobacco fields and drying sheds in Puerto Rico. The large white patches are fields in which the tobacco is grown under cloth to improve its flavor.

about one twelfth that of Cuba. The population is a little more than 1,500,000 with an average of 450 to the square mile. This is somewhat too crowded for an agricultural country. Nearly three fourths of the people belong to the white race; the remainder are negroes or of mixed blood. Since coming under control of the United States, Puerto Rico has made rapid material progress, and illiteracy is being rapidly reduced under the excellent school system established by our Government. The governor of Puerto Rico is a continental American. The Puerto Ricans have held citizenship since 1917. The demand for full statehood is growing.

A mountain range extends from east to west through the island with the mountains generally cultivated to their summits. Since the island lies in the belt of the northeast trade winds, the north side has abundant rains while the south side needs some irrigation for crop and fruit production.

Puerto Rico lies in the dangerous hurricane belt. In 1928 a severe hurricane killed 271 people and injured more than 3000. Many of the crops, fruit trees, and buildings were destroyed or greatly



damaged. Four years later another destructive hurricane visited the island.

The leading products are sugar, tobacco, citrus fruits, and coffee. Nearly all the Puerto Rican exports find a ready market in the United States. A large part of the coffee is reshipped from the United States to Europe. Grapefruit production is rapidly growing and canned grapefruit is being sent to the United States in increasing quantities. The island imports grains and cereal products, cotton goods, manufactured iron and steel, and meat products.

Other Possessions of the United States

Guam, American Samoa, Wake Island, and Midway Islands are Pacific possessions of the United States valuable mainly as cable and naval stations. The Virgin Islands were bought from Denmark. The Panama Canal Zone was acquired by treaty from the Republic of Panamá. The zone extends inland five miles on either side of the canal. The cities of Panamá and Colón are in the area comprising the zone, but they do not belong to the United States.

Guides to Study

1. Name the territories and dependencies of the United States and state how each was acquired.

2. Has the purchase of Alaska been justified? Give your reasons. How can its resources be made more useful?

3. Why can Alaska support many reindeer? How are these animals useful to the people of Alaska? How may they become commercially important?

4. How has the handling of the fur-seal problem been a good example of international coöperation?

5. How did the World War stimulate the production of coconut oil in the Philippines?

6. How are the Hawaiian Islands valuable to the United States? How may they help our defense in time of war?

7. What has been the effect of our Government's efforts in Puerto Rico?

Research for Students

1. Why was the Matanuska Colony established by the Federal Government in Alaska?

2. Show how American farmers have been obliged to compete with products from the Philippines.

3. Appoint a committee to learn the facts and then decide whether or not it was wise for our Government to arrange for the independence of the Philippines.

4. On an outline map of the world locate each of our dependencies. Draw lines showing routes connecting each with the United States. List the ways in which these possessions aid our commerce.



Courtesy of Pan-American Airways, Inc.

The beautiful land-locked harbor of Rio Janeiro showing Sugarloaf in the sea and Gorcovado with the famous statue of the Christus which tops it. The flood-lighted statue serves as a guide to mariners many miles out at sea.

FORECAST OF UNIT ELEVEN

THE other countries of the New World are in a sense our next-door neighbors although some of them are no nearer to us than the countries of Europe. Canada is not only near us, but its people are of the same race and speak the same language. In the following section we shall be interested to learn in what ways Canadian resources differ from ours and the basis for the extensive trade carried on between the two countries. One might expect that, since the people of Canada and the United States are so much alike and are such friendly neighbors, they would unite to form a single nation. But one soon learns that Canadians are very loyal to their king and are quite content to remain a part of the great British Empire.

An unfortified boundary of over three thousand miles separates our country from Canada, which is in striking contrast to the fortifications constructed on the frontiers of so many of the countries of Europe.

The part of the New World lying to the south of the United States is known as Latin America because the people of those countries speak languages which have developed from Latin, the language of ancient Rome. Besides differing in race and language, the countries to the south are unlike the United States in other ways. A large part of Latin America is a tropical region with high temperature and heavy rainfall. Such a climate is not well suited to white people; for that reason we find the countries inhabited chiefly by Indians, Negroes, and mixed races. Many of the agricultural and forest products except those of southern South America are also quite different from ours. Cocoa, coffee, bananas, and rubber are products which we must import from tropical lands. Unlike our country too many of the inhabitants of western South America dwell on the high plateaus of the Andes. Life is possible there because the high plateaus are so near the equator that, notwithstanding the altitude, the climate is still warm enough to permit the growth of grass and the raising of a few vegetables. In no other continent does so large a proportion of the inhabitants live in the highlands. In our study of Latin America we shall find, however, many ways in which the countries and their people are like ourselves.

Mexico and the countries of South America, with the exception of the Guianas, all have democratic forms of government more or less like our own. It is very important that our republic help to maintain democratic ideals in these countries based on the liberty of the individual citizen as set forth in our own Bill of Rights. This is especially necessary since the idea of the totalitarian state has made such headway in Europe where once democratic ideals prevailed. Our good-neighbor policy and the favorable trade agreements made by our Department of State are working toward this end. Peace and good will in this hemisphere will help establish universal peace.



Photo by James Sawders

The size of these grain elevators located on the dock at the city of Quebec is indicative of the importance of the production and exportation of the Dominion's wheat crop.

1. CANADA–NEIGHBOR, FRIEND, CUSTOMER

Three thousand miles of unguarded frontier. Canada's southern border joins our northern boundary, but from the Atlantic to the Pacific across the entire stretch of three thousand miles, neither soldiers nor sailors guard the frontiers. There are no fortifications. Not any are needed, for Canada and the United States are friends as well as neighbors. The two countries have much in common. Both are populated largely by people whose ancestors came from the British Isles. English is the predominating language although in the province of Quebec, where many French settled, French is the official tongue as well as English. A thriving, ever-growing trade has developed between the United States and its northern neighbor and

today our trade with Canada is even greater than that with the United Kingdom. Canada sends us more than thirty-five percent of its exports, and we sell it fifty-eight percent of its imports. Canadians buy more goods from us than do the people of any other country in the world except the United Kingdom and tariffs are the only barrier to an even greater international trade. Our new reciprocal treaty will no doubt increase trade between the countries.

The length and breadth of the land. With the exception of Alaska Canada occupies the whole continent of North America north of the United States. Its irregular and broken coastline measures nearly 25,000 miles, the distance around the earth at the equator. No other country in the world has so many lakes and inland waters within its borders. When we think of the extent of our own country, we usually think of it from east to west—Appalachian Highland, Central Plains, Rocky Mountain region, Pacific coast. When we think of Canada we are apt to think of it as stretching north and ever farther north to the Arctic circle and beyond. This is an unfair viewpoint as Canada's east to west expanse is even greater than our own and its physical features, its low eastern highlands, its rolling central plains, its lofty Rocky Mountain regions are but extensions of our own mountains and plains. The resources of the various sections are much the same as ours. The chief difference is one of climate due to the more northerly latitude of Canada. While the range of climate in the United States is from subtropical to cool temperate, in Canada it is from cool temperate to arctic.

The great central plain of Canada includes more than half the area of the Dominion. Its southern portion closely resembles our own North Central States. On the north it merges into a great forest region which in turn merges into the bleak and frozen tundras. The Canadian Rockies form a natural barrier on the west, but railroads, monuments to modern engineering skill, span the valleys and tunnel the mountains, thus opening up the whole of the interior of Canada to the vast possibilities of western communication through the port of Vancouver. In these mountains one finds some of the most inspiring scenery in the whole world. The diversity and charm of the eastern highlands is also well known to the thousands of tourists who visit the region every year, both winter and summer. We share with Canada four of the Great Lakes—Superior, Huron, Erie, and Ontario. The mighty river, St. Lawrence, draining them, except for a short distance along the northern border of New York

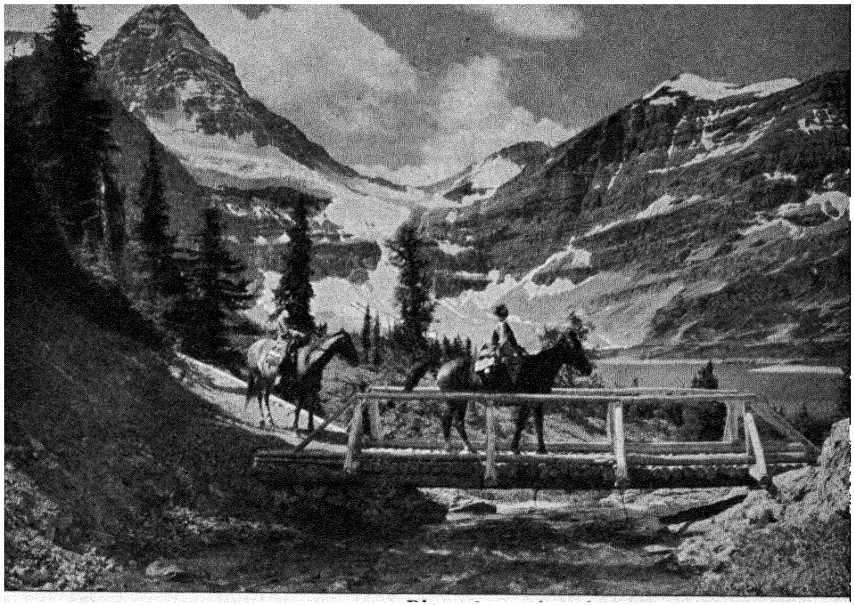


Photo from Associated Screen News, Limited

The picturesque Canadian Rockies draw many tourists from our country, especially during the summer vacation season.

State lies wholly within Canada. Because of the advantages of the northern latitude, eastern Canada is much nearer Europe than the eastern portion of our own country.

What the weatherman says. The climatic regions of Canada are as varied as its physical regions. In the southern sections of the great plains and the central provinces the summers are short and hot; the winters long and cold. There are summer heat waves similar to those experienced in our own Central and North Central States with the thermometer soaring to 90° and above. In winter the temperature as far south as Manitoba frequently drops to 50° below zero. The maritime provinces in the east have a cool, moist summer and cold winters with much snow. The valley of the St. Lawrence has a bracing climate, similar to that of our northern New England. The western slopes of the Coast Ranges although in the same latitude as Labrador have a very mild, moist climate with luxuriant vegetation due largely to the westerly winds from the Pacific Ocean. The climate there is very much like that of southern England, only warmer. Because of its climate and the many English people who have settled there, Victoria on Vancouver Island is sometimes said

to be more English than England itself. As a whole the climate of Canada is considered to be a very healthful one.

Canada's central plains. The central plains of Canada are but the extension of our own interior plains. Here is the fruitful wheatland which has for many years invited sturdy, intelligent emigrants from the British Isles and in late years from our own country. Beef and dairy cattle and hogs are also raised in this prosperous region. Although farming is the chief occupation of the Canadian people, only about forty percent of the possible farm lands have as yet been made available for agriculture.

Canadian wheat farming is carried on by quite as modern agricultural methods as our own. The growing season in these provinces being short and the rainfall rather light, especially toward the west, a careful selection of crops must be made; and so only hard wheat that can resist frost and drought is planted. Spring wheat is the ideal farm product here and its firm, dry, richly glutinous grain affords excellent flour for breadmaking. The Provincial Departments of Agriculture have done a great deal to improve the varieties of grain best suited to Canadian soil. Although the wheat fields lie hundreds of miles from the Atlantic Coast and thousands of miles from European markets, Canada is usually ranked first among the wheat-exporting nations of the world. Oats, barley, and rye are other important crops grown here and mixed farming is increasing.

Agriculture in the east. Like the United States Canada too has farm lands in the east, in Ontario, the Province of Quebec, New Brunswick, Nova Scotia, and Prince Edward Island. In southern Ontario and in the southern part of the Province of Quebec farm products are practically the same as those of our Northeastern States—fruit, grains, hay, potatoes, and tobacco. Three fifths of the people of Canada live in the two provinces of Ontario and Quebec.

Wealth from the dairy. Canada has for many years been an important dairying country. Its excellent pastures and abundant hay crops furnish plentiful provender for dairy cattle. Canadian butter is of fine quality, and it brings good prices in domestic markets. The Dominion's cheese finds ready sales in the mother country and on the continent. Canadian milk is now being used extensively in the manufacture of condensed and evaporated milk. These dairy products are sold chiefly in the United Kingdom and in our country. The eastern provinces of Ontario and Quebec lead in the dairying industry.



Photo from Ewing Galloway

An Ayrshire dairy herd on an Ontario farm. This province has over a million milch cows, exceeding the number of any other province of the Dominion.

Fruit growing. Among the fruits of Canada apples are the leading crop; the value of the yearly commercial yield is about $10,000,000. The chief producing region is the Annapolis Valley of Nova Scotia. Great Britain and other European countries are the best markets for this fruit. The eastern provinces also produce small fruits, including blueberries and strawberries, quantities of which are exported to the United States after the season for those fruits has gone by in our country.

The Niagara Peninsula, the most southern portion of Canada, juts between Lake Huron on the west and Lake Erie and Lake Ontario on the east and is known as the "garden of Canada." Here, as in western New York, apples, peaches, and grapes are raised.

"**Timber!**" This shout of warning which the lumberjack gives serving notice that the tree is about to fall echoes through many a Canadian forest. North of the central plains are extensive woodlands extending east and south to the Atlantic and west across the Rockies to the Pacific. The value of the country's forest products is exceeded only by those of the farms and the mines.

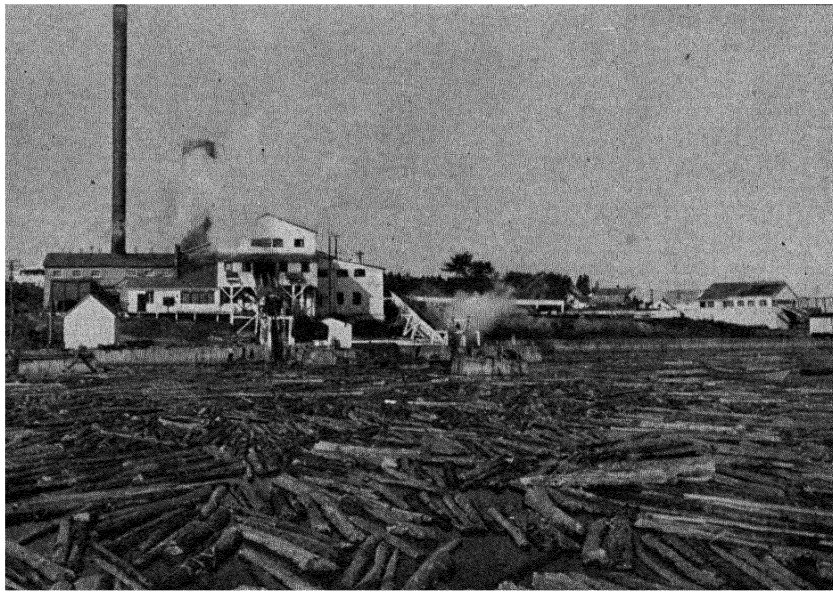


Photo by James Sawders

Much of Canada's potential wealth is in its forest areas which supply limitless quantities of lumber and pulpwood. This is the Rimouski River which has floated the logs from the Gaspé Peninsula to the mill.

The most valuable product of the forests is wood pulp. Much of this is made into newsprint within the country, of which two thirds is exported to the United States. The country has large areas of spruce and poplar as raw material for pulp mills besides abundant water power so necessary in the paper industry. Three fourths of the wood pulp is the output of the two provinces of Ontario and Quebec. With the depletion of our own forests American capitalists turned to those of Canada. Nearly $500,000,000 of capital from the United States is invested in the paper, pulp, and lumber mills of Canada. This interest is due to the fact that our country is the greatest consumer of newsprint in the world and we are obliged to look to forests other than our own for the supply.

As in the United States, the Pacific Coast is the greatest producer of lumber. British Columbia produces nearly as much lumber as all the other provinces combined. Douglas fir is the most important kind of lumber produced. Quebec comes next in the production of lumber. Fortunately more than one fourth of Canada's forests are at present inaccessible. If they can be saved from destruction by

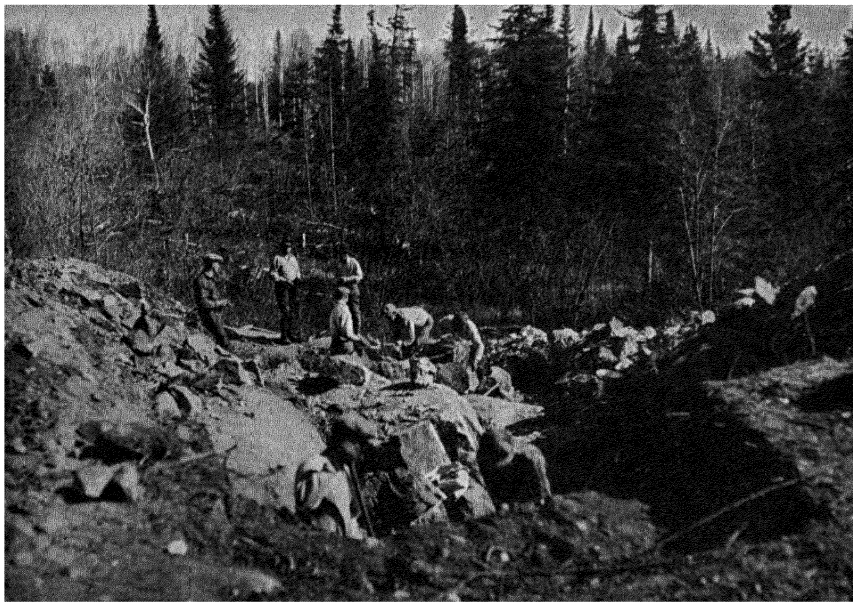


Photo from Ewing Galloway

A new El Dorado is being exploited in the Sturgeon River gold area in Ontario.

fire and insect pests, this very inaccessibility may be a blessing in disguise–thus saving for future generations a supply of timber.

Pay dirt. About the same time that gold was discovered in California, rich deposits were also found in the Fraser River valley in British Columbia. The swift waters of the river had eroded the soil and gold was found in the sand or gravel along its banks. Armed with shovels and pans the early gold seekers dipped up the sand along the river margins and washed away all but the heavy particles of gold. The gravel was panned and, if it yielded a fair amount of gold, it was called *pay dirt.* These early gold rushers could scarcely do more than scratch the surface. The real value of the wealth of the mines was undreamed of until they were worked methodically and scientifically in later years. With steam to thaw the ground and huge streams of water to dislodge the gravels, mining can be profitable even though there be but a few ounces of gold to a ton of ore.

For more than twenty years Ontario has led all other provinces in gold production. The gold there is in the solid rock which must be mined, brought to the surface, and pulverized before the precious

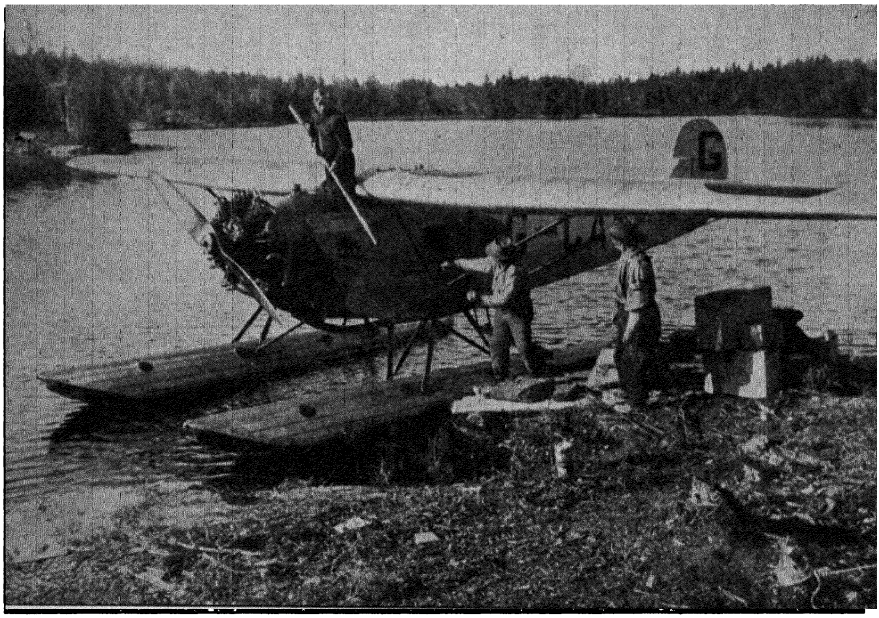


Photo by James Sawders

Loading a hydroplane with supplies for a mining camp in an inaccessible region of Canada. Food, medicine, and materials of many other kinds are delivered quickly by air in remote places.

metal can be extracted and refined. Canada ranks third among the gold-producing countries of the world. Using airplanes now instead of plodding on foot or by sledge as the early gold seekers did, prospectors are constantly pushing farther and farther north into Canada's untried wilderness—one of the greatest unprospected mineral areas in the world.

By airways to the mines. In some of the newer mining towns of Canada which lie beyond the reach of railroads and highways, the airplane is the only means of communication. Miners and their families reach the mines by airplane and leave in the same manner. All supplies for people and equipment for the mines are brought by plane. Products of the mines are taken out in the same way. Canada to a greater extent than any other country uses the airplane for carrying freight.

Canada's coal bins. The wealth of the coal mines is second only to that of the gold fields. The mines are fairly evenly distributed in the different sections of the country. Nova Scotia mines an excellent grade of soft coal that finds a ready market in eastern

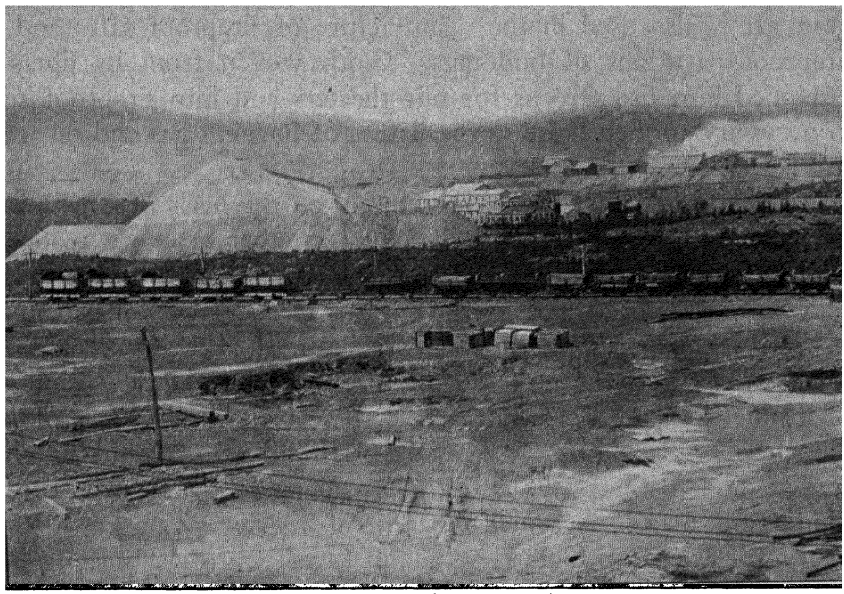


Photo from Associated Screen News, Limited

The asbestos mines and mine dump at Thetford in the province of Quebec. The United States leads all countries in the manufacture of asbestos products but produces only a very small fraction of the necessary raw material.

Quebec. British Columbia exports some coal to our western states which are lacking in coal. The coal deposits in central Canada are of comparatively poor grade and in the markets of Ontario and Quebec the coal meets with a great deal of competition from the product of our Ohio and Pennsylvania mines.

Other sources of mineral wealth. Nickel is playing an increasingly important part in present-day manufactures. Munitions, the automobile, moving parts of machinery, and household utensils use it extensively. Nearly ninety percent of the world's supply of nickel and twenty-five percent of its cobalt are mined in southern Ontario. Cobalt is a component of valuable alloys used in the manufacture of cutting tools. It is also used as a pigment in the coloring of glass—one tenth of one percent will give a deep-blue color to glass. Asbestos is a fibrous, flexible mineral found in Quebec. When shredded, it looks like wool and it is often spoken of as *mineral wool.* It neither burns nor melts at ordinary temperatures, and being a poor conductor of heat it is used extensively to cover boilers, furnaces, and

steam pipes and as an insulation for houses to prevent the escape of heat. It is also used in the manufacture of fireproof safes and to fireproof partitions of buildings. Cloth woven from its fibers is fashioned into fire screens for our theaters and into fireproof suits so necessary to men fighting the flames of burning gas and oil wells and forest fires.

Mighty hunters. Following closely on the heels of Champlain, Cartier, and other early French explorers, there came a troop of hunters and trappers in quest of the valuable furs to be had for the taking or to be bought from the Indians in exchange for a handful of beads. On snowshoes these hardy men pushed their way into the great white wilderness of northern Canada. Countless numbers of ermine skins were needed for the royal robes of European kings and queens. Rich furs were a part of the dress of all the nobility of that day; so there was also a great demand for the pelts of the sable, mink, marten, beaver, fox, and seal.

To carry on this lucrative trade in furs, the great Hudson's Bay Company, which is still in existence, was founded in 1690. Trading posts were established on the shores of Hudson Bay itself as well as farther south. Skins, particularly those of the beaver, were used in place of money. Even today a Hudson Bay blanket has several short stripes woven near one corner to indicate to the Indians its exchange value—three if worth three pelts; four, if worth four pelts. Fur-trading posts became the outposts of civilization and later many thriving cities grew up on their sites. Winnipeg is now the chief collecting and distributing center for the fur trade of Canada. Montreal ranks second. Canada is the leading country in the production of furs.

Fur farming. So ruthless and shortsighted were many of the methods used in carrying on this very profitable trade that many animals were in danger of becoming extinct. To overcome this threat and at the same time meet the heavy modern demand for furs, fur farming is now carried on extensively in parts of Canada. Animals can be bred for certain specific qualities and their pelts matched even more exactly than when captured in the wild. Silver-fox farms were the pioneers in this novel industry. Mink, raccoon, marten, skunk, and muskrat are also successfully bred in captivity. It has been said that a millionaire can wear only one pair of shoes at a time, but that a million people need a million pairs of shoes. The same truth applies to the wearing of furs. Whereas in the old days

only the royalty could afford to wear them, now, with increased prosperity, their use has become widespread and there is a constant demand which provides a steady market for all that the trapper can procure and the fur farmer can raise. More than half of the furs worn in this country come from Canada.

Offshore fisheries. The best fishing grounds in the world are in the cool waters of the northern oceans. Canada, bordering both the Atlantic and Pacific Oceans, has a most advantageous location for carrying on extensive fisheries. Added to the advantage of location is another great advantage, that of a deeply indented coast line with many adjacent islands and many fine harbors. The many inlets and bays give ready access to ocean waters that are teeming with salmon, cod, haddock, halibut, and herring.

These ocean areas are great storm centers and are often blanketed with dense fog. Defying storm and fog and other well-known dangers, Canadian fishermen have built up a fishing industry that is second to none in the whole world. The value of the salmon fisheries, particularly those of the Pacific Coast, is about equal to that of all the others combined. Along shore Canadian fishermen have also carried on extensive lobster fisheries, but that particular branch of the industry has been pursued so recklessly that lobsters are now becoming scarce and, as in the United States, the catch has to be regulated.

Near the Grand Banks of Newfoundland are two small barren islands, St. Pierre and Miquelon. These islands belong to France—all that is left of its former great Canadian possessions. Fleets of French fishing vessels still visit the banks in the vicinity of these islands every year. On the islands their catch of fish is salted and dried for the market back home. France looks to this industry for a very important part of its food supply.

Land-locked waters. In addition to the opportunities for salt-water fishing, Canada also possesses over 200,000 square miles of fresh-water areas. The waters of these numerous lakes and rivers abound with pickerel, trout, and many other varieties of food fish, that lure not only the fisherman who works for a living, but thousands of sportsmen as well. The fisheries of Canada yield a total value of about $40,000,000 annually. Of this over $4,000,000 comes from the fish taken in the many lakes and rivers of the Prairie Provinces.

"The twentieth century belongs to Canada." Sir Wilfred Laurier, one of Canada's greatest premiers, made this prophecy more

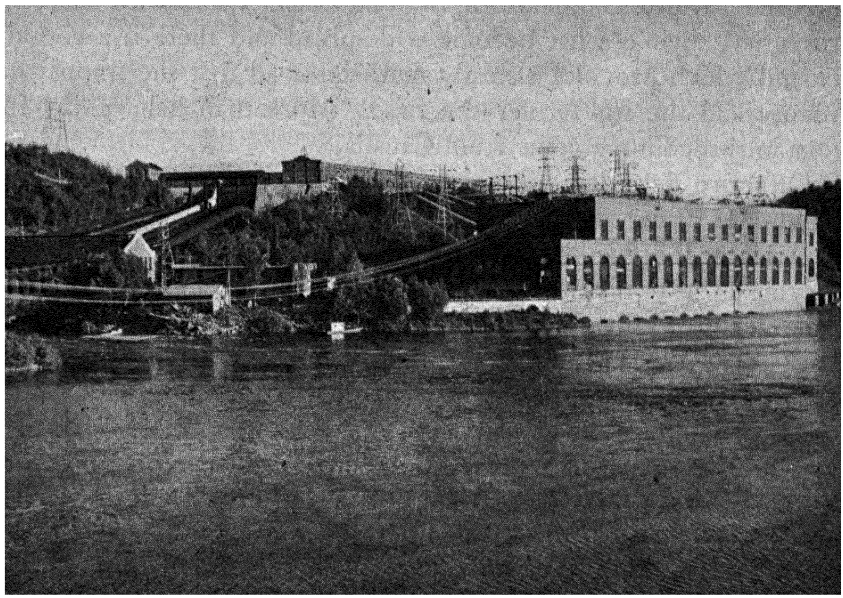


Photo by James Sawders

This power plant harnesses the water of the Shawinigan Falls of the St. Maurice River and supplies illumination and electric power for aluminum reduction, pulp and paper, and many other industries which make this neighborhood very prosperous.

than thirty years ago and the facts and figures of today prove the soundness of his judgment. Nowhere do we see more progress than in Canada's manufactures which now are double the value of its agricultural products.

The leading manufactures of Canada are those which take for their raw materials the products of the farms and ranches. Flour milling and meat packing are important industries. Butter and cheese help to swell the total. Canada is one of the leading countries in the value of cheese exported. In our study of the forests we noted the great value of the paper and pulp produced. The manufacture of textiles and of products of iron and steel is also important. Three fourths of the manufacturing is carried on in the provinces of Ontario and Quebec. These provinces have the advantages of abundant power and accessibility to the industrial regions of the United States and Europe. The rapid development of water power for the generation of electricity has greatly stimulated manufacturing of all kinds.

As in the case of the lumber and paper industries, much foreign

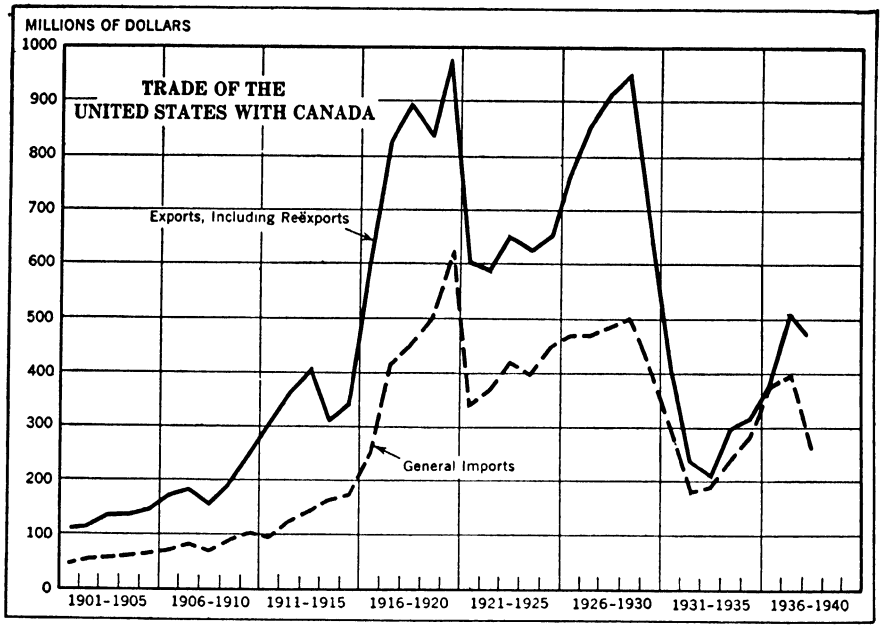
capital is invested in other Canadian mills and factories. Capital from the United States totals over $4,000,000,000 while that from Great Britain is about two thirds as much.

If American manufacturers establish branches in Canada, they avoid the tariff payable on their products made in the United States and sold in Canada. They also secure the advantages which Canadians have in trading with other parts of the British Empire. Many American manufacturers producing both in this country and Canada make automobiles and tires, farm machinery, aluminum, foods, and drugs. Many other American producers have stores and offices in Canada for the distribution of their products. The leading manufacturing cities are Montreal, Toronto, Hamilton, Winnipeg, Vancouver, Quebec, and Ottawa.

Canadian railroads. Southern Canada is well supplied with railways. The great wheat and grazing lands would be practically useless without them. Three continental lines connect the eastern ports with those of the west. The eastern terminals in summer are Montreal and Quebec. In winter when the St. Lawrence is closed by ice, Halifax and Saint John become the terminals. During the winter season much of the Canadian foreign trade moves southeasterly across the United States through our North Atlantic ports. One of the transcontinental lines, the Canadian Pacific, owns a fleet of large ocean steamers which sail from both Atlantic and Pacific ports. It also maintains sumptuous hotels in all important cities and at famous summer resorts along its route.

For years the farmers of western Canada have been insisting on the advantages which they believed would be gained by running a railroad from their wheat fields to Hudson Bay. Hardheaded railroad experts argued in vain that ice would render a Hudson Bay port practically useless except for a few weeks a year. The government finally built the road at a cost of $73,000,000. In 1931 a new port was opened at Churchill on Hudson Bay. The road has not proved a success. Churchill remains icebound most of the year and the taxpayers of Canada must continue to pay for a huge white elephant in the form of an almost useless railroad.

Canada's foreign trade. Canada ranks fifth among the great commercial nations. It owes this high place to a wealth of resources in agricultural lands, forests, mines, and the waters of its shores, lakes, and rivers. Added to these is the greatest resource a country can have, that is, an enlightened and progressive people. The country



has attracted to itself immigrants from Europe who have done much to aid in the development of resources, and, as we have already seen, not a little of the development of Canada's industries and trade is due to the foreign capitalist.

The exports of the country in order of value are wheat and flour, newsprint and wood pulp, and minerals. Among the leading imports are products of iron and steel, petroleum, coal, textiles, and raw cotton.

Canadian cities. *Montreal* is Canada's largest city and leading port. It is at the head of navigation on the St. Lawrence for large ocean-going ships. Since a large part of Canada's trade is with Great Britain and the United States, Montreal is favorably placed for transatlantic trade and for shipments to and from industrial United States. Montreal might be thought of as the New York of Canada. *Winnipeg*, the Chicago of Canada, is in the heart of the great grain and cattle region. It is centrally located for grain moving eastward to the Great Lakes and for that which is transported west to Vancouver and then to Europe by way of the Panama Canal. *Vancouver* is the leading port on the Pacific Coast carrying on transpacific trade and trade with Europe through the Panama Canal. *Toronto*, Canada's largest port on the Great Lakes, is in the center

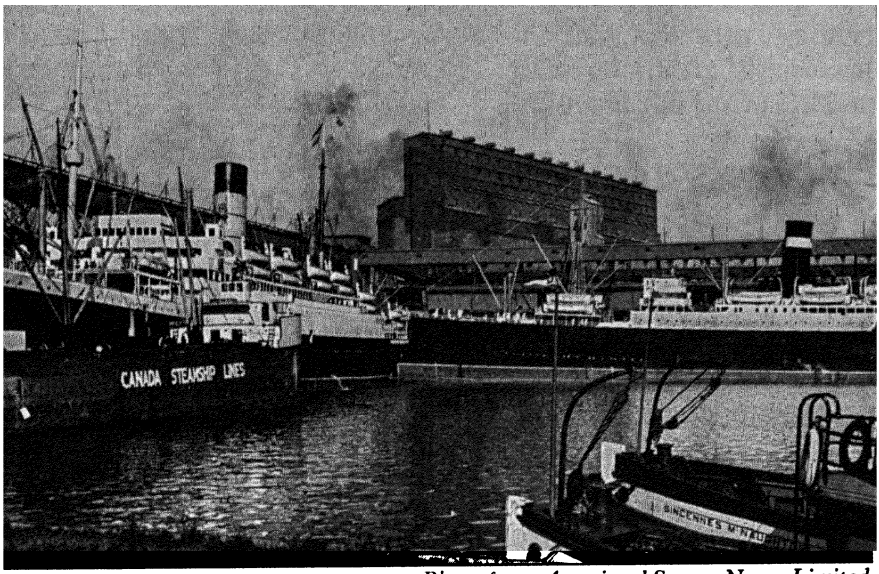


Photo from Associated Screen News, Limited

The huge grain elevators on the docks at Montreal collect millions of bushels of Canadian wheat for shipment to all parts of the world. Montreal, chief port city of Canada, is the leading wheat-export port of the world.

of a rich agricultural and mining region. It has access to the power of Niagara Falls. Its varied manufactures include large meat-packing plants and it is a distributing center for this part of the Dominion. *Ottawa*, the capital of the Dominion, has access to the abundant water power of the Ottawa River. It has nearly two hundred manufacturing plants.

Newfoundland—Great Britain's oldest colony. Off the eastern coast of Canada, nearly spanning the entrance to the Gulf of St. Lawrence, lies the island of Newfoundland which politically has never been a part of Canada. This colony includes that part of the mainland known as Labrador. The surface of the island is too rugged and too heavily wooded and the climate too cold to carry on much agriculture. Off to the south, however, lie the Grand Banks, the most prolific fishing banks in the world. Until recently fishing was Newfoundland's most important industry. Fishing now ranks second to the manufacture of newsprint. Newsprint and fish are the country's leading exports. Because of its scenic attractions and the

abundance of game and fish Newfoundland is a sportsman's paradise. The people of Labrador are engaged chiefly in fishing. The missionary work that Sir Wilfred Grenfell has done along this coast has aroused great interest among English-speaking people in the work and life of the inhabitants.

Guides to Study

1. The area of Canada is greater than that of the United States. Why is its population so much smaller than ours?
2. From the Atlantic to the Pacific how do the physical features of Canada compare with those of the United States?
3. How does the climate of southeastern Canada differ from that of southwestern Canada? From that of south-central Canada?
4. How do the agricultural products of these three regions differ? Why?
5. Why are the people of the United States deeply interested in the forests of Canada?
6. How do the mining methods of today differ from those of former years? Why?
7. Of what minerals does Canada have almost a monopoly of the world supply?
8. What are the advantages of fur farming over hunting for fur-bearing animals?
9. What part has fishing played in the history of Canada and in the development of its trade?
10. What are the country's leading manufactures and what advantages are offered for each?
11. Why is Canada's trade largely with the United States and Great Britain?
12. Why has Newfoundland's fisheries been reduced to second place in that country's leading occupations?

Research for Students

1. Using the scale of miles on the map showing Canada (*Pl. 1*), find the distance from the Atlantic Coast to the Pacific. From the southern border to the Arctic Ocean. Estimate the number of square miles of area. Compare your estimate with the table in the Appendix (p. 670).
2. What attractions does Canada offer the tourist? Study newspapers and magazines for advertisements of special areas.
3. Consult Tables 3 and 5 (p. 678) and make line graphs showing Canada's position as a wheat producer; Canada's position as a wheat exporter.

4. On an outline map indicate the locations of the chief cities of Canada. Learn as fully as you can what resources, industries, and trade are responsible for the importance of each.

2. MEXICO–OUR NEXT-DOOR NEIGHBOR TO THE SOUTH

Why we are interested in Mexico. We are interested in Mexico because our citizens have more than a half-billion dollars invested in Mexico's mines, oil fields, and farm lands. Furthermore, machinery necessary to develop these resources is purchased largely in the United States. Then too the products of the American companies are sold mainly in our markets. In fact, almost two thirds of Mexico's foreign trade is with our country. For these reasons we are anxious that our southern neighbor be at peace, for American business is endangered when civil war or disorder arises as rather frequently happens. Law and order in Mexico mean peace along our borders, regular dividends for American investors, and uninterrupted business relations for all our people dealing with Mexico.

The wealth of centuries. Since 1521 when the Spanish conquered the country, Mexico has given to the world over two thirds of all the silver mined, and today this country leads all others in the production of this precious metal (*I. 394*).

Silver is found in every one of Mexico's twenty-eight states. Many of the mines yield silver alone and others silver mixed with various ores, notably lead.

Gold is found in eighteen states, but gold mining has declined. Besides silver, lead, and gold, Mexican mines produce copper, iron, coal, and zinc. Near Durango there is a mountain of iron estimated to contain millions of tons of ore. These deposits await a greater demand and better means of transportation.

Oil and water that mixed. For a number of years Mexico ranked second among the nations of the world in the production of petroleum. Mexican oil did much to help the Allies win the World War. About 1920 the supply of oil began to fail and some of the oil wells began to fill with salt water. Now Mexico has fallen to seventh place in world production. Interest in Mexican oil began at the start of the present century. Oil magnates from the United States were invited to come to Mexico to study its oil resources and

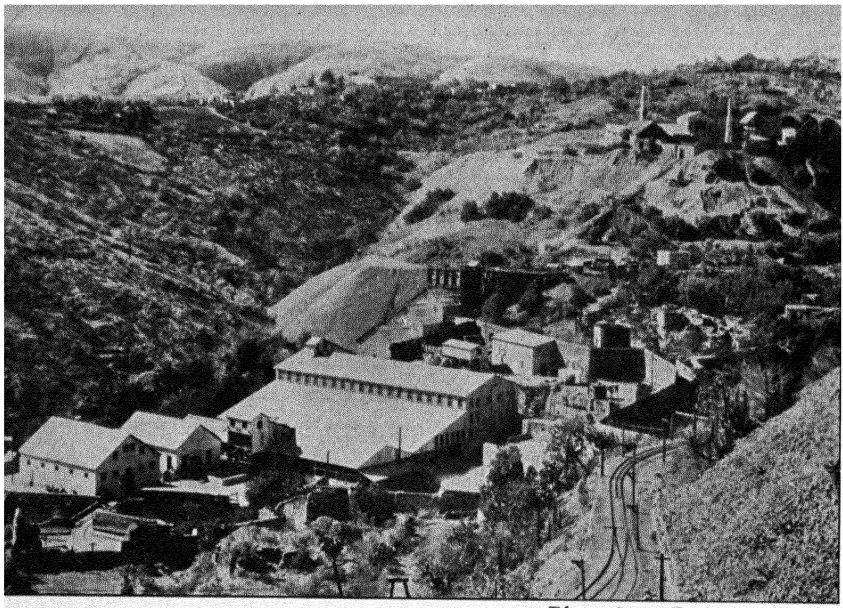


Photo from Ewing Galloway

The silver mines at Pachuca, Mexico, have been operated since the early 16th century. Mexico is the largest silver-producing country in the world and Pachuca is the oldest and one of the greatest of its mining camps.

to develop them. Instead of traveling all over the country seeking oil, the investigators made a study of maps. Wherever they found a name signifying oil, tar, or pitch, there they sought oil. In those places there had been seepages of oil from the ground for many years and places had been named because of the presence of these products of petroleum. The plan proved a great success, and the oil discovered gave Mexico a high place in oil production for many years. In the past this industry was controlled almost entirely by British and American investors. Much of the petroleum was exported to the United States and Great Britain. In 1938 the oil properties were *expropriated* by the Mexican Government, that is, they were forcibly taken from the control of foreign capitalists and taken over by the government. It is expected that arrangements will be made whereby the former owners will receive payment for the property thus taken from them.

Mexico's surface and climate. The framework of the country consists of two mountain ranges. One of these is a high range on the

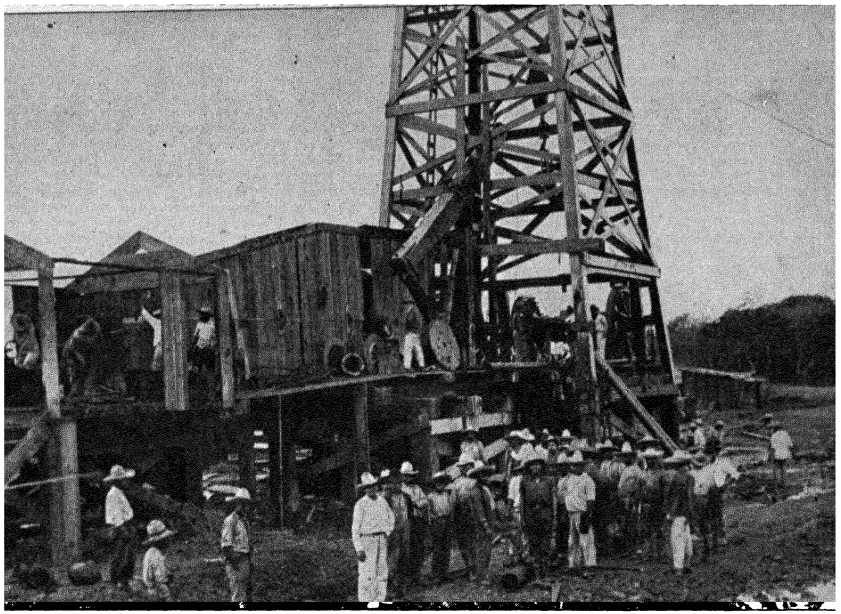


Photo from Ewing Galloway

This runaway Mexican oil well has just been brought under control, and the workers gladly pose for a picture.

west, a continuation of the Rocky Mountains of the United States. The eastern range is much lower and is separated from the higher by the central plateau, which joins on the north the Central Plains of the United States. East of the low range are low coastal plains continuous with our Gulf Coastal Plains, but of course having a much warmer climate. West of the ranges of the high Sierra Madre narrow coastal plains border the Pacific Ocean.

The country has a great variety of climate owing to great differences in latitude and elevation. The eastern plains are hot and moist; the plateau is cool with rainfall decreasing from south to north. The temperatures of the high mountains varies from that of the plateau to that of snow-covered peaks. The country lies in the belt of the northeast trade winds, thus receiving heavier rains on the east than in any other part of the country. The northern part of the plateau is largely desert.

Farm crops for home use and export. Because of the many types of climate Mexico raises a great variety of farm products. Over a large part of the eastern plain the climate is hot and moist. Here are raised rice, sugar cane, bananas, cocoa, and citrus fruits.



Courtesy of Caterpillar Tractor Co.

The tractor-drawn wagon train is loaded with fertilizer to be used on the Mexican cane fields. The ox teams are bringing cane-loaded wagons to the mill.

Farther west in the foothills of the eastern highlands coffee is one of the chief products.

Nine tenths of the people of the country live on the central plateau where the climate is temperate and the rainfall much less than on the eastern plains. There cattle and horses graze, particularly in the semiarid regions of the north. Corn and black beans (frijoles) raised on the plateau are the staple foods of the Mexican peasants. Corn constitutes nine tenths of the food of the Indian diet. It is grown and prepared as it was by their ancestors hundreds of years ago. On the plains of the Pacific Coast rainfall is light and irrigation is necessary. There are raised tomatoes, peppers, and green peas which are marketed in the United States during the northern winter. This hot lowland also produces the vanilla bean from which vanilla extract is made. From this region comes more than one fourth of the vanilla beans used in the United States.

The green gold of Yucatan. Fiber obtained from the henequen plant competes with manila fiber in making rope and binder twine used in tying bundles of wheat. Sisal fiber is not so strong as manila

hemp, but it is useful for many purposes where great strength and durability are not required. Since sisal is injured by salt water, rope made of it is not so desirable for use on ocean-going vessels. Large quantities of the fiber are exported from the port of Progreso. The growing of henequen and the preparation of the fiber brought prosperity to Yucatan.

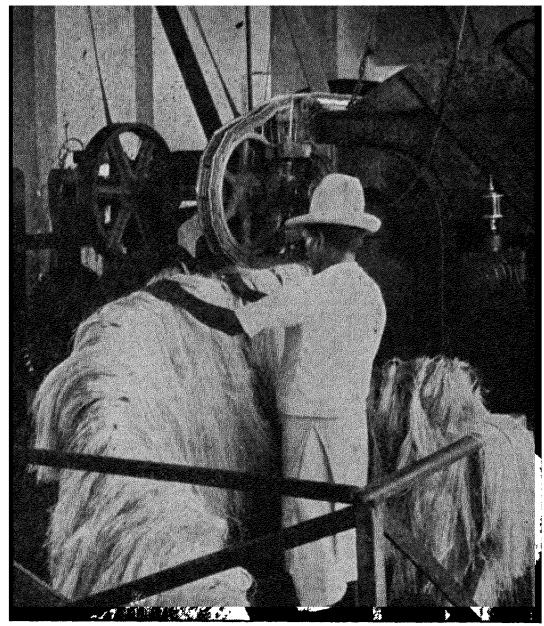


Photo from Ewing Galloway

Long lustrous fibers of sisal emerging from the machine that eliminates the pulp and other refuse. The production of sisal fiber is Yucatan's chief industry.

Formerly the United States received nearly all of its import of sisal from Mexico, but in recent years the British in East Africa and the Netherlanders in Netherland India have established plantations for raising henequen. Now only a little more than half of the sisal fiber imported comes from Mexico. British East Africa and Netherland India together supply more than one third.

The raising of henequen is about the only industry of Yucatan. The plant has long, tapering, fleshy leaves with strong fibers running from end to end. Formerly the fibers were separated from the pulp by hand, but this was a slow and tiresome process. Now the work is done quickly and efficiently by machine. The growth of the industry has been due largely to cheap and rapid machine methods of production. After separation the fibers are dried and baled for transportation.

Where we get our chewing gum. The substance of most of our chewing gum is *chicle*, the hardened juice (latex) of a tree growing chiefly in Mexico and British Honduras. The latex is obtained from the trees in much the same way that rubber trees are tapped. The latex is hardened by boiling and drying. It is then pressed into

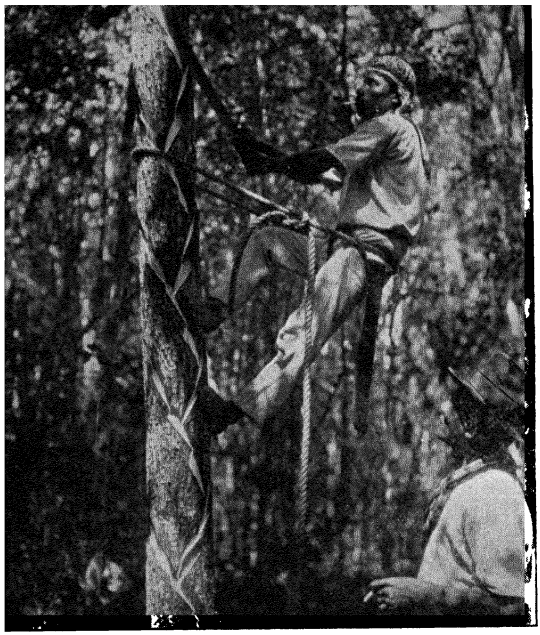


Photo from Ewing Galloway

Hunting the chicle, from which chewing gum is made, in the jungle forests of Yucatan. American advertising has set the jaws of the world in motion—the chewing habit has spread to all corners of the globe.

blocks for shipment. When it reaches the factory in the United States, it is mixed with small quantities of other substances, flavored, and put up in the form that we know so well. Crude chicle is exported to the United States and Canada. The value of that imported by the United States alone is more than one and one half million dollars. The value of the chewing gum exported from our country is equal to two-thirds that of the chicle imported.

Undeveloped resources. Only one fourth of the arable lands are cultivated, and on these primitive methods are used. The mines would yield larger returns if there were a stable government to make investments safe. The country has extensive forests rich in pine, spruce on the higher lands, and mahogany and rosewood on the low, hot plains. Eventually the world will make use of these partially developed forests.

There is opportunity for development of the tourist trade, which is constantly increasing. Tourists are attracted by the beautiful scenery of parts of the country, by the many places of historic interest, and by the customs and handicrafts of the people. Much of their handiwork, consisting of pottery, glassware, and embroidery, is brought back by the tourist and is also offered for sale in all parts of the United States.

Tourists reach Mexico by steamship lines and by a railway which connects the United States with Guatemala on the south. A line also connects the Gulf Coast with the Pacific Coast. The country

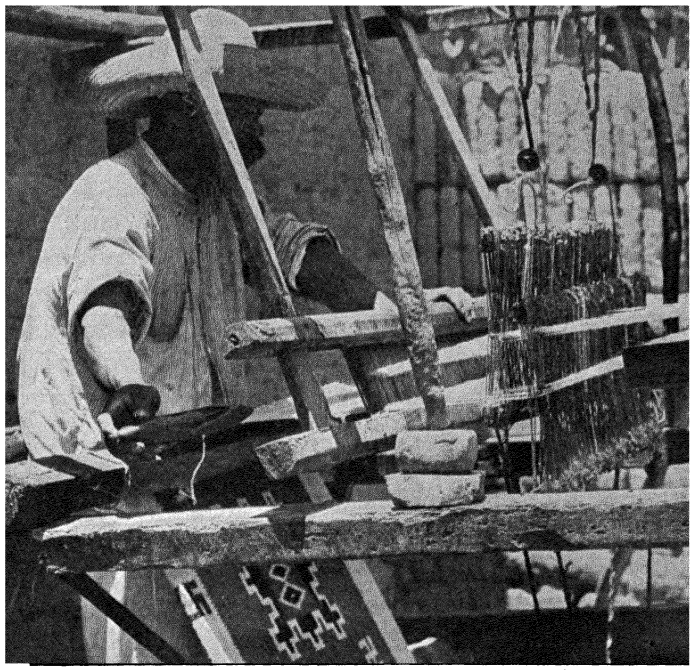


Photo by James Sawders

A serape weaver at his loom in San Miguel, Mexico. Most of the manufacturing in this country is done in small factories or in the homes with native products for the raw materials.

has several good airports and is served by Pan-American Airways. An air line connects Yucatan with Cuba.

There is little manufacturing. The chief manufactured articles are foods and beverages. There are several hundred small plants manufacturing textiles and shoes; yet nearly all the country's manufactured goods are imported.

A country depends upon its people. Humboldt, a noted geographer, once compared Mexico to a beggar sitting on a bag of gold. The gold, of course, is the country's resources. The beggar represents the poor backward people of the country. The development of resources and an increase in prosperity await a sound government and an awakened people.

The early conquerors, the Spanish, were not interested in Mexico except for the wealth which they could take from the country and ship to Spain. Agricultural lands were divided among the Spanish while the poor natives were little better than slaves. In the past

few years there has been a determined effort to break up the large estates into small areas and distribute them among the people. Many large holdings of foreign owners have been seized for this purpose.

As in our own country, the original inhabitants were Indians. More than half the present population are of mixed race, resulting from the intermarriage of the Spanish and the Indians. Thirty per-cent are Indians and only fifteen percent are pure whites. The latter are well educated; they control the wealth and constitute the influential portion of the population. The Indians and many of the mestizos form the laboring classes, or *peons*. Education and ownership of property will no doubt lead to greater interest in public affairs and in the welfare and progress of the country.

Mexico's foreign commerce. The chief exports of the country are metals, including silver, gold, lead, zinc, and copper. Then in order of importance come petroleum and its products, gasoline, and lubricating oils. Mexico has two of the largest refining plants in the world. Other exports of importance are cotton and coffee.

Among the leading imports are foods, machinery, equipment for mines and oil wells, automobiles, and chemicals.

Guides to Study

1. Why are the people of the United States interested in Mexico?
2. How does the mineral output of Mexico today differ from that of past centuries?
3. How can old maps aid in locating new oil deposits?
4. Why do Mexicans prefer to manage their own oil wells?
5. What physical divisions of Mexico are similar to those of the United States?
6. In what respects do the products of corresponding divisions of the two countries agree? In what ways are they unlike?
7. Why does the climate of one part of Mexico differ greatly from that of other parts?
8. Why are there relatively few people in the eastern and western parts of the country?
9. What products of Mexico come to the United States? Why?
10. How do climatic conditions in East Africa and Netherland India compare with those of Yucatan?
11. What is *chicle* and how is it prepared for market?
12. What can Mexico do to increase its tourist trade?
13. What is necessary for the greater development of Mexico's resources?

14. What does the list of Mexico's exports tell of the country's resources and industries?

15. How do the decorations on Mexican manufactures reveal the life of the people?

Research for Students

1. Topics for special reports: (*a*) The conquest of Mexico by the Spanish; (*b*) The acquisition of Mexican Territory by the United States; (*c*) The oil wells of Mexico.

2. Make a list of Mexican products found in your homes or for sale in local stores.

3. Prepare an exhibit made up of Mexican products and pictures of Mexican products.

4. Make a poster contrasting the life and products of Mexico with those of the United States.

3. CARIBBEAN LANDS–THE NEW WORLD OF COLUMBUS

Treasures old and new. The northern coast of South America and the bordering waters are the *Spanish Main* of the early explorer and pirate. It was here that Columbus first saw the land of the New World and believed that he had reached India. Here came Spanish explorers and pirates of many nations in search of gold and silver. As a safeguard treasure was often buried on shore. Many a search has been made in the hope of finding some of this hidden wealth. Stevenson's *Treasure Island* is a fascinating story of such a quest.

All the Caribbean lands were conquered and for a long time controlled by foreign nations. Nearly all have since gained their freedom. Only the Guianas, British Honduras, and some of the smaller islands still remain colonies of European powers. Ships sailing the Spanish Main in our day carry little gold and silver. The treasure consists rather of fruits, sugar, coffee, and petroleum. Our interests in the region are very great because of the investments of American capital and because of nearness to the Panama Canal and to the United States itself. Nearly all the lands carry on a greater commerce with us than with any other country.

Central America

Tropical America. The surface of Central America is in general similar to that of Mexico. There are low, hot plains on either side

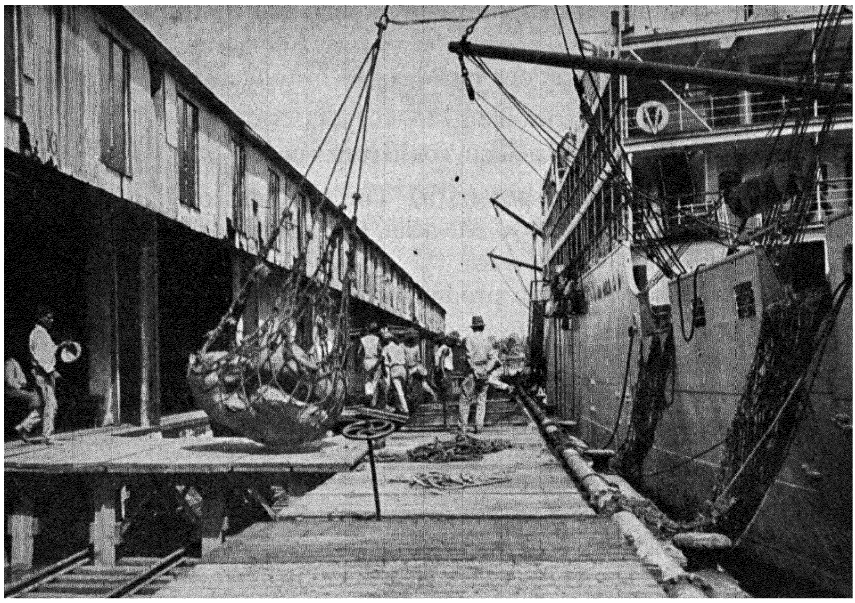


Photo by James Sawaers

Loading coffee on an American ship at Puerto Barrios, Guatemala. This coffee was grown in the highlands of Central America.

with highlands between. Because of the disagreeable and unhealthful climate of the lowlands, the inhabitants live chiefly on the uplands where the temperatures are lower and the rainfall is less. In what other country did you find a similar condition?

All the countries of Central America lie within the tropics. Foreign nations are interested because of their tropical products and because of the markets offered for manufactured goods. On the hot, rainy plains on the east are banana plantations, financed and managed by Americans and cultivated with the help of negro labor. Throughout all tropical America the negro is better able to withstand the heat than the native Indian. There are plantations raising sugar, cotton, and rice on the western plains, and on the plateaus and the low mountain slopes bordering the lowlands coffee is raised. The coffee, which in general is superior to that of Brazil, is exported largely to the countries of Europe. The United States is the chief importer of mahogany and other cabinet woods of the tropical forests. In exchange for the products of plantations, mines, and forests Central America looks to the outside world, especially the United States, for textiles, flour, and petroleum products.



Photo by James Sawders

This banana plantation near Quirigua, Guatemala, has its own narrow-gauge railroad with its donkey locomotive to transport the bunches of fruit to the port for shipment to foreign lands.

Bananas everywhere. Throughout the year, winter and summer, we see yellow bananas on the shelves of our fruit shops and grocery stores. The sight is so common that we do not give them a second thought. Yet, not more than fifty years ago, bananas were not nearly so common as they are today, and the supply was more or less irregular. In the earlier days of the banana trade it was common for the fruit dealer or the grocer to suspend a large bunch of bananas from the ceiling with the fruit pointing downward and to cut the fruit from the large stem with a curved knife as they were sold. This method is followed in some of the smaller stores even now.

The fruit probably originated in India and gradually moved westward to the Canary Islands and from there to American shores. Bananas have become plentiful in temperate lands as the conquest of tropical diseases has improved labor conditions and as experience has taught methods of handling, ripening, and transporting this perishable fruit. In order to bring the banana to our homes in perfect condition, it must be harvested while green. People who have lived

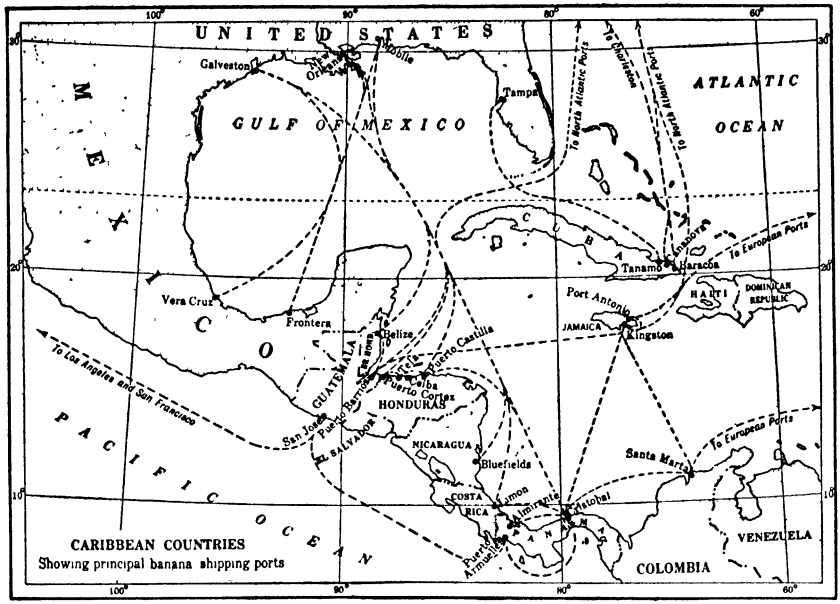
in the tropics tell us that the flavor of the tree-ripened banana is far superior to that of those harvested while green. Bananas rank high in food value. In the tropics they constitute an important item in the native diet.

Great fruit companies. We depend for our supply of bananas upon great fruit companies which were at first simply transporters of tropical products. These companies found that in order to have a constant supply of first-class fruit they must supervise its growth and handling. The first small lots were transported in sailing vessels. Boston, New York, and New Orleans were among the first ports to receive large shipments. The companies serving those ports in 1899 united to form the United Fruit Company. This company has extensive plantations in Central America, Cuba, Jamaica, and Colombia. The company employs thousands of people, owns and operates hundreds of miles of railroad in Caribbean countries, and maintains a fleet of steamers which carry the products of their banana, sugar, and cocoa plantations to the United States and Europe. Their steamers known as the "Great White Fleet" carry passengers as well as freight to and from the Caribbean. They have helped to make the Caribbean known to thousands of tourists and to make their stay comfortable by maintaining first-class hotels for their convenience.

Raising bananas. The company first selects a large tract of land accessible to a good harbor since the fruit is transported by the shipload. There must be a good supply of rain, at least 75 inches through the year, to give moisture for the twelve or fifteen months required for growth. The negro workers first clear the jungle of all underbrush and small trees.

The banana rootstock is then planted in holes about a foot deep and about twenty feet apart. Then the larger trees are cut and allowed to decay where they fall to supply fertilizer for the growing plants. Other groups of workers put up the buildings needed for the workers and the superintendents. Still others lay tracks over which the fruit will be carried to the ship. In the meantime ditches are dug to drain off surplus water. In about three months from time of planting all weeds and bushes must again be cut to give room and sunlight to the growing plants. This work is repeated several times until harvesttime. There are dangers from floods, but more especially from strong winds which may lay the whole plantation flat and ruin the crop.

Fruit ripens at all times of the year. As a banana ship approaches



the port, the plantation office is notified by wireless, immediately telephone messages are sent to all parts of the plantation, and harvesting begins. The great bunches of fruit which are borne fifteen or twenty feet from the ground are harvested by cutting a gash about half way up the stem which partially severs it. The fruit is carefully lowered to the shoulders of a waiting workman who carries it to a mule or car to be forwarded to the ship. There endless belts carry the bananas from the wharf to the ship and loading takes place rapidly. Great care is taken not to bruise the fruit at any time and while on the ship refrigerating plants maintain an even temperature of about 57° F. Upon its arrival at a northern port railroads carry the fruit to all parts of the country. The United States is the greatest consumer of bananas, but the fruit is shipped to all countries of Europe, to Canada, and even to Alaska. (*I. 85*)

The West Indies

Who owns the islands. The West Indies practically surround the Caribbean on the north and east. Cuba, Jamaica, Hispaniola, and Puerto Rico make up the Greater Antilles. The Lesser Antilles consist of groups of islands lying at the eastern end of the Caribbean Sea. These are the Windward and the Leeward Islands. To the north of Cuba are the Bahama Islands. Most of the islands of the West Indies

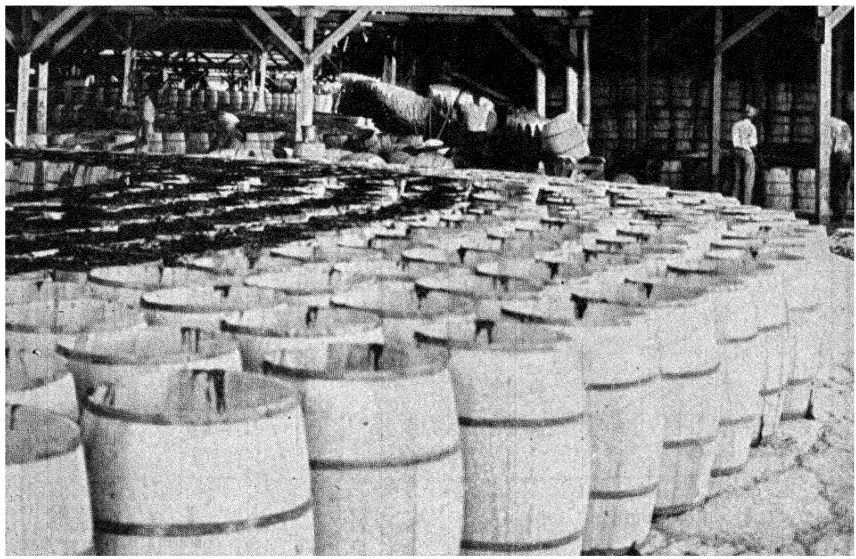


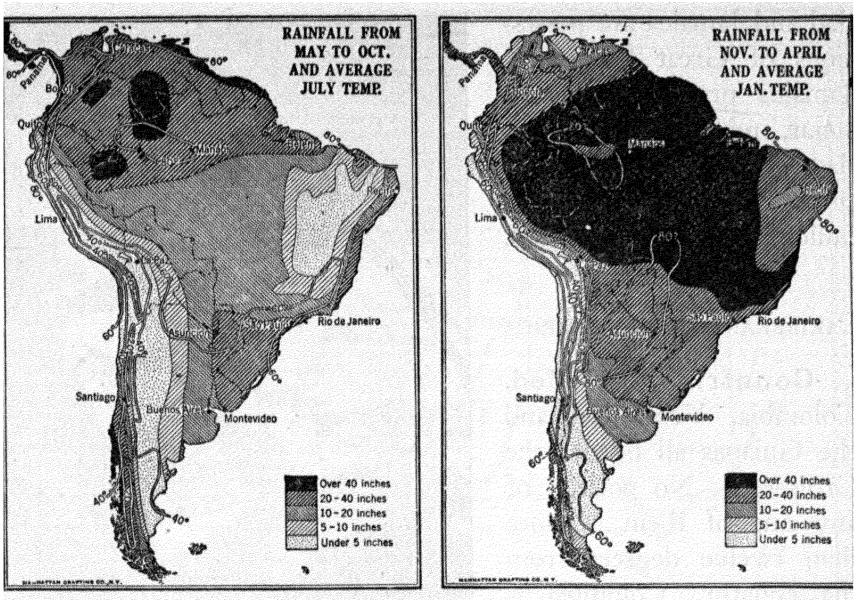
Photo by James Sawders

This asphalt lake at Trinidad seems to be an inexhaustible source of this material so necessary for road building and for other structural work. Here the barrels are being filled for export.

are possessions of the United States or other great powers. Puerto Rico and the Virgin Islands of the United States belong to us. Cuba, Haiti, and the Dominican Republic are all self-governing. Jamaica, the Bahamas, and other small islands are British. The remaining small islands are controlled either by the French or the Dutch.

Products and markets. These islands are of value to the countries of temperate lands in several ways. They serve as naval bases and as fuel stations both for naval and merchant vessels. Their cane sugar, tropical fruits, and tobacco find a ready market in northern markets. Sugar and banana plantations and mineral deposits are developed and managed mainly with foreign capital. Like most other tropical regions they furnish a good market for a variety of manufactures. Some of them, such as the Bahamas, are popular winter resorts for the people of North America and Europe. Ships conducting vacation cruises make brief stops at many of the Caribbean ports.

Cuba. This island is noted for the production of sugar, and much of the sugar consumed in the United States comes from that country



(p. 105). Tobacco is another important crop of the island. The soil of the western part of the island gives an aroma for which Cuban tobacco has long been famous. Cigarmaking is one of Havana's important industries. Much tobacco leaf is exported however, and many so-called Havana cigars are manufactured in the United States. More than one fourth of Cuba's tobacco crop comes to the United States. The city of Tampa with scores of cigar factories, many of them operated by Cubans, is especially noted for the manufacture of Havana cigars. Cuba is a source of some winter vegetables and tropical fruits. Vegetables include tomatoes, eggplant, peppers, cucumbers, and potatoes. Among the tropical fruits are pineapples, bananas, and grapefruits.

The minerals of Cuba are iron, copper, and manganese. The ores are shipped chiefly to smelters and refineries along our Atlantic Coast. Water transportation from Cuba gives our eastern smelters cheaper ore than that brought from the West by train. Cuba's trade is mainly with the United States. The country is a market for American manufactures. American owners of plantations, sugar mills, and mines naturally turn to their own country for equipment and supplies.

Other islands of the Caribbean. Tropical products are characteristic of all the islands. Coffee, sugar, and tobacco are the leading products and exports of Haiti and the Dominican Republic. Trini-

dad and Jamaica are possessions of Great Britain. Jamaica produces bananas, sugar, and coconuts. Trinidad ships from its famous pitch lake asphalt for road-building and other purposes.

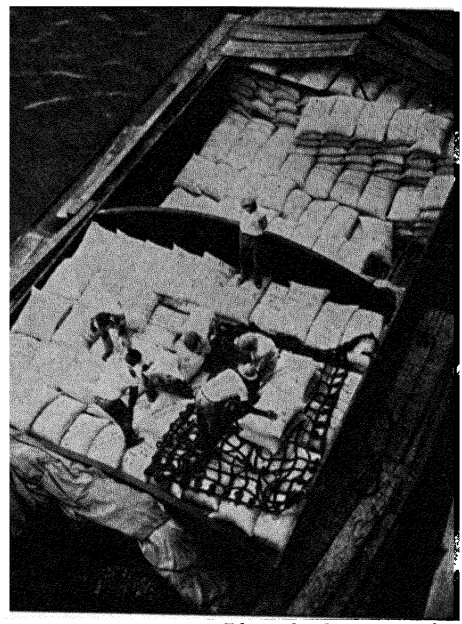


Photo by James Sawders

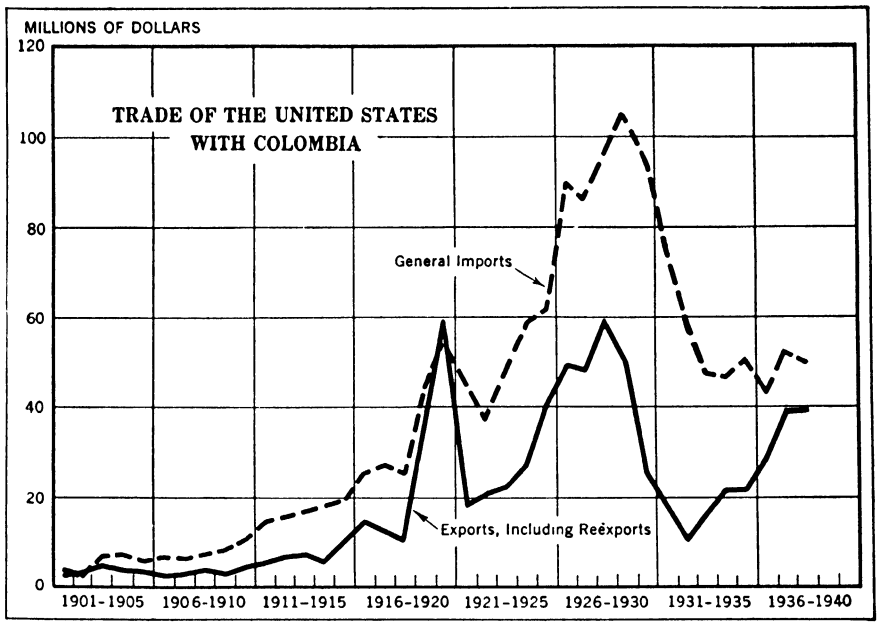
Bargelike lighters laden with sacks of coffee grown in the Colombian highlands come to the ships from other lands waiting in the harbor of Cartegena.

Caribbean South America

Countries included. Colombia, Venezuela, and the Guianas all border the Caribbean. No portion of any one of them is more than twelve degrees from the equator. Colombia is crossed by that line and the southern borders of Venezuela and the Guianas come within two or three degrees of it. For this reason the lowlands are hot and in rainy seasons very wet and unhealthful. The few white people live in the highlands where the climate is more agreeable. The great majority of the inhabitants are Indians, negroes, and those of mixed race, known as *mestizos*.

Colombia. In this country, named after the discoverer of America, the Andes run in three nearly parallel ranges in a general north and south direction. Between the ranges are plateaus and broad valleys. The great eastern plain lies in the basins of the Amazon and Orinoco Rivers. On the foothills of the mountains are many plantations where coffee, the chief crop of the country, is raised. In quality it is considered superior to that of Brazil. Coffee makes up more than one half of the exports of the country, the most of which comes to the United States. On the low plains at the north the United Fruit Company has large areas devoted to the growing of bananas. Nearly half the crop is shipped to the United States and the rest to European countries.

The minerals of Colombia rank next to its agricultural products

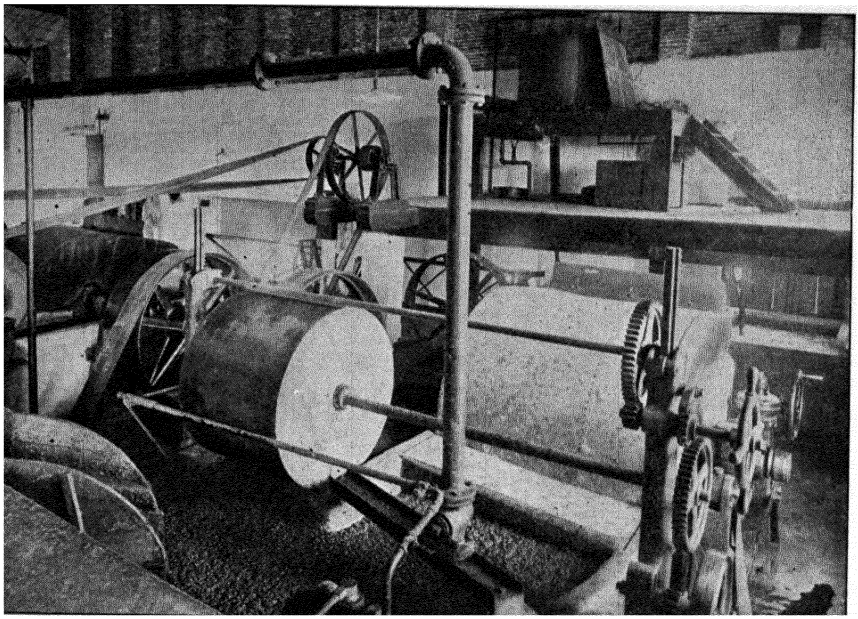


in value. Under the rule of Spain millions of dollars' worth of gold was taken away in Spanish galleons. Even today gold next to petroleum is Colombia's most valuable mineral export. Colombia is excelled only by Canada and Russia in the production of platinum. Some years ago the streets of one of Colombia's towns were dug up in the search for this rare metal. It is obtained mostly by dredging from river gravels. The United States obtains its supply of platinum chiefly from Great Britain and Colombia. Great Britain gets its supply by refining Canadian ores.

Petroleum is produced in the Magdalena Valley by an American Company. Much of it is shipped to the United States. Since there is little manufacturing in Colombia, the country imports a great variety of manufactured goods. The United States supplies cotton textiles, machinery, radios, automobiles, buses, and equipment necessary for plantations, oil wells, and mines.

The country has a little less than 2000 miles of railroads. Much of the transportation within the country is by river and on muleback. The journey from the Caribbean coast to the capital, Bogotá, requires a week. The same distance could be traveled in the United States in twenty-four hours.

Venezuela. The country has a great variety of surface and climate. In the northwest the Andes enter the country and extend



Courtesy of Venezuela Consulate

Interior of a Venezuelan paper mill. The machine here grinding the pulp is quite different from our modern machinery.

eastward along its northern border. Two of the ranges surround the low, hot plain in which Lake Maracaibo lies. East and south of the mountains are the great prairies, or *llanos*. Extending southward from the llanos are low mountains.

Although agriculture is the leading occupation of the people, the value of production is not great for a country larger than Texas and New Mexico combined. Coffee and cacao beans are the principal agricultural exports. Venezuela stands third in the production of petroleum following the United States and Russia. Much of the petroleum is shipped from the wells in the Lake Maracaibo district to the island of Curaçao (belonging to the Netherlands), where it is refined and the products exported.

The imports are similar to those of other Caribbean lands. They include cotton textiles, foods, and equipment for oil wells, automobiles, and trucks. The country is building some excellent highways. One of these runs westward to the Colombian border over Andean passes 14,000 feet in height.

The Guianas—British and French—and Surinam. These countries are developed even less than Venezuela. They are the only

portions of the continent that are not self-governing. France has used its possession as a penal colony since 1883 but popular opinion at home will probably lead the government to discontinue the practice of sending criminals to Devil's Island.

The low plains of the coast yield sugar cane, rice, cacao, and coconuts. The plateau to the south has not been fully explored. Bauxite, the ore of aluminum, is mined and exported from both British Guiana and Surinam. Gold and diamonds are other mineral products. The trade is largely with the governing countries.

Guides to Study

1. Why was a region in the western hemisphere known as the *Spanish Main?*
2. How does the treasure of the region today differ from that of olden days? Why?
3. Why is the United States interested in Central America?
4. Describe the work necessary to raise bananas and prepare them for distant markets.
5. Why is the banana industry under the control of large companies?
6. Why are nearly all the islands of the West Indies under the control of foreign countries?
7. Of what value are the islands to the people of temperate lands?
8. What are the chief resources and industries of Caribbean South America?
9. What resources of the region are developed by foreign capitalists and what ones by the inhabitants? Account for the differences.

Research for Students

1. On an outline map of the Caribbean region print the names of all countries and the larger islands. Locate and print the names of principal cities.
2. Why is there more rainfall on eastern coasts than on western?
3. Make a special study of the conquest of malaria and yellow fever in the Caribbean region.
4. Collect pictures or make simple drawings of the work on banana plantations.
5. Make a list of products of Caribbean lands which come to the United States; another list of products which those lands receive from the United States.
6. What is the "Monroe Doctrine"? Why do we insist on its observance?
7. What is meant by Pan-Americanism? Make a brief report of the importance and necessity of this movement.

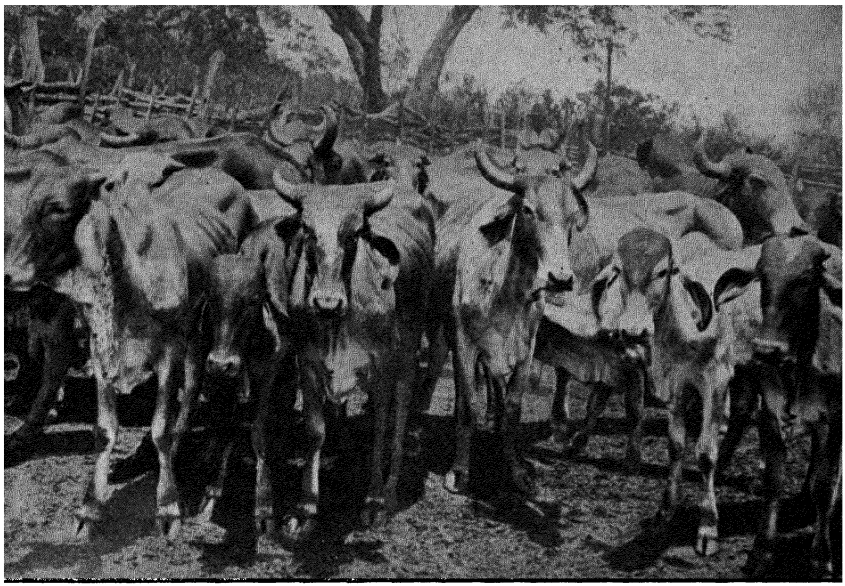


Photo by James Sawders

Cattle in Bahía, Brazil. A crossbreed of native stock and zebu cattle imported from India which has proved extremely resistant to ticks and the other pests so prevalent in tropic lands.

are mahogany, rosewood, and ebony. Transportation is extremely difficult and the trees of a single species are widely scattered.

Resources and commercial products. The resources of the Amazon Valley are products of the forests. On the eastern plateau the one great crop is coffee. Cotton, tobacco, and sugar cane are grown over large areas of the country and the possibilities for the production of each is almost unlimited. Corn is raised in every state of Brazil. The country has extensive plains with abundant grass for grazing cattle. There is a great variety of mineral deposits including gold, manganese, and iron.

Coffee. The greatest coffee-producing area is on the plateau near the tropic of Capricorn. Although soil, land surface, and climate are almost ideal, frosts do sometimes occur and do great damage. About twenty years ago a severe frost did great harm to both crop and trees. Immediately the price of coffee in the world's market was doubled. Each year as harvesttime approaches, coffee dealers the world over are interested in Brazilian weather. A frost in Brazil may increase the price of a cup of coffee anywhere in the world.



Photo by James Sawders

On the coffee docks at Santos—the greatest coffee port in the world. The tall buildings in the background are flour mills where imported wheat is ground.

Cotton. This fiber is native to Brazil and was used by the Indians before the coming of white men. The climate is suitable for cotton all the way from the state of São Paulo to the Amazon Valley. In recent years the Japanese, the greatest consumers of raw cotton, have been deeply interested in Brazil's cotton crop. Of the 200,000 Japanese in Brazil many are engaged in growing cotton. Cotton planters in the United States are concerned to see that Brazil is gaining markets formerly supplied with American cotton. The annual yield in Brazil is three and a half times as large as it was ten years ago.

Other Brazilian farm products. For more than a hundred years European countries looked to Brazil for their supply of cane sugar. But the increase in the plantings of cane in the East and West Indies and the rapid spread of the beet-sugar industry greatly reduced the markets for the sugar of Brazil.

Tobacco was used by the Indians in South America before the days of Columbus just as it was in North America. The principal tobacco-growing region of Brazil is near the port of São Salvador



Photo by James Sawders

This tobacco experiment station in the state of Bahía is maintained by the Brazilian government. Every type of tobacco known is planted and every approved system of cultivation is used in the search for the ideal type and system suited to the soil, climatic conditions, and market.

(Bahía). Other agricultural products raised in quantities sufficient for export are rice and oranges.

Raising cattle for beef. The high plains of Matto Grosso offer almost unlimited grazing lands for cattle. But in the warm, moist climate the cattle suffer from diseases and insect pests to an extent not known in more temperate lands. Cattle immune to disease have been imported from India, but the meat is much less desirable than that of European stock. Blooded stock has been imported from the United States and Europe to improve the Brazilian herds. The first meat-packing plant was established in 1913. Now the value of the animal products exported is exceeded only by that of coffee and cotton. Besides cattle the country supports millions of swine, sheep, and goats.

The minerals of Brazil. Until the discovery of the diamond mines of South Africa Brazil was the chief source of diamonds. The country yields a small number of gems of fine quality but a much larger number of black diamonds called *carbonadoes.* The black

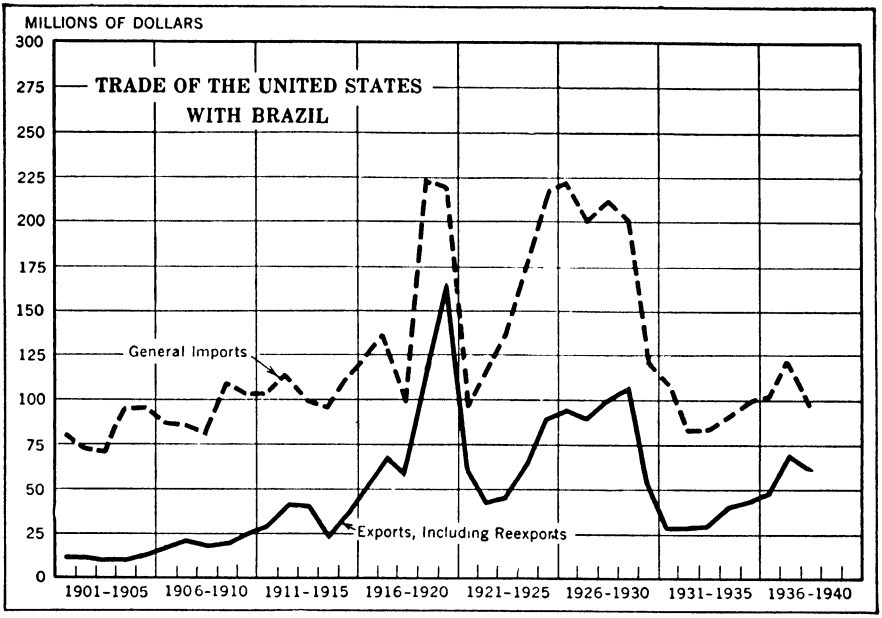


Photo by James Sawders

An outcrop of manganese ore of which Brazil is one of the large producers. We use manganese in making steel alloys for various industrial purposes.

diamonds are used on drills for cutting rock and on other tools for cutting or turning hard substances. Brazil has vast deposits of iron ore that have yet hardly been touched. With an eye to future needs British and American capitalists have acquired ownership of a large part of the deposits. Greater demand for steel and better means of communication will no doubt lead to the working of these rich resources. The lack of coal suitable for making coke is still another reason for the slight progress of Brazil's iron and steel industry. Few countries possess manganese in any large quantity. Brazil is one of the lucky few and manganese for making steel finds its market mainly in the United States.

Industrial Brazil. Manufacturing is handicapped by lack of good coal and by poor transportation facilities. Limited means of transportation leads to production on a small scale in widely separated parts of the country. The more difficult it is for a region to exchange goods with other parts of the world, the more nearly self-sustaining that region must be. São Paulo leads all other states in manufacturing as it does in nearly all the country's activities. The



great output of coffee gives it better connection with other parts which in itself is a stimulus to greater and more efficient production. The spinning and weaving of cotton takes the lead of all Brazilian industries. It is protected by a tariff high enough to keep out all cotton textiles except those of the finest quality.

In southern Brazil is the most valuable softwood area in all South America. The lumber milled from Paraná pine is widely used in Brazil and is exported to Argentina and Uruguay. We may therefore add lumbering to Brazil's important industries. Other smaller industries are the smelting of iron, the manufacture of tobacco, and the refining of sugar.

Trade with other lands. Brazil's exports are the products of its plantations, forests, and mines. The leading exports in order of value are coffee, cotton, animal products including meats, hides, and skins, and cocoa. The only articles appearing in its list of exports which could be rated as manufactures are the products of meat-packing establishments, sugar refineries, and tobacco factories. The leading imports of the country are foods, the most important of which are wheat and wheat flour coming chiefly from Argentina and the United States. Much of the wheat imported as well as that raised at home is milled in Rio de Janeiro, thus making that city an important milling center. Machinery, automobiles, and trucks stand



Photo by James Sawders

Port of Bahía looking down from the upper city toward the lower town and the harbor with ships awaiting cargoes of cocoa, coconuts, vegetable oils, tobacco, and other products from various parts of the state of Bahía.

high on the list of imports. These products come largely from the United States. Brazil has no petroleum of its own; therefore petroleum and its products constitute important imports. These products too are chiefly from the United States. (*I.* 375)

Brazil's leading ports. *Rio de Janeiro* is the capital and largest city of the country. It is noted for its picturesque harbor and for the beauty of its parks and public buildings. *Santos*, the chief city of the state of São Paulo, is the leading coffee port of the world. *São Salvador* (Bahía) to the north is the center of the cocoa and tobacco industries. *Recife* (Pernambuco) exports cotton and sugar, and *Belém* (Pará) was for years the world's leading rubber port. In later years it gave way to Singapore of the Malay Peninsula. Besides some rubber Belém exports Brazil nuts and lumber. (*I.* 114)

Paraguay

Paraguay is a country of little commercial importance. Its population is ninety percent Indian and mestizo. Its inland location tends



Photo by James Sawders

Paraguayan women cutting the shoots and leaves from the Ilex tree (a species of holly). This is the tree that produces maté, or Paraguay tea, from which a stimulating drink is made that is greatly relished in South America. Cans of maté can be bought also in our stores.

to hinder world contacts and to make the country more backward. Its communications and trade are almost wholly with bordering countries by way of the Paraguay and Paraná Rivers. The leading occupation is cattle raising and the chief exports are animal products, such as hides and skins, beef extract, and canned beef. Next in order of value stand the forest products. Quebracho extract and quebracho logs used for tanning leather are products of Paraguay as well as of Argentina.

Yerba maté, or Paraguay tea, is of considerable commercial importance in southern South America. The small tree producing it grows wild and to some extent is cultivated in Paraguay and southern Brazil. Both these countries export the tea to Argentina and Uruguay. The tea is cured by passing the branches quickly through the flame of a hot fire. It is said to have no harmful effects, and it enables those who drink it to do hard work with less fatigue. Its sale and use are limited almost wholly to countries bordering the areas of production. Argentina is the chief importing country.

Minerals are believed to be abundant but are yet unexploited, largely because of lack of fuel for smelting and poor transportation facilities.

Guides to Study

1. How does the climate of the Amazon Valley differ from that of the Mississippi Valley? Why?
2. The Amazon Valley is rich in resources. Which of these resources are most likely to be developed in the future? Why?
3. The output of Brazilian cotton is increasing rapidly. Give reasons for this increase.
4. Why is Brazil unable to raise cattle as successfully as Argentina? What part of the country is best adapted to cattle raising? Why?
5. What use will probably be made of Brazil's deposits of iron ore in future years?
6. What conditions in Brazil favor the development of manufacturing? Which of the country's products could best be used as raw material in its own factories?
7. Why is the foreign trade of Brazil so largely with the United States?
8. Paraguay is the most backward country of South America. Account for this fact.

Research for Students

1. Special report: The Ford rubber plantations in the Amazon Valley.
2. On an outline map of Brazil show the locations of the chief cities and the railroad lines. Why is the railway mileage of the country so small? For what is each city important?
3. On the same outline map indicate the principal areas devoted to the raising of coffee, cocoa, tobacco, and cotton and to cattle raising.
4. Make line graphs showing the relative position of Brazil in the production of coffee, cotton, and rubber. (See Tables in the Appendix.)

5. ARGENTINA AND URUGUAY—LANDS OF GRAIN AND CATTLE

Argentina

The market basket of Europe. Our Middle West with its hundreds of miles of waving wheat and corn has been called justly the *breadbasket* of the United States. The packed cities of industrial Europe look to Argentina for food supplies—for wheat, beef, and

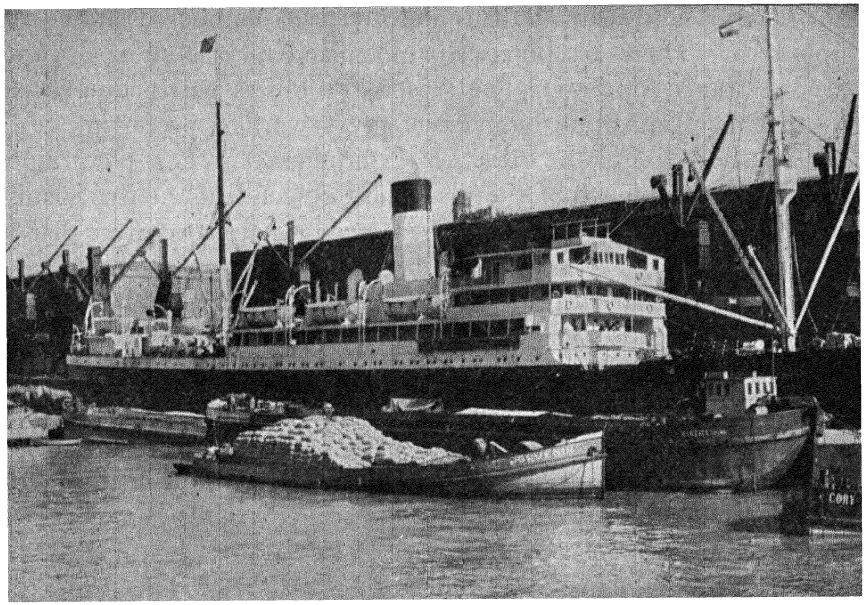


Photo by James Sawders

Argentine wheat being loaded from lighters in the harbor of Buenos Aires. Wheat from Argentina is exported in competition with that of our country and with Canadian wheat.

mutton in enormous quantities. From the ranch and the farm come the products that have lifted Argentina to its high place in world commerce. It surpasses all other nations in exporting beef and corn; it occupies second place (sometimes third) as an exporter of wheat; it stands second as an exporter of mutton. No wonder Argentina has been called the *market basket* of Europe.

With some of the money resulting from this successful trade, Argentina turns to the United States to supply itself with modern farm equipment. It buys tractors, reapers, and other farm machines, as well as automobiles. Thus the Argentine farmer keeps not only European factories busy and European workers employed and fed, but American farmers and factories as well. Truly a great trade cycle has its mainspring here in South America.

Progressive people. No other country of South America has so large a proportion of white people of pure European stock. The climate and the many resources have favored the settlement of the country by progressive peoples. While the majority of the inhabitants are of Spanish origin and Spanish is the language of the coun-

try, there are also many Italians and Germans numbered among the population. There are practically no mixed races here as in other parts of South America. The reason for this is partly due to the fact that the original inhabitants were very warlike, preferring death to submission and were therefore exterminated. The picturesque Gauchos, the cowboys of the plains, are descendants of the Spanish and the Indians. The form of government is patterned after that of the United States. It is very much to the credit of the Argentines that all their boundary disputes have been settled by arbitration.

Four regions of Argentina. The Andes Mountains form the western boundary of Argentina. The rest of the country is generally level. There are four distinct natural regions: the Gran Chaco, the pampas, Patagonia, and a desert belt that parallels the Andes Mountains. The differences in the crops and the occupations of these four regions are due to the variations of climate, especially rainfall.

The *Gran Chaco* is a name applied to a section of South America, part of which is included in northern Argentina. The Argentine Gran Chaco lies in the northern part of the republic. It has a warm, moist climate and is covered with open forests of quebracho and other trees. The quebracho is very valuable because its bark, sapwood, and especially its heartwood are rich in tannic acid. The quebracho requires a semitropical climate and an abundant rainfall.

South of the Gran Chaco lie the *pampas.* Level, fertile, usually well-supplied with rain, the pampas constitute "one of the garden spots of the earth." The soil has been washed down from the mountains and not a stone can be found for hundreds of miles. Here is where the great crops of wheat, corn, and flaxseed are raised; here also is a vast natural pasture where innumerable cattle graze. The climate is so mild that no barns or sheds are needed to house the cattle. All the year round they can remain in the open fields. No wonder that wealth flows to the owners of the enormous ranches as the result of the exportation of meat and meat products.

Patagonia, lying south of the pampas, is the least productive part of Argentina. The rainfall is light because the Andes cut off the moist westerly winds from the Pacific. The winters are unpleasant always and in the south exceedingly cold. This is no place for crops; bunch grass and scrub cover the land which is suitable only for sheep raising. There are 10,000,000 sheep in Patagonia.

The fourth region of Argentina is the *desert belt* that lies east of the Andes and west of the Gran Chaco and the pampas. This is

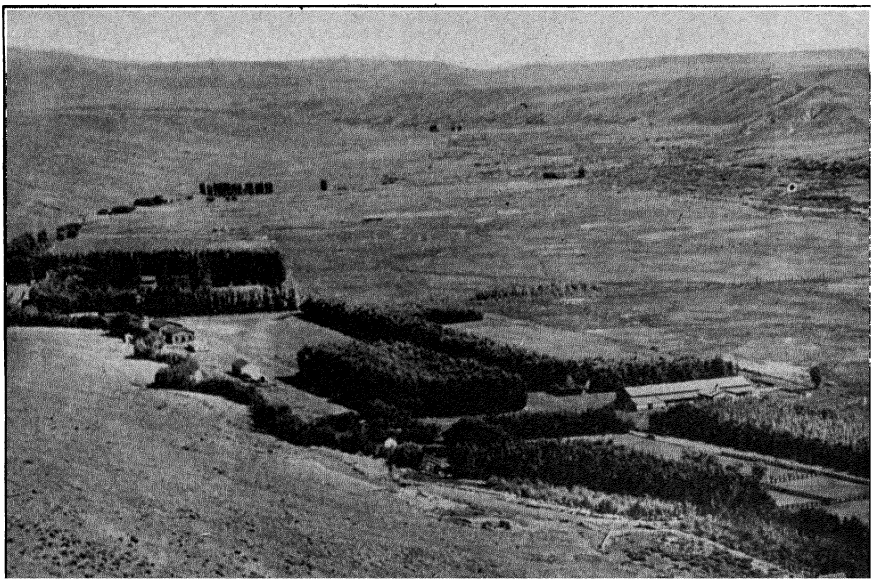


Photo by James Sawders

This otherwise forbidding landscape is a Patagonian ranch with trees planted as a protection against ravaging winds.

practically a rainless country. The section is too far from the Atlantic to benefit from the moisture carried by the southeast trade winds; the lofty Andes cut off the winds from the Pacific. Irrigation is the only hope of this region. Water is brought from rivers of the Andes and, in areas thus irrigated, some agriculture can be carried on. The provinces of Tucumán, San Juan, and Mendoza are the most important of the irrigated regions.

To sum up, Argentina's great advantages are its temperate climate, its level surface, and its soils suitable for grazing and agriculture on an extensive scale. Its areas of greatest production are near the sea; so there are no expensive hauls for grains, meats, hides, or wool when being shipped to foreign countries.

Network of railroads. The flat level country east of the Andes is an ideal surface for railroad construction (*Pl. 4*). The railroads are largely limited to the region within a few hundred miles of Buenos Aires. Here lie the great areas of wheat, corn, and flaxseed; here are the extensive ranches with their millions of cattle, sheep, and goats. The vital center of all this wealth is Buenos Aires, the capital.

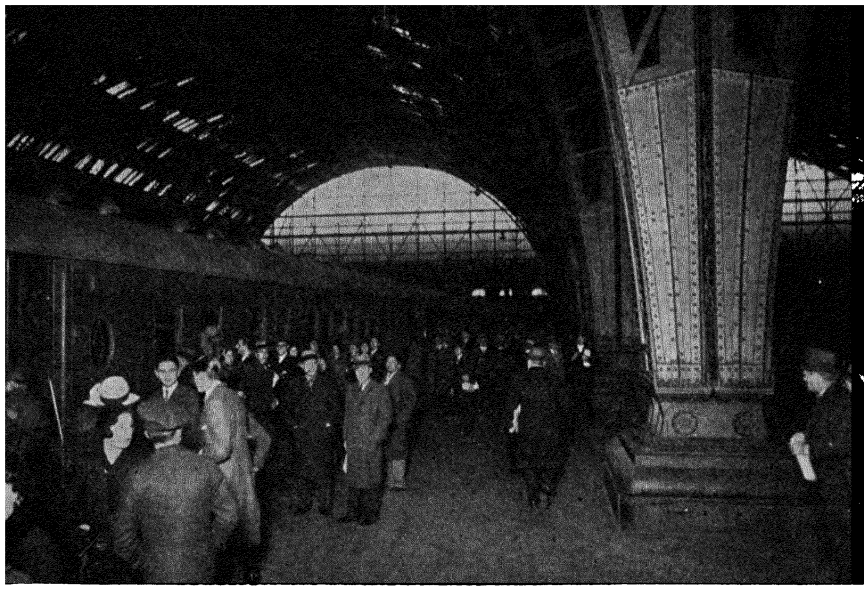


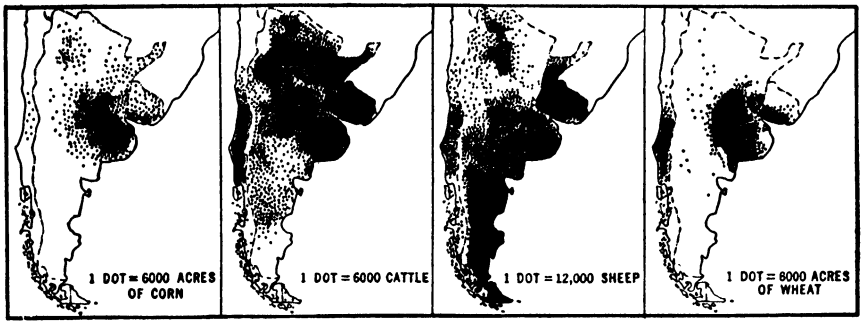
Photo by James Sawders

An express train of the Central Argentine Railway about to depart from Buenos Aires for Cordoba and other points in the interior. The Argentine railway system uses English type coaches.

There are over 25,000 miles of railroads in Argentina, mostly owned and operated by British investors. The terminal stations in the capital are large and impressive.

A great granary. Wheat, corn, and flaxseed are the chief crops and are largely exported. As we have learned, the best farming lands are on the pampas, within three hundred miles of the ports of Buenos Aires and Rosario. Here the moderate temperatures are better for grains than the more tropical regions to the north. Here too the rainfall is heavier than it is in the west or the south. As in our own country, the ranches cover thousands of acres. Planting, cultivating, reaping, and threshing are done by means of modern agricultural machines imported from the United States.

After being threshed, the grain is poured into bags. Great numbers of these bags are stacked out of doors and are protected from the weather only by a cover of canvas. Later the sacks are loaded on enormous carts for transfer to the railroad stations. As there is no stone on the pampas for road building, the roads are of soft dirt. Consequently the carts have great wheels, eight and ten feet in diam-



eter. The grain elevators at the ports cannot shelter all the grain; therefore, much must be left in the open until there is an opportunity for shipment.

Of all the cereals wheat takes first place in the export trade of the world. Argentina is one of the leading countries in the production and exportation of this cereal. It exports more than half of all the wheat raised. Much of the wheat is exported in the form of flour. Brazil and Great Britain are heavy buyers.

Less than one fourth of the farm land of Argentina is given over to corn, and the entire yield is much less than that of the United States. Yet Argentina exports more than three quarters of its crop while we export not more than two percent. This striking contrast is due to a marked difference in the feeding of domestic animals. The United States uses more than half its corn in fattening cattle and hogs. Argentina, having few hogs and using alfalfa for cattle feed, can export most of this valuable grain.

Flaxseed, like wheat and corn, is raised on the pampas. As a crop, it takes much from the fertility of the soil, but it is little harmed by drought or sultry weather. As you have already learned (p. 128), Argentina is the greatest exporter of flaxseed, nearly one fourth of which comes to the United States. Among the exports of Argentina, flaxseed ranks third in value. Other important crops are cotton, sugar, and grapes.

Alfalfa. Alfalfa is a kind of clover with very long roots, which enable it to resist drought and to thrive even in arid regions where most grasses would die. Vast areas of wastelands have been made useful by this astonishing fodder plant. In the mild climate of the pampas alfalfa supplies the cattle with food all the year round. Use of this crop is the basis of the successful cattle industry of today. It has been said that this crop has brought to Argentina wealth far



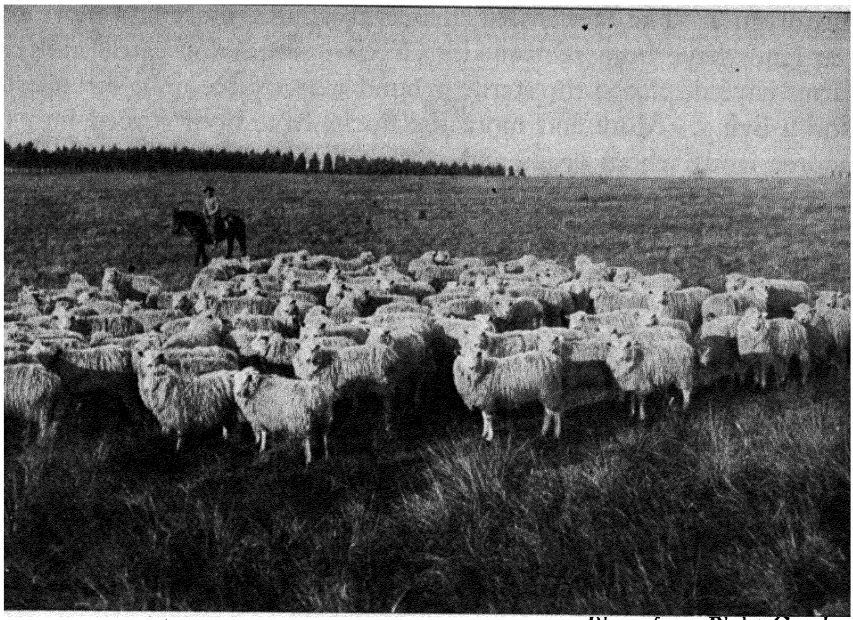


Photo from Philip Gendreau

A sheep ranch in southern Argentina. The animals are growing heavy fleeces to protect them in the cold damp climate of the Argentine winter.

to Europe; to the United States it sends large quantities of canned beef.

Trends in dairying. In the early part of the present century there was a great advance made in the scientific handling of milk, butter, and cheese. Large well-equipped factories were located near Buenos Aires and other large cities where consumption is greatest.

Argentina exports about one quarter of the butter produced. Great Britain is the country's best customer. Another dairy product of growing importance is *casein* This substance is a product of skim milk used to make certain kinds of paint and glues and plastics, to coat paper, and in printing wallpaper and fabrics. In Italy casein is used in making a substitute for wool. Sweaters and other articles of clothing are made of this material. Argentina supplies three fourths of the world's output of casein, and we import about one seventh of Argentina's production.

Sheep raising. Argentina stands fourth among the sheep-raising countries of the world—Australia, Russia, and the United States surpassing it (Table 35, Appendix). The number of sheep in Argentina has been declining for the past forty years. Does this drop spell

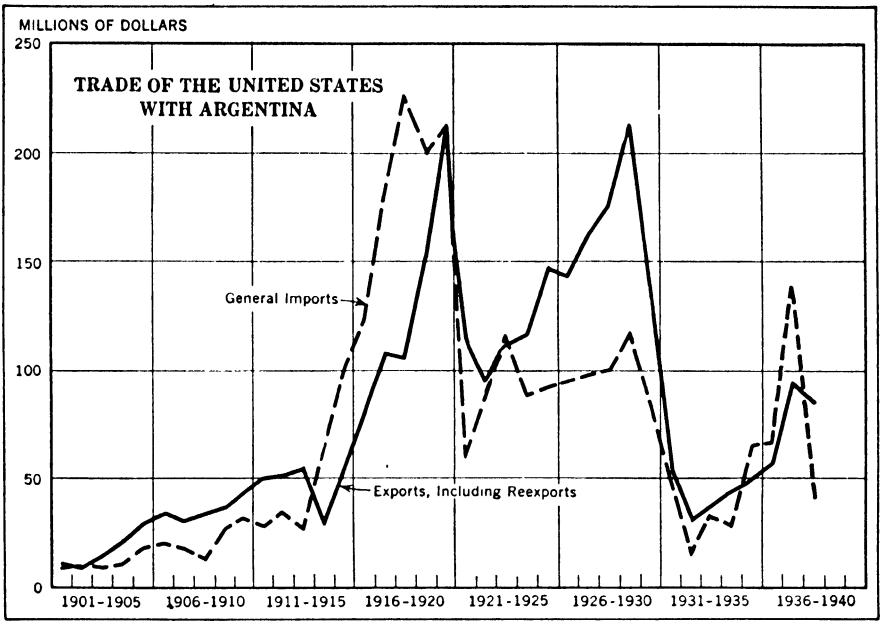
misfortune? The fact is that, thanks to alfalfa, more and more barren lands have been reclaimed. Green pastures for cattle and rich farms have displaced the sterile ground where once only sheep could find a living. More and more the flocks have been forced into the poorer lands where crops and cattle raising are not profitable. In central Argentina, where sheep are raised more largely for lamb and mutton, there are large meat-packing plants convenient to the ports.

Wool, mutton, and lamb are leading exports. Argentina is surpassed only by Australia in the quantity of wool exported and by New Zealand in the quantity of mutton and lamb. The United States imports little or no mutton, but, of late years, more and more wool has been imported as well as cattle hides and sheepskins. Much Argentine wool goes to European countries.

What irrigation accomplishes. The dry lands of the west have been made fertile by irrigation. Water from the mountain streams of the Andes has been diverted into a network of innumerable canals and ditches. Sometimes the government has aided in these important undertakings, for the expense is very great. The fine city of Mendoza lies in the largest section of irrigated land. Here is the center of the very important wine industry. Many of the vineyards are owned by Frenchmen and Italians, skilled in the culture of the grape through their Old World experiences. Often years are required before a wine reaches perfection; so large cellars are built in which casks, barrels, and bottles may be stored indefinitely.

Other products of the irrigated lands are sugar and fruits. Sugar comes from the sugar cane, which is grown chiefly in the province of Tucumán. Argentina produces all the sugar needed for home use, but exportation is handicapped by the distance of the sugar fields from the ports. The fruit industry has a promising future. Because of the difference in seasons the fruits of Argentina ripen in our springtime, long before our fresh fruits come to market. So, both in the United States and in Europe, Argentine fruit finds a ready market and brings good prices.

The quebracho tree. The forests of Argentina are in such inaccessible regions that, for building purposes, it is easier to import lumber from the United States. They do, however, contribute one highly valuable tree—the quebracho. Argentina and Paraguay are the only places in the world where this useful tree is found. Its heartwood is cut into chips and steeped in hot water, which removes the tannin (p. 149). The result of the process is a dark-colored sub-



stance which is put into jute bags for shipment. Many logs are exported too. About one fourth of the extract and logs exported come to the United States.

Manufacturing—a minor activity. Industrially Argentina is seriously handicapped in that it lacks fuel, power, and minerals. Being chiefly an agricultural country, the manufacturing is mainly the preparation of raw materials from farm, ranch, vineyard, and forest for home needs and for the overseas trade. As we have seen, wines and sugar are products of the irrigated areas. Most of the important manufacturing is done in or near Buenos Aires, Rosario, and Bahía Blanca. Here are large plants for meat packing and flour milling, the tanning and working of leather, and the weaving of textiles. Northern Argentina supplies all the cotton needed for its own mills and provides a surplus for export. The processes in these mills are comparatively simple, and the workers are not highly skilled. Goods requiring intricate machinery and expert workers must be imported. It will be long before Argentina can compete industrially with Europe or the United States.

A leader in South American trade. With its great fields of cereals and its countless sheep and cattle Argentina is well able to feed Europe. It exports wheat and flour, flaxseed, corn, meat, wool, cattle hides, and sheepskins—all products of the farm or ranch. Only

India surpasses Argentina in the value of the hides and skins exported. From the forest comes the valuable extract of the quebracho tree.

In Europe Great Britain is Argentina's leading customer. Britain's need for foods and raw materials is very great. The chief exports to the United States are linseed, hides and skins, quebracho, wool, and canned meats. To its near neighbor, Brazil, Argentina sells much wheat. Its foreign trade is twice that of Brazil, its closest rival in South America.

The imports are chiefly manufactured goods from Europe, especially Great Britain, and from the United States. Great Britain and the United States supply more than a third of all Argentina's imports. Ninety percent of the automobiles and a large proportion of all the farm machines imported come from our country. We also send petroleum products, lumber, and radio and telephone apparatus. One item of interest on the import list is jute, large quantities of which are imported to be made into bags for grain, wool, meats, quebracho, and other products.

Three chief ports. The leading ports of Argentina are Buenos Aires, Rosario, and Bahía Blanca. *Buenos Aires* is the largest city in the southern hemisphere. This port attracts products of all kinds from every section of the country. Here are the factories and the great docks from which are shipped grain, meats, wool, and other products of farm and forest. It is an amazing blend of Chicago, New York, and Washington. Like Chicago it is a great railroad center surrounded by an agricultural and grazing region; like New York it is a great seaport through which passes most of the Argentine trade; and like Washington it is the capital of the republic. Apparatus of all sorts, elevators, warehouses, and railroad lines combine to handle both swiftly and efficiently the products pouring into this great city, a very large part of which enter into Argentina's foreign trade.

Rosario is the second port of Argentina. It is situated on the Paraná River, where there is a good harbor. It is noted for its exports of grain and flour. Its docks are excellent; as many as forty ships may be loaded at one time.

Bahía Blanca on an excellent harbor is near the greatest grain and grazing section of Argentina. It is nearer the Atlantic Ocean than Buenos Aires or Rosario. In the fall, when business is at its peak and the river front is congested at Buenos Aires, goods are routed to Bahía Blanca.

Uruguay

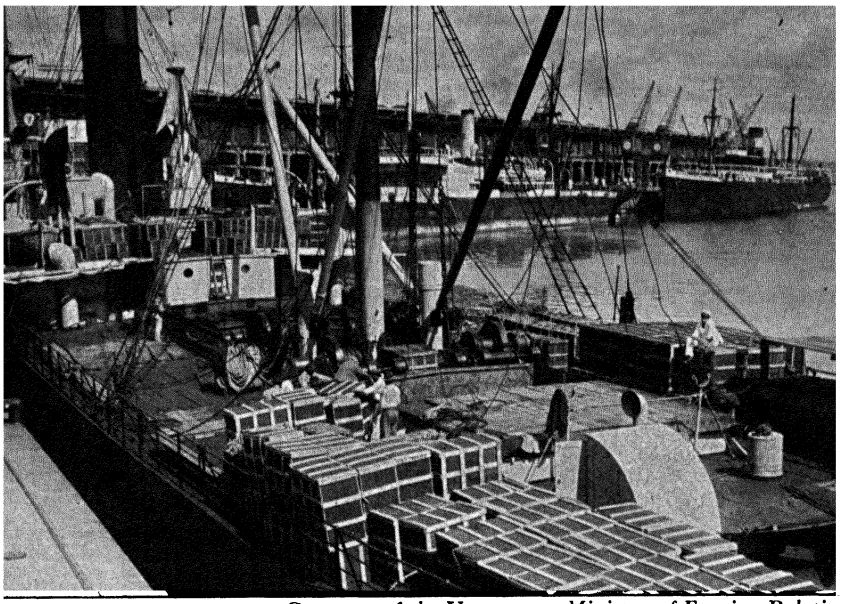
A prosperous nation. Uruguay is the smallest of all the South-American republics. Nevertheless, it is wealthy and very progressive as is shown by its up-to-date social-service legislation. This is the result of two factors—the character of the people and the nature of the country. As in Argentina, the people are mainly of European stock. The native Indians were exterminated by the early settlers; so there were few marriages between the red race and the white. The country consists almost entirely of rolling plains which are covered with grass and are ideal for the raising of cattle and sheep. The climate is mild so that the herds and flocks can remain in the open all the year round. The Uruguayan finds little attraction in farming; he prefers long days in the saddle, guiding and tending his wandering herds.

A ranchman's paradise. Before the invention of refrigerator cars and ships the cattle ran wild over the plains and were hunted for their hides and their tallow. The flesh was used to make extracts of beef, and a few large factories were built for this purpose. The carcasses of sheep were regarded almost as a waste product. The animals were driven to brickkilns, where they were killed, the skins removed, and the carcasses fed to the flames as fuel for the kilns.

Today all this is changed. The frozen or chilled beef or mutton can be sent in refrigerator ships to the crowded industrial centers of Europe. American and British investors saw a great opportunity here. They promptly established large meat-packing plants in Montevideo, the capital and chief port of Uruguay.

Minor industries. The government has attempted to encourage cultivation of the soil and thus secure for the country a greater variety of products. This has been uphill work, however, for the freer life of the ranchman is preferred to the more plodding toil of the farmer. Some farming is carried on, the chief crops being wheat, corn, oats, and flaxseed. There is some tanning of leather and manufacturing of woolen and leather goods. These, after all, are but minor industries; the major industry being meat packing.

Imports and exports. Uruguay's leading imports are gasoline and fuel oil, sugar, coal, and textiles. The country is without coal or petroleum; its forests are small, consisting of the trees edging the banks of some of the streams. Fuel for the homes and the factories must be brought from abroad.



Courtesy of the Uruguayan Ministry of Foreign Relations

Transatlantic freighter in the harbor of Montevideo, Uruguay. Cases of insulating material arriving for the huge meat-freezing plants (frigorificos) of Montevideo.

As we should expect, nearly eighty percent of the exports are products of the ranches. The United States has a large trade with Uruguay. It sends us wool, hides, fertilizer materials, and flaxseed; we return petroleum products, automobiles, and sugar. Our trade with Uruguay is exceeded only by that of Great Britain.

Guides to Study

1. Why is Argentina the most progressive country of South America?
2. Why is Argentina's trade with European countries greater than that with the United States?
3. How do the resources of Argentina differ from those of Brazil? Why?
4. Why is Argentina an excellent country for raising wheat, corn, and cattle?
5. Why can the products of Argentina reach European markets as cheaply as the products of the United States?
6. How has the use of animal products changed from earliest times to the present? Why?
7. What products of Argentina go mainly to European countries?

What products are sent both to European countries and to the United States? Explain.

8. Among Argentina's exports are corn, wheat, meats, hides and skins, cane sugar, raw cotton, grapes, and quebracho. What do these exports tell of the climate of different parts of the country, of its resources, and of its leading occupations?

9. Argentina's leading imports are textiles, manufactures of iron and steel, automobiles and tractors, farm machinery, and the products of petroleum. What do these imports tell of the country's resources and occupations?

10. Why is the raising of cattle and sheep the leading occupation of Uruguay?

Research for Students

1. On an outline map of Argentina and Uruguay locate the regions noted for the chief products of each country. Print names of leading cities and learn for what each is important.

2. The value of Argentina's exports is much greater than the value of its imports. Does this same condition exist in other South American countries?

3. What is meant by the *ABC* countries? Why have these countries great influence in South American affairs?

4. Argentina exports more corn than the United States; yet it produces very much less. Explain.

5. Buenos Aires is known as the "Paris of South America." What does that mean and what makes it possible?

6. ANDEAN SOUTH AMERICA

Chile

A mountainside country. Chile is a ribbon of land between the Pacific Ocean and the crest of the Andes. It is 2700 miles long and, if placed over North America, would extend from Key West in Florida to the southern part of Greenland. Its average width is about 110 miles. Because of its unique shape it has been called the "Shoestring Republic."

From desert to dense forests. The great differences in climate growing out of differences in latitude have divided Chile into three regions: the northern desert, the fertile central valley, and the southern forest region. The winds of the northern desert are the southeast trade winds. In their path across the Andes they leave all their

moisture on the Argentine side. Consequently, no rain falls in this northern third of Chile and the country is a desert. The southern third of Chile lies in the westerly-wind belt. Here the winds blow from the Pacific Ocean to the highlands and the rainfall is excessive. Central Chile, more fortunate than other sections, has a rainfall like that of southern California or the Mediterranean countries. The winter season is the rainy season. The northward movement of the prevailing westerly winds brings rain to central Chile. In the summer when the wind belt moves south, the region is dry. Because Chile lies in the south-temperate zone, its seasons are the reverse of those in the United States. Our springs are their autumns; and our winters, their summers.

Eighty-five percent of the people live in the central region. Its favorable climate and fertile soil have produced a vigorous, enterprising nation. The inhabitants are chiefly of European stock and are energetic and progressive. A few native Indians live in the mountains and in the southern area near Terra del Fuego.

Fertilizer from the desert. In the northern desert of Chile are found the country's most valuable mineral resources. This desert is the world's great storehouse of sodium nitrate, the salt which is so essential to all commercial fertilizers. It is the one place in the world where this substance is found in natural form and the supply is practically unlimited. Like sugar and salt it is readily soluble in water. A few weeks of heavy rain would wash all this vast wealth into the Pacific Ocean. The dryness of the desert alone makes its existence possible. It is believed that originally the nitrates were brought to this region by underground waters. Then the nitrates crystallized, binding together the loose material into masses so hard that explosives are necessary to separate them again. The beds of nitrate are not continuous but are irregularly distributed from north to south for a distance of more than four hundred miles.

Caliche, or crude nitrate, is found near the surface of the ground. The workmen make use of dynamite to break up the large masses and then, with hammers, break the rock into smaller lumps. It is then loaded upon carts and drawn to one of the many railroads operating in the nitrate fields. The trains deliver the nitrate to refining plants where it is dissolved in hot water and allowed to settle, to separate it from any earthy matter that would adulterate it. The solution is drawn off into large tanks and allowed to cool. Crystallization of the various salts occurs as a result of the cooling. Common



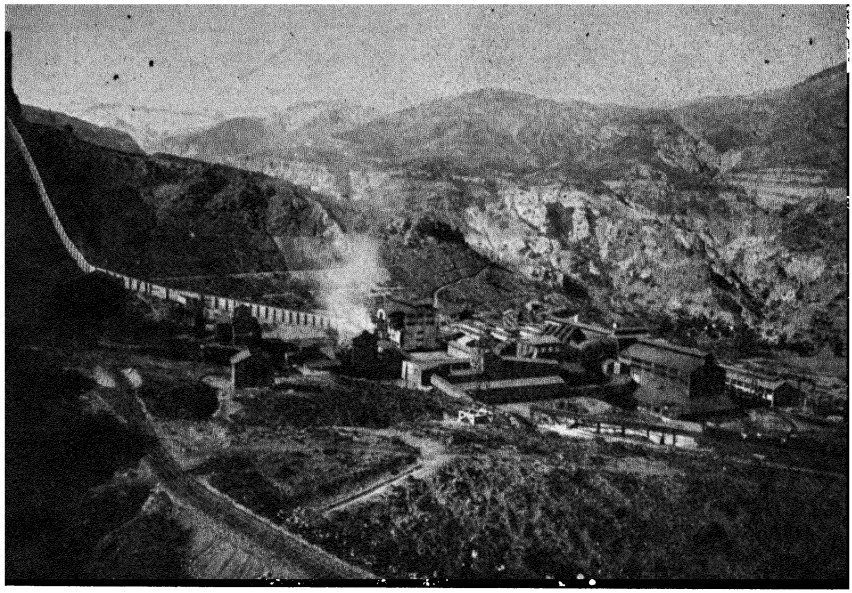
Courtesy of W. R. Grace and Co.

Chilean caliche awaiting the railroad cars to take it to the crushers and then to the leaching vats in the process of refining

salt, or sodium chloride, is the first to crystallize. The remaining liquid is drawn off from this and allowed to stand until nitrate crystals separate from the solution thus removed. The remaining liquid is drained off and the crystals allowed to dry. Then the next step is to put the nitrate into bags for export.

A new and cheaper process for extracting nitrate from the caliche, known as the Guggenheim process, has been perfected by which more nitrate is recovered at a lower cost. In the preparation of nitrates, a valuable by-product is obtained. This is iodine, of which the nitrate companies of Chile have a monopoly. The quantity of iodine recovered is so great that only a small part is placed upon the market. In this way a reasonable price for the commodity is maintained. Common salt and borax are other useful products of the desert.

Each nitrate manufacturing plant is a small community completely surrounded by the desert. The workers must look to the outside world for all their necessities, for water, food, fuel, even the soil for their small gardens. Water is piped to the settlements from the Andes more than one hundred miles away.



Courtesy of W. R. Grace and Co.

The smelter of the Braden Copper Company at Caletones below Sewell

Nitrates are most in demand in the United States and in countries of western Europe which require this commodity for intensive farming and for industry.

Mountains of copper. The Chilean desert is also rich in copper ore. The mines were first worked by the Indians; then, in 1601, came the Spaniards; and now, at the present day, the two largest mines are owned and operated by companies in the United States. One of these mines is about 150 miles from the port of Antofagasta. Great masses of ore are blasted from the face of the mountain, and it is moved in trainloads to the crushers. After being crushed, the ore is refined. The electricity used in the refining process is generated at the shore with petroleum brought from Peru. The electricity is transmitted to the mines a hundred miles away by currents of high voltage. This method of securing power is cheaper than it would be to send coal or fuel to the mines. The thousands of workers must be made comfortable and kept contented. Special efforts are made to make life in the barren mountains as agreeable as possible to the American engineers and superintendents. Not least among the attractions are high salaries and long vacations. There are good houses, schools, and an excellent hospital. Toward the close of the nine-

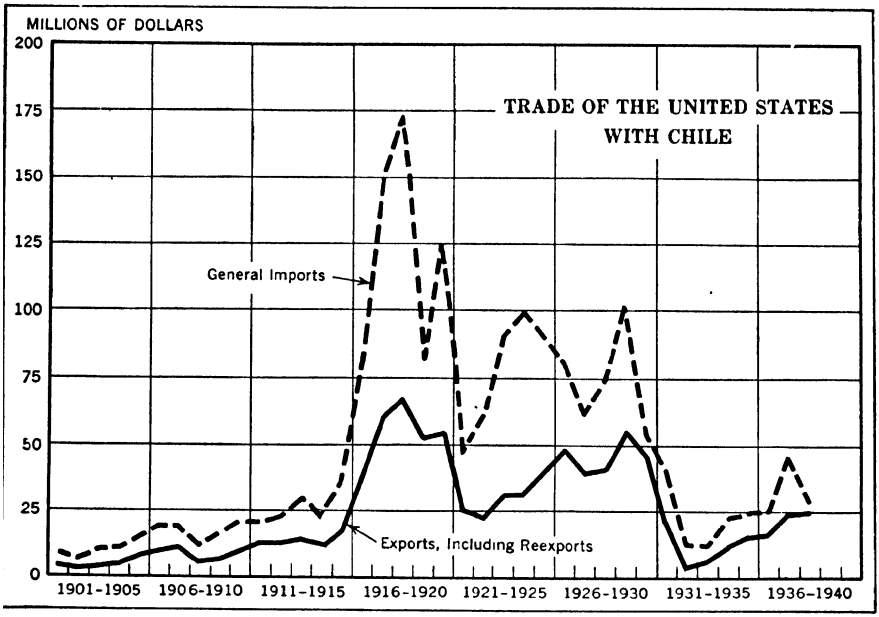


Photo by James Sawders

Harvesting melons in the central valley of Chile. A nice ripe one seems to have been too strong a temptation to be resisted by the gentleman at the extreme right.

teenth century Chile was first in the production of copper. Today it ranks second, having been surpassed by the United States. Besides copper Chile has deposits of coal, iron, gold, and silver. Over ninety percent of Chile's exports consist of minerals. About eighty percent of these minerals are nitrates, iodine, and copper. Although it might appear that Chile's desert is really its greatest asset, it is a fact that only a small proportion of its people are engaged in mining or benefit from the industry. It is the foreign owners of both the nitrate and the copper mines who draw the large revenues. Formerly an export tax on nitrates brought much money to the Chilean government. In recent years, however, nitrates produced elsewhere by electric processes and as a by-product of other industries have entered into competition with the Chilean output.

The heart of Chile. With a desert to the north and rainy forests to the south, the central part of Chile has a climate resembling that of the Mediterranean countries. The summer months there are warm and very dry, especially in the region bordering the desert. Irrigation is necessary to secure good crops. The mountain streams are



tapped and the water distributed among the farm lands. The crops consist of the grains, vegetables, and fruits usual to temperate and subtropical zones. The making of wine is an important industry. Attention also is given to the drying and preserving of fruit for home use and export. Chile practically feeds its people; however, it imports rice, coffee, tea, yerba maté, and sugar to supplement its food supplies.

Wooded slopes. Because of excessive rainfall in the southern section the soil is saturated with water and the roads are almost impassable. Consequently few people care to live there. Dense forests cover the mountain slopes and the plains. Lumbering is carried on with difficulty during three of the least rainy months of the year. Much lumber, however, is imported from the United States.

Chile's sheepfold. Farther south the grazing of sheep has become an important industry. As in Patagonia, many of the flocks are in the care of Scottish shepherds who are very skillful in the management of sheep. Wool, frozen mutton, and sheepskins rank high among Chile's exports.

Transportation, a problem. The railroad system of Chile consists of a main line running from north to south, with short lines leading west to the coast and east to the foothills. It is far cheaper to transport goods by water than by rail; consequently the railroads

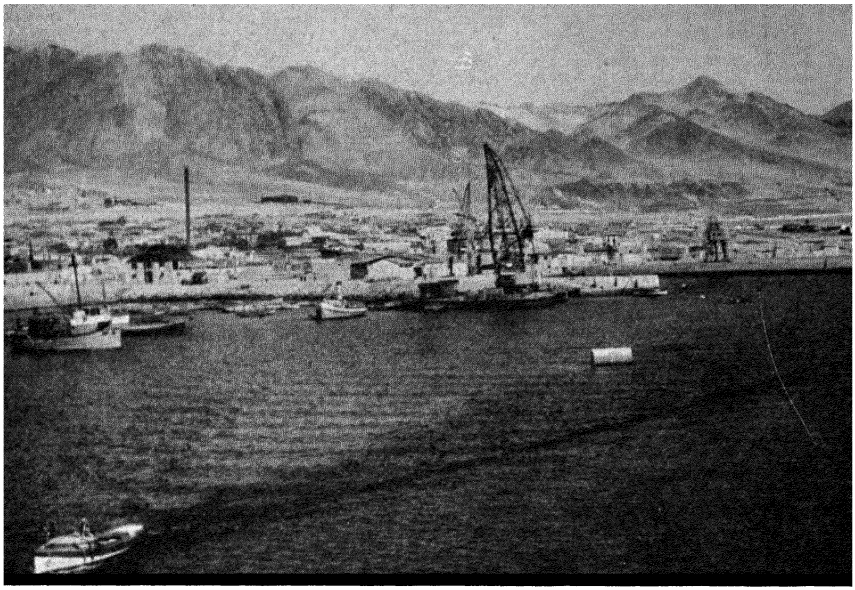


Photo by James Sawders

The harbor at Antofagasta, one of the chief nitrate-shipping ports of Chile. The desert foothills of the Andes form a back drop to this dusty town.

suffer. Santiago, the capital, is the chief railroad center. It is linked by steam and electric railways to all the important cities of central Chile. Roadbeds have recently been much improved by the government. Automobiles are being imported in ever increasing numbers. Airplanes serve as carriers of passengers and mail and are used for military purposes as well.

What Chile lacks. Chile is well qualified to become a manufacturing nation. Its cool climate, its hard-working people, its coal, its water power, and its abundance of raw materials—all are in its favor. Nevertheless, there is little manufacturing in the republic. One great disadvantage is its inaccessibility to foreign markets and to sources of raw materials which it might need. Chile must, therefore, send abroad for many factory products. Iron and steel manufactures, machinery, tools, and textiles are the chief imports. The textiles consist of cotton and woolen goods and bags in which nitrates, wool, grains, and meats may be packed for export. Petroleum is imported to be used at the nitrate plants and for generating power to be transmitted to the copper mines.

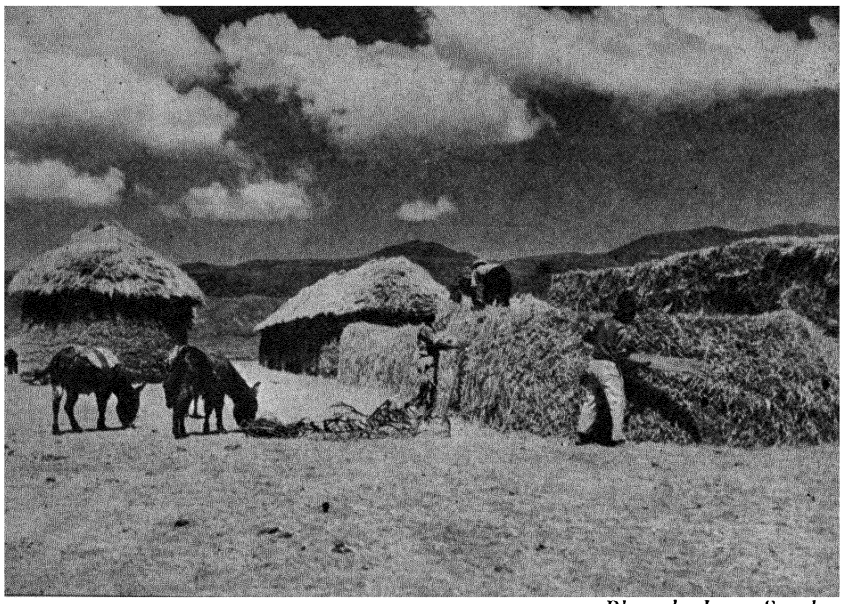


Photo by James Sawders

Bolivian farmers harvesting the hay crop on the high plateau in which lies the great Lake Titicaca

The chief port of Chile, Valparaíso (Paradise valley), is located in the fertile central section. It was founded by the Spanish in 1536—nearly one hundred years before the founding of the Plymouth Colony. It is the most important seaport on the west coast of South America.

Antofagasta, Iquique, and Tocopilla are seaports of the desert region for the shipping of nitrates. Chile boasts the southernmost city in the world, Magallanes, on the Strait of Magellan. It is the outlet for the prosperous sheep-growing region of southern Chile.

Bolivia, Peru, and Ecuador

A highland people. The lofty Andes Mountains cross these three countries, and between the ranges are high plateaus. On the west Peru and Ecuador have narrow plains edging the Pacific Ocean. East of the Andes the lower lands merge into the jungle of the Amazon Valley.

These countries make little appeal to white people. Their populations, like other parts of South America excepting Argentina and

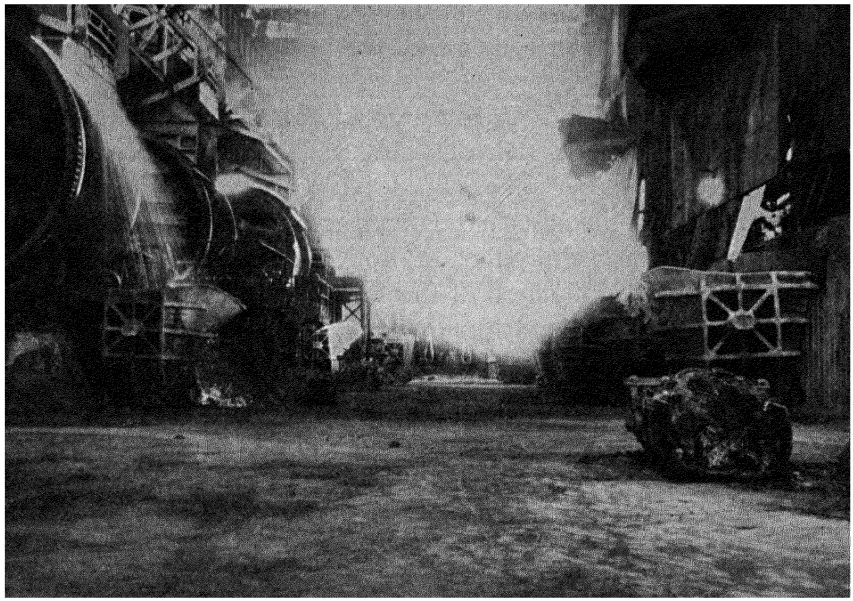


Photo by James Sawders

Peru's great copper smelter at Oroya in full blast at night. This is the converter room in the Cerro de Pasco Copper Corporation's plant. The natives of the Peruvian Andes have proved very adept under American instruction in operating and caring for the machinery employed in this work (*I. 201*).

Uruguay, consist of Indians and mestizos. Full-blooded Indians inhabit the plateaus; very backward tribes have settled in the eastern jungles. Indians perform most of the labor and are careless and unreliable. It is not surprising that progress in farming methods is slow.

Copper and tin. The Andes Mountains in Peru and Bolivia hold great wealth in minerals. Four hundred years ago the word "Peru" stood for gold. Pizarro, the Spanish explorer, sacked the Indian cities and sent ship after ship to Spain, laden with gold, silver, and even priceless jewels. In all, billions of dollars' worth of precious metals were mined and transported to the mother country.

Today the copper mines of Peru and Bolivia and the tin mines of Bolivia are of more value than gold and silver. The mines are located at altitudes so lofty that both men and pack animals are handicapped by the rarefied air. One great problem is that of transportation—the bringing of heavy machinery up the lofty heights from the coast and

the dispatching of the weighty metal to the seaboard. The slopes are very steep and the trails rough. Heavily laden mules and men daily face cruel, well-nigh impossible tasks. American capital is invested in the copper mines, and American engineers have overcome tremendous obstacles to build railroads into the Andes Mountains. The greatest obstacles to the successful development of the Peruvian and Bolivian mines are the costs and difficulties of transportation (*l. 132*).

The most valuable product of Bolivia is its tin. This country ranks third in the production of this important metal, British Malaya being first and Netherland India second. Tin is peculiarly Bolivia's own possession. It is a curious fact that the tin deposits reach, but do not pass beyond the boundaries into Peru or Chile. In working the tin mines the same difficulties are encountered as present themselves in the working of the copper mines. Here too British and American investors own many of the mines. Little smelting takes place in Bolivia because fuel is expensive. It is cheaper to ship the tin to Great Britain, where centuries of experience have made experts in refining and marketing tin. As in the case of the nitrates of Chile, the real wealth of the country goes to the foreign capitalist.

Only a small number of the people are miners; the vast majority either graze cattle on the plateaus or are engaged in farming. Only a few crops, such as grains and potatoes, will grow on the cold and lofty plateaus. The methods of farming are crude; except for the plow, no modern farm tools are desired. It is no wonder that the Indian makes but a precarious living.

Products of the coast. The Peruvian plain along the Pacific is narrow and dry. The mountain streams have been utilized to irrigate some of this region. Guano from the islands off Peru and nitrates from Chile have fertilized the soil. Excellent crops of cotton and sugar cane are raised. A cotton plant here will bear for several years; in the United States cotton must be planted every year. Cotton and sugar make up about one third of the exports of Peru. Britain offers the greatest market for the cotton while the raw sugar is imported in large quantities by the neighboring republic of Chile.

Petroleum occurs in considerable quantities in northwestern Peru near the coast. The oil is of fine quality, with large percentages of kerosene and gasoline. The location of the deposit greatly reduces the cost of transportation. Petroleum with its products is the greatest export of Peru. Gasoline, kerosene, and fuel oil are sent to Chile for use in the nitrate plants.



Photo by James Sawders

Ecuadorian women are experts in the weaving of the world-famous Panama hats, which derived their name from the fact that they were first exported from Panama ports.

Ecuador's industries. More fortunate than Peru, Ecuador has a coastal plain with an abundant rainfall except in the south. On these low plains are plantations of cocoa trees whose product, the cacao bean, is Ecuador's leading export. Two pounds of dry beans a year is the average yield per tree. Once Ecuador stood first in the raising of cocoa; but haphazard methods of cultivation combined with a disease that ravaged the trees have given the leadership to other parts of the world. Coffee is raised on the western mountain slopes. Ecuador exports annually about $2,000,000 worth of coffee. A unique article of export is the Panama hat, so light in weight and desirable for summer wear. These hats are woven with painstaking care by Indians. The early morning or late afternoon, when there is some moisture in the air, are the times of day that insure the best work. The Panama hats are of excellent quality and of interesting designs. The name was given them because they were shipped to North America by way of the Isthmus of Panama.

Ports of Peru and Ecuador. The Pacific Coast as far south as Chile is lacking in good harbors. The one exception is the Gulf of

Guayaquil, running inland for one hundred miles. It belongs to Ecuador. Guayaquil, on the Gulf, is the port from which this little republic sends its cocoa, coffee, Panama hats, and other products to foreign countries. Bolivia has no port, but must depend upon those of Chile and Peru. Callao and Mollendo are the Peruvian ports. With the exception of Guayaquil the harbors are too shallow to admit vessels of deep draft. The ships anchor at quite a distance from the shore. Then their cargoes are unloaded upon small boats of light draft, called *lighters*. These lighters transfer the goods from the ship to the city wharves. This handling is often careless so that it is imperative that the goods should be carefully packed to withstand such rough treatment. Each of the above ports is the terminus of a railroad.

Guides to Study

1. Why is the climate of northern Chile different from that of central Chile? Of southern Chile?
2. Describe the methods used in preparing nitrate for market.
3. Why is the nitrate industry of Chile of less importance than in former years?
4. How is it possible to mine copper ore with profit when there are only a few pounds of pure copper in each ton of ore?
5. Why do most of the inhabitants of Chile live in the central part of the country?
6. How does the foreign trade of Chile differ from that of Argentina? Explain.
7. Why are there few white people in the Andean countries?
8. Why have the Andean countries progressed much more slowly than Argentina?
9. What are the mineral products of each country? Why are the minerals used largely in foreign countries?
10. What are the chief ports of western South America? What are the leading exports and imports of each port?

Research for Students

1. Make special studies and report to the class on each of the following topics: (*a*) The value of Andean products to American industries; (*b*) American investments in Andean countries; (*c*) Why the tin of Bolivia is sent to England before it is shipped to the United States; (*d*) The value of the desert to Chile; its value to Peru; (*e*) Has the Panama Canal been a help or a hindrance to the development of the west coast of South America?
2. Who were the Incas? Make a brief report of their civilization.

EUROPE—A CONTINENT OF DIVERSE NATIONALITIES

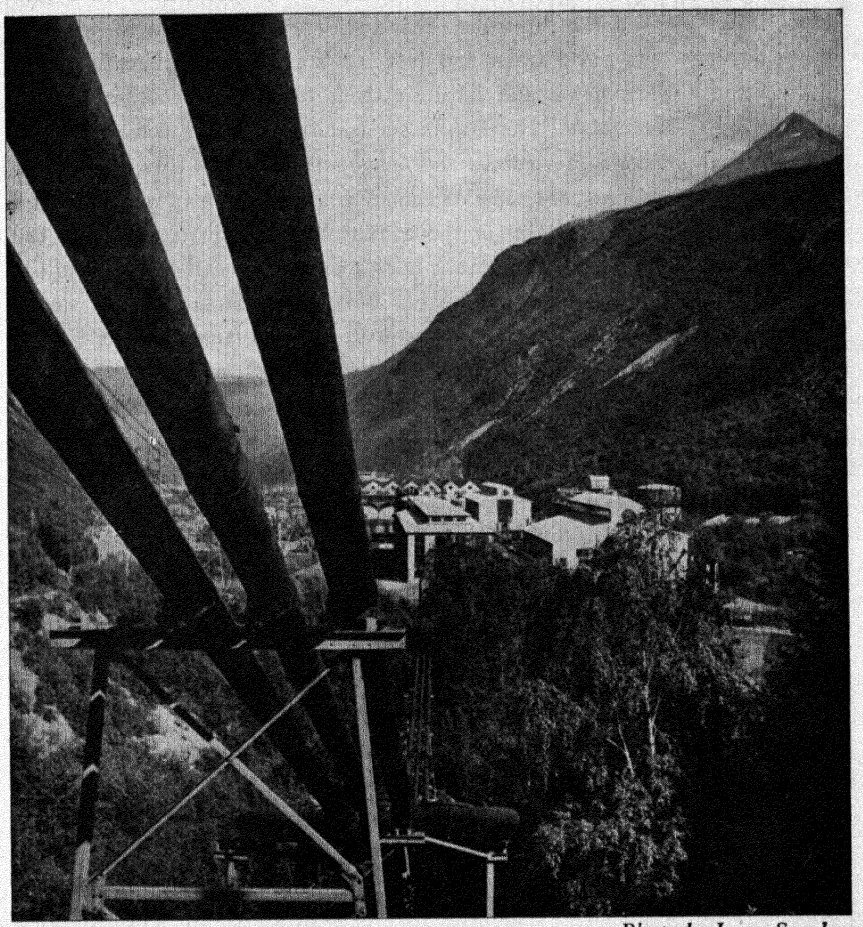


Photo by James Sawders

Norway's mountainous country with its glaciers, rivers, and falls provides water for much electric power. Rjukan's hydroelectric development is the greatest in the country and provides power to local chemical plants and to other industries as far as one hundred miles away.

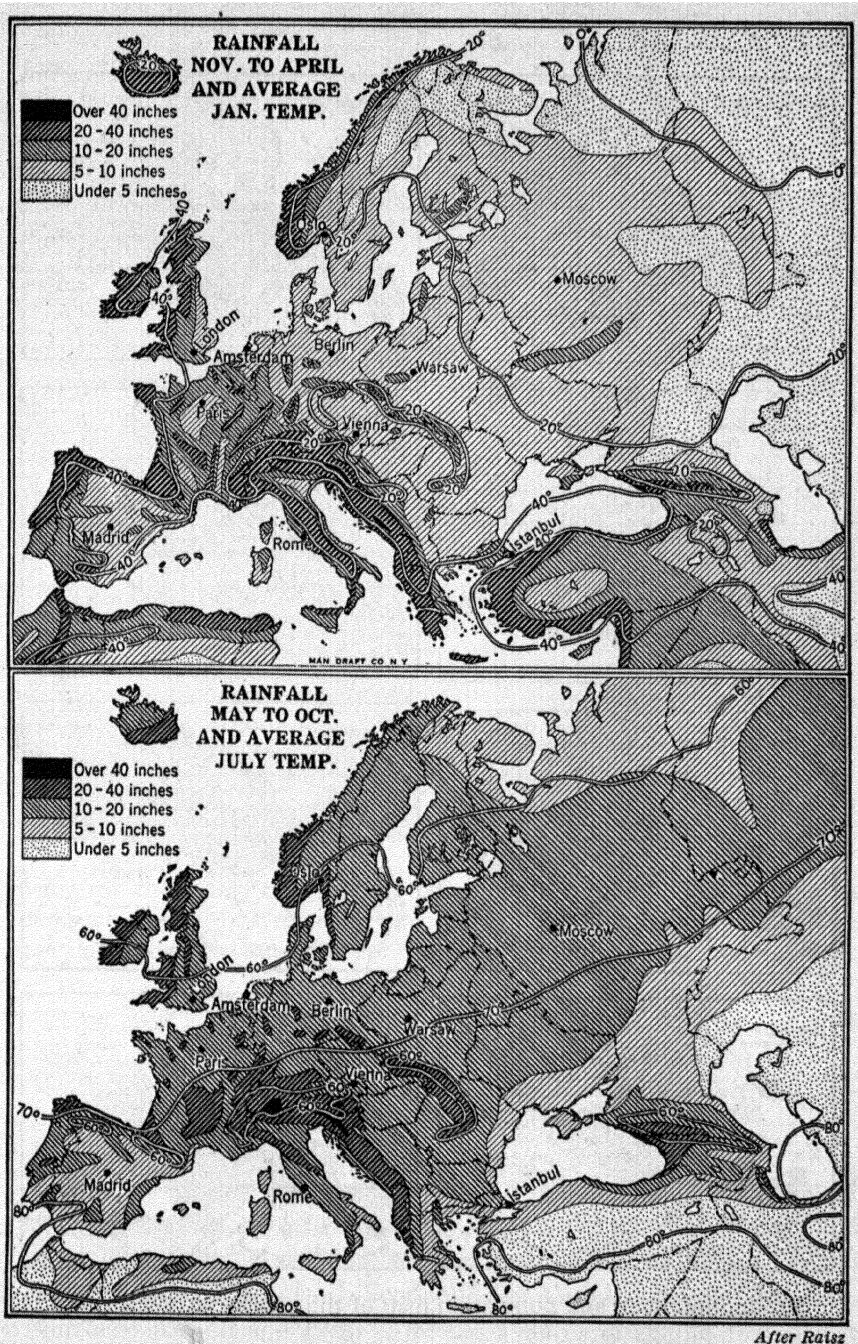
FORECAST OF UNITS TWELVE TO FOURTEEN

EUROPE is the center about which the whole world turns. From this continent have gone out influences that have encompassed the earth. Seventy percent of the people of the world are governed by Europeans or the descendants of Europeans. European countries have large possessions in North America, Asia, and Africa. The great islands Australia and New Zealand belong to Great Britain.

A continent whose power and culture extends to all other continents must possess unusual advantages. Here, as in our country, is a rare combination of favorable environment and vigorous and enlightened people. Like the United States Europe lies in a belt of temperate climate where people may work hard and be comfortable. The mountains of the continent are so distributed that the westerly winds blowing from the Atlantic bring moisture to nearly all parts of the continent. There are no large desert areas as in the United States. In the wintertime the westerly winds bring a mild temperature to much larger areas of Europe than they do in North America. There are no large areas of sparsely settled northern land as in North America. In Europe great plains suitable for farming stretch from the Atlantic eastward through the center of the continent and continue even into Asia. The yield of wheat, oats, rye, barley, potatoes, and sugar beets is much greater than in North America. Europe has more cattle, sheep, and swine than the United States. The mineral and forest resources too are very great. Nature has been generous indeed in preparing the continent as a home for human beings.

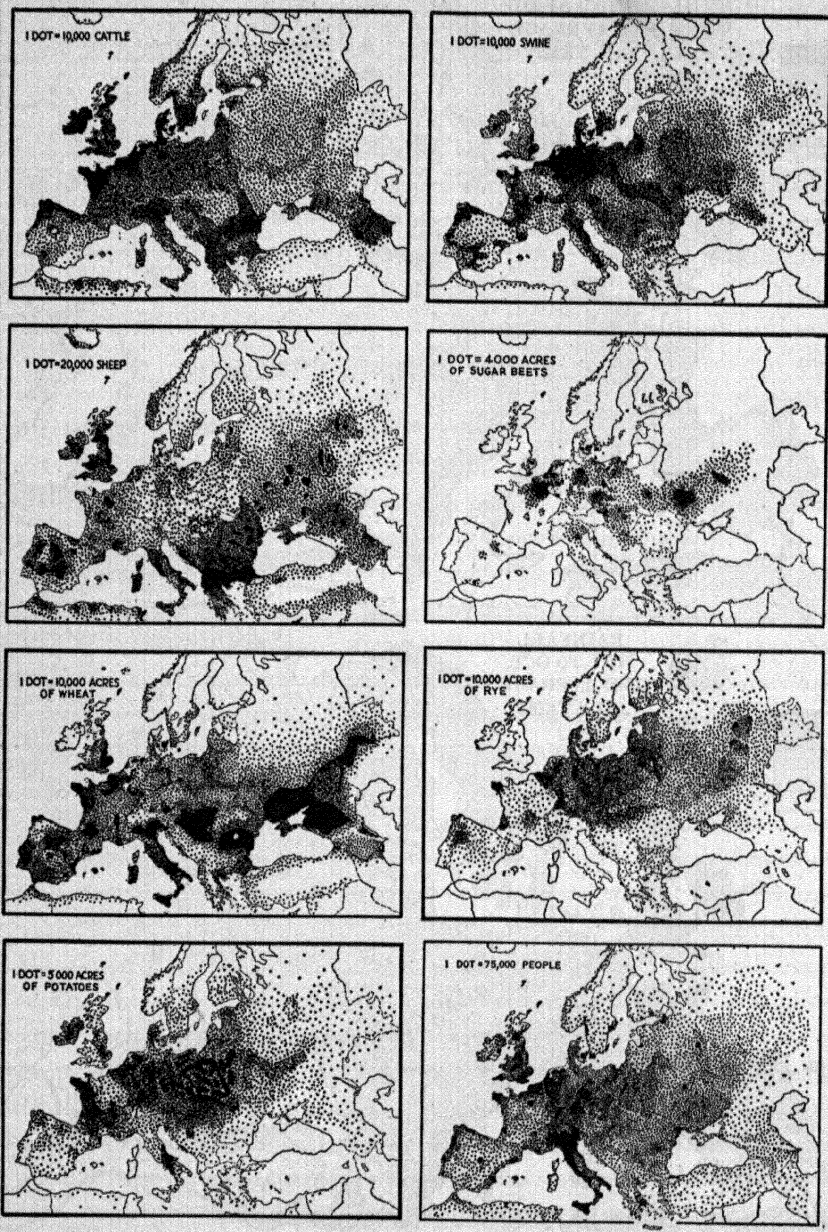
Europe was peopled largely from the east and southeast. From the ancient centers of civilization in Egypt and the Near East the wisdom and culture of the ages gradually moved westward and northward until all Europe was brought under their influence. Thus was laid the foundation needed for the establishment of stable governments and the organization of industries and trade. While civilization came from the south, no doubt the blood of the northern peoples added a vigor and hardihood which made possible the great accomplishments of civilized Europe.

Yet Europe is a continent of diverse nationalities, each of which owes much to its origin and to the environment in which it has developed. Various theories of government are struggling for supremacy there. Many of the small or defenseless nations are threatened with absorption in whole or in part by powerful neighbors who covet their agricultural lands or their minerals or their raw materials. Force or threat of force has taken the place of arbitration as a method of settling disputes, and the major nations are engaged in an armament race that is exhausting their resources and piling up debts that future generations will have to pay. In several countries dictators rule and freedom of speech, of the press, and of assembly is either restricted or prohibited. Freedom of trade is likewise curtailed, and an attempt is being made to make such countries self-sufficient, which results in privation and hardship for the citizens.



After Ratsz

Rainfall and temperature maps of the continent of Europe



Production maps and population map of the continent of Europe

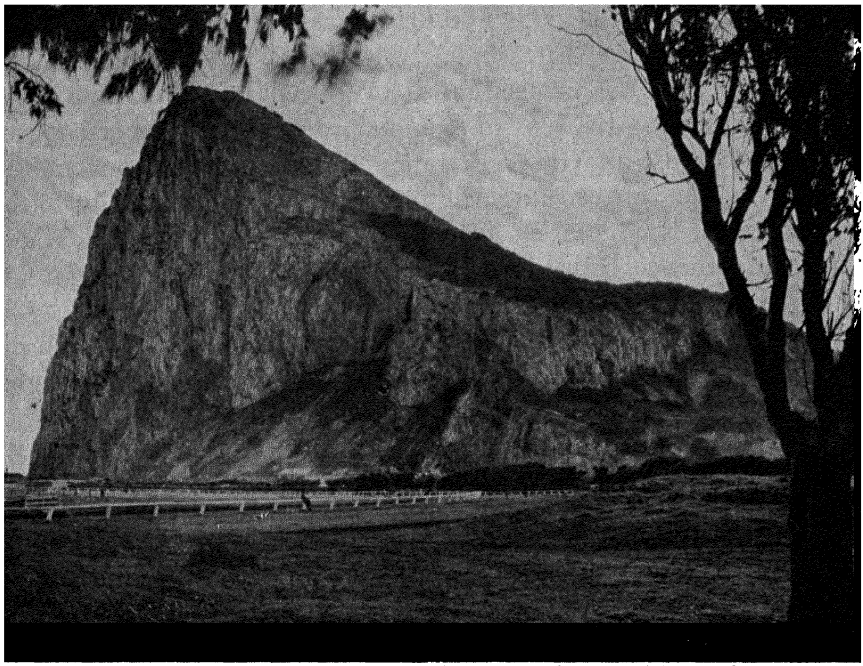


Photo from Associated Screen News Limited

View of the Rock of Gibraltar that rises majestically at the western entrance to the Mediterranean Sea. It has been a British possession since 1713 and is connected with the Spanish mainland by a narrow isthmus.

1. GREAT BRITAIN–A NATION OF WORLD-WIDE INFLUENCE

British names and their meanings. The *British Isles* consist of two large islands, Great Britain and Ireland, the Channel Islands, and numerous small islands lying off the north and west coasts. *Great Britain* comprises England, Scotland, and Wales. *Ireland* comprises Northern Ireland and Eire. *Eire* has a status similar to that of the self-governing dominions, but with slight differences. In the new constitution for Eire, there is no mention of the King. In foreign relations alone Great Britain acts for Eire and in time of war British

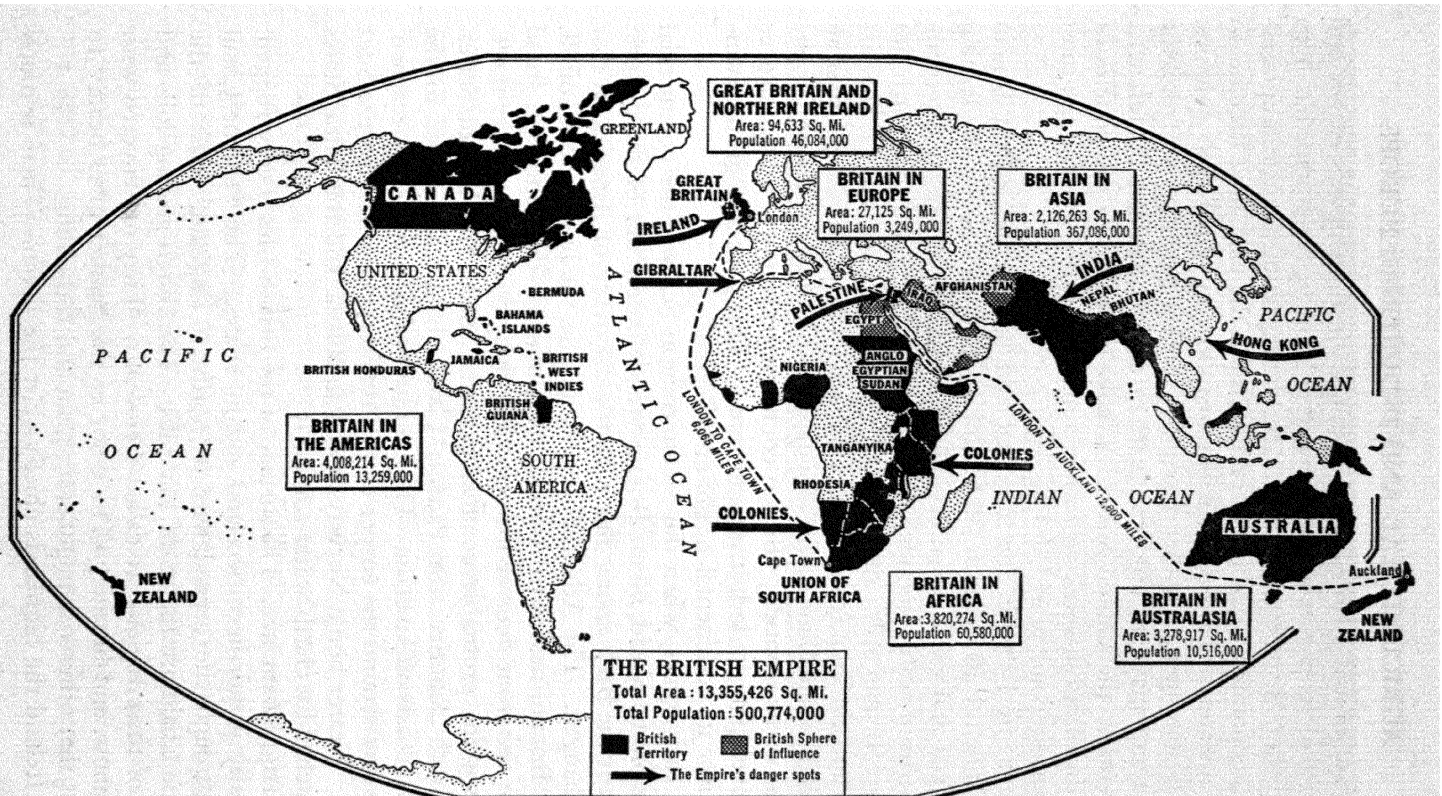
forces would come to its defense. The *United Kingdom* consists of Great Britain and Northern Ireland (six counties of Ulster). The *British Commonwealth of Nations* consists of the United Kingdom and the dominions. The dominions are self-governing and comprise the Commonwealths of Canada, Newfoundland, Australia, South Africa, and New Zealand. The *British Empire* comprises the British Isles, the dominions, Eire, India and Burma, the colonies, the dependencies, and the protectorates. We shall use the name Great Britain as meaning the United Kingdom, that is, the mother country.

Our interest in Great Britain. Great Britain is our mother country. The thirteen original colonies were almost wholly settled by British people. Settlers from the East moved on to the Middle West and thence to the shores of the far Pacific, carrying to all quarters of our broad land English speech, laws, and traditions. Our institutions are modeled after those of Great Britain. We claim our heritage in its great literature and in the high development of English freedom through a long historic past.

The United States is vitally concerned in the commerce of the British Empire. To Great Britain, to the dominions, and to the colonies we send forty percent of our exports and receive in return from them more than thirty percent of our imports. Except for Canada, Great Britain is our leading customer. It offers a profitable market for our tobacco, cotton, fruits (fresh and canned), grain, meat products, machinery, and petroleum products. In return Britain ships to us linen, cotton, and woolen goods, tin, hides and leather, and leather manufactures.

The vital needs of humanity center in foodstuffs, raw materials, and fuel. Oil today is of tremendous importance, and competition for the possession of oil fields is keen. Our country meets Great Britain as a competitor for the control of these essential commodities. It is our keen rival in the markets of the world. Of late years the leading commercial countries have been handicapped by having more goods than they have been able to market. Distribution has not kept pace with production. Today the important question is: Where can we open up new markets for our products so as to keep our workers and our machines busy and avoid the piling up of surpluses?

North, south, east, west—no corner of the world is beyond the influence of the British Empire. It covers about one-fourth of the earth's surface, and British subjects number more than one fourth of the world's population. It is a well-known truth that the sun



Where Britain "holds dominion over palm and pine"

never sets on the British flag. Because of the empire's extent and because of its numerous and powerful ships Great Britain has been called the "Mistress of the Seas." In dealing with its overseas possessions, its policies, often faulty and selfish in the past, have become, in time, a standard for other nations to follow in ruling their colonies. British statesmen, whether from the mother country or from the dominions, play an important part in all international conferences. No wonder the United States is keenly interested in the policies of the other English-speaking nation, a great world power and the most democratic country of Europe.

A prime location for industry and commerce. Great Britain owes much to its location. It is near continental Europe, the leading industrial and commercial continent. The English Channel, a narrow strip of water known as the "Silver Streak," and the North Sea separate Britain from the mainland. Before the coming of the airplane and the submarine these protecting waters freed Britain from the need of spending money for large armies and munitions for the defense of its frontiers. Britain could use its funds to a large degree for developing its industries and trade. This gave it a great advantage over its continental neighbors.

In early times, when the Mediterranean Sea was the commercial center of the world, Great Britain was definitely out of the picture; it was at the back door. But with the discovery of America all that was changed. The Atlantic became, in time, the busiest ocean of all. Great Britain, nearer to America than most of the continent, stood then at the front door of Europe. Far-flung trade lines center there. There is the profitable commerce with Canada, the United States, and South America, the Panama Canal giving easy access to the western coasts of America. The continent of Africa is easily reached. Asia is just around the corner of the Mediterranean Sea and the Suez Canal. Nearer home Norway, Sweden, Russia, and the Baltic States are reached by cheap water routes.

A rugged surface. The surface of the British Isles is very rugged, especially in northern Scotland and in Wales. The Pennine Chain runs through the central part of northern England. East of the Pennine Chain are ranges of low hills. The rough grazing hills and plains of these regions are called *moorlands.* They are covered with grass, moss, and heather. The color of the heather gives beauty to regions that otherwise might seem grim and forbidding.

In Ireland the highlands chiefly skirt the ocean. There is much

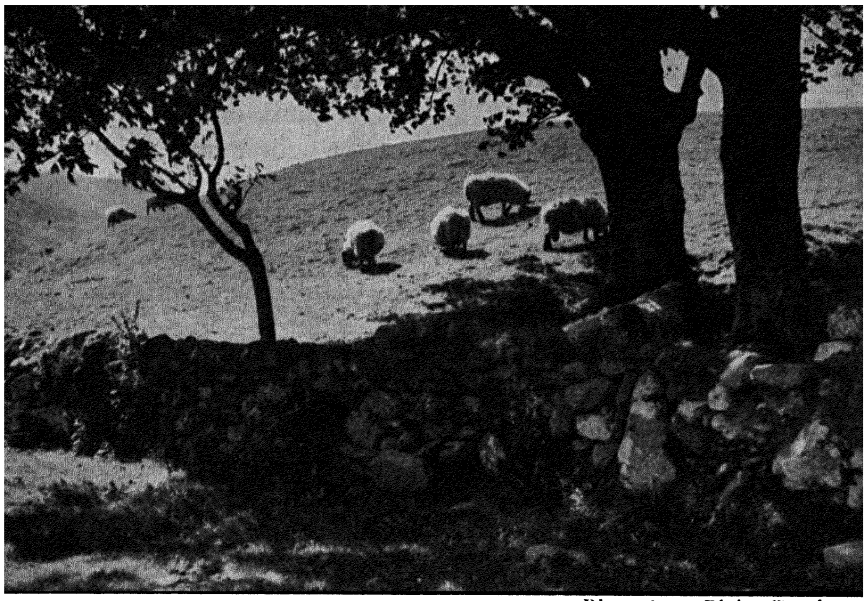


Photo from Philip Gendreau

Sheep grazing on a hillside above Killarney. Ireland's sheep number more than 3,600,000.

bogland where peat is cut for fuel. Unlike the people of Britain the Irish are mainly occupied in farming. About one third live in cities and towns.

A fostering climate. The British Isles have a mild but stimulating climate. The mild winters and cool summers are due to the westerly winds, blowing for many miles over the Atlantic Ocean. Ocean waters are never so cold in winter or so warm in summer as is the land in the same latitude. Therefore the British Isles, being set in the ocean, do not experience the great seasonal differences in temperature common to inland regions.

Both farming and manufacturing are helped by a mild temperate climate. Farmers can work out of doors all the year round. In summer British factory workers suffer little from the heat. In northern Scotland the period of sunlight in winter is only five and one-half hours. In summer the days are more than seventeen hours long. Then it is possible to read and write outdoors long after ten o'clock at night. The high latitudes of Great Britain account for these curious seasonal differences. Its southern coast is a little farther north than our Canadian border.

The rainfall is heaviest on the western coasts, Ireland especially having the greatest rainfall of all. So green is its grass and so verdant its ivied walls and trees that it has been appropriately called the *Emerald Isle.* The luxuriant growth of grass offers fine pasturage for cattle and sheep. Toward the east the lighter rainfall gives excellent conditions in both England and Scotland for the growing of wheat. Southern England has very little snow. Indeed the southwestern counties have been called the *Florida of England.* The moist air from the sea is responsible for the disagreeable "pea-soup fogs," or "yellow fogs," that occur in London during the fall and winter. These in themselves would not be so disagreeable, if it were not for the soot and smoke which fill the air and coat everything they touch with their grimy deposit.

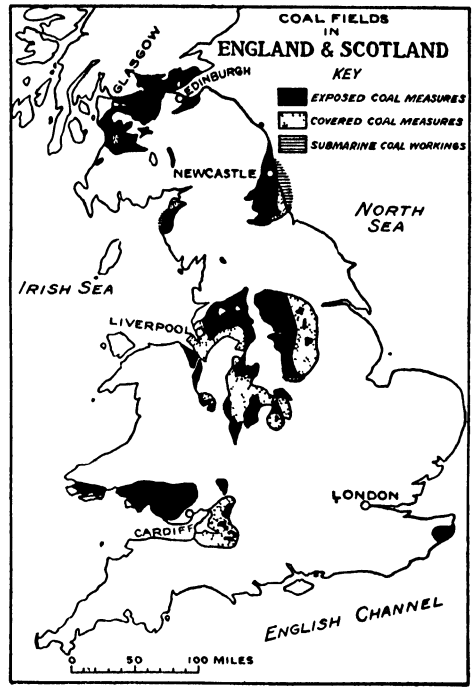
A pioneer in industry and commerce. For centuries the Britons had been sea rovers. They were a fearless, hardy race who discovered many new lands which they claimed for their own. In these colonies they built forts and trading posts and exchanged goods with the native peoples. They gave them cloth, trinkets, knives, and weapons and received in return furs, spices, precious metals, and other valuable products. This trade increased so rapidly that in time the demand for British goods far outran the supply. Necessity is the mother of invention. To meet this increased demand, the British invented machines by which their output of goods could be multiplied many times.

In England were built the first machines for spinning and weaving and the first steam engine. Muscles were displaced then by water power and by steam. Coal and coke were used there for the first time to smelt iron and make steel. These events marked the beginning of the great industrial revolution which began about the middle of the eighteenth century. The evolution of the British Empire was vitally affected by these profound changes in British industry.

A greatly increased supply of goods made new markets possible. Colonies were built up in distant lands to serve this purpose. With the wealth resulting from this commerce, Great Britain was enabled to conquer new lands and to fight successfully any enemies opposing its progress. So the cycle of trade advanced: new colonies, more trade, greater wealth, still more new territory. The colonies sent to the mother country food for workers and raw materials for factories. In return the mother country shipped manufactured goods

of all sorts to the colonies. British money came to be invested in colonial enterprises. Many Englishmen migrated to the colonies where, of course, they still remained British subjects.

The nations in Europe which had a later awakening to the demands of a machine age found, to their sorrow, that the most desirable lands had fallen into the hands of the English. Little was left for the laggards. Thus because of its early start Great Britain has profited greatly for nearly two hundred years. Today, however, with many nations advancing industrially, these advantages are gradually diminishing. British statesmen must solve perplexing economic problems arising from these chang...



Courtesy Department of Commerce

Resources and Industries

King Coal. One of the chief sources of wealth in Great Britain is coal. Only Germany and the United States mine more coal than Britain. The industrial life of Great Britain, a large part of its export trade, and its military and naval strength rest to a considerable degree upon its enormous supplies of coal. About three quarters of a million British workers are engaged in this industry.

Unfortunately for Great Britain, oil is now displacing coal. Today most naval vessels and merchant ships burn oil and Britain has practically no oil. Coal is still used in many of Britain's great mills and manufacturing plants, but even there hydroelectric power is gradually creeping in. Coal exports have decreased because the ships of other countries also burn oil; because of the increased use of hydroelectric power the world over; and because the United States and Germany and other countries are now competing with Britain for the coal trade. Nevertheless about one sixth of the British out-

put of coal is exported. Much goes to Europe; much to South America; some small lots of Welsh anthracite even come to the United States. This Welsh anthracite competes with American anthracite for the heating of our homes.

Coal centers. The great coal deposits have determined the centers of industry. The map indicates four of these: the Scottish lowlands, Newcastle, the Midlands, and South Wales. The coal fields of southern Scotland form an almost continuous belt, stretching for over ninety miles from coast to coast. On its western seaboard lies Glasgow, the greatest shipbuilding center of the world. Glasgow and its neighboring cities form a great manufacturing area (*l. 471*).

Newcastle lies near great coal fields and, close at hand, are deposits of iron ore. Here is a great iron-steel manufacturing city. Because of Newcastle's nearness to coal fields and its great docks on the Tyne, coal is easily exported to lands across the North Sea—to Scandinavia, Finland, and the Low Countries. This wealth in coal deposits gave rise to the old saying. "Don't carry coals to Newcastle." Shipbuilding is another activity of this flourishing city of almost 300,000 people.

In the Midlands the coal fields lie close to the Pennine Chain. On the east are the great manufacturing cities of Leeds, Bradford, and Sheffield. The mills of Leeds and Bradford are famous for woolen goods; those of Sheffield for metal products. To the west lie Manchester and several other cities noted for their cotton manufactures. Farther south is the richest of the coal deposits. Over this section hangs a perpetual smoke pall that almost turns day into night. The name of *Black Country* has been given to this locality, of which Birmingham is a leading city.

South Wales has large and very rich deposits of coal. Cardiff is the leading coal port of the world. Over forty percent of Britain's exportation of coal is shipped from here, and it is also a coaling station for steamers. Iron, copper, and tin ores are imported into South Wales for smelting.

Coal has been justly called "the cornerstone of British industries." Coal has brought the people more wealth than mines of gold and silver. For generations the ingenuity of the British nation has been transforming coal into gold which has financed industries at home and abroad.

Iron—a great asset. The iron industry has a long history. The Romans introduced the smelting of iron into England about 2000

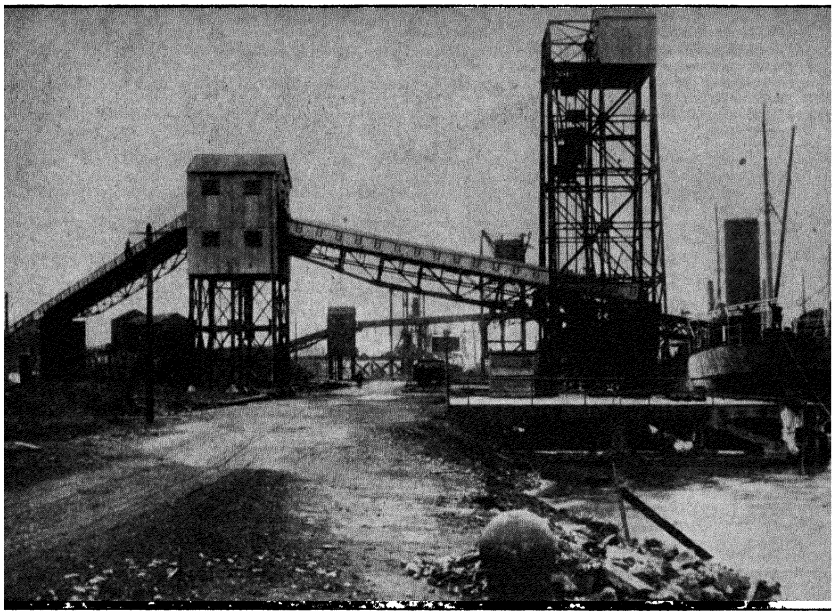
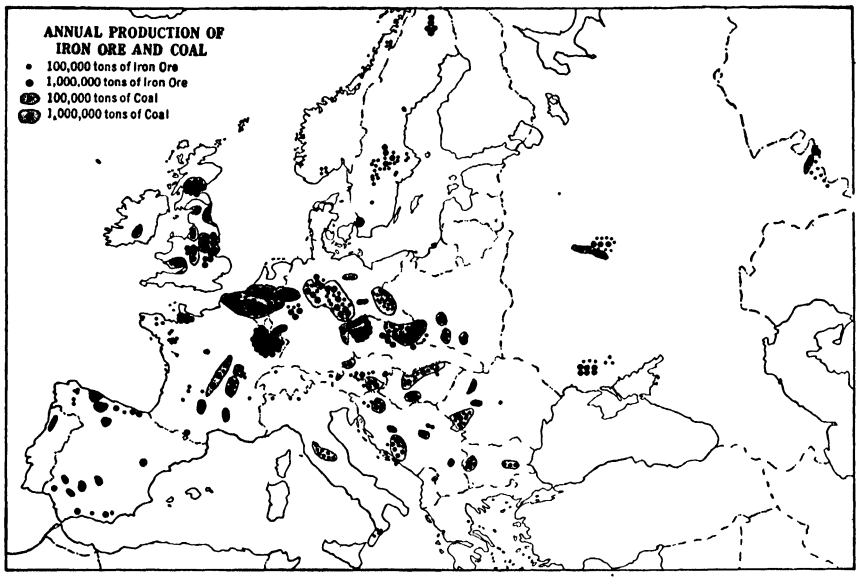


Photo from Ewing Galloway

Electric belt conveyor bringing coal to a ship at the docks of Port Talbot, in southern Wales

years ago. Forests provided charcoal for the necessary fuel. These two factors—forests and iron mines—determined the rise of cities. Birmingham grew up near the Forest of Arden and Sheffield near Sherwood Forest, the haunt of Robin Hood and his Merry Men. But, as the industry grew, the nation was threatened with the loss of all its forests. Since warships as well as merchant vessels were made of wood in early days, the situation became serious. About the middle of the sixteenth century a law was passed forbidding the cutting of trees except in certain specified places. Ever since the middle of the eighteenth century, however, when it was found that coal and coke make excellent fuels for smelting, the industry has had no lack of fuel.

Britain led the world in iron production until nearly 1890. This leadership was due to two causes: first, its abundant supplies of coal and iron; and, second, its clever inventions. The British were the first to use coke for smelting. Two great labor savers, the puddling furnace and the rolling mill, were of British origin. In 1856 an Englishman invented the Bessemer converter which made steel so plentiful and so cheap that it practically took the place of iron. The



The continent of Europe has abundant resources of coal and iron ore.

quality of steel was farther improved by the open-hearth process, another British invention.

Of late years Britain has been surpassed in iron-ore production by the United States, France, and Russia. About one third of all the iron ore used in British industry is imported. High-grade ores come from Spain and Sweden. Much of Britain's iron ore is of low grade. Because its coal fields are near the coast, the imported ores can be smelted there without the heavy cost of transportation inland.

Multiple products of iron and steel. From Britain's large and numerous iron and steel plants come implements for the farm, machinery for the mills and factories, locomotives, cars, ships, and a vast quantity of metal articles for export. Birmingham, Manchester, and Sheffield are three leading manufacturing cities. Birmingham stands first in the making of hardware. As Manchester is a great center of textile mills, that city naturally makes textile machinery. Sheffield is celebrated for its cutlery. Glasgow makes engines for steamships and builds ships of iron and steel that have displaced the wooden three-deckers of the past. Shipbuilding is also carried on in Belfast, Ireland, in Newcastle, and in other cities of the northeast coast. Surely British industries and trade have a firm foundation, being built on iron and steel.

Cotton cloth. Cotton cloth, woolen goods, and linen are the leading textile manufactures of Great Britain. Raw cotton is the chief import and cotton goods the greatest export. No other country equals Britain in the value of the cotton goods and woolen goods manufactured and exported. Four favoring conditions gave Britain its early industrial start: its abundance of coal, its favorable climate, its early employment of machines, and its skilled workers. Raw materials and markets for manufactured goods were readily found in the colonies and in foreign countries, thanks to Britain's carrying trade.

The Lancashire district about Manchester is the great cotton center of England. In the early days the mills were run by water power from the short, swift streams flowing down the western slopes of the Pennine Hills. Later, coal was found close at hand and steam then largely displaced water power. Access to the sea was needed and so, in 1894, the Manchester Ship Canal was built to Liverpool. This made it possible for large ships, laden with cotton from the United States and other countries, to unload their cargoes almost at factory doors in Manchester. The city thus became a distributing center for the entire region.

It will be remembered that, as long ago as the eleventh century, Flemish immigrants taught the English the art of weaving. In those days spinning and weaving were handicrafts, passed on from father to son. Even in this machine age there is specialization in Lancashire. Towns near the sea where the air is moist spin the finest of threads; those at a greater distance spin a coarser thread; while those which get little moisture have turned their attention to weaving. British yarns are of such fine quality that they are in demand in textile-manufacturing countries throughout the world where high-grade cloth is woven. Fine British cotton cloth is also to be found everywhere.

Recently a heavy cloud has been hanging over this British industry. Until forty years or so ago, there was little manufacturing in Japan, China, or India. Now Japan is in the field, making cheap cotton goods on a large scale. Japan not only meets its own needs but sells great quantities to China and also a lesser amount to India and indeed to all countries of the world. It is not difficult to make cotton cloth. The machinery for the process has been so perfected that, aside from a few experts, most of the work can be accomplished by unskilled labor. Both China and India are making cottons today (pp. 600, 613). Some of these mills are owned and operated by

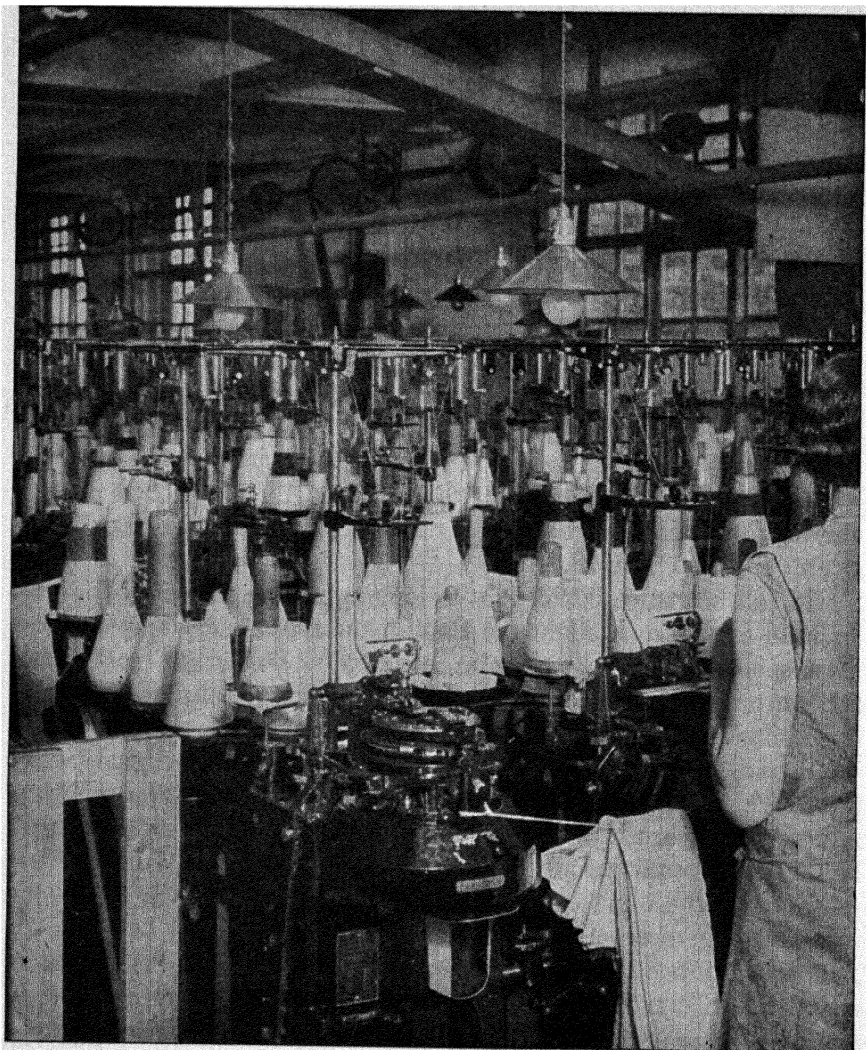


Photo by James Sawders

Interior of a knitting mill at Leicester, England. The machines are so perfectly constructed and adapted to their work that they need little attention from the operator.

British, American, and Japanese capitalists. In China a few mills are owned by the Chinese themselves. All these recent developments in the Far East greatly curtail the British market. The only means of coping with this Oriental rivalry is for Great Britain to market superior cloth made with a skill far beyond that which the East has as yet attained.

Woolen goods. The cotton industry is new compared to the woolen industry. Until about 1800 wool was the universal wear in all European countries except those bordering the Mediterranean Sea. Socks and stockings as well as other garments were fashioned of wool. Cotton, silk, and linen garments were regarded as luxuries.

Britain is noted for the fine quality of its woolen goods. Its serges and Scotch tweeds are in demand everywhere. Leeds and Bradford are the centers of what is still the world's greatest woolen-manufacturing region. Bradford specializes in wool combing and worsteds; Halifax, in carpets and rugs; and Leeds, in clothing. As machinery and methods improved the wool-weaving industry grew apace. Australia, Canada, New Zealand, and Argentina were ready and eager to ship wool to Britain to supplement the native supplies. The importation of raw wool and the exportation of woolen goods constitute an important part of Great Britain's commerce (*G. 468*).

Irish linen. Irish linen is famous throughout the world. Flax has been grown in Northern Ireland for centuries. There the women became skilled in weaving it into linen. At first the work was all done by hand, but, later, the workers learned to use machines. At the present time much flax is imported from Belgium and a smaller quantity from Latvia. The quality of this flax is excellent, and it can be grown more cheaply on the continent than in Ireland. Consequently Ireland today raises very little flax.

The green grass of Ireland offers a perfect bleaching ground, and the wages of the girls and women, whether at home or in the factory, are low. Consequently excellent linens can be sold at reasonable prices. Irish linen sets the standard for the best linen everywhere. Belfast is the largest linen market in the British Isles. Another center of this industry is to be found in the eastern part of the Scottish lowlands.

It is interesting to recall that the colonists in America raised flax and wove linen, doing all the work by hand. When machinery came into use, our linen industry ceased. It could not compete with other textiles in a country where labor commanded high wages.

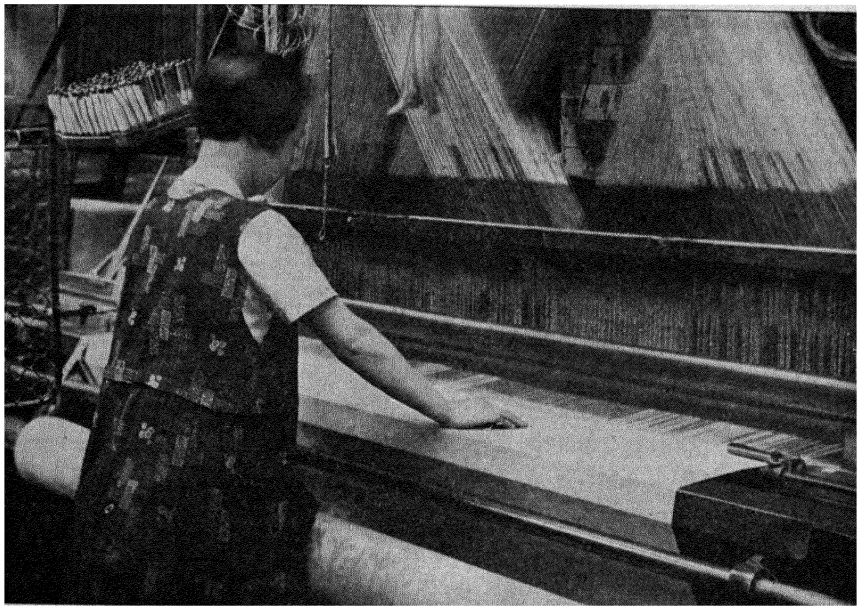


Photo from Ewing Galloway

A Belfast weaver making linen tablecloths. The design is woven from a set pattern which the loom follows from a punched roll of paper.

British fisheries. The British, sometimes jokingly referred to as *beefeaters*, consume great quantities of fish as well. Kippered herring are considered a great delicacy. Cod, plaice, and sole, which also abound offshore in the cool northern waters, form an important part of the British bill of fare. The best fishing ground of the North Sea is the Dogger Bank, an extensive shoal about sixty miles east of Newcastle. There are other banks to the south, and there are shoals off the coast of the Netherlands. The fish caught there are plaice, cod, halibut, and sole. Cod, haddock, and herring are plentiful around the Shetland, Orkney, and Hebrides Islands off the Scottish coast. Scottish fishermen specialize in herring. Nearly one hundred thousand people are engaged in catching, cleaning, and preparing fish for market. Grimsby, Hull, London, and Yarmouth, all coast towns, are important fishing centers. London is the largest fishing port in the world. About 1,000,000 tons of fish are taken yearly, and about 150,000 tons are exported. The British import about an equal quantity of fish, especially canned salmon from the United States, Canada, and Asiatic Russia. The fish shipped abroad go chiefly to Germany, Russia, and the countries of southern Europe.

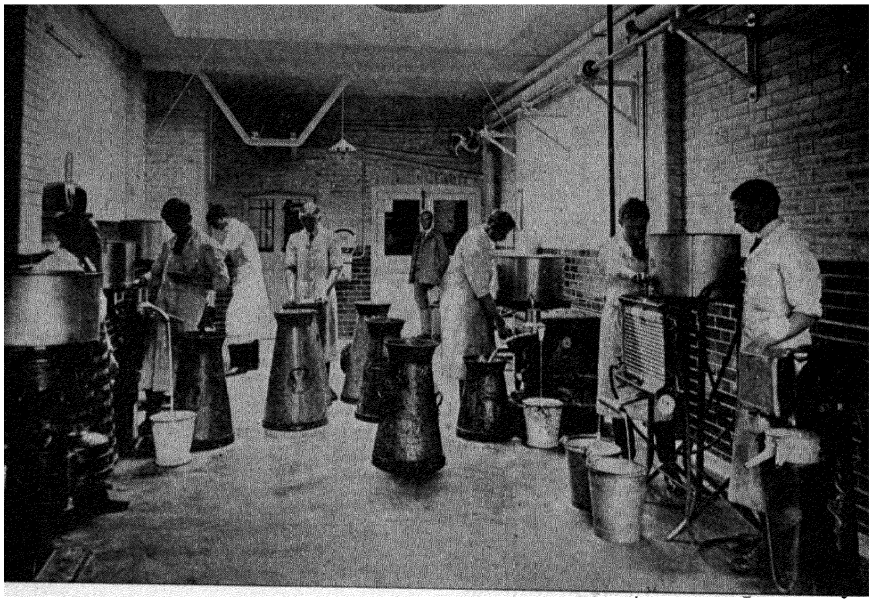
Outlook for agriculture. For two thousand years agriculture was the main occupation of Great Britain. Now less than six per-cent of the people gainfully employed are engaged in farming, whereas three times as many are engaged in trade, and more than six times as many are employed in manufacturing. Crops dependent upon sunshine and a long summer season suffer in Britain. There the clouds hang low, and it is cold and raw much of the time. Much of the land is rocky or swampy and is suitable only for grazing. In the nineteenth century experiment stations and other aids to farmers accomplished much. When the World War came to an end, British agriculture was at its peak. Nevertheless, it should be clearly understood that British farmers never could feed a population numbered in millions. For example, only one third of the necessary wheat is raised in Britain; the remaining two thirds must be imported. And so it is with many other staples. If all imports of foodstuffs should be interrupted for a very few days, Britons would soon be going hungry. The enemy submarines in the World War were aiming to bring about this very condition.

In the years following the World War, the acreage of wheat, barley, oats, beans, and peas has been greatly reduced while the areas of clover and grass for pasturage have been tremendously increased. This has been done because much of British soil is better adapted to grazing than to agriculture.

The moist climate of Great Britain favors the successful raising of strawberries, raspberries, currants, and gooseberries. The tendency of the times is toward specialization. The British farmer of today is giving his attention to dairying, poultry raising, and the growing of choice fruits and vegetables.

Although farming is one of the minor occupations, it is far from being unimportant. The aggregate is impressive, for the annual farm products, including livestock and livestock products, of England and Wales alone are worth more than a billion dollars. This gives the British some food and certain raw materials and serves as the basis of various industries. In addition to the textile industry, flour milling, curing of meats, and the brewing and distilling of liquors are important occupations.

The wheat crop. Wheat is raised in eastern England where the land is neither too high nor too moist. It is also grown in the eastern part of central Scotland. But, owing to Britain's large population, its relatively small area, its rugged surface, and its extensive tracts of



Students at an English farm school at Reading in Berkshire learning all about modern dairy practices

unsuitable soil, much wheat must be imported. Canada, Argentina, the United States, and Australia are the chief granaries from which Britain draws its needed supply of wheat. Britain cannot compete with the cheap, machine-cultivated wheat of the New World. This, however, should be said in praise of the British farmer: Thanks to the skillful use of fertilizers and to intensive cultivation, his lands yield nearly three times as much per acre as do the fields of Canada, the United States, Argentina, or Australia.

The oat crop. Oats thrive in moist, cool climates. Consequently this grain is grown nearly everywhere in the British Isles. It is a very important crop in Scotland, for oatmeal there is a staple article of food. Both Scotch and Irish oatmeal are famous brands in world markets. A famous Englishman once remarked that in Scotland oats are eaten by the people while in England they are fed to the horses. The retort was, "And Scotland is noted for its able men while England is noted for its horses." Oats have even played an important part in Scottish history. It took years for the British to subdue the Highland Scots, due partly to the fact that all the Highland soldier needed for rations was a small bag of oatmeal. In addition to his

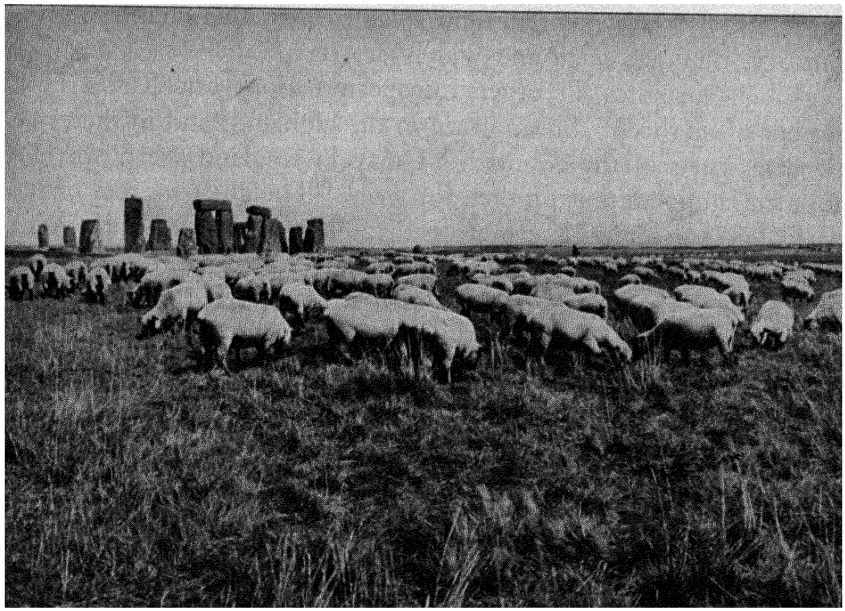


Photo by De Cou

English sheep grazing at Stonehenge on the Salisbury Plain. The United Kingdom's census of livestock shows nearly 25,000,000 sheep.

oatmeal he always carried on the pommel of his saddle a small sheet of iron. When hard pressed, he would alight beside a brook, stir up a bit of oatmeal with water, light a fire, cook his oatmeal scones on the sheet of iron and be off again before the British could catch up with him. Barley, as well as oats, is raised and used in large quantities as feed for farm animals. Corn cannot be raised because summers even in the southernmost parts of the British Isles are too cool for this crop.

Livestock and their products. In the past sixty years the trend of British agriculture has been away from farming and toward stock raising. Hayfields and pastures cover about twenty times as much land as does wheat. The best regions for pasturage are in the western parts of the islands. Here is rugged country most suitable for grazing and here are the moist winds and the heavy rainfalls necessary to produce abundance of grass. The British are experts in raising fine cattle, horses, sheep, and hogs. They have sent blooded stock to all parts of the world where really fine animals are desired. Their Guernsey and Jersey cows are celebrated for their rich milk, and their Shorthorns and Herefords for the production of beef. The

slaughterhouses are not enormous plants, as in this country; on the contrary, they are small and widely scattered.

Britain surpasses all other European nations but Russia in the number of its sheep. Sheep graze in the highlands and in the eastern and drier parts of the country. Today in England sheep are raised more for lamb and mutton than for wool. The chief sources of wool for Britain's great mills are Australia, New Zealand, South Africa, India, and Argentina. London, the capital, is the greatest wool market in the world. Large quantities of the imported wool are reëxported to other nations.

Britain has about a million horses bred for riding, hunting, and racing. Beautiful thoroughbreds contest for first place at the famous race tracks of Ascot, Epsom, and Derby.

Animals and animal products constitute yearly about seventy percent of the farm products in value. Nevertheless they do not supply enough food for Britain's needs. Beef is imported from Argentina and Uruguay; mutton from New Zealand and Australia; pork products from the United States, Ireland, and Denmark, and dairy products from Denmark, New Zealand, and other countries. More than half the imported cheese comes from New Zealand alone. Eire sends butter, fresh cream, and milk.

The dairy outlook. The dense population of Britain creates a wide demand for dairy products. As a consequence, many British farmers become dairymen. Butter and cheese can be brought from a distance, but fresh milk must be produced nearer home. Therefore eighty percent of the dairy farmers produce milk. As in all countries butter and cheese can be made by those who do not have ready access to large markets. The Irish farmers have organized cooperative creameries which supply large quantities of butter to the English market. The dairy center of Eire is near Dublin.

The Commerce of the British Isles

The character of British trade. Great Britain is a small country with a dense population; therefore much food must be imported. In return for food it can exchange manufactured goods and coal. In order to manufacture, however, Britain must buy enormous quantities of raw materials from other nations, which in turn must be paid for with manufactures. And so the great cycle continues: food and raw materials to Britain; manufactured goods and coal from Britain. The manufactured goods are the product of skilled labor. If British

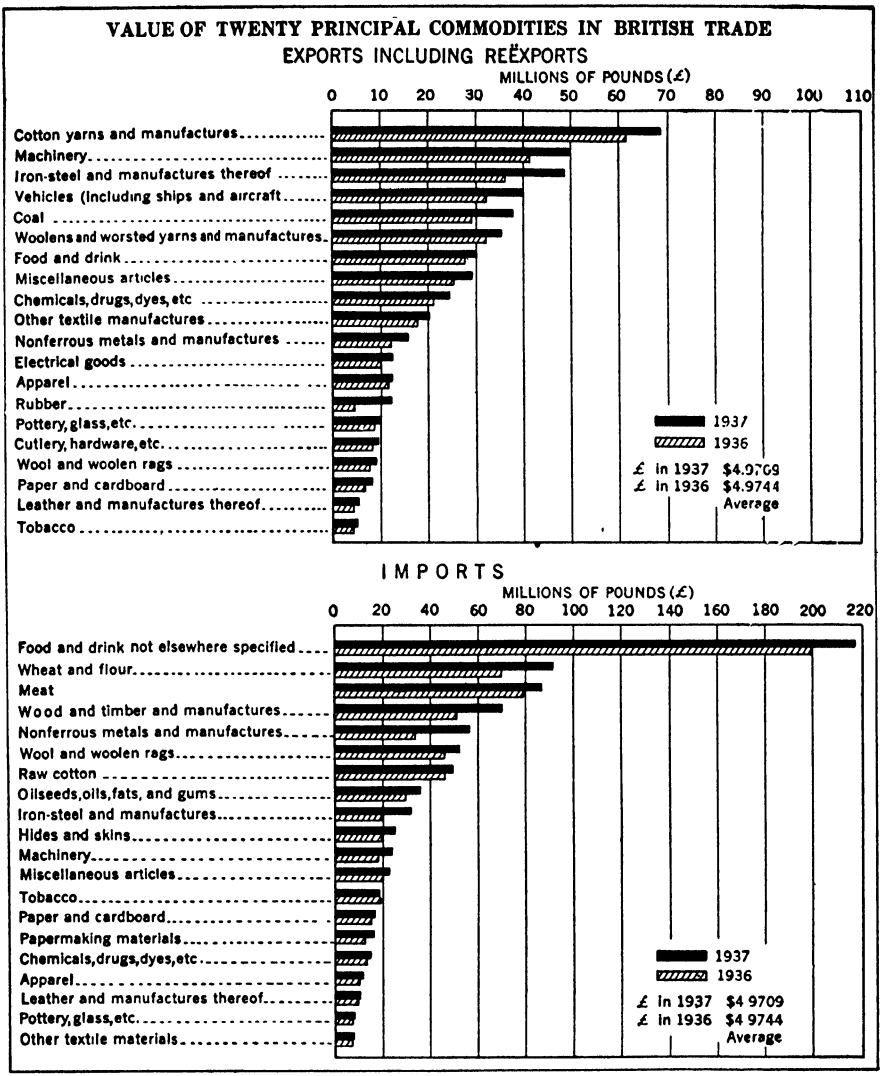


Photo from Ewing Galloway

Ocean liner tied up at the Cunard Docks at Southampton, one of England's important Channel ports

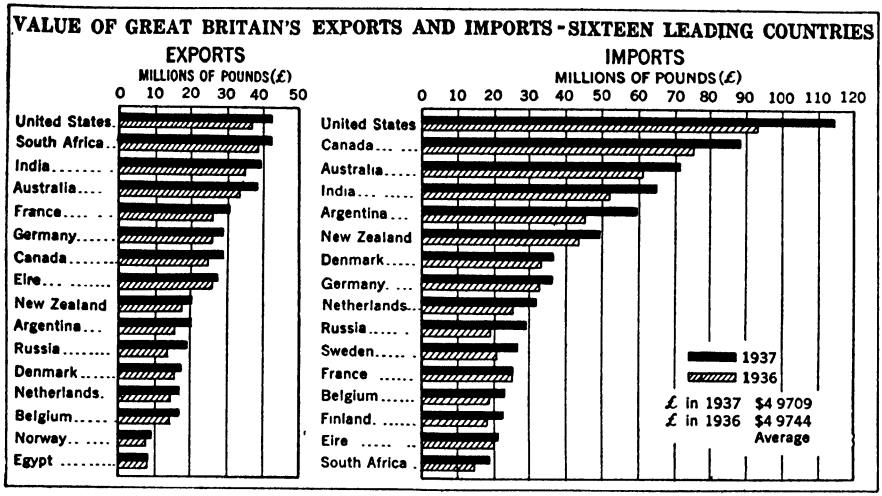
coal and iron have entered into their making, the price of coal and iron must also be considered in estimating the value of the article to be exported. Thus selling skill, labor, and fuel, Britain pays its way. Not otherwise could a nation of limited natural resources support so large a population or have attained such an influential place in the world's industrial life.

The graphs dealing with British exports and imports should be carefully studied. The graph showing the items exported reveals that they consist almost wholly of manufactured goods. This is what we should expect. The graph also reveals the relative importance of the different industries. Coal is the only item not a manufacture. Great Britain is fortunate in having a surplus of coal for export. Imports, such as wool, grains, cotton, and timber, are bulky and in proportion to their value occupy much cargo space in ships. The exports, manufactured articles, such as clothing, pottery, glass, and cutlery, are compact and occupy little space in proportion to their value. The abundant supply of coal helps in the solution of this problem. If a ship has brought nitrates from Chile or wool from Argentina or coffee from Brazil, it can take back coal for at least



part of its cargo. Since the return voyage must be made anyway, coal can be carried at a low rate. Smaller returns are better than a trip without a cargo or with only a partial one.

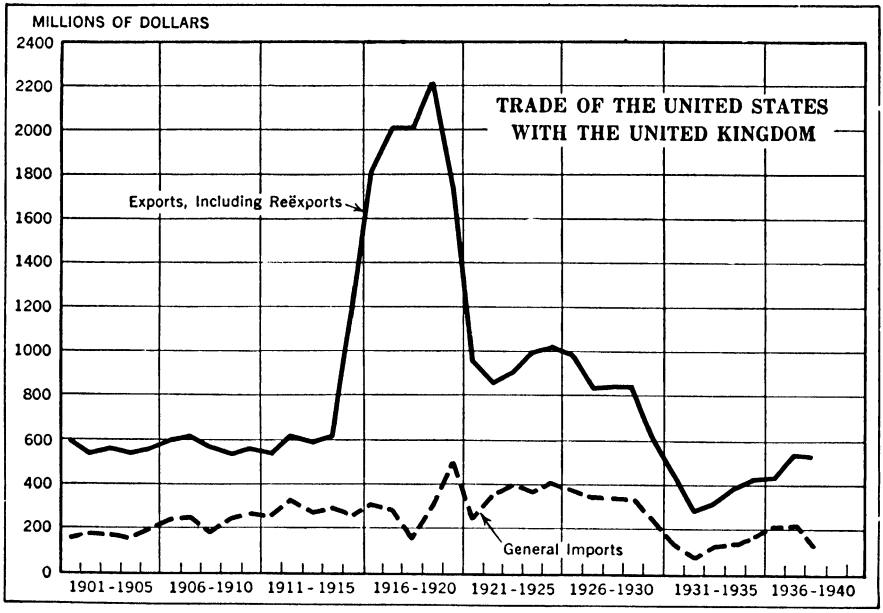
Study the graph showing the chief imports. As we should expect, foods and raw materials head the list, while manufactures of iron and steel are far down in the list. These manufactures are chiefly specialized articles, such as typewriters and sewing machines. Wood and timber is in fourth place. Lumber is greatly needed for building as Britain has very few forests.



The carrying trade and foreign investments. Britain has other ways of making money besides selling manufactured goods. The British merchant marine transports not only its own goods but goods shipped by the people of other nations. There is also the income from the investment of British money in foreign enterprises, such as railroads, mines, oil wells, and plantations of various kinds. Then there are British business houses, such as banks and insurance offices, located far and near all over the world. All these activities yield sizable profits which go to swell the income of the British people and to help pay for the heavy imports.

Britain's leading customers. Study the graph which shows where Britain sends its chief exports. United States, South Africa, India, and Australia are in the lead. Now look at the graph of exports in order of their value. Cotton goods, iron and steel, machinery, and woolen goods are high on the list. What is the relationship between these facts? India is the best market Great Britain has for cotton goods. At the same time cotton goods are usually the most valuable of the exports to Australia. To the United States Britain exports large quantities of both cotton and woolen goods. Cotton and woolen goods, with iron and steel products, constitute the bulk of Britain's exports.

Where Britain buys. Compare the graphs dealing with British imports (pp. 468, 469). Can you discover why the United States heads the list of countries from which Britain buys? Try to account for the position of the next three countries in this list. Great Britain



buys about sixty percent of its imported goods from foreign countries and about forty percent from the other countries of the empire. On the other hand, Britain sells a little over fifty percent of its domestic products and manufactures to foreign countries and only slightly less than fifty percent to the other parts of the empire.

Great Britain as a middleman. Many goods pass through British ports that are not used in that country at all. For example, tea grown in India or Ceylon is sent to England, is there prepared and packed, and then may be sent to the United States. The tea was exported to Britain, but reëxported. Such products are known as reexports. British merchants import wool from Australia to sell in the United States and on the continent of Europe; cotton sent from the United States to Liverpool may be reëxported eventually to Germany or France; rubber from the Malay Peninsula often comes to the United States by way of London. Cargoes are thus obtained for British ships and profits for British merchants. Germany, France, Eire, and the United States are the chief purchasers of British reexports.

Ships and shipbuilding. Britain is not self-sustaining; in fact; it produces only food enough to supply it for two days of each week. The rest of the food must be contributed by all parts of the world. Raw materials for British industries must be brought from afar and

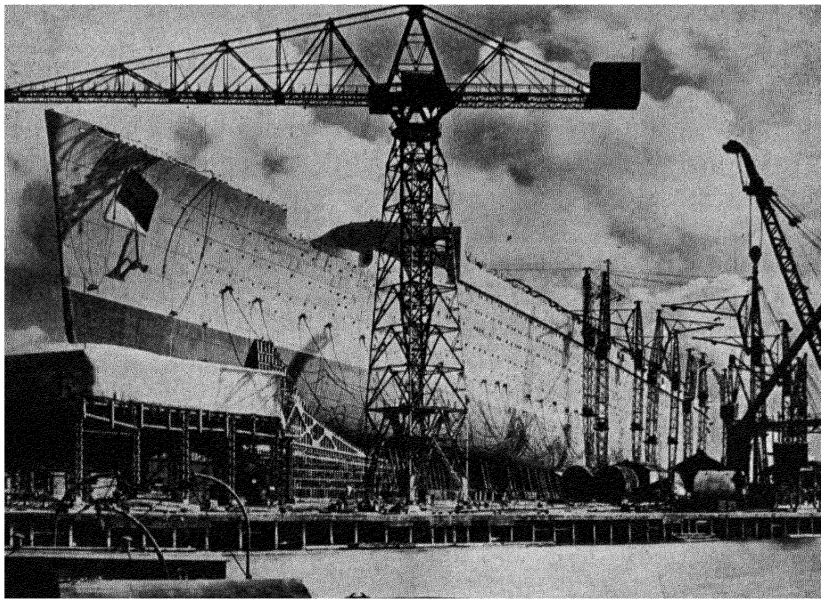


Photo from Philip Gendreau

Ocean liner under construction in a Scottish shipbuilding yard on the bank of the Clyde River

manufactured articles must be transported to distant markets. To meet this situation, thousands of ships are needed. Britain has a larger number of ships carrying freight and passengers than any other country. British ships carry nine tenths of the oversea trade of the empire and one half of the oversea trade of the world.

Britain has excellent harbors on all coasts. These harbors are easily reached from the interior as no part of the British Isles is more than seventy miles from the seaboard. Some of the chief ports are London, Liverpool, Glasgow, Bristol, Plymouth, Southampton, and Belfast. Newcastle, Cardiff, and Barry are important coal-exporting ports.

Britain has developed a great shipbuilding industry. In some years it has held fourth place among that country's industrial activities and two hundred thousand workers have been employed. There are, however, wide fluctuations in production and employment. Glasgow is the chief shipbuilding center. Other important centers are on the Tyne and in Belfast, Northern Ireland.

Guides to Study

1. What different names are applied to Great Britain and its possessions?

2. In what ways has British influence extended to the United States and to the rest of the world?

3. In what ways is Britain's location superior to that of almost any other country?

4. How does the climate of the British Isles differ from that of eastern North America in the same latitude? Explain the difference.

5. How did an early start help Great Britain to become great in industry? In commerce? In colonial possessions?

6. What part has coal played in helping Britain to become great?

7. Why is coal less valuable as a resource than in former years?

8. The manufacture of textiles has for many years been Britain's leading industry. How did this come about?

9. Why is Britain particularly fortunate in having a large supply of fish near at hand? How did this industry aid in the growth of the country?

10. Why are the British Isles better adapted to grazing than to the cultivation of the soil?

11. Why should England itself produce as much of its own food and raw materials as possible?

12. How do the exports and imports of England compare with those of Argentina? Explain the differences.

Research for Students

1. On an outline map of the world color with one color all the possessions of Great Britain. Learn the value of each possession to the mother country.

2. List in order of importance what you consider Britain's principal resources.

3. Before the industrial revolution England exported wheat and wool and imported manufactured goods from Flanders. How does the trade of that day compare with the trade of today? Account for the differences.

4. On a map of the British Isles locate the principal industrial centers and the chief ports. Give the reasons for the growth of each. What advantages has London, the largest city in the world?

5. Make a list and if possible collect samples of British products that are sold in your vicinity. Study newspapers and magazines for advertisements of British products. Why are those products desired by Americans?



Photo by James Sawders

A Bergen fishmonger making a selection for a particular customer. This Norwegian fish market on the famous Hanseatic wharf is always visited by the tourist.

2. SCANDINAVIA–MINES, FORESTS, AND FARMS

Norway–The Land of the Vikings

A nautical people. Norway and Sweden make up the Scandinavian Peninsula. Besides these two nations the term *Scandinavia* usually includes another peninsula, that of Denmark.

Long ago the ancestors of the Scandinavians were a hardy, sea-loving, warlike people known as *vikings*, or *Norsemen.* They ravaged the coasts of western Europe, plundering wherever tempting goods and riches offered themselves. They were so feared that everywhere Christian people prayed to be delivered from the fury of the Northmen. They even penetrated as far as the coast of New England. The sea at their doors was their roadway, always testing their strength and always beckoning them on to greater adventures.

Today the Norwegians are, as we might expect from their heritage, hardy fishermen and brave sailors. For centuries the people of Norway have earned their living through occupations that grew



Photo by James Sawders

Norway's important hay crop is hung on racks to dry in the sunshine of the long summer days characteristic of this high-latitude land. This quick-drying method preserves the sweetness of the hay, and the racks make modernistic designs in the landscape.

out of their contacts with the sea. These are fishing, shipbuilding, and the carrying of goods by their merchant vessels.

A forbidding land. One writer has picturesquely described Norway as a country with a granite back and a fir-tree jacket. Mountains cover practically the whole of the country. The forest trees are mostly evergreen. Strong winds blowing over the many hills make the trees stunted and irregular in shape. In the gorges, where there is protection from the fierce winds, the trees grow tall and straight. Such trees are of great value in shipbuilding and other activities.

Norway is often called "the land of the midnight sun." Strictly speaking, we should apply that name only to that part of the country that lies within the Arctic circle.

The soil of the country is poor. In fact, three quarters of the land is unsuited to cultivation. The area remaining is so small that over half the farms are not more than five acres in size. Nevertheless, these small farms support more than one third of all the people. The

location of Norway, so far to the north, has this advantage: eighteen or twenty hours of daylight in summer is of great help in ripening the grain crops. The mineral resources are very limited. No wonder that, in seeking a living, Norwegians turn from the land to the sea.

The inviting sea. Norway has one of the most irregular and picturesque shore lines inhabited by man. Deep narrow bays, called *fiords*, penetrate far inland, furnishing quiet waters along the entire stretch of coast. Winds from the Atlantic prevent the freezing of even the northernmost harbors. Sheltered by fir-clad mountains, these fiords, whether gloomy under lowering clouds or bright with bursts of sunshine, are always beautiful. No wonder the tourists are seeking Norway today in ever increasing numbers. It was easy in the early days for the Norsemen to venture forth. Numerous bordering islands were their first goal. Lumber for building more and larger ships was close at hand in the forests. Thus we see how naturally fishing and the building of ships came to be Norwegian industries, to which later was added the overseas carrying trade.

Wealth from the sea. As we have seen, fishing is a main source of wealth for Norway. All the ports are fishing centers. Although Oslo is the capital and the largest city, Bergen is the leading fishing port. The fishing industry is of three types: fishing for cod in the North Sea and near the Lofoten Islands; fishing for herring in the waters surrounding southern Norway; and fishing for whales in the South Atlantic and Antarctic Oceans. As a result of these extensive fisheries, Norway prepares and exports enormous quantities of salted, dried, or canned fish. To the United States alone Norway sends millions of pounds of canned fish. The whale is chiefly valued for its oil although a few countries eat whale flesh for food. Forest products, especially wood pulp and newsprint, head the exports; but fish and fish products come second.

Wealth in forests. About twenty-five percent of the forests are hardwood; the rest are evergreen. The products of the forest are lumber, pulp, paper, wooden articles, and paper articles. Spruce in great abundance and practically unlimited water power are the factors favoring the production of wood pulp and paper in large amounts. These exports find their largest market in the United Kingdom. To the United States Norway sends newsprint and considerable pulp. Today Norway is aroused to the need of conserving its forest resources. This is a wise move since forest products furnish more than twenty percent of its exports in value.



Photo from Ewing Galloway

A whaling vessel equipped with a harpoon gun, the modern method used to spear these monsters of the deep

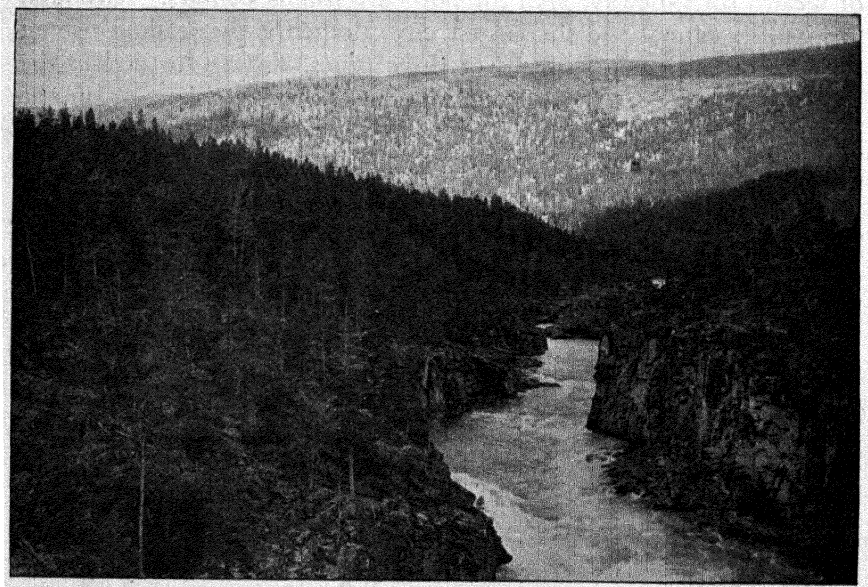
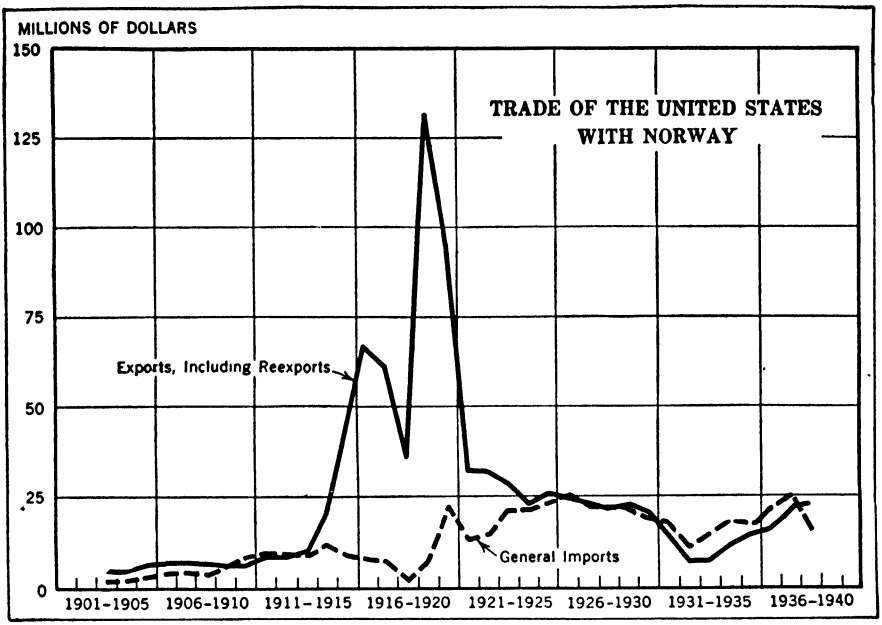


Photo by James Sawders

Norwegian forests furnished the materials for the ships of the vikings. They still provide lumber for all sorts of construction as well as wood pulp for paper. The streams that course so rapidly through them furnish power for Norway's industries.



The harnessing of water power. No other country of Europe has so much water power as Norway. The western mountain slopes are abrupt and their streams have consequently swift currents with great potentialities for power. However, to date, only one seventh of the water power has been utilized. There are two important chemical industries in which hydroelectric power is employed—one is the making of nitrogen compounds to be used in manufacturing commercial fertilizers; the other is the making of aluminum.

The nitrogen for making nitrogen compounds is drawn from the air. Norway has no coal and but little iron, but it has as much atmosphere as any other country. No one can stint this raw material. The supply is limitless and instantly available for the important manufacture of nitrogen compounds.

To make aluminum, the ore for the process must be imported. Some five tons of coal are necessary to prepare each ton of ore for the electric furnaces. Unfortunately, Norway has no coal except in far-distant Svalbard (*M. 325*), so great quantities of coal must be brought from a distance. Aluminum is, however, an important export of Norway.

Norwegian cargoes. Since Norway cannot provide enough food for its people, foodstuffs stand first among the imports. Tex-

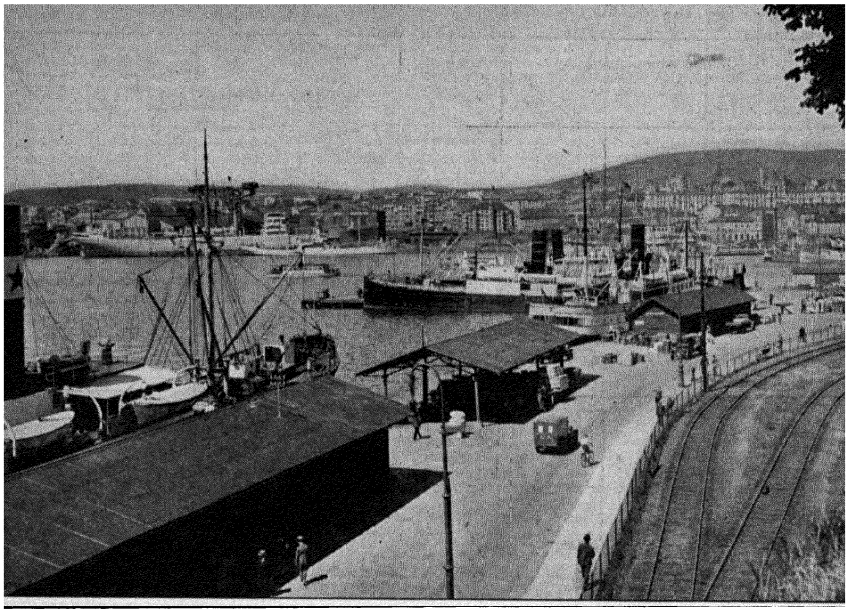


Photo by James Sawders

The water front at the city of Oslo, where the ships of all nations dock. Twenty miles from the sea at the head of Oslo Fiord, the city is Norway's chief seaport.

tiles and manufactured goods are other important items. Coal is imported and some ores to be smelted and refined by electricity. Norway buys about equally from Great Britain and Germany.

Norway exports the products of its forests, its fisheries, and its hydroelectric plants. There is the possibility that, in time, it may sell its electric power to neighboring countries to the south. Great Britain, across the North Sea, is Norway's chief buyer.

Service of the merchant marine. When the population of Norway is considered, we find that its merchant marine exceeds that of any other country. It has been justly said that "the whole nation could be taken aboard its own ships." Norwegian ships not only transport their own goods, but they engage in the carrying trade for the benefit of other nations. The Norwegian sailors, whether officers or crew, are known and approved everywhere. They still are living up to the old viking traditions of courage and daring.

It is interesting to note that steel ships engaged in trade for Norway are generally built in neighboring coal-producing countries. To import coal for shipbuilding or to have the native coal brought



Photo by James Sawders

The Swedish method of stacking wheat. Drying the cut grain on these huge racks is necessary in some parts of Sweden because of excessive rains in the harvest season.

from Svalbard is so costly as to be prohibitive. Because of this handicap, Norway cannot compete with coal-producing countries in iron and steel industries.

A word about the people. Norway has less than three million people, but its influence is felt in world affairs. The three Scandinavian nations are strong for peace and for intellectual freedom. A recent treaty has been signed by them insuring peace among themselves for twenty years. Outstanding men have arisen in this rugged little country to make great contributions in the fields of music, literature, science, and exploration.

Sweden—the Home of a Capable People

Valuable natural resources. Sweden is more fortunate than Norway in several important ways. In the first place it is larger than Norway. In the second place its forests are more extensive. They cover about half the country and constitute the nation's greatest resource. In the third place Sweden's agricultural resources are much greater than those of Norway; there is not so much need to

import foods. Most of the farms are in southern Sweden where the surface is not mountainous and where the growing season is longer than farther north. The value of the farm products exported is nearly one half that of the farm products imported.

Sweden is rich in iron. Its deposits of iron ore are greater than those of any other nation in Europe with the possible exception of France. Millions of tons of iron ore are exported every year while at home large iron and steel plants give employment to thousands of workmen. Sweden is fortunate in its quarries of granite, marble, and sandstone—all useful for building. In recent years there has been marked development in the quarrying of stone and the future for this trade seems promising.

Norway, Italy, Russia, and France are the only European countries which exceed Sweden in water-power resources. Water power runs the sawmills and planing mills which prepare lumber for home use and for export; hydroelectric power smelts iron and other ores, makes nitrates and other chemical products, and supplies power for many other manufacturing plants. However, it must be realized that, owing to the freezing of the rivers in winter, the water power is then much curtailed.

If we consider all its abundant resources, it is not surprising that the foreign commerce of Sweden is nearly twice that of Norway.

Contributions of the forests. Lumbering has been carried on in Sweden for centuries. There is nothing to prevent its being continued indefinitely as the government has excellent conservation laws. Nearly half the forests are owned by the farmers. The other half is divided almost equally between the state and the large lumber corporations. The leading purchasers of Sweden's forest products are those nations whose virgin forests were felled long ago—namely, Denmark, Britain, and Germany.

The heavy work of cutting down and trimming the trees is done in the winter. The lumbermen leave the logs piled beside the rivers so that the spring floods may carry them down stream to the sawmills. There they are fashioned into planks, mine props, and matches. Other products are pulp, paper, and charcoal. Even the sawdust is utilized, for the Swedes are remarkable for thrift. Nearly one third of the population get their living from the forests or the industries allied to them.

A safety match is one that must be rubbed against a specially prepared surface. This is a Swedish invention that was the founda-



Photo by James Sawders

The logs from this forest in central Sweden will be hauled by truck to the neighboring pulp mill to be converted into paper.

tion of its mammoth match industry. Money from foreign investors aided the rapid rise of the business. The Swedes have invented intricate machines to perform all the necessary processes. The largest of these machines makes 40,000 boxes of matches per hour. All the match factories in Sweden produce 30,000 matches every second. Is it any wonder that the price of a box of matches is but one cent?

Contributions of the mines. Sweden has some deposits of copper and zinc. Its greatest asset, however, is its iron. The iron mines are widely scattered; some are in the south near thickly settled regions while others are far away in Lapland, north of the Arctic circle. The latter are the largest deposits. Since Sweden lacks coal, the smelting is done with charcoal. The result is a very fine grade of iron, much in demand abroad for making cutlery and other articles of superfine quality. Now that coal and coke are employed in smelting, Sweden no longer leads the world in the production of iron and steel. Today electricity is being used to some extent both in smelting and in making steel.

The large deposits of iron ore in Lapland cannot be smelted profitably with charcoal because they contain much phosphorus.

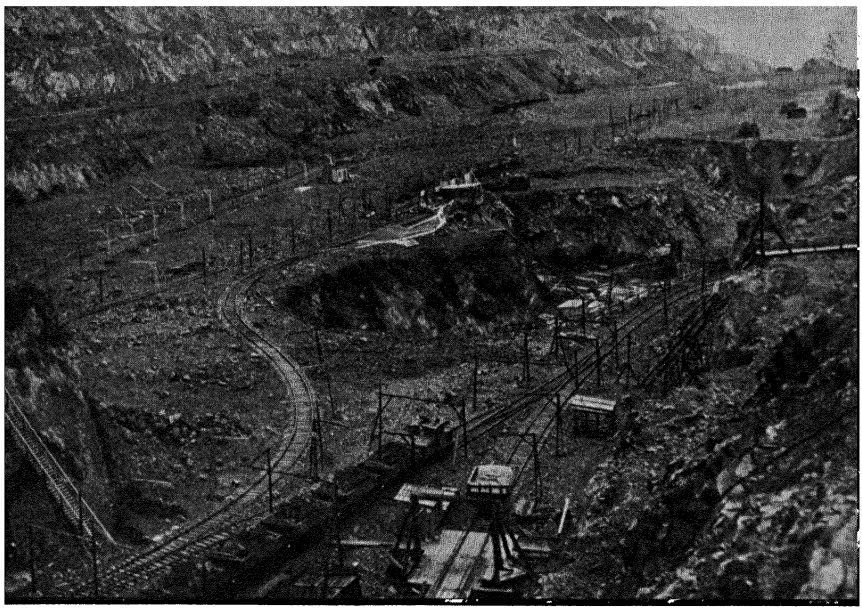


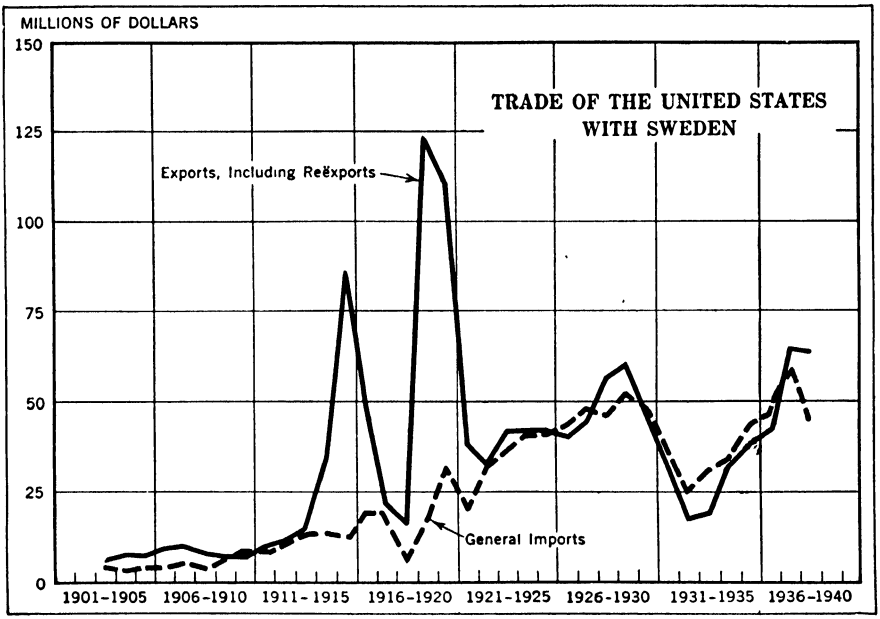
Photo by James Sawders

The great iron mines at Kiruna in Swedish Lapland are ninety miles north of the Arctic circle and have to be artificially lighted all day during the greater part of the year. Because of its high phosphorus content Sweden cannot use the ore of this mountain of iron but exports it to England and Germany.

There is nothing to do, therefore, but to export the ore to coal-producing countries. Accordingly, much is sent from the ports on the Gulf of Bothnia in the summer and from the port of Narvik in Norway in winter when the gulf ports are frozen. Sweden is far colder than Norway in winter. This is because the great mountain chain of Scandinavia cuts off the warm, westerly sea winds that keep the coast of Norway at higher winter temperatures than prevail in Sweden.

Some steel is made into machinery. Sweden is noted for the manufacture of telegraph and telephone apparatus. An important piece of dairy equipment, the cream separator, is a Swedish invention much in use at home and abroad. Machinery is an important item in the list of Swedish exports.

Commodities of trade. In money value imports and exports are about the same. The chief imports are coal, iron and steel, textiles, machinery, petroleum products, chemicals, and coffee. Although



more than 150,000 tons of sugar is made annually from the beet, Sweden finds it necessary to import sugar. Wheat also is imported, for agriculture, carried on very successfully in southern Sweden, cannot yet supply all the necessary breadstuffs. Feed for cattle is also imported.

Paper and pulp make up more than half the value of the exports of forest products. Next on the trade list comes lumber. The three items—pulp, paper, and lumber—constitute nearly one half of Sweden's exports. Iron ore, metals, and machinery make up nearly one quarter. Butter, in a single year, has been exported to the value of $20,000,000. Fish are sent to southern countries.

Stockholm and Göteborg are the two most important cities. Stockholm is one of the finest of European capitals. Its setting amid lake, harbor, and islands is superb. Göteborg has an excellent harbor on the west coast.

Denmark—Land of Successful Coöperation

Animal specialization. Denmark has few natural resources. It has no mineral wealth, no forests, no water power. Even its soil is not very fertile. But the Danes—a sturdy, virile people—have done their utmost to combat these adverse conditions. They have used

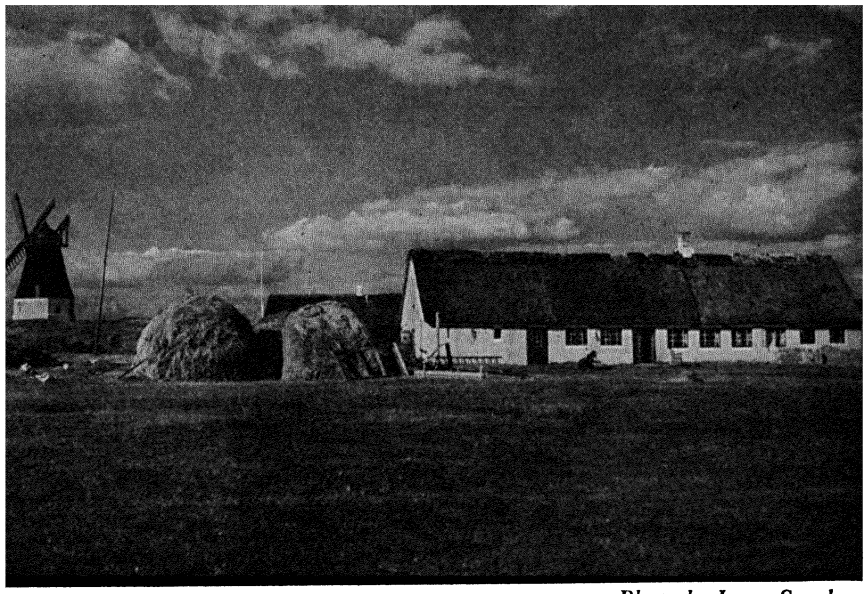


Photo by James Sawders

A typical Danish farmstead. The farmhouse is of white plastered stone surmounted by a thatched roof. The windmill is of similarly treated stone but its top is of black shingles.

commercial fertilizer to improve the land, and they have taken great pains to improve their farm animals. Their wealth is mainly centered in the cow, the pig, and the hen. England's trade with Denmark is enormous, for Danish butter, bacon, and eggs are most wanted for British breakfast and tea tables. If Great Britain should decide to "Buy British," that is, to take only products from the empire, Danish industries would collapse.

Denmark has established coöperative associations that are exceedingly important agents in the success of the farmer. These associations buy, sort, grade, and, if the articles warrant, stamp, and market the farmer's products. The official stamp guarantees approved quality, quantity, and proper conditions of cleanliness on the farm whence the products originated. Over 1000 coöperative creameries make and market butter; coöperative slaughterhouses kill the pigs and find a market for the bacon and pork; coöperative associations grade eggs, stamp them, and thus guarantee their excellence. There are coöperative stores in all the towns. Here the farmers may buy fodder, farm machinery, fertilizers, coal, and supplies for

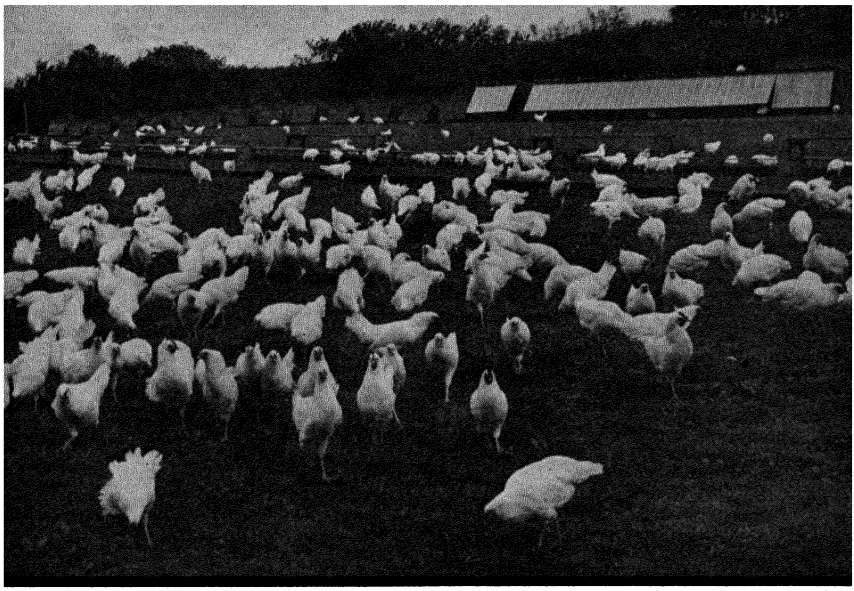


Photo by James Sawders

A Danish chicken farm on the island of Funen. Denmark exports in excess of 90,000,000 dozen eggs annually.

the home. The farmers themselves manage all the cooperative associations, which are also carefully supervised by the government.

Farm crops. The crops raised are mainly those that furnish food for the domestic animals. A mixture of barley and oats serves as an excellent food for the cattle. Even though handicapped by a poor soil, the thrifty Danes manage to raise about three times as much grain per acre as we do in the United States. Sugar beets are an important crop. They not only furnish the country with most of its sugar, but the beet tops and pulp make valuable food for the livestock.

Pork and bacon. Skim milk and buttermilk are by-products of the butter factories; there is also dairy and crop waste. The thrifty Danish farmers saw in the raising of pigs and the marketing of pork products a chance to use this waste to great profit. Consequently meat-packing plants are found throughout the country. The pork, bacon, and lard exported have a value exceeding $100,000,000 and form almost one third of the total exports of Denmark.

Butter. The Danes export eighty-five percent of the butter that they make. On their own tables they use margarine as a butter

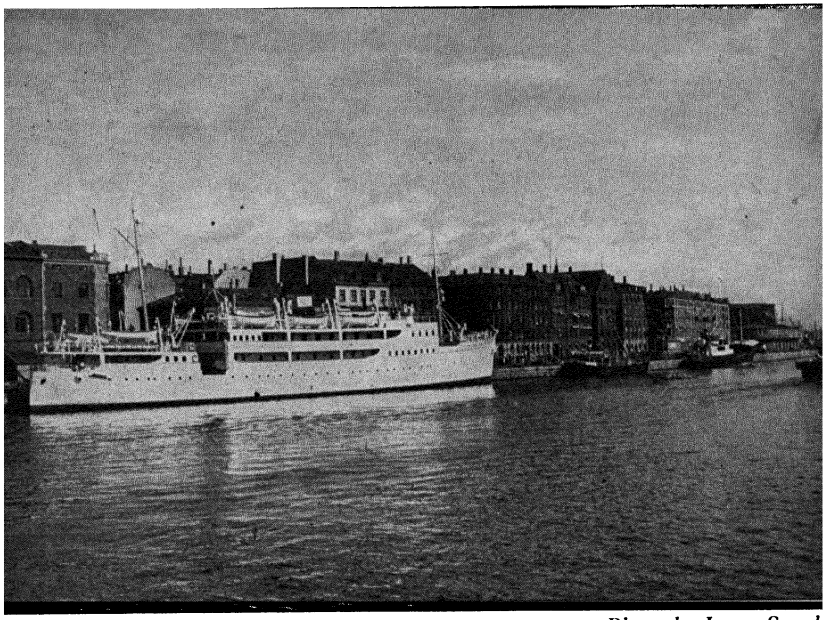


Photo by James Sawders

Copenhagen, the capital and chief city of Denmark, is the largest city in Scandinavia. It is also the first port of Denmark.

substitute. Butter constitutes nearly one-fourth of the total exports in value. Everywhere the superlative quality of the Danish output is recognized. It is the coöperative brand that stands behind every pound of butter, every pound of bacon, and every egg exported. Thus is maintained the high reputation that Danish goods have acquired. Should any factory or dairy fall below the standard of quality or of cleanliness, it is forbidden to use the government brand. Danish buttermakers have been asked to visit Canada, Russia, and the Baltic States to teach the foreign farmer the secrets of making and marketing a well-nigh perfect product.

Eggs. Eggs are shipped mainly to Great Britain, Norway, and Sweden. The freshness and quality of every egg exported is guaranteed by the coöperative associations. Each egg bears the number of the farm from which it came and the number of the association that marketed it. If a case of eggs or even one individual egg should be bad, the responsibility can be traced right back to the very hennery in Denmark whence came the inferior product. The offending merchant can then be dealt with by the association. In this way the high reputation of Danish food products is maintained.

Leading imports. Aside from coal the imports arise from the needs growing out of the intensive animal husbandry. Therefore, we find that grain and oil cake are imported for cattle feed; oilseeds are imported for making margarine; and fertilizers are purchased for the betterment of the soil. Money to pay for a part of the imports comes from the earnings of the Danish merchant marine.

Denmark is a "one-city country." This one city is Copenhagen (Köbenhavn), the capital and a leading center of world trade. Tivoli, "Europe's most famous pleasure garden," is one of the attractions of Copenhagen.

Guides to Study

1. Why did Norway become a land of sailors and fishermen?
2. How has Norway made the best use of its resources?
3. How did the use of Norway's forests in the past differ from that of the present time?
4. How does Norway send its water power to foreign markets?
5. How does Norway's merchant marine help to increase its imports?
6. In the days of wooden ships Norway was noted as a shipbuilding country. How does it obtain its ships today?
7. How has fishing influenced the other industries and the commerce of Norway?
8. Why is Sweden's foreign trade larger than Norway's?
9. Sweden has iron but no coal. Would it be better to have coal but no iron?
10. In what form does Sweden market its forest products?
11. Sweden exports forest products and iron ore; France sells skill and taste. Which will be the better off in years to come? Why?
12. In what ways do Danish coöperative societies help in marketing farm products?

Research for Students

1. Learn the uses made of Svalbard in the past and its value to Norway now.
2. The harbors of Norway are never closed by ice; those of Sweden are closed for a part of the winter. Explain.
3. Compare the resources and exports of Norway, Sweden, and Denmark. Which do you think is using its resources so that the future will be best provided for?
4. Make a brief report of the explorations and discoveries by Norsemen in North America.
5. Many Scandinavians have settled in the northwestern part of the United States. What part have they played in the development of that region?

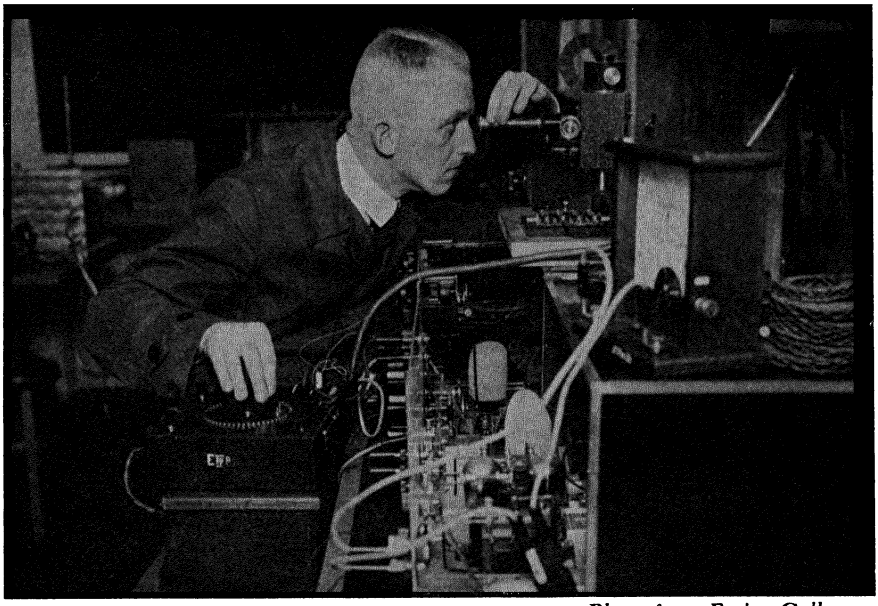


Photo from Ewing Galloway

German wireless-research laboratory where tests are being made of a newly perfected instrument for television broadcasting and for experimentation in overcoming obstacles to perfect reception.

3. GERMANY—A LEADER IN APPLIED SCIENCE

Germany's contributions to world progress. Germany did not become a united nation until the close of the war with France in 1871, and its industrial revolution did not begin much before that date. Yet its progress in science, agriculture, manufacturing, and commerce has been outstanding. It has been said that genius is an infinite capacity for taking pains. German scientists and German businessmen have studied their problems with infinite care and in solving their problems they have taught other nations valuable lessons. Germany, as compared with the United States, is not a land of great resources, but patient and painstaking study has led to discoveries, inventions, and methods of work that in times of peace brought prosperity to Germany.

Older Germany made many contributions to world culture. Gutenberg, a German, is credited with the invention of the printing press and the use of movable types. Germans helped to perfect



Photo from Ewing Galloway

An aerial view of the great Krupp Works in Essen. This mammoth industry supplied much of Germany's military equipment during the World War and again its chief production is being used for munitions and armament.

Gothic architecture which has influenced building construction the world over. German names are prominent in many fields of endeavor, as, for instance, Wagner in music, Goethe in literature, Dürer in art, and Roentgen and many others in science.

Germany before the World War. To understand the problems of present-day Germany, we must know something of its background. The World War was a major disaster for that country. Before 1914 Germany stood with Great Britain and the United States as a world leader in industry and trade. It excelled Great Britain in the production of iron and steel, machinery, electrical supplies, and chemicals. Britain surpassed it only in the output of textiles and coal. In world commerce only Britain, "the Mistress of the Seas," gained a larger revenue from its exports. In the value of its manufactured goods Germany was excelled by the United States alone. The German government had acquired extensive, though not especially valuable, colonies in Africa and had obtained a long lease of a portion of the Shantung Peninsula in China. The foothold in

the East gave Germany great opportunities to develop resources and to secure trade in China.

Germany after the War. With the World War the picture changed. Germany suffered heavy losses. It was obliged to surrender to other nations about one eighth of its territory (*M. 567*) and population in Europe. As the ceded areas contained a part of the German coal deposits and three fourths of all its iron ore, this loss was a crushing blow industrially. Alsace-Lorraine, returned to France, was the greatest loss. This province contained a large textile industry, valuable potash mines, and very rich deposits of iron. Its four African colonies and a few small islands in the South Pacific were placed under the control of other nations. Its navy was almost completely destroyed, and most of its merchant marine was given to other nations to pay for the damages wrought by German submarines. All these losses weakened Germany and made the revival of its industries and trade very difficult.

The Germany of today. For a time following the World War Germany was governed under a constitution resembling that of the United States. But the pressing economic problems resulting from the war and the new adjustments made necessary by new world relations could not be met speedily by a people inexperienced in self-government. Economic, financial, and political problems brought confusion, great dissatisfaction, and unrest. Experts from the United States were sent to Germany to help the country map out a plan of action, and find ways to meet its obligations to other countries. None of these plans was successful.

The unsettled conditions led the people to look for relief from their troubles from whatever source that relief might come. Adolf Hitler, a native of Austria, by promising to cure all their economic and political ills was successful in a comparatively short time in having all the powers of government placed in his hands. Under his rule the people have absolutely no part in government; they have been told how their religious services must be conducted; their business is directed by the State; and their property may be used as the leader or Fuehrer directs.

One of the avowed aims of the government is to keep the German race pure and united. This aim has led to a return to German paganism and the adoption of a plan to exclude eventually all other races from German territory. The carrying out of this plan has led to the persecution of the Jews and the confiscation of their property.

Other nations are coöperating to find new homes for these sorely persecuted people.

The great need of raw materials and of money to finance the government led to the invasion and annexation of Austria and the Sudeten Lands of Czecho-Slovakia. These regions to be sure were occupied quite largely by people of German blood but they had submitted willingly to the rule of their own countries until aroused by German propaganda. The unrest in Austria and the Sudeten Lands of Czecho-Slovakia increased and the demands of Germany for the annexation to that country of those areas became more and more insistent. The invasion of Austria by German troops met with no armed opposition by that country and Austria became a part of the German Reich. To avoid war Czecho-Slovakia was obliged to cede considerable areas of its territory to Germany. These transfers of territory were made when Czecho-Slovakia found that it could not count on the support of Great Britain and France, although France and Russia were obligated to aid Czecho-Slovakia in case of invasion.

The acts of the German government toward other races, toward its weaker neighbors, and toward democratic government at home and abroad have led to strained relations between Germany and those countries, including our own, in which self-government is regarded as a sacred right.

Physical features. As regards location Germany has much in its favor. It is in the north-temperate belt with its stimulating climate. Westerly winds bring rainfall from the Atlantic supplying all the moisture needed for crops. The country lies in the very heart of the leading industrial and commercial region of Europe. To the northwest is the North Sea leading directly to Great Britain and the world's most important ocean highways. On the north is the Baltic Sea giving ready access to the ports of Denmark, Finland, the Baltic States, and Russia. Land and river routes connect Germany with nearly a dozen neighboring countries. Its area was increased in 1938 by the acquisition of Austria and the Sudeten areas of Czecho-Slovakia. Austria, however, brought few resources to Germany. Before the World War Austria's prosperity depended on its close relationships with areas that later became Czecho-Slovakia, Hungary, and Yugoslavia. It contains considerable deposits of iron ore which will prove very useful to Germany. Its beautiful mountain scenery, historic churches, universities, and musical centers attract many tourists. The acquisition of the Sudeten Lands transferred to Germany a number of



Photo from Ewing Galloway

The busy Rhine port of Duisburg-Hamborn showing tugs and barges with the main docks in the background. Originally two separate cities, this metropolis is one of the large industrial cities of the Rhineland.

Czecho-Slovakia's leading industries which will help to make Germany more nearly self-sustaining.

A study of the rivers of Germany tells much of the country's physical features. These in general flow northward into the North and Baltic Seas, thus connecting with ocean routes. As the flow of the rivers suggests, the higher and more rugged portions of the country are in the south while in the north are low sandy plains which stretch across Central Europe. The Rhine offers an excellent water route all the way from Switzerland through the Netherlands to the North Sea. The Elbe and the Weser connect the great ports of Hamburg and Bremen with the North Sea. The acquisition of Austria has given Germany much greater control of the Danube. This is likely to prove of value to Germany in opening up trade with agricultural countries to the southeast.

The country's resources. Germany is not rich in agricultural lands. Not much more than half of the land can be cultivated, and the soil is not especially fertile. On the sandy plains of the north the principal crops are potatoes and rye. Farther south where the

land is more hilly, wheat and sugar beets are raised. The leading dairy regions are still farther south and also on the lowlands bordering the Netherlands.

Before the loss of Alsace-Lorraine Germany was rich in all essential minerals. With Alsace-Lorraine went much of the country's source of iron ore and a part of its supply of potash. Germany still has some iron ore, and the world's largest known deposit of potash. In the Rhine-Ruhr Valley is the greatest deposit of bituminous coal in Europe while in other parts of the country are enormous deposits of lignite. Other minerals mined in considerable quantities are copper, lead, and zinc. Germany's yield of petroleum is small.

Forests cover about one fourth of the country. They are scattered over areas not well suited to farming in the northern plains and in the highlands to the south. They are cared for almost as carefully as the farm crops and yield a large part of the lumber needed. In the forest areas woodworking in the homes is an important occupation, and articles made of wood are exported in considerable quantities.

Coal and lignite. Germany has great wealth in coal. In fact, as a producer, it is exceeded only by the United States and Great Britain (Table 39). If lignite is included, it is exceeded only by the United States.

Lignite is made into briquettes which are burned in the homes. In the sugar refineries of central Germany it is used as fuel. The country is somewhat lacking in water power. Throughout the lignite-mining region of central Germany, lignite, so conveniently at hand, furnishes the fuel to produce steam in electric-power plants. German chemists have found that a mineral oil very like petroleum can be obtained from lignite. Germany's coal not only supplies power for industries but is an important export. Coal is shipped from Germany to the Netherlands, Italy, France, and Belgium. More than one tenth of the coal mined is exported.

The largest deposits of coal are found in the Rhine-Ruhr Valley (*M. 458*) in western Germany. Their location close by the navigable Rhine is a favorable factor for commerce. Here also are several of Germany's greatest industrial cities. Here is Essen, noted for its war munitions and producing a great variety of iron and steel goods. Here also, a little to the south of Essen, is Solingen, like Sheffield in England, noted for its superior steel cutlery. Some important textile-manufacturing cities are also neighbors to the coal areas. Chemnitz

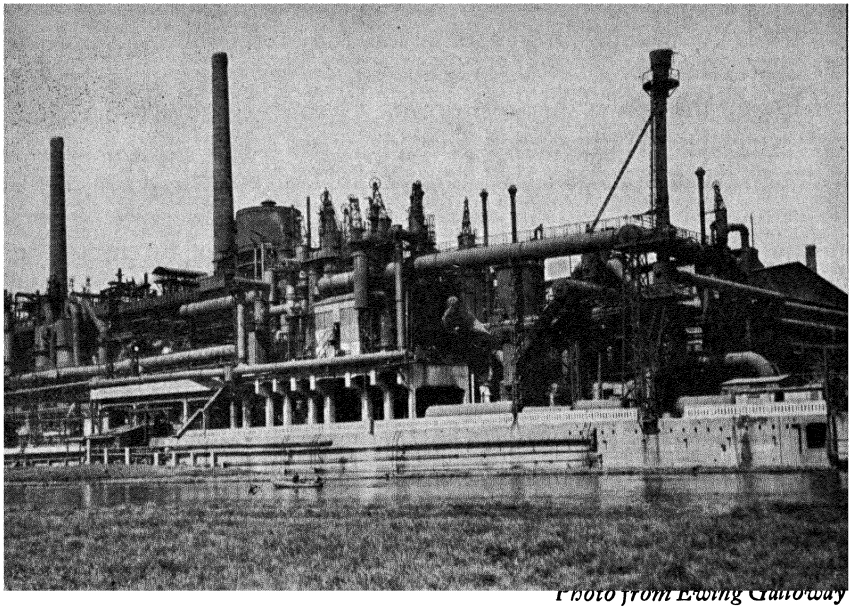


Photo from Ewing Galloway

The former Hugo Stinnes iron and steel plant at Mulheim in the Ruhr Valley—now a unit in the state-controlled industry. Much of the production of iron and steel recently has been for military purposes.

is situated near other coal deposits. Its textile industries are of such importance that it has been called the "Manchester of Germany."

Iron and steel. The return of Alsace-Lorraine to France cost Germany nearly three fourths of its iron reserves. Other mines and smelting plants were lost to Poland as the result of a plebiscite in 1921. Small quantities of iron have been mined in the Rhine-Ruhr Valley for many years. Since the World War new mines have been opened in the interior of the country. To carry on its extensive manufactures of iron and steel, Germany imports iron ore from Sweden, France, and Spain. In a recent year Germany imported over 18,000,000 tons of iron ore. One of the few resources which the annexation of Austria has brought to Germany is iron ore. Germany's production of pig iron and steel is greater than that of any other country in Europe.

This dependence of Germany upon other nations for iron is a fact very alarming to Germany. In case of war or serious misunderstanding it might lose its foreign supply of iron ores and thus be forced to close down its great iron and steel plants.

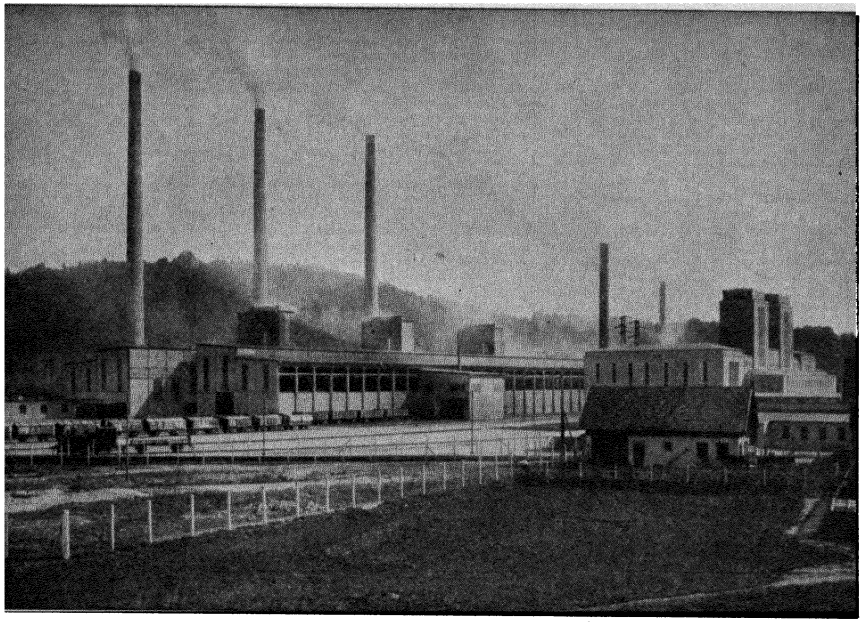


Photo from Ewing Galloway

Lime fertilizer factory in Bavaria. Nitrogen taken from the air is combined with carbide in this modern factory to supply plant food for German farms. The Germans were among the first to extract nitrogen from the air to be used in making explosives and commercial fertilizers.

The Rhine-Ruhr Valley is where the chief iron and steel plants are situated. Over three quarters of all the iron and steel output of Germany is made in this region. Small local deposits of iron started the industry which was continued with imports and with ores brought from other sections of the country. The Ruhr Valley is an ideal location for a mammoth industry. Here are large deposits of coal; here is easy access to the North Sea and the ocean trade routes; and here are rivers and canals penetrating into all corners of Central Europe and linking Germany closely with the eleven nations on its borders. The Rhine River, passing as it does through a great manufacturing area on its way to the North Sea, is one of the busiest waterways in the world. Thus we see how, through these arteries of trade, raw materials like cotton, wool, and iron ore can readily be brought to factory doors. In their turn manufactured goods can be as easily routed to all parts of Europe and even to other continents.

Work of German chemists. Agriculture and industry have been stimulated greatly by the work of German scientists, especially the

chemists. They have studied the nature and needs of the soil and sought to provide the best of chemical fertilizers. They have discovered the best methods of using potassium for fertilizer, and they have been leaders in extracting nitrogen from the air both for use as fertilizer and for manufacturing explosives. Chemists have made the beet yield much more sugar than formerly. They have obtained dyes, drugs, flavors, and perfumes from coal tar and have been among the first in making and using vegetable oils. More recently German chemists have discovered a new and cheap process of manufacturing wood alcohol. They have successfully obtained gasoline from coal and are improving the processes of making rayon and plastics. Like American chemists they are now experimenting to produce rubber from new sources.

The potash industry. Germany is immensely wealthy in potash. These deposits lie east of the Harz Mountains near Stassfurt. Provided there is no increased demand for potash over that of the present day, these rich beds can supply the world for two thousand years. Alsace-Lorraine has the next largest deposits of potash. During the years that Germany owned these provinces, it had practically "cornered" the world market for potash. With the return of Alsace-Lorraine to France in 1918, the two countries agreed that, in the future, Germany should supply about two thirds of the foreign orders for potash and France about one third. At home the potash is used to fertilize the poor soil. The salts also furnish raw materials to be employed in many chemical products. Chemical products and nearly half the potash salts mined are exported.

Textiles. Germany is dependent upon other countries for the raw materials of its textile industry. A century ago home-grown wool and flax sufficed. In recent years a large part of all Germany's imports has been raw materials for its mills and factories. In an effort to meet this need, German chemists are facing a Herculean task; namely, to invent and perfect substitutes for all imported raw materials.

Cotton from the United States comes mainly through the port of Bremen, a cotton-distributing center for much of eastern and southern Europe. The finer yarns for making the best woolen articles come, as always, from Britain. The textiles of Germany are a leading export of the country. The chief textiles exported are cotton, silk and rayon, wool, and linen.

A leading center of the textile industry is the Ruhr Valley. Here,

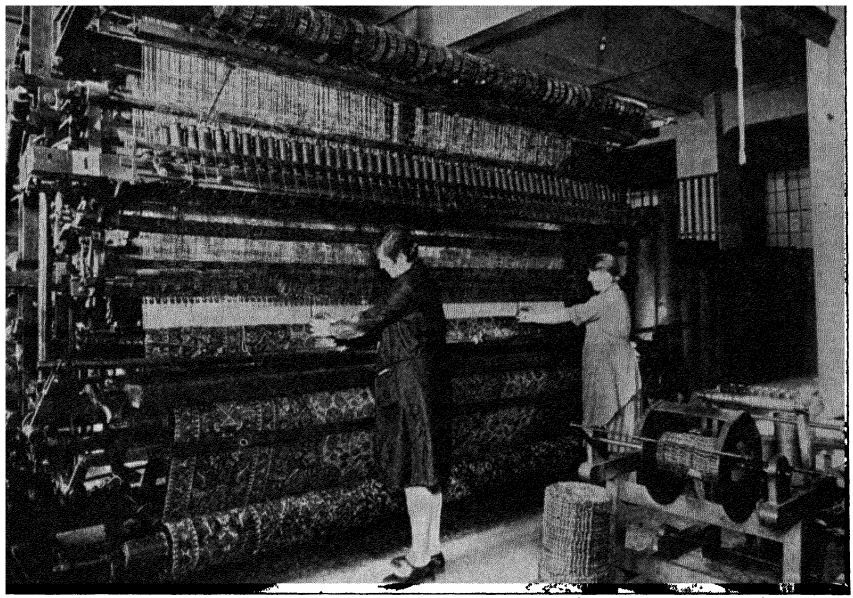


Photo from Ewing Galloway

Cottbus is noted for its manufacture of all kinds of rugs. This enormous machine weaves reproductions of Oriental rugs so ingeniously that only an expert can tell the difference between an Oriental and a reproduction.

where there is an abundance of fuel, raw materials can be easily imported and the finished goods can be readily shipped to foreign markets. Wuppertal is noted for its woolens and silks. Only Lyon in France surpasses Krefeld-Uerdingen in the making of exquisite silks. Chemnitz, near the coal fields of southern Saxony, is another important textile city.

Teamwork of agriculture, industry, and trade. Chemists and agricultural experts have contributed much to the improvement of German agriculture. Wise crop rotation and the well-advised use of fertilizers have also aided Germany's efforts toward feeding its own people. To supply fertilizers both industry and trade come to the aid of agriculture. The chemical plants furnish nearly all the nitrates needed; the iron smelters yield large quantities of phosphates from their discarded slag. What additional phosphates are needed are imported from the United States in the form of phosphate rock. Potash from German mines gives a supply of this valuable constituent of all commercial fertilizers. The nation's soil may be poor, but Germany leads the world in its use of fertilizers.



Photo from Ewing Galloway

Harvesting a late potato crop in southern Bavaria. Germany is still behind the United States in its use of agricultural machines.

Another way in which industry has aided farming is in the production of modern farm machines which are distributed from the manufacturing plants to all parts of the nation. Many farmers are now using electric motors on their acres, and primitive hand tools are rapidly being displaced.

The results of scientific methods and the use of fertilizers are shown in the heavy yield of crops. Although the area of Germany is only about twice that of our own state of Colorado, the German potato crop is nearly four times as great as that of the United States. The yield per acre is about double that in our country. Besides being used as food for the people, potatoes are fed to farm animals, and the surplus is used in the manufacture of starch and motor alcohol. Germany has little petroleum; therefore, any addition to the supply of motor fuel is a real asset. By its system of barter Germany has secured petroleum from Mexico, which in 1938 expropriated the oil wells.

Central Germany has a cool, moist climate, well adapted to the crop of sugar beets. Central Germany is also a densely settled region where cheap labor is readily obtained for the necessary cultivation and thinning of this valuable crop. Beet tops and pulp

are fed to the livestock. This bit of farm and mill economy helps to make the animal industry profitable.

At the present time Germany has too little meat and milk for the proper nourishment of its citizens. Compared to the population, the number of food animals is too small. This is true even though this country of limited area has nearly one third as many cattle as the United States and more than a third as many hogs. In a densely settled country like Germany the cattle are usually "stall-fed." This means that they must be kept in barns because of the lack of pasturage. Besides potatoes, beet tops and beet pulp from the beet-sugar mills and seedcake from the margarine factories are also fed to the cattle. In addition to these home-grown products used as fodder, Germany imports millions of dollars worth of foodstuffs for its livestock.

Means of transportation. Germany has many means of communication and transportation. Rivers, canals, railways, and highroads spread a close network over the country. Remote villages are linked with important cities and thus coöperation is secured.

Germany has more than 5500 miles of inland waterways. The Rhine, Weser, Elbe, and Oder are navigable rivers. Millions of dollars have been spent to make the Rhine which runs through a region of great mineral, industrial, and agricultural wealth, the important water highway that it is today. Rotterdam in the Netherlands gets the bulk of the Rhine traffic. The Rhine is also of great value to Germany as a tourist attraction.

Canals link the German rivers one with another and with the Seine, the Vistula, and the Danube. The Kiel Canal is cut from the North Sea to Kiel on the Baltic Sea. By its use vessels avoid the loss of time required for the detour around Jutland. In a year two thirds as much tonnage passes through the Kiel Canal as through our Panama Canal. More than half the vessels going through are foreign.

Germany has over 40,000 miles of railroad. In equipment and management they are unexcelled by the railways of any other country. The railways transport four times as much freight as do the rivers and canals. Nearly all lines are owned or supervised by the government which assures coöperation with the waterways rather than competition. The roads too are excellent and are constantly being improved and extended. The government has in hand a five-year program of highway construction. These highways are controlled by the government and are used especially for rapid commer-

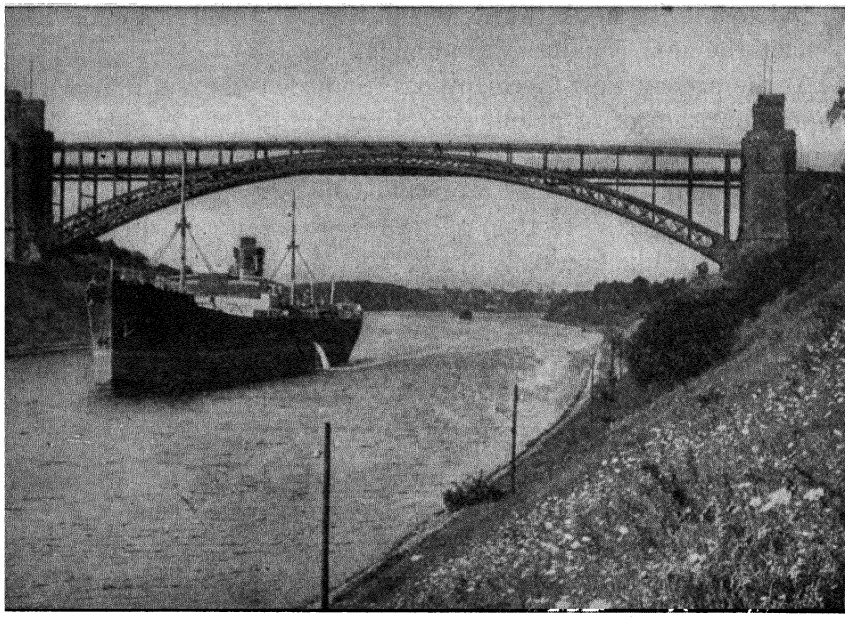


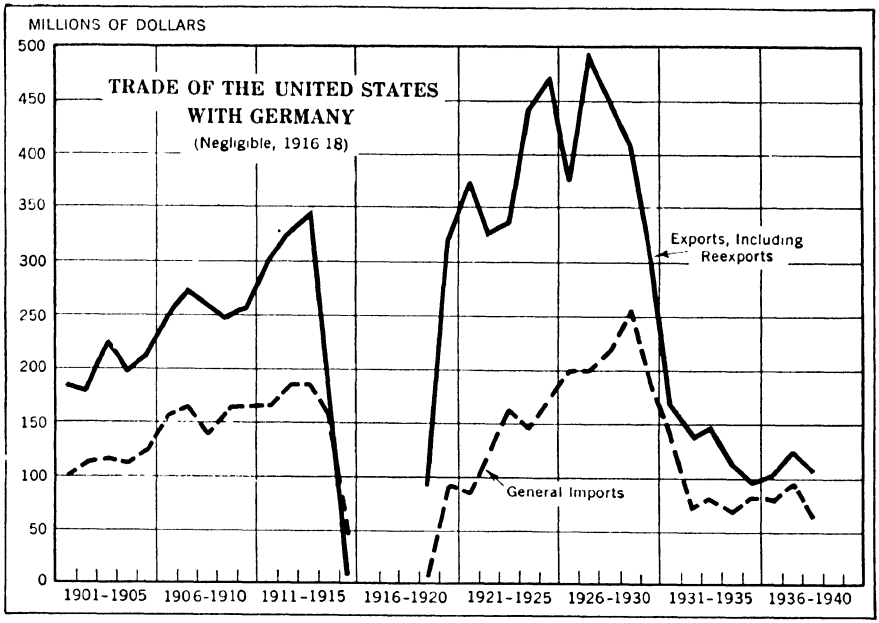
Photo by James Sawders

The Kiel Canal by which Germany has safe inland connection between the North Sea and the Baltic Sea. It extends from Holtenau on the Baltic Sea to Brunsbüttel on the Elbe River.

cial transportation and for military purposes. Private automobiles are required to pay tolls. There are no grade crossings and densely settled areas are avoided. Germany has more air traffic, in proportion to its size, than any other country. There is an airport in every large town.

At the present time Germany is well served by its merchant marine. At the close of the World War, it was forced to give most of its ships to the Allied Nations because so many of their ships had been destroyed by German submarines. To replace all those lost ships was a mighty task. Today, however, Germany has over 2200 merchant vessels with a tonnage almost three-fourths that of 1913. Few transatlantic liners are superior to Germany's recently built ocean greyhounds.

Foreign trade. Intercourse with other nations is easy because of the very favorable location of Germany. It is in the heart of the great commercial continent of Europe, and eleven other countries touch its borders. Three of these countries, Czecho-Slovakia, Hungary, and Switzerland, have no seacoasts; so naturally much of their



oversea trade passes through Germany. Sweden, Finland, the Baltic States, and Russia, all lying upon the Baltic Sea, are easily reached from Germany's Baltic ports. Western Germany is near the great ocean trade routes of the North Atlantic.

A large part of Germany's exports find a market in Europe. The Netherlands and Great Britain are Germany's best customers. Other large continental buyers of German products are Belgium, France, Italy, and Sweden. The list of its important exports is a long one. It includes iron and steel, their manufactures, chemicals, electrical machinery, coal, leather, paper, cotton goods, silk and rayon, glass, and china.

The chief imports of Germany are foodstuffs, oilseeds, cotton, wool, ores and metals, hides and skins, rubber, and petroleum. These articles readily group themselves into two classes—provisions and the raw materials needed in manufacturing. Germany's imports come largely from the United States, the United Kingdom, Italy, the Netherlands, Sweden, Denmark, and Brazil. Argentina and Czecho-Slovakia are also sources of imports.

German foreign trade has fallen off considerably in the last few years. A great deal of money has been spent for armaments, thus leaving relatively small sums for the importation of anything except actual necessities. Labor engaged in the manufacture of munitions

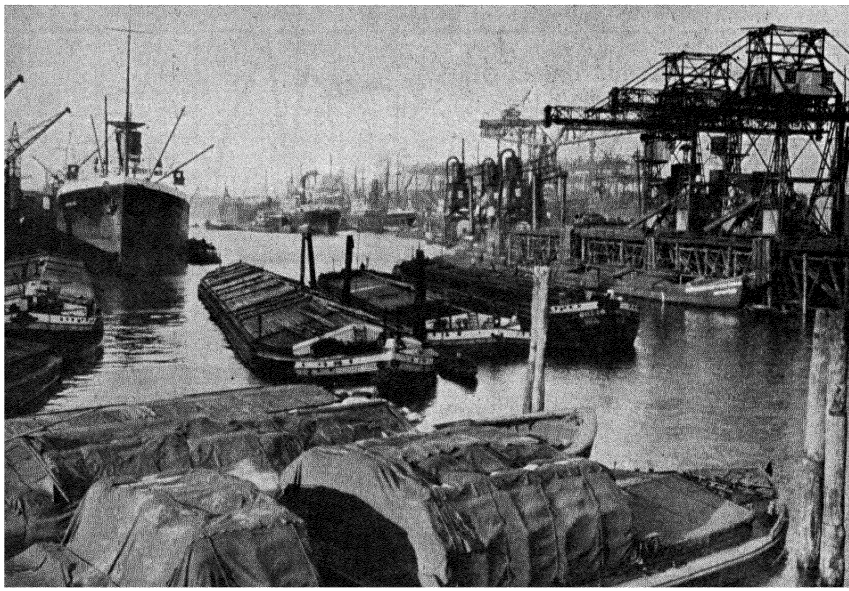


Photo from Ewing Galloway

Hamburg harbor is jammed with shipping as the German merchant marine regains its old-time prestige on the seas.

of war cannot at the same time produce articles for export, which in turn would pay for imported goods.

Ports of Germany. The two leading ports of the country are Hamburg and Bremen. *Hamburg* has an especially favorable location, for the Elbe River on which it is located is navigable across Germany and into Czecho-Slovakia. Both these ports are easily accessible from the Rhine-Ruhr region, the chief industrial center of Germany. *Bremen* is the leading city on the continent in importing American cotton, rice, and tobacco. *Stettin,* near the mouth of the Oder River, is Germany's main Baltic port. It serves as a port for Berlin, the capital, with which it is linked by canal and river. Stettin, like all the Baltic ports, is seriously handicapped in trade by the freezing of the Baltic Sea in winter. Its tonnage is only one ninth that of Hamburg, which is nearer the North Sea and the great routes of trade. *Kiel* is located at the eastern end of the Kiel Canal. Shipyards where vigorous work is maintained may be found in all these ports. *Vienna* (Wien) is a river port, but it owes its high standing to other influences as well as its location on the Danube. In the past Vienna was industrially, commercially, and politically one of the

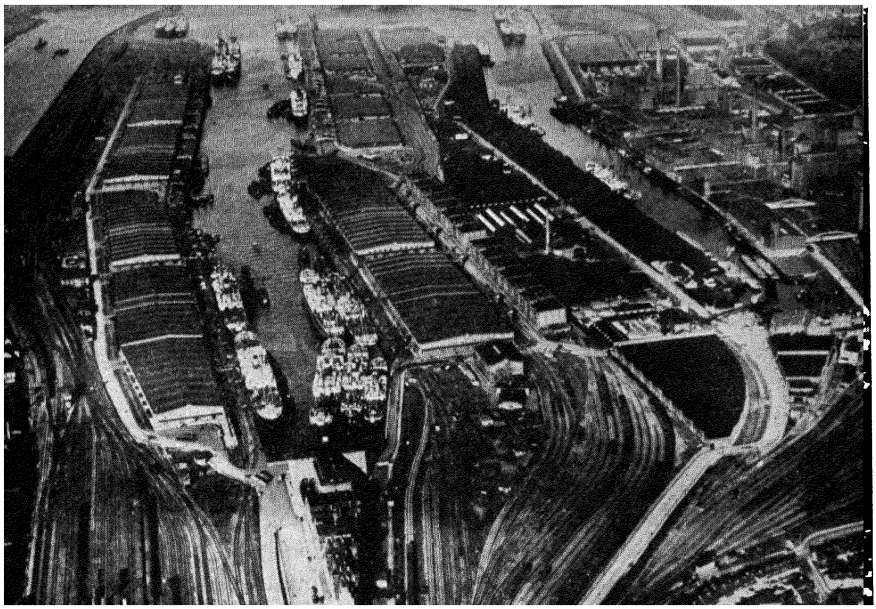


Photo from Ewing Galloway

Airplane view of part of the industrial district and a section of the harbor at Bremen, the second largest seaport of Germany. Railroad lines and ocean lanes provide transportation for a vast volume of foreign and domestic commerce.

leading cities of Europe. It was the capital and trade center of the old Austro-Hungarian Empire and the center of exchange of the products of agricultural Hungary and industrial Austria. It had extensive textile mills, chemical plants, and metal industries. It was also important for the manufacture of technical and musical instruments. It has long been known as a center of fashion and refinement and is the seat of one of the famous European universities. The division of the old empire left Vienna stripped of nearly all its old resources and trade relations. Its old physical environment, however, remains. It lies in the path of great land routes; it is on the Danube between regions, on the one hand, rich in agricultural resources and, on the other, with highly developed industries. What its new relationship as a German city will bring to Vienna only time can tell. *Berlin,* the capital and largest city of Germany, is connected by canals with the Elbe and Oder Rivers. Much of its foreign trade is carried on through the port of Stettin. It is an important distributing center for overland trade with countries to the east and

south. Berlin is also a manufacturing city. Among its industries are plants producing metal products, including machinery and railway equipment, electrical supplies, textiles, and a variety of small wares.

Guides to Study

1. What has the rest of the world gained by contact with German life and work?
2. What losses did Germany suffer as a result of the World War?
3. Why is the rest of the world interested in Germany's actions and ambitions?
4. Why is the Rhine-Ruhr Valley the most densely settled part of Germany?
5. How do the Germans put their coal and lignite to the best uses?
6. How has the German chemist helped the agriculture, the manufactures, and the commerce of the country?
7. Why are the potash deposits of Stassfurt one of the country's greatest resources? Where are there other deposits of potash?
8. How do the crops of one part of the country differ from those of other parts? Why?
9. How does agriculture aid manufacturing and commerce?
10. Why is it necessary for Germany to trade with other countries?

Research for Students

1. Tanganyika, South-west Africa, Togo, and Cameroon were former German possessions. How valuable were these possessions to Germany? (See unit on Africa and consult encyclopedias.)
2. What great resources were lost when Alsace-Lorraine was ceded to France?
3. What has Germany gained by the acquisition of Austria and the Sudeten areas?
4. How has German science helped the country to be less dependent on other nations?
5. Germany is trying to make itself self-sustaining. In what way is this wise? In what ways is it unwise?
6. Make a study of Nazism. List your reasons for thinking it inferior to democracy.
7. Contrast the situation of individuals in Germany today with that

4. BELGIUM AND THE NETHERLANDS—SMALL LANDS OF GREAT ACHIEVEMENTS

Belgium

"The workshop of Europe." This little kingdom is a very beehive of industry. Because of its intensive farming and its many specialized manufactures, it supports more people to the square mile than any other nation in the world. Its situation in Europe is most advantageous as it borders upon three important industrial and commercial countries. Belgium indeed may be considered a part of that great industrial region that includes northern France and the Rhine-Ruhr section. Furthermore it lies on the great trade routes between the Atlantic and the important cities of central Europe. As a consequence much wealth accrues to the little country through this transit trade.

The textile industry. For centuries Flanders was noted for its skillful spinners and weavers. During the Middle Ages "all the world was clothed with English wool wrought in Flanders." This art the Flemings, or natives of Flanders, taught to the English. Hundreds of years later the British repaid their debt by teaching the Flemish weavers to make and to use new textile machines that had been invented in England. Belgium was a part of Flanders. Consequently we should expect great skill in the making of textiles. Brussels (Bruxelles) is famous for its carpets; Liége and Verviers are noted for their woolen goods. The exquisite cotton, linen, woolen, and silk goods made today are the result of the wonderful skill developed through centuries of effort in this direction. Belgium is also famous for its beautiful handmade lace. Fabrics and fine-spun yarns are among its chief exports.

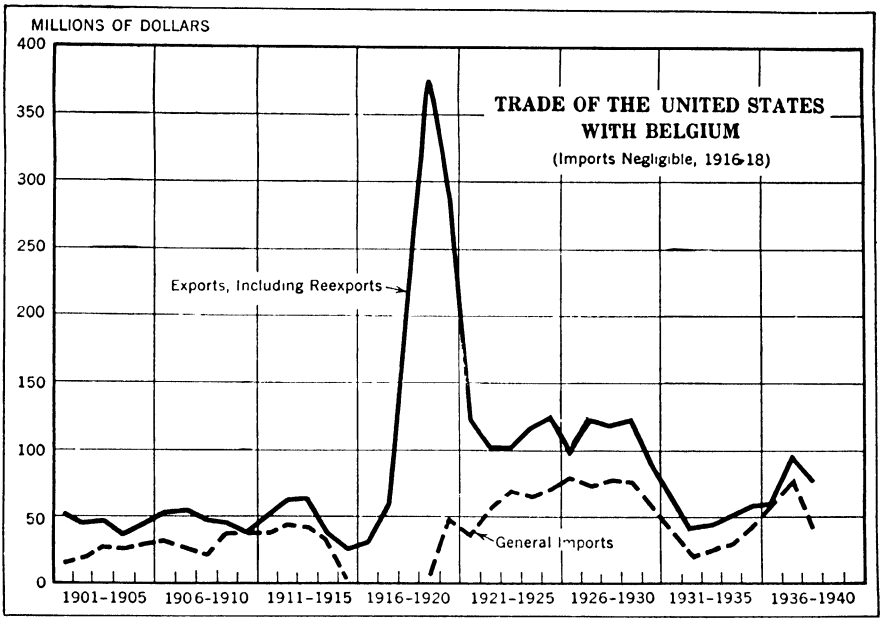
Belgium's preëminence in the making of textiles is due to three reasons: first, the skill of the workers, second, its own abundant supply of coal and that from the near-by mines of Britain and Germany; and third, its nearness to the necessary raw materials, markets, and trade routes.

Expert metal workers. The leading exports of Belgium are the products of the iron and steel industry. Iron ore is easily procured from the mines of Lorraine and Luxemburg; the necessary coal is close at hand. The skilled workmen produce not only most of the



Photo by James Sawders

A productive Belgian flax field with workers engaged in retting the flax. The plants are grown here for the production of fiber which we know as linen.



machinery needed in their own mills but also large amounts for export. Locomotives, munitions, steel rails, and a great variety of steel articles are made. All the steel products are of superlative quality and, as the cost of labor is comparatively low, Belgian manufacturers can readily compete with their rivals in other countries. Liége is a center of this industry.

Miscellaneous manufactures. The southeastern part of Belgium is the center of the important art of glassmaking. Coal and sand, both essential for this manufacture, are here in abundance. Plate glass of the finest quality is an important export. Pottery, fertilizers, and other chemical products are important manufactures.

Small farms—large crops. Farming is a very important industry because much food is needed for the many workers in Belgium. The land is intensively cultivated. Besides grains, potatoes, and sugar beets a small amount of raw material, such as flax, is raised. This flax is of a very fine grade, and much is exported to northern Ireland for its linen industry. Belgium imports from Russia flax of an inferior quality to use in its own linen factories. No other nation raises so much wheat per acre.

Facilities for trade. Rivers, canals, and railroads thread the country in all directions and connect it with the outside world. The Scheldt and the Meuse Rivers give easy access to the sea. There are

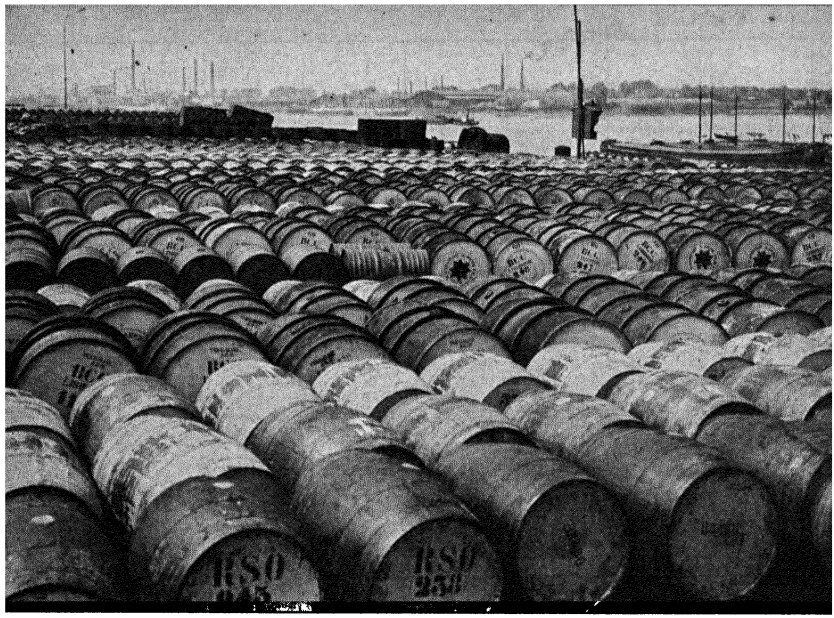


Photo from Ewing Galloway

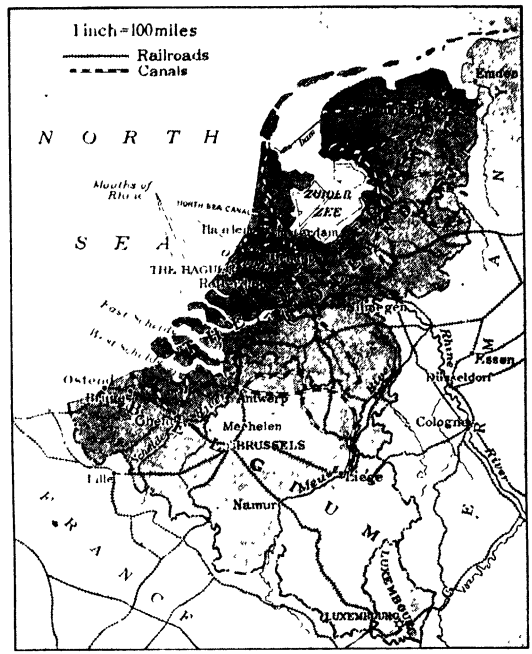
Antwerp on the River Scheldt—one of Europe's busiest ports. The water front here is crowded with barrels of oil, tar, and grease products. American concerns use Antwerp as a distributing port for products going to many European countries. American motor cars are assembled in Amsterdam.

many canals in the lowlands of the west. As for railways, Belgium surpasses every other country in its miles of railroad to the square mile.

Antwerp (Antwerpen—the name means "on the wharf"), near the mouth of the Scheldt River, is a great world port, and much of Belgium's foreign trade centers there. As we should expect in a country so highly industrialized, its exports are manufactured goods while its imports are foods and raw materials. To the United States Belgium sends fine cotton goods and precious stones. It imports in return automobiles, wheat, raw cotton, and petroleum products.

Belgium's African colony—the Belgian Congo. Hundreds of miles to the south in Africa is Belgium's one great colony. Palm nuts, palm oil, cotton, coffee, rice, and cocoa are raised there. The mines yield copper, tin, diamonds, and gold. Ivory is one of the many valuable exports. Naturally the greater part of the Congo trade is with the mother country.

The Netherlands



The Low Countries showing reclamation areas in the Zuider Zee

"That beats the Dutch." One of the reasons why the Dutch nation is powerful is the people themselves. They are fighters and conquerors. Always they have fought the sea and, because of the nature of their country, the fight must be eternal. Rivers, too, at times become enemies. "God created the world, but the Dutch made the Netherlands" is a well-known Dutch saying. These valiant people have pushed back the sea and secured the reclaimed land by dikes; they have dealt with the shoals and the sand bars that the rivers are constantly building; and they are still draining the waters of the Zuider Zee. The latter project when completed will add to the country nine hundred square miles of farm land.

Alien nations have sought to rule the country; but the inhabitants have met invading armies fiercely and, in times of dire stress, have cut the dikes, calling the sea in to overwhelm their enemies. Their contest for the oversea carrying trade was yet another struggle. In the seventeenth century they were the most important commercial nation in the world. They had a monopoly of the carrying trade and a strong navy to defend it. Their great rival was England. In times of great commercial competition whenever an English merchant had scored an unusual success he was likely to exclaim, "That beats the Dutch." Thus originated a common expression. After a great naval victory a Dutch admiral fastened a broom to the masthead of his ship and boastfully sailed along the British coast to show that he had swept all British ships from the English Channel.

Notwithstanding these facts the inhabitants of the Netherlands

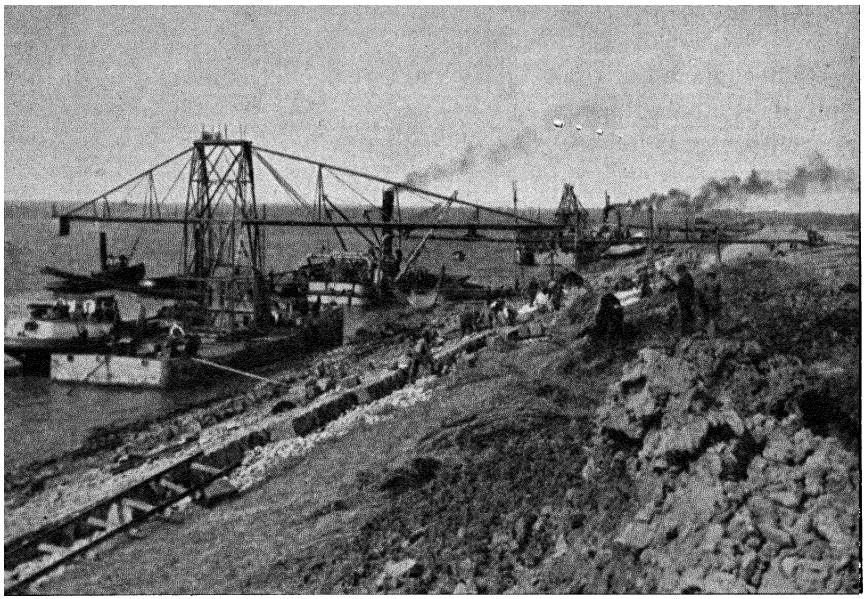


Photo by James Sawders

The work of reclamation of large areas once covered by the Zuider Zee will go on for years as the Dutch wrest more land from the sea. This large project by which nine hundred square miles will be reclaimed was begun in 1920.

are a peaceful people. They do not wish to conquer foreign territory, but rather to maintain and develop the welfare of their nation within its own borders. Because of their tolerance and great love of civil liberty their country has often become a haven for refugees from other lands. The Pilgrim Fathers, persecuted in England, sojourned there for several years before they sailed for our shores. Some of their scholars and artists rank among the greatest of all time and have made important contributions in their respective fields.

A low country that stands high. In area the Netherlands is about equal to Massachusetts and Connecticut together; its population is greater than that of all New England. Nevertheless the Netherlands is a leader in commerce, its foreign trade being about one fifth as large as that of the whole United States. Only seven or eight countries surpass it in the extent and value of their foreign trade. The Netherlands builds and operates thousands of boats of all kinds and maintains a merchant marine for the exchange of goods with its rich colonies in the Far East and with other distant lands.

A fortunate location. What is the secret of so small a nation being so important commercially? Its resources are limited and it has but little mineral and agricultural wealth. Even the cobblestones of the streets and the wooden piles of its wharves must be brought from other countries. The answer is its location and its nearness to Great Britain, France, and Germany, the leading commercial countries in Europe. It is situated on the North Sea and is crossed by the River Rhine whose headwaters reach far into central Europe. The Netherlands is practically at the crossroads of trade. The ships of the great ocean lines come to its ports. Goods from Germany and Switzerland come by railroad or down the Rhine into the Netherlands to be shipped overseas. Two other rivers aiding this trade are the Scheldt and the Maas (Meuse).

Wealth in colonies. The Dutch have ever been famous navigators and have made many notable explorations and discoveries. In the latter part of the sixteenth century William Barents, a Dutch navigator, in search of a northeast passage to India reached Svalbard and Novaya Zemlya. A little later Henry Hudson in a Dutch ship discovered Hudson Bay and the Hudson River and gave the Dutch a claim to New Amsterdam. Later New Amsterdam was traded with the British for Surinam, or Dutch Guiana. About the same time the Dutch gained control of valuable lands in the East Indies and through the Dutch East India Company carried on a most valuable trade with the East which brought the country much wealth and great prestige. The Dutch East Indies (now preferably called *Netherland India*) form a great island empire, comprising Java, Sumatra, Celebes, and the Netherland sections of Borneo and New Guinea. Together these islands cover an area fifty-five times that of the mother country and support a population seven and one-half times as large as that of the homeland. The Netherlands' trade is aided greatly by valuable island products, many of which are shipped from Surabaya and Batavia, the chief ports of Java.

Java is one of the leading regions of the world in the production of cane sugar. Much of the raw sugar is sent for refining to the homeland. The mineral wealth is great, petroleum and tin being important products. Some petroleum is shipped to Europe, but even more finds a ready market in the Far East. Tin is imported by England, largely by way of the port of Singapore. One fourth of the world's supply of rubber comes from the Netherland plantations. Only a little rubber goes home since far more is exported directly to



Photo by James Sawders

This method of harvesting rice in one of the islands of Netherland India is in striking contrast to the way the crop is harvested in the United States.



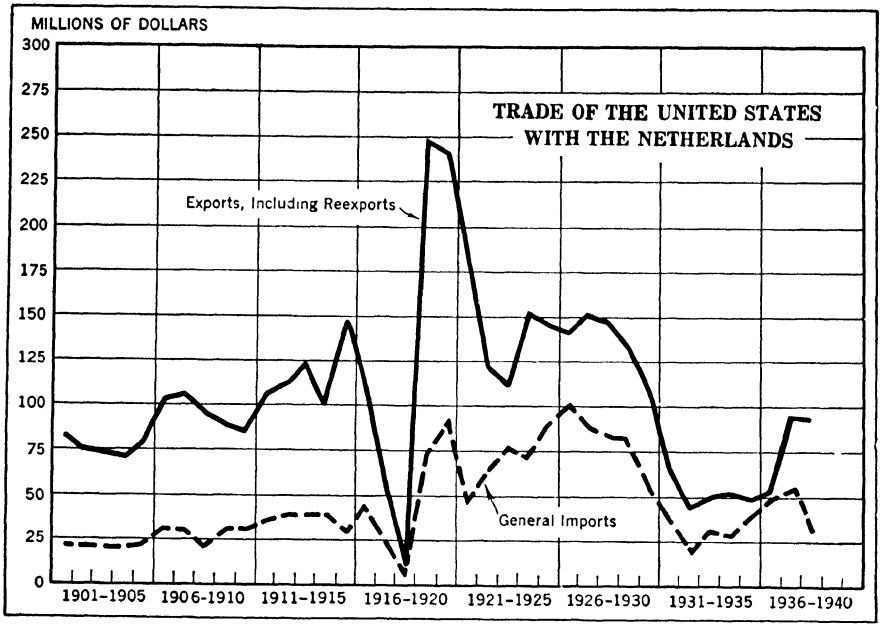
Photo by James Sawders

This scene on the dike at Vollendam shows that not all the inhabitants have discarded their wooden shoes.

Great Britain and the United States. Other valuable island exports are tea, coffee, oilseeds, fibers, spices, and tobacco. This centuries-old trade with its colonies and with neighboring countries has resulted in great wealth for the Netherlands. The system of colonial administration that has been developed during their long occupation is wise and efficient and is surpassed by that of no other nation that has developed a colonial empire.

Agriculture that pays. After commerce agriculture is the chief occupation of the people. Much of the land is low but, thanks to the silt brought down by the rivers and the clays deposited by the ocean, the resulting soil is excellent both for crops and for pasturage. About one third of the country is below sea level, and much of the remainder is but little higher. Dikes to prevent the sea from flooding the lowlands are at all times most carefully maintained. Picturesque windmills, which once pumped water from the low land to the canals, have largely been superseded by steam pumps. The chief crops are oats, rye, flax, potatoes, and sugar beets.

The low, moist lands grow fine grass which feeds the cows in the open for half the year. The remaining six months they are housed in



scrupulously clean barns and sheds. Butter and cheese from the Netherlands are famous throughout the world, and these articles with condensed milk are widely exported to surrounding industrial countries—to Great Britain, Germany, France, and Belgium. Dairying, as you see, is the chief industry of the country regions.

Another unusual activity is bulb culture for which the Netherlands has been famous for centuries. Hyacinths, tulips, and other flower bulbs cover with their lovely blooms wide areas in the springtime. Every ten years special efforts are made to attract from all corners of the world visiting garden clubs and flower lovers "for to admire and for to see." Many tourists cross the ocean especially for this brilliant sight, and millions of bulbs are exported.

Diamond cutting and other industries. With little coal and other mineral supplies, the Netherlands cannot compete with its neighbors in general industry. Diamond cutting has long been centered in Amsterdam. The industry was developed there by Jewish refugees who could possess nothing but hidden wealth. These much-coveted stones from South Africa are cut and polished in many establishments, giving employment to thousands of workmen. Delft chinaware is a famous product of the potteries. The refining of sugar, the manufacturing of margarine, and shipbuilding are other important industries.



Photo by James Sawders

Canals are an important element in the transportation system of the Netherlands. Incoming and outgoing cargoes line the sides of the canal awaiting disposition.

Imports and exports. Notwithstanding its intensive farming, the Netherlands cannot raise sufficient food for its people. Grain for both people and cattle is a leading import. From the United States the Netherlands receives cotton, wheat and wheat flour, and petroleum. Other leading imports are textiles, machinery, manufactured articles of iron and steel, and coal. The chief exports include vegetables, flower bulbs, pork products, and the highly important products of the dairy; namely, butter, cheese, and condensed milk. Manufactured articles, such as textiles, margarine, and vegetable oils, are also exported. Diamonds are shipped to the United States, netting valuable returns.

Two busy ports. Rotterdam and Amsterdam are the chief commercial cities. Both are built on land reclaimed from the North Sea; both are connected with the sea by means of canals. That great piece of engineering, the draining of a portion of the Zuider Zee, will not interfere with commerce since, thanks to the canals, ships have access to the piers without going through the Zuider Zee, which will be known as "Lake" Yssel when the reclamation is completed.

Great quantities of fish are caught each year in the canals and rivers. Salt-water fishing is chiefly for herring which are found in the North Sea. Nearly two thirds of the herring catch is exported yearly. Oysters abound near the mouths of the rivers.

Guides to Study

1. How can Belgium support so dense a population?
2. How have the textile industries of Britain and Flanders been related through the centuries?
3. What advantages has Belgium for manufacturing and trade?
4. In what ways is the Belgian Congo of benefit to Belgium?
5. How have the people of the Netherlands made their influence felt in world affairs?
6. How do you explain the fact that the Netherlands is one of the leading countries in the value of its commerce?
7. In what ways do the foreign possessions of the Netherlands aid that country's industries and trade?
8. How do the low moist lands affect the country's agriculture?
9. Explain the importance of the diamond industry in the Netherlands and Belgium.
10. What advantages have the ports of the Netherlands for foreign trade?

Research for Students

1. Make a list of the resources of western Europe that are readily accessible to Belgium and the Netherlands.
2. On a desk outline map of Europe trace the great routes of trade which pass near or through these two countries.
3. On a map of the world locate all the possessions of each of these two countries. Trace routes which the products of those lands take to world markets.
4. Make a list of noted leaders of these two countries and learn what contributions each made to his country and to the world.

5. FRANCE—A LEADER IN SKILL AND TASTE

France in world affairs. For centuries France has exerted a powerful influence in the economic, commercial, and political affairs of the world. Even today few countries are more deeply concerned with international relations. Although the honor is now shared with English, for many years in international conferences the French language was the "language of diplomacy." Relations with the United

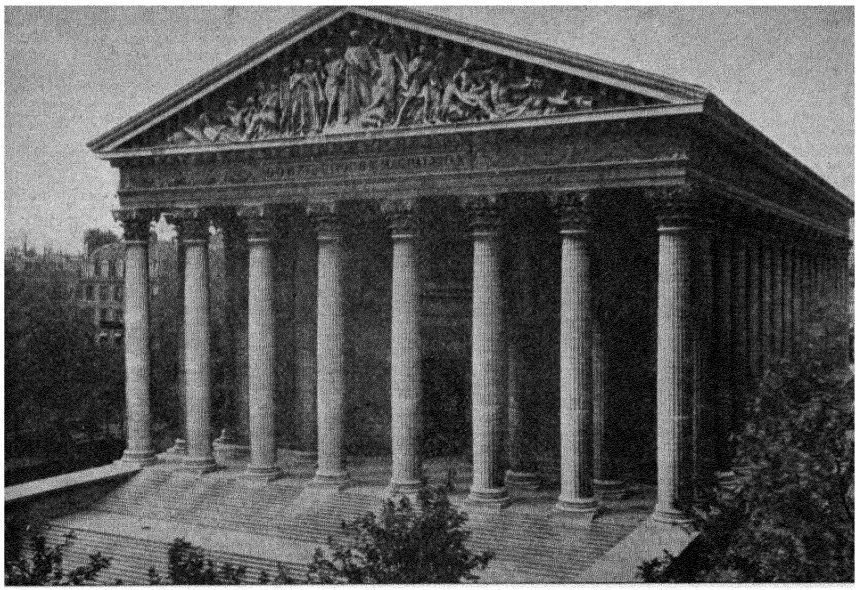


Photo from Ewing Galloway

Like a Greek temple of old—the classic lines of the famous Church of the Madeleine in Paris

States have, in the main, been friendly even from colonial days. French pioneers explored and settled large areas of North America. The French rendered America assistance in the days of the Revolutionary War. Inspired by the outcome of that war, the French, with the watchwords of "Liberty, Equality, and Fraternity," soon after took the first steps toward their own democracy. With England and the United States it now ranks as one of the three leading world democracies. At the time of the World War thousands of American and French soldiers fought side by side.

Love of beauty—a French characteristic. The French have always been noted for their appreciation of the beautiful and their ability to create beautiful things. This characteristic is shown in their art, architecture, literature, music, and industries. To a greater extent than any other people the French create objects famous for beauty and skilled workmanship. In this way their artistic abilities are turned to commercial advantage. Thousands of tourists and students visit France each year to see and to study French art and architecture. These visitors bring to the country millions of dollars, which add to the country's national prosperity. French art and skill

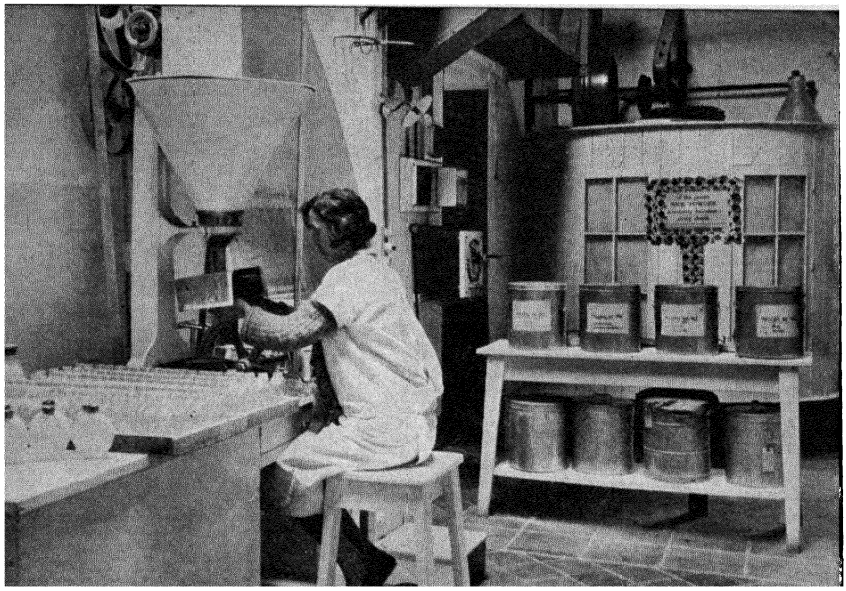


Photo from Ewing Galloway

The manufacture of perfume is one of the important industries of France. A scene in the talcum-powder department of one of the big houses shows the grinding and filling machines.

not only bring wealth and renown to France itself, but they contribute much to the art of gracious living everywhere.

French industry. The artistic nature of the French people has had a strong influence on the character of French manufacturing. In the value of its industrial products and the amount of its foreign trade France ranks next to Great Britain, the United States, and Germany; but French methods differ considerably from those of these other three great manufacturing nations. The French do not go in so much for mass production of standardized goods. They specialize more in high-grade and skilled workmanship, producing articles so excellent in quality and so distinctive in design that they find a ready sale in the world's markets. Such things as delicate laces, fine fabrics, beautiful tapestries, distinctive clothing and millinery, costly perfumes, artistic chinaware, and many other beautiful articles bring great profit to French manufacturers. Of course, there is some heavy industry and large-scale factory production in France, but the French still depend mainly on skilled workmanship and artistic quality. Even French automobiles are largely custom-made.



Photo by Raffius from James Sawders

Alsatian peasant women get on their knees to plant sugar beets and to say their prayers. The man and the oxen seem to be able to rest standing on their feet.

The growth of French industry has been handicapped by the unwillingness of the farm population to enter the crowded factories of the cities. To a large extent French farmers own their own land, which helps to keep them out of industry. France also lacks the coal necessary for a greater industrial growth. The result of these factors is to make France more an agricultural than an industrial country.

French farming. There are several reasons for the great importance of farming in France. The first is the fact that nearly 60 percent of the total area is under cultivation. The great Central Plain of Europe extends across northern and southwestern France and gives the country a vast area of fertile farm land. A large part of the central plateau is also suitable for crops. French soils are more fertile than those of Germany, which is another advantage. Both rainfall and temperature are also favorable. The winds from the Atlantic bring abundant summer rains and mild temperatures. In the southeast France has a Mediterranean climate with winter moisture and warm, dry summers. Thus the country has a variety of surface, rainfall, and climatic conditions which makes possible a great variety of

agricultural production. Added to these advantages is the fact that French farmers seem to love the soil and take a great pride in their work. The only disadvantage in French agriculture is the lack of scientific management, which makes the yields per acre less in France than in Great Britain and Germany. Even so, French farms supply the country with a large percentage of its food requirements.

Small-scale farming. French farms are usually small plots, averaging not more than twenty-five acres in extent. Instead of living in scattered farmhouses as our American farmers do, the French like to gather together in villages from which they can easily reach their small farms each day. These villages give the farm people the advantages of schools, churches, and social contacts which they would otherwise lack. On the farms there is a great deal of hard labor and the women do considerable work, especially in busy seasons. The small farms make machinery somewhat impractical, and French farms seem rather old-fashioned compared to those of the United States, especially the large farms of our Middle West.

Crops for food and fodder. In northern and central France the principal crops are wheat, oats, barley, rye, potatoes, sugar beets, fruits, and vegetables, all of which are well suited to the climate of the Paris Basin. Of these crops wheat is the most important although several million more bushels of oats than wheat are annually produced. The oats are largely consumed as feed for farm animals, particularly horses and mules, of which there are more than 3,000,000 in France. The wheat is the most important single element in the French food supply. The French people prefer white bread to dark, and this requires large quantities of wheat flour. In France the per-capita consumption of wheat is considerably more than it is in the United States. As a result of this great demand France cannot produce enough wheat to supply its own needs and is forced to import each year about fifteen percent of its requirements. As a wheat producer France ranks fourth among the countries of the world, being surpassed only by Russia, the United States, and India. Potatoes and sugar beets are also important crops. Only Russia, Poland, and Germany produce more potatoes than France; and only Russia and Germany and, in some years, the United States raise more sugar beets.

In the southern Mediterranean region the chief crops are grapes, olives, figs, mulberry leaves for silkworms, and flowers for perfumes. Some corn is also raised in the southwest.

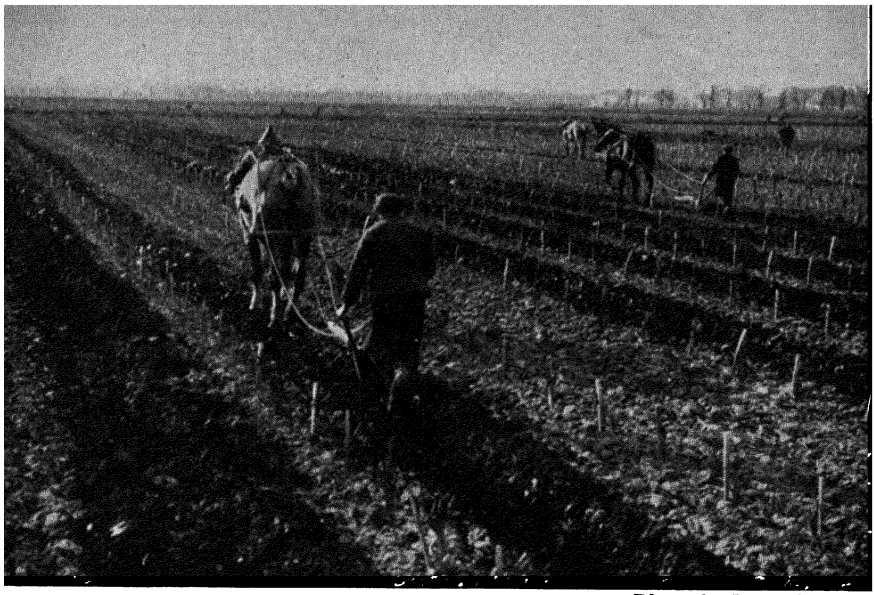


Photo by James Sawders

Spring in the vineyards of southern France. The farmers are plowing the ground to cultivate the young vines.

Grape culture. France is the leading wine producer of the world, with Italy ranking next. However, the French consume so much wine as a beverage that they import annually more than one fourth as much wine as they produce from their own vineyards. It is also true that France exports some wine, but the quantity exported amounts to only about one fifteenth of the quantity imported. In recent years the per-capita consumption of wine in France has exceeded thirty gallons annually. Most of the wines imported are inferior grades, some of which are blended with the French wines for the export trade. But more than ninety percent of the imported wine is consumed by the French themselves. The making and marketing of wine is one of the leading industries. Many French wines have become world-famous and are known by the names of the regions where they are produced. Among them are Champagne, Burgundy, Moselle, Bordeaux, Sauterne, and others. The different qualities of these wines come from the differences in soil, climate, and methods of production. Great care has been given to the propagation of hardy vines by grafting French varieties on strong roots from other countries. Generations of experience have given the French great skill



Photo by James Sawders

An Alsatian sheep herder with his newly shorn flock taking a rest at noonday

both in grape culture and wine making. The leading vineyard areas are in the valleys of the Rhône, Loire, Garonne, and Moselle.

Domestic animals. Livestock are important in France both for beasts of burden and for foods and raw materials. Some very famous kinds of draft horses originated in France and are still found there in large numbers, doing much of the heavy work on the farms. Perhaps the best known of these is the Percheron breed, found chiefly in the northern part of the country. These horses are strong and powerful and are highly prized not only in France but in other countries as well.

Cattle are also used as work animals, but they also supply dairy products, meat, and hides for leather manufacturing. Many excellent breeds of cattle have been developed in France, but most of these are for general utility, that is, for both meat and milk production, rather than for one special use. In the number of its cattle France ranks next to Russia and Germany in Europe. Only a small amount of meat has to be imported for food. Both butter and cheese are exported. Special varieties of French cheese, such as Camembert and Roquefort, are eagerly sought in all parts of the world. Hides and skins supply

raw material for the French leather industry, and large quantities are also exported. The best cattle lands are in northern and western France. France has long been noted for its fine sheep, found mostly in the southern highlands. The spinning and weaving of wool is one of the ancient industries of France, and its beautiful woolen fabrics are famous. At present much raw wool is imported since the local production is far from sufficient to supply the French mills. Hogs are also abundant, next in number to those of Russia and Germany in Europe. Poultry and hares abound on the many small farms. Altogether the domestic animals of France are a valuable asset, both for food supply and for export products.

French forestry. Of the total area of France, twenty percent is forested, and various kinds of woodworking make up one of the important industries of the country. Like Germany, France gives great scientific care to its forests; no waste is permitted, and new trees are constantly being planted. Twigs, roots, and underbrush are used as fuel, and paper is carefully saved to reduce the amount of pulpwood needed in papermaking. Even with this economy France has to import a considerable quantity of wood pulp for its paper mills. Some lumber is also imported. The forests of the southwest produce large quantities of tar, turpentine, and rosin. The naval stores produced here compete with those of our Southern States.

Industrial twins—coal and iron. France has never had coal enough to meet its industrial needs. Even before the World War about one third of the coal used was imported. During the World War, German invaders wrecked the coal mines of northern France. To repay France for this damage, it was given control of the rich coal area called the Saar Basin, until 1935, when the people of this region were to vote on the question of whether they were to return to German control, become French, or remain under the League of Nations. In 1935 the inhabitants voted to rejoin Germany, which further handicapped France in its coal supply. The northern mines have been restored, but France still must import about one fourth of its necessary coal supply. Germany now produces more than four times as much coal as France. On the other hand, France now has an abundant supply of iron ore. Before the World War France mined less iron ore than Germany; but when Alsace-Lorraine was returned to France (it had been taken from France by Germany in 1871) the positions of these two countries were reversed. Alsace-Lorraine is rich in iron ore, and now France produces annually about

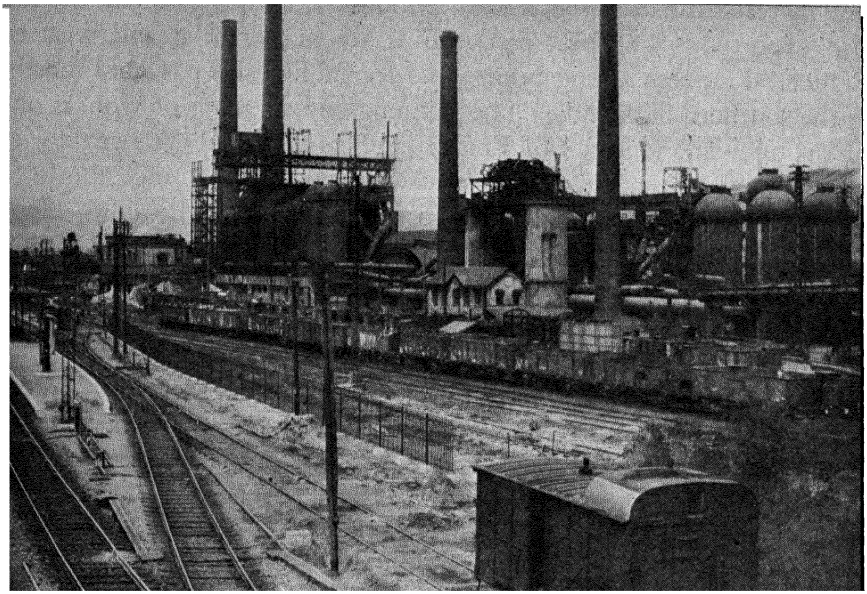


Photo by James Sawders

French iron and steel works in the heart of Lorraine—one of the famous centers of this industry

five times as much ore as Germany. Thus France is able to export fully half of its iron-ore production while Germany has to import two thirds of what it uses.

As we have learned, in the manufacturing of steel it is cheaper to ship iron ore to coal than to send coal to iron ore since it requires more coal than ore to produce pig iron and steel. The result is that French steel production is less than half that of Germany. France, however, has a large iron and steel industry, centering in Lille, Nancy, Le Creusot, and St. Étienne. The country is now able to export a large amount of fabricated iron and steel products, such as pipes and structural forms. Yet it is still necessary to import a great deal of heavy iron and steel and many kinds of machinery. These heavy iron and steel industries are a new departure in French manufacturing, but the abundant supply of iron ore is stimulating them to a much greater growth. There are now more people employed in various kinds of metalworking than in any other single industry.

To overcome the shortage of coal France has turned to water power of which there is an abundance in the eastern, central, and southern highlands. These are all regions poorly supplied with coal;

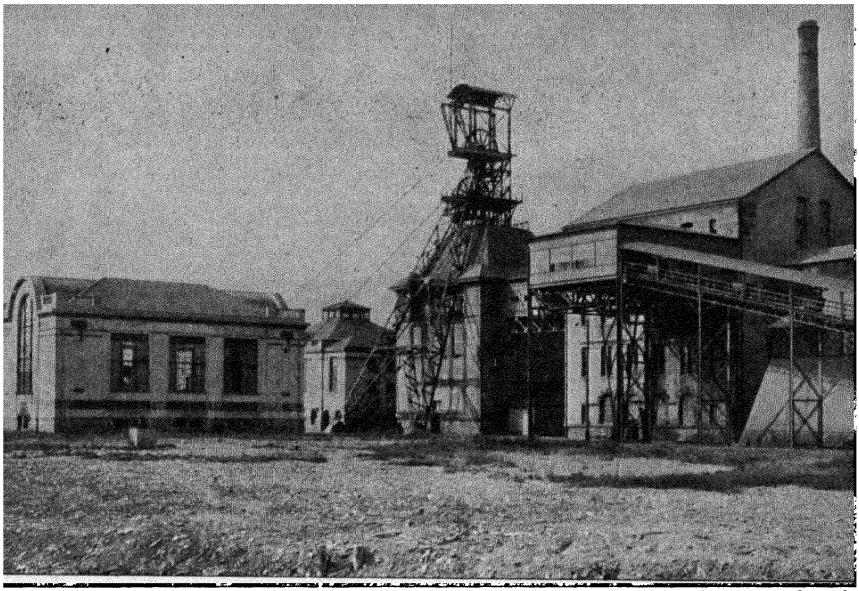


Photo by James Sawders

The shaft, powerhouse, and storage plant of a potash mine in Alsace, France. Only Germany produces more of this constituent of fertilizer than France. Potash has many other industrial uses.

so hydroelectric current is coming into much wider use both for power and lighting.

Potash. The return of Alsace to France after the World War restored valuable potash deposits to the French. So important is this fertilizer ingredient that under French policy the mines are obliged to supply the home market in full before they can export any quantity to foreign countries. Belgium and the Netherlands are good customers of France for this product. Both countries also reëxport the potash in some form. The Alsatian mines are state-controlled.

High-grade textiles. The number of people employed in the French textile industries is second only to those engaged in metal-working and machinery production. Very large numbers are also occupied in the manufacture of clothing from French textiles. These textiles and the clothing made from them are probably the most valuable of all French manufactured products. In these industries the artistic skill of the French worker is very effective.

Choice silks. Silk manufacturing has flourished in southern France for centuries, centering at Lyon, the greatest silk city of

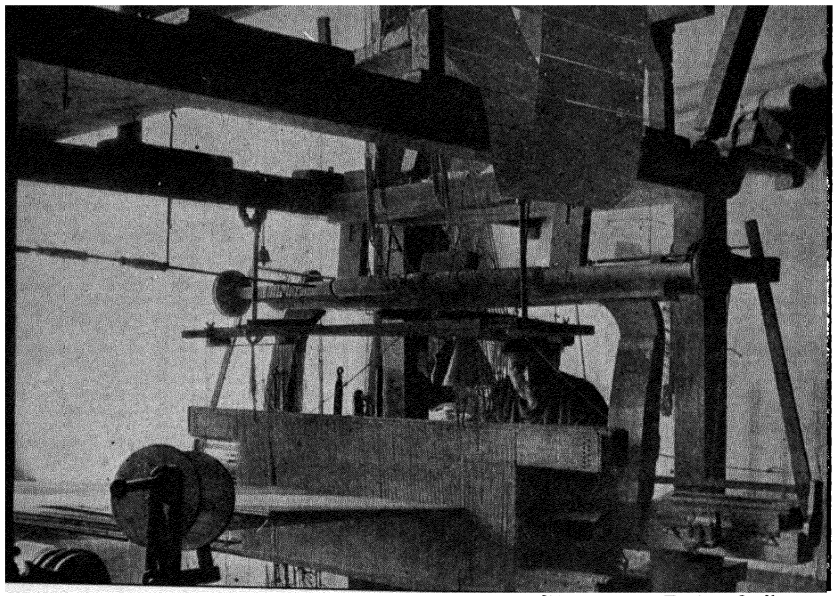


Photo from Ewing Galloway

A woman at her loom in Lyon, France. Much of the weaving of silk is still done in the homes, although the factory system is making rapid inroads on domestic manufacturing in many industries.

Europe. The climate of this section is favorable to the growth of the mulberry tree, on which silkworms feed. For that reason silkworms were introduced there and for a long time this French silk supplied most of the French needs. As the industry grew, it became necessary to import raw silk from Italy, Japan, and China. At present very little raw silk is produced in France; but French mills produce more silk fabrics than any other country in Europe. Only the United States surpasses France in the manufacture of silk textiles. A great deal of rayon is also produced in France though not so much as in Great Britain, Germany, and Italy.

Rare woolens. France was a pioneer in woolen manufacturing in Europe, and French weavers first brought the industry to England, where it became very extensive and still remains so. At present the woolen industry is second to cotton manufacturing in its importance both in France and in England. The leading wool centers are in the northwest and in Alsace-Lorraine. About nine tenths of the raw wool used is imported.

Fine cottons. Cotton manufacturing is the most important of the

French textile industries in the quantity produced, the number of workers employed, and the value of exports. French mills specialize in high-grade, beautiful fabrics which have a high value. All of the raw cotton is imported. Rouen, Lille, and Mulhouse (Mülhausen) are great cotton-textile centers. The reasons for the importance of cotton manufacturing in these three centers are interesting. Rouen is close to the great port of Le Havre, through which American cotton comes into France. Lille is in the center of the great northern coal region, making fuel easily available. Mulhouse has abundant water power. The acquisition of Alsace-Lorraine by France has added very greatly to the textile resources of the country, especially in cotton. Linen is woven in Flanders and Brittany, but it is not so important as other fabrics.

Modern transportation. France is covered with a network of excellent highways, railroads, rivers, and canals. The highways reach every town and village in the country, and France uses more motor trucks and buses than any other country in Europe. If we take the highway mileage per 1000 square miles of area in various countries, we find that France exceeds even the United States in this respect and is exceeded only by Denmark and Great Britain. This is partly due to the density of population and the great development of domestic trade.

The railroad mileage of France is the third greatest in Europe. The total length of railroads is nearly 40,000 miles. Paris is a great railroad center from which lines radiate to all parts of the continent.

Navigable rivers and canals supply more than 6000 miles of inland waterways which are very valuable for the transportation of heavy materials, such as ore, lumber, coal, and steel. Barges and canalboats drawing less than nine feet of water carry an enormous amount of freight on these inland waterways, amounting annually to an average of 50,000,000 tons.

France ranks high in civil aviation. Passengers, mail, and light freight go by air to all parts of Europe.

In the tonnage of its merchant marine France ranks fifth in Europe, being exceeded by Great Britain, Norway, Germany, and Italy in that order. Some of the finest transatlantic ships coming to the United States are French. In this transatlantic passenger trade, there is great rivalry among the ships of Great Britain, France, Italy, Germany, and Holland. Our American ships find it difficult to compete with these European vessels.

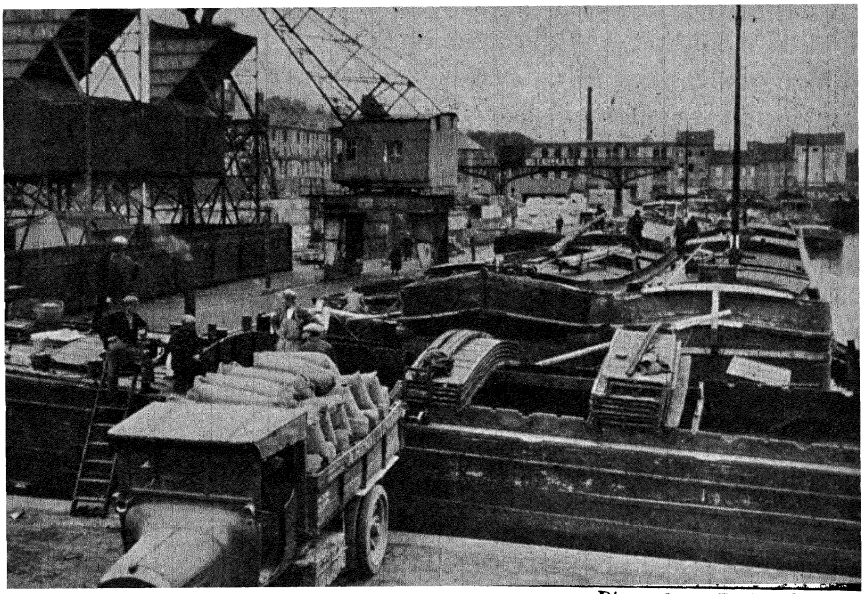


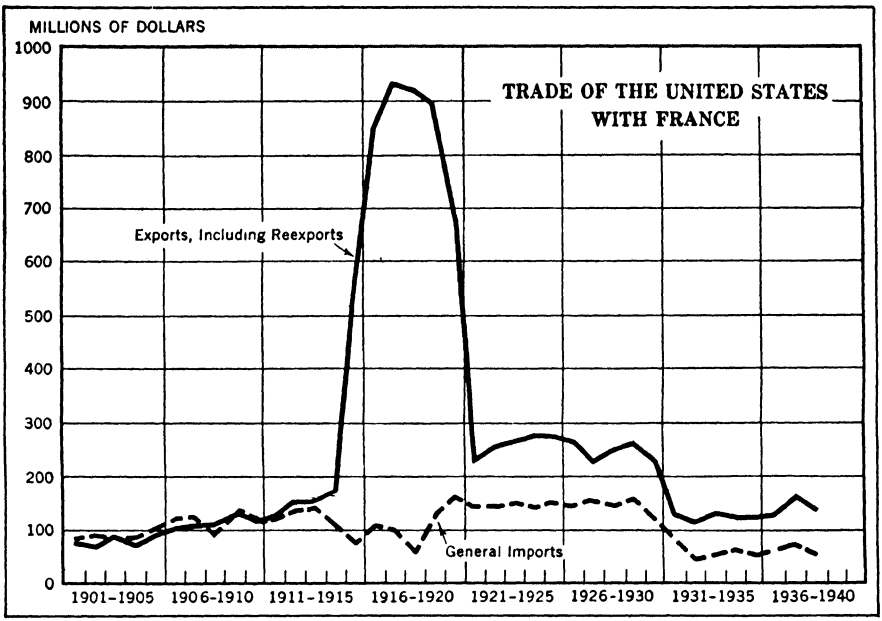
Photo from Ewing Galloway

The Marne Canal crowded with barges at Nancy, Lorraine. Grain, coal, and other bulky goods are swinging aboard these roomy craft.

Foreign trade. France has always been a great trading nation, and its location is of great advantage for foreign trade. It is surrounded by great industrial and commercial nations. It faces two great sea routes, the Atlantic on the west and the Mediterranean on the south. The Atlantic carries traffic to and from the New World, and the Mediterranean gives access to Africa, other Mediterranean countries, and the Far East. By the Mediterranean route, France is nearer to the Orient than any of the other industrial nations of Europe. These ocean fronts, with the mountains on the eastern and southern borders, also serve as natural defenses in time of war.

While France produces nearly enough food to supply its own needs, it still finds it necessary to import some wheat and other foods, such as vegetables, fruit, rice, corn, tea, coffee, sugar, and cocoa. Raw materials, such as wool, cotton, silk, rubber, hides, oilseeds, and wood pulp, together with petroleum products and coal, are also important imports. Raw materials make up about half of all French imports, foodstuffs about a third, and manufactured goods only about one sixth.

More than half of French exports are manufactures, chiefly tex-



tiles, clothing, machinery, automobiles, iron and steel, wine, perfumes, and numerous small articles. Its chief food exports are cheese, butter, wheat, sugar, vegetables, fruits, and fish. Much iron ore and some hides and skins are exported.

French imports greatly exceed the exports in value, giving the country an unfavorable balance of trade. But this is partially balanced, as it is in Great Britain, by the profits of foreign investments, a large merchant marine, and a large tourist trade. France buys largely from its own colonies, the United States, Great Britain, and Germany, in that order. Most of its exports go to its colonies, Belgium, Great Britain, the United States, and Switzerland, in that order. The chief imports from the United States are raw cotton and mineral oils; the chief exports to the United States are wines and miscellaneous manufactures. We sell almost three times as much to France as we buy from her.

World-famed cities. *Marseille* and *Bordeaux* are busy seaports which are connected with the interior by the waterways of the Rhône and Garonne valleys. Marseille refines vegetable oils and manufactures soaps and perfumes which are world-famous. Bordeaux is the center of a great wine-producing area. The Atlantic coast is the great commercial gateway of France. Here are located numerous

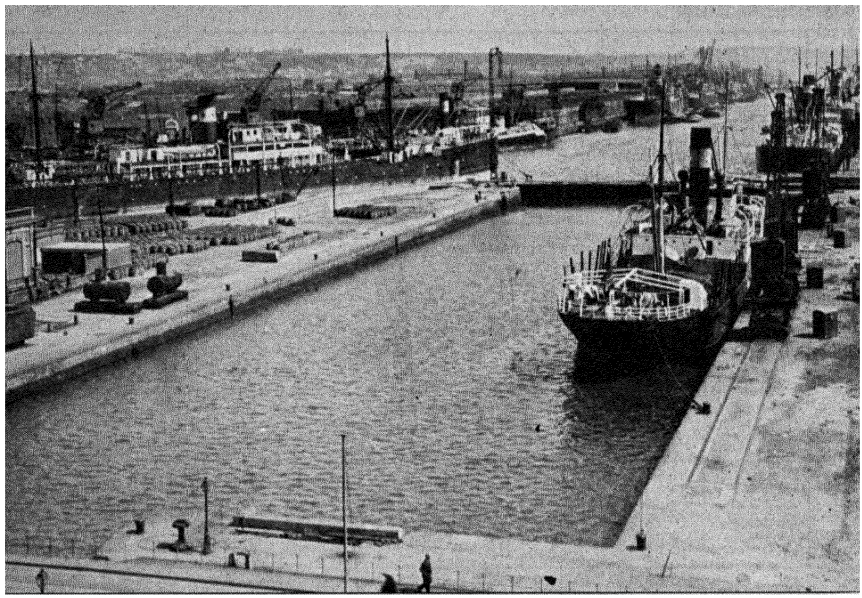


Photo by James Sawder

Vettilart Basin of the port of Le Havre with many steamships tied up to the wharfs, which are lined by warehouses

smaller ports which together do an enormous shipping business. Among these are *Calais*, *Dunkerque*, *Le Havre*, *Cherbourg*, *St. Nazaire*, and *Nantes*. *Paris*, fourth largest city in Europe, is famous for its beauty and art. In its museums and galleries are found some of the most famous pictures and sculptures of the world. It is also a great manufacturing and distributing center. Buyers from all over the world come here to select high-grade chinaware, fine laces and fabrics, and millinery and clothing which set the style standards for Europe and America. So famous is Paris for its beauty, its art, its music and drama, and its wide variety of products that there is an old saying: "See Paris and die."

French colonies. The French colonial empire is second only to that of Great Britain. At one time France held most of Canada and the Mississippi Valley and Great Lakes region. Canada was lost to Great Britain and the Louisiana Territory was bought by the United States. France also formerly held a large part of India, but this was also lost to Great Britain. France has since acquired vast new territories in Africa and in Asia. At the end of the World War France received a large part of the former German possessions in Africa,

called Togo and Cameroon. On the whole France has been quite successful in its management of its colonies, allowing the native peoples a large share of self-government and doing everything possible to improve their living conditions. In Africa the French and British possessions are about equal in area, being approximately 4,000,000 square miles each. The most valuable French territories in Africa are Algeria and Tunisia, from which necessary raw materials are obtained.

Guides to Study

1. What contributions have the French made to world progress?
2. How do the products of French industries differ from those of most other countries? Why?
3. Why is France well situated for communication with other regions—by land? By sea? By air?
4. Why does the climate of southeastern France differ from that of the northwestern part of the country?
5. Why is France a leader in the production of wine?
6. How can a small country produce so large a part of the food needed by a large population?
7. In what ways do the French economize in their use of forest products?
8. What did France gain by the reacquisition of Alsace-Lorraine?
9. What are the leading centers of the French textile industry? What advantages has each region for the work carried on there?
10. Why is France especially well favored in its transportation facilities?
11. "The French sell skill and taste." What is the meaning of that statement? How does this help them to make the greatest use of their raw materials?
12. How do the French colonies of today differ from those of former years?

Research for Students

1. Make a list of French products used in your homes, for sale in the stores, or advertised in newspapers and magazines.
2. What French names are given to textiles made in the United States? Why is this done?
3. Make a collection of French products or of advertisements of French products. Why are they sold in this country?
4. Appoint a committee to make a large map of France on cardboard or paper. On this map locate important cities. Place in correct locations small pictures or drawings of the products or industry of

each region. From the ports draw arrows showing the directions taken by exports. At the end of each arrow list the exports going from that port of the country. In a similar way list the imports. Let the whole class advise as to what shall be placed on the map.

5. Study a map of the St. Lawrence Valley, the Great Lakes Region, and the Mississippi Valley and find places bearing French names. Explain as fully as you can why each was so named.

6. SWITZERLAND—THE HEART OF THE ALPS

A land of sports. Switzerland is a tourist paradise. Its lofty mountains, its glaciers, and its sparkling lakes attract thousands of tourists every year. Housing, feeding, and entertaining these visitors give employment to many Swiss and prosperity to the country as a whole. Besides caring for foreign visitors the Swiss are busily occupied in making watches, clocks, musical instruments, microscopes, and wood carvings. A goodly share of these delicate articles find their way into shops in the United States. We also import some Swiss cheese, milk chocolate, and condensed milk.

A diversified country. Switzerland is truly a land of mountains. Three fifths of its area lies in the region of the Alps. It has also many valleys and a central plateau which lies between the Alps on the southeast and the Jura Mountains on the northwest and stretches from the Lake of Geneva to the Lake of Constance. Two thirds of the population live on this plateau. Here are the principal farm lands and the largest factories. Here also have sprung up the chief cities: Zürich, Basel (Bâle), Geneva, and Bern.

Where the people live. More than one third of the Swiss people live among the high Alps. The great ridges and valleys run generally from east to west, but are broken often by transverse valleys. Through some of these transverse valleys, or passes, there have been, for centuries, famous routes of trade. Three well-known passes are the Simplon, St. Gotthard, and Great St. Bernard. They connect Italy with Switzerland, and beneath two of them are famous tunnels. The wonderful glaciers, lakes, and waterfalls attract the tourist by their beauty; the falls are utilized for power; the grass of the upland pastures provides food for cattle; and in the valleys below are picturesque villages and profitable farms. Thus both mountains and plateaus serve the needs of the Swiss people. (*l. 19*)

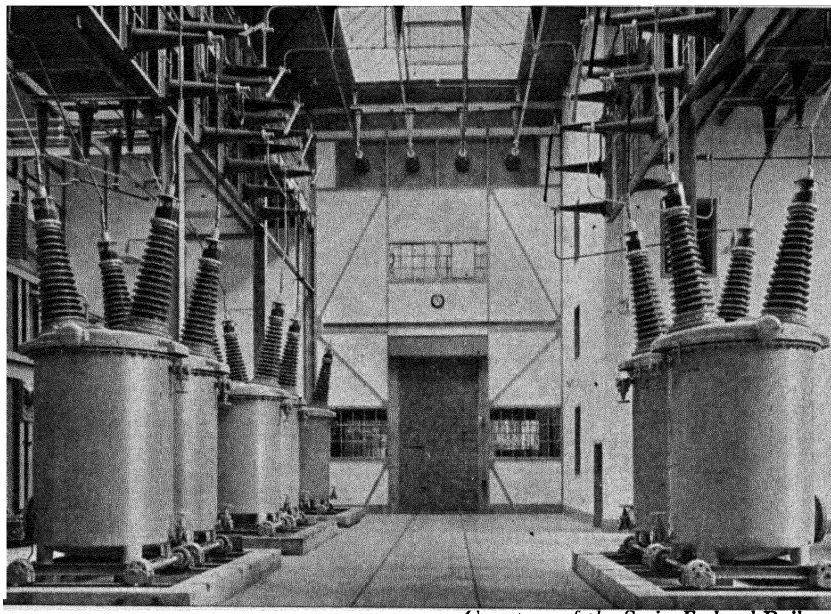


Photo by James Sawders

The Matterhorn—one of Switzerland's loftiest peaks—is so shaped that very little snow ever clings to its slopes. The peak of this 3,000-foot "horn" is 14,780 feet above the sea.

Swiss character. The Swiss are a very intelligent and liberty-loving people. Their public-school system is excellent. Their government, a republic, is one of the most progressive in the world and is remarkably responsive to the needs of its citizens. The Swiss environment is most unusual; nevertheless their adjustment to it has been most successful. Neither great wealth nor abject poverty is found among the Swiss. The businessman is content with moderate profits. As a nation the Swiss are exceedingly thrifty.

Gifts of nature. Switzerland belongs among what are called "the have-not nations," for it is almost totally lacking in coal, iron, copper, and petroleum. This is a great handicap. As compensation, however, nature has bestowed a marked abundance of water power, due to heavy rainfall, lofty mountains, snow fields, waterfalls, and lakes. The basis of industrial life throughout Switzerland is the hydroelectric energy that has been developed from the abundant and steady water power. Electricity is used in the homes and in the home industries, and two thirds of the railroads have been electrified. The greater number of the power sites are to be found along the eastern



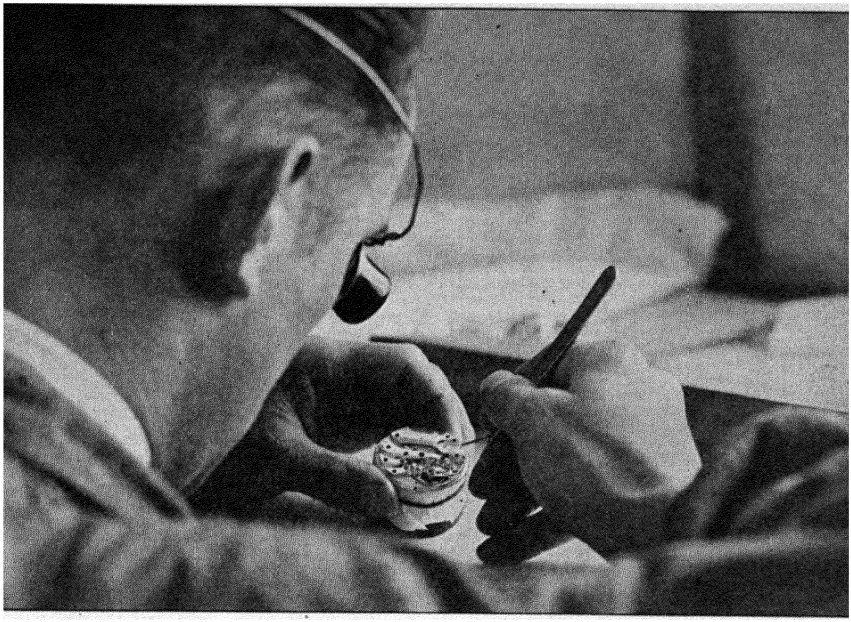
Courtesy of the Swiss Federal Railroads

These oil circuit breakers protect the flow of power in this huge hydro-electric plant which supplies current for the Swiss railway system.

border of the plateau. Factories naturally have arisen in their neighborhood; so the cost of transmission of electricity is comparatively light.

Swiss farming. From the nature of the country we should not expect an extensive system of agriculture. Only about one eighth of Switzerland is farm land. The farms are found upon the plateaus and in the mountain valleys. The farms are small but are worked intensively. The main crops are potatoes and other vegetables, wheat, rye, barley, oats, and common fruits. Switzerland is unable to feed all its population; so large amounts of foodstuffs must be imported. About one fourth of Switzerland is covered with forests and lumber is an important raw material for Swiss industries. Wood carving is a very common occupation.

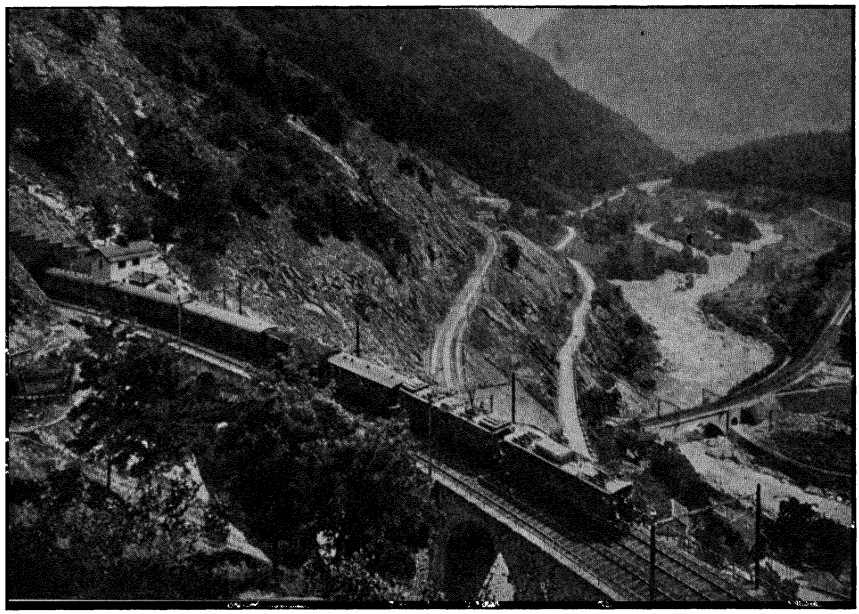
Swiss dairying. The Swiss dairy herds yield more milk than those of any other country except Denmark and the Netherlands. In May the cattle are driven to the fields and, as the season advances, they graze higher and higher up the mountains until, at the height of the summer, they are feeding just below the snow line. Herdsmen are with them all summer. On the lower slopes are harvested



A Swiss watchmaker giving a final adjustment to the delicate mechanism of an almost completed watch

two or three crops of grass to be stored for winter use. Much condensed milk, milk chocolate, and butter are manufactured for export as well as for the home market.

Swiss manufactures. For hundreds of years the Swiss have faced the hard fact that their land is poorly equipped to furnish a living. Coal, iron, petroleum, and raw materials must be imported. At the same time money must be sought through foreign trade. As a consequence of these conditions the Swiss have wisely determined to make their profit on articles that require little raw material and much skilled labor. It is the exquisite, painstaking work that gives their products their high market value. Much of the work is localized. In the Jura, for example, it is watches, watches everywhere. Some of the work is still done in the homes, but small factories are steadily increasing in number. One factory makes watchcases; another watch springs. Geneva is the great watchmaking center. Sometimes Switzerland exports about twenty million watches and clocks in a single year. Cotton and silk are manufactured in Zürich; Basel is the center for the silk-ribbon industry. Thousands of industrial plants turn out goods of great importance, such as lace, rayon,



Courtesy of the Swiss Federal Railroads

Electric power from the swift mountain streams enables the Swiss railroads to traverse the long tunnels and climb the steep grades that are so characteristic of Switzerland. The section of track here has a twenty-six percent grade.

embroideries, cotton goods, shoes, dyes, chemical products, musical instruments, machines, and scientific apparatus.

A peace-loving nation. Because Switzerland depends upon its neighbors for food and for the raw materials so necessary to its very existence, friendly relations must be maintained with all. It is a peacemaker among the nations. Perhaps that is why Geneva was selected for the home of the League of Nations.

Railroads and tunnels. To build and operate railroads in a mountainous country is very expensive. Notwithstanding that fact, Switzerland has one of the most efficient railroad systems in all Europe. Most of the roads have been electrified; so it is the power of falling water that propels the trains through the mountain tunnels, over bridges, and up exceedingly steep grades.

Besides the ordinary freight and passenger service rendered by the railroads, some have been developed for the tourist. Often these have called forth great engineering skill. The plateau region is best supplied with railroads. Several important railways entering Switzer-

land from France and Germany have their routes determined for them by the Rhine and the Rhône Rivers. Connecting the North Sea with the Mediterranean, important lines cross Switzerland passing through the great Simplon and St. Gotthard tunnels. The Swiss have excellent automobile roads traversed by cars, many of which come from the United States.

Swiss foreign trade. Almost fifty percent of Swiss trade is with Germany, France, and Italy, the three states upon its borders. Germany buys more than any other country and also furnishes more imported goods. Both the United Kingdom and the United States are leading customers. Although we buy much of Switzerland, our sales to that country always surpass our Swiss imports in value. Our most valuable imports from Switzerland are watches, clocks, machinery, silks, cottons, embroideries, and dairy products. Because of the great labor and exquisite skill bestowed upon their output, the exports, ton for ton, are of higher value than those of other commercial nations. The people of no other nation are more clearheaded and practical in the conduct of their business affairs than are the Swiss.

Guides to Study

1. Why do many tourists visit Switzerland?
2. In what ways are these visitors a help to the country?
3. Why do more people live on the plateau than in the mountain region?
4. What uses do the Swiss make of the mountains?
5. Why do the Swiss use little raw material in their manufactures?

Research for Students

1. What problems does a "have-not" nation have to solve?
2. Collect stories and legends of Switzerland which give a knowledge of the country itself and of the characteristics of its people.
3. On a detailed map of Europe locate the noted passes and tunnels of the Alps and find out how each helps to connect the country with other lands.
4. Collect folders and other advertisements which show what Switzerland offers the tourist.
5. Prepare a report for the class on the topic: Why I would like to visit Switzerland.
6. Have the Swiss national air played for the class.

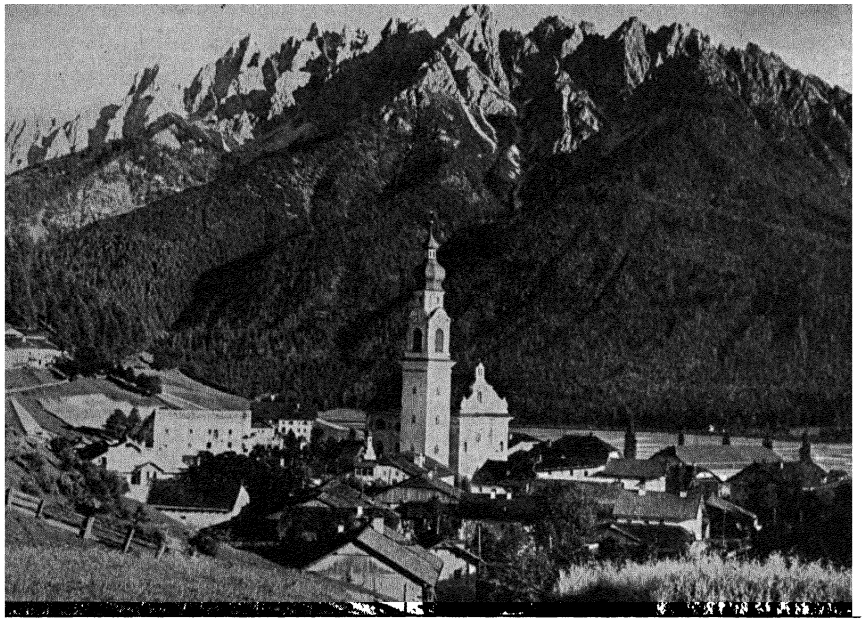


Photo by James Sawders

Toblach, a village in the Italian Tirol, noted for its beautiful scenery and as a resort for tourists. From this plateau 4015 feet above the sea flow the Rivers Drave and Rienz.

1. ITALY–LONG A CENTER OF CULTURE

Italy in the life of the world. Italy's gifts to the world have been most generous. The influence of the Latin tongue is seen wherever the Romance languages are spoken and in the English language as well. The principles of Roman law have come down through the centuries and serve as the basis of much of the law of today. Italian science gave the world the telescope, the barometer, and the radio. Operas written by Italian composers are enjoyed the world over. The palaces and cathedrals of the country show the handiwork of the greatest architects and artists of all time. Italy has transmitted to other lands the best that it has received from the past and its own

creations as well. All the world comes to its doors for education and inspiration. Its contributions are to the spirit of man as well as to his financial welfare.

The lure of Italy. Thousands of tourists flock to Italy every year. Why do they go? First, there is natural beauty: sparkling lakes set amid lofty Alps; blue Mediterranean waters, picturesque shores with palms and vineyards; even snow-crowned volcanoes. Then there is the record of man's achievement as revealed in art galleries, museums, and churches. Everywhere in crumbling monuments and ruins can be traced the historic records of the great Roman empire. The Italians of today are a winning and courteous people; their leading cities are impressive. No wonder that wealth flows into Italian coffers by reason of the travelers within its gates. The tourist trade is a steady source of revenue.

A pioneer in commerce. Europe learned its first lessons in navigation in that inland sea, the Mediterranean. Later, the bolder spirits pushed beyond the Straits of Gibraltar to venture out upon the great ocean. Italian seamen, from the earliest days, have been great adventurers. The world will never forget Columbus, Verrazano, Amerigo Vespucci, and the Cabots, all early Italian discoverers and explorers. After the discovery of America and the rounding of the Cape of Good Hope, much of the world's commerce left Mediterranean waters for the Atlantic. This shift was due not only to the tremendous widening of the world's horizons, but also to the fact that the natural resources of Northwestern Europe were far richer than those of Southern Europe. Thus Italy and other Mediterranean countries dropped to second rank. Mussolini with ambitious plans for his African colonies expects to restore the lost prestige of this inland sea.

Italian trade today. The opening of the Suez Canal in 1869 brought renewed opportunity to Italy and to the millions of people living on Mediterranean shores. Italy occupies a dominating position in the Mediterranean, close to the major countries of Europe and midway between Gibraltar and Suez. It has several first-class harbors, out of which sail its fine merchant ships and its ocean liners. Out through the Mediterranean gateways they go—through the Suez Canal to the east and the Straits of Gibraltar to the west—carrying Italian goods to far corners of the world. Ships from the Orient and from America use Italian harbors as ports of call. Only five other European countries have more ships than Italy engaged in international trade.



Photo by James Sawders

Cánapa–an Italian hemp–produces fibers of many uses. Rope was made from it for years. Il Duce, in order to reduce the importation of cotton and wool, ordered that it be used as a substitute. From it coarse sheets are made and in combination with other fibers cloth is woven for clothing. This cloth takes dyes well and has excellent wearing qualities.

Surface features. The relief of a country is always a great factor in influencing its agriculture and its industries. The Alps and the Apennines are the chief mountain ranges of Italy. The massive Alps separate Italy from Switzerland and Germany. The Apennines, running generally north and south, form the backbone of the peninsula. Italy's most famous plains are the wide, rich valley of the Po, the valley of the Arno, the Roman Campagna, and the Neapolitan plain. In the valleys north of the Po River are found beautiful glacial lakes–Maggiore, Lugano, Como, and Garda. Italy includes two large islands, Sicily and Sardinia. Mt. Etna, one of Italy's famous volcanoes, is in Sicily. Its perfect cone, capped with snow, rises 10,758 feet above the sea. Even more famous is Vesuvius, near Naples.

Farming—the leading occupation. The Italian people are natural gardeners. Almost half the working people in Italy are engaged in farming. Nevertheless there is not enough food raised to meet the needs of the nation; large quantities must be imported. The crops

and methods of farming are quite different in the north from those in the south. Combining their skill in gardening with their love for beauty, the Italian people have created some of the most beautiful landscape gardens in the world.

Farming in the north. Agriculture is at its best in the Po Valley. The plains of this very fertile valley were built up by the silt washed down from the mountain slopes. The rainfall of the region is light, but the very streams that brought down the soil also bring down water to be used for irrigation to supplement the moderate rainfall.

Many crops grown here, particularly rice, require irrigation. No other European country raises so much rice as Italy. Other important products are wheat, Indian corn, potatoes, and vegetables. Hay and other forage crops are extensively grown, and hemp is raised in smaller quantities. The mulberry tree flourishes in the Po Valley, and much silk is produced there. Only Japan and China surpass Italy in the production of silk.

Farming in the south. Conditions are less favorable here than in the north. The climate is drier, and there is little rain in the summer. Good crops follow careful irrigation, but irrigation is expensive and the people are poor. As a natural result the Italians of the south have come to depend upon drought-resisting crops. These are grapes, olives, and wheat. In general agricultural methods are careless in southern Italy. Little attention is paid to the rotation of crops, and harvests are apt to be small and uncertain.

Vineyards. The Italian farmer depends upon his vineyard for a large part of his income. In winter the level ground is often given over to cultivation of several varieties of low-growing vegetables. As summer approaches, the ground is trenched in order to catch all possible rainfall. Thus each vine stands in its own vine pit. The graceful loops of the vines are supported on trellises or on wires strung between straight, light willow poles. Sometimes closely trimmed mulberry trees furnish the needed support for the vines. Although the Italians are expert vineyardists, the French, who follow the single-crop plan, surpass them in the quantity of grapes produced. Most of the grapes are made into wine. Some are used for raisins, for which there is a great demand.

Olive orchards. The olive grows best in a somewhat dry climate, such as is found in southern Italy, southern France, Spain, and northern Africa. Gnarled olive trees with their gray-green foliage are a picturesque feature of the Italian landscapes. Olive trees live



Photo by James Sawders

Littoria–a few years ago this was a region of fever-ridden swamps, which have now been drained, and the land has become a wheat-producing area requiring the use of modern harvesting equipment.

for hundreds of years. They require little care, and the entire crop is harvested at one time. The ripe olive is an exceedingly important article of food. Olive oil is a substitute for butter, a vital fact in this country of scanty milk supply. Olive oil is an important export. Great quantities of Spanish olive oil are imported into Italy, there to be refined and blended with the native product. No other country except Spain raises so many olives as Italy nor devotes so much acreage to this important staple.

Wheat fields. Wheat is grown in all parts of Italy. Even in the dry regions of the south the yield is very fair considering the adverse conditions. Production is greatest in the Po Valley. Wheat is much needed for bread and for macaroni. The Italians are as fond of wheat as are our people; their per-capita consumption almost equals our own. So great is the demand for wheat that small quantities must usually be imported to care for the nation's needs. At the north very close planting and the moist climate result in wheat with long stalks. The famous Leghorn hat is plaited from the long straws of this tall variety of wheat.



Photo by James Sawders

Sicilian women sorting and packing orange rinds for export. The rinds are pickled in salt water before being packed in barrels.

Citrus fruits. Italy is surpassed only by the United States as a producer of lemons, and it is one of the four great orange-growing countries of the world. The island of Sicily grows most of the lemons, and oranges are raised near by on the mainland. The fruit trees are always a beautiful sight. In the spring fragrant white blossoms, green fruit, and golden fruit, all may be seen on the same tree. A choice brand of oranges comes from Messina.

Domestic animals. In the upper valley of the Po and on the Alpine slopes grass grows well because of the abundant rainfall. Here is the dairy district of Italy and cheese is the chief product. Little butter is needed because Italians use olive oil instead. Cheese is exported to many foreign markets. In southern Italy, where pasturage is scanty, sheep and goats are raised. Herds of goats are driven through the village streets in the morning and are halted to be milked at the customer's door. Mules and donkeys are largely used instead of horses.

The rise of manufactures. In spite of unfavorable climatic conditions agriculture has been the chief means of support of the population of Italy. The nation has no coal and very little iron; in fact,

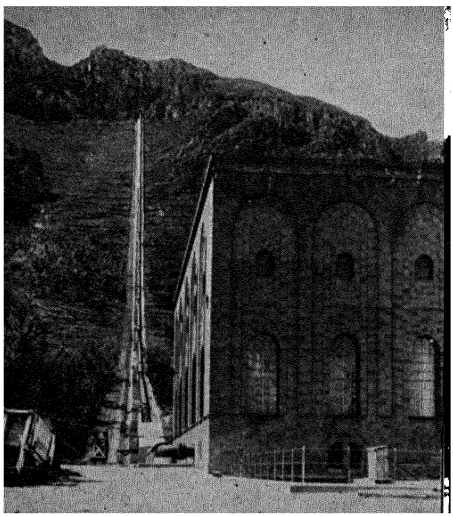


Photo by James Sawders

This hydroelectric plant at Palermo, Sicily, furnishes electricity for the city and the vicinity.

there is a scarcity of nearly all the essentials for building up great industries. During the last century, while Great Britain, Germany, France, and Belgium were making their marvelous advance in the use of modern machinery, Italy showed little industrial development. But its attitude has changed entirely in the last thirty years or more. Seeing large numbers of its people emigrating to foreign lands, Italy awoke to the fact that it must provide more work at home. Agriculture is stimulated, but a decidedly vigorous emphasis is placed upon industrial development.

Great power resources. When it was discovered that water power could be changed into electric power and that this power could be easily transmitted long distances, Italy came to realize the great opportunity for industrial wealth within its own gates. Then it manifested its great interest in industrial development and its urge to acquire more colonies to provide the necessary raw materials and markets. Since the World War there has been rapid progress in the use of hydroelectric power. By 1930 Italy led all the European countries in this respect. About sixty percent of its potential power is now available for lighting and heating, for railroads, and for manufacturing. The southern slopes of the Italian Alps have an abundant rainfall and many rapid streams from high mountains. This is, therefore, the region where electric power is most easily produced and where industry is making its greatest progress. In central and southern Italy the Apennines, though lower and more arid than the Alps, possess important power facilities which are waiting for later development.

Varied industries. The textile industries give employment to the greatest number of workers. In northern Italy the weaving of native silk and the manufacture of imported cotton are leading activities.

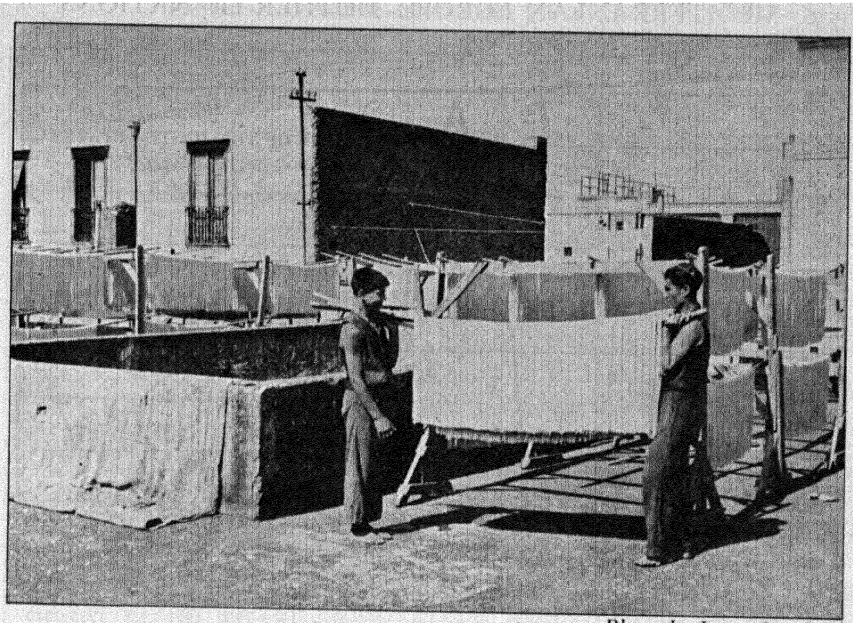


Photo by James Sawders

Drying macaroni in the sunshine on the roof of a building. Italians prefer this favorite food to be sun-dried rather than heat-dried.

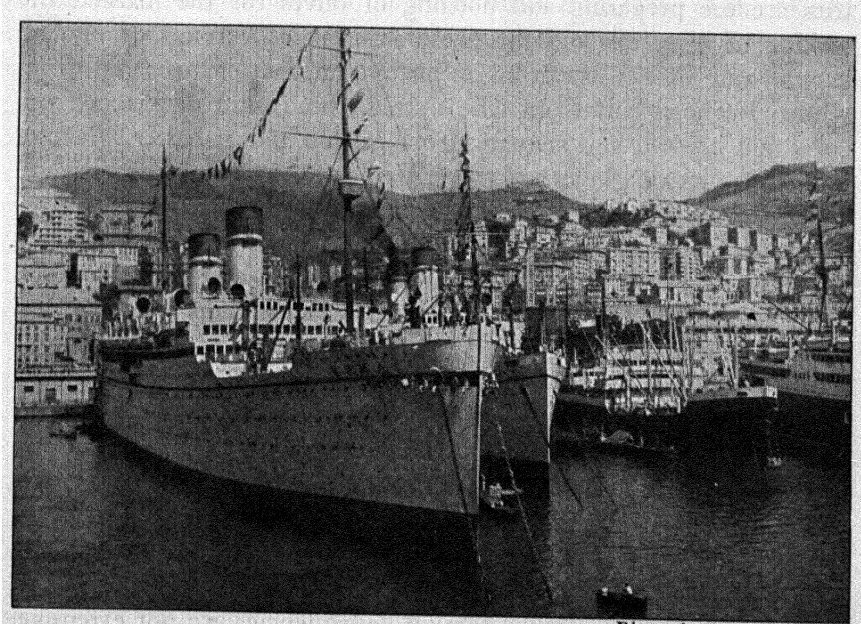
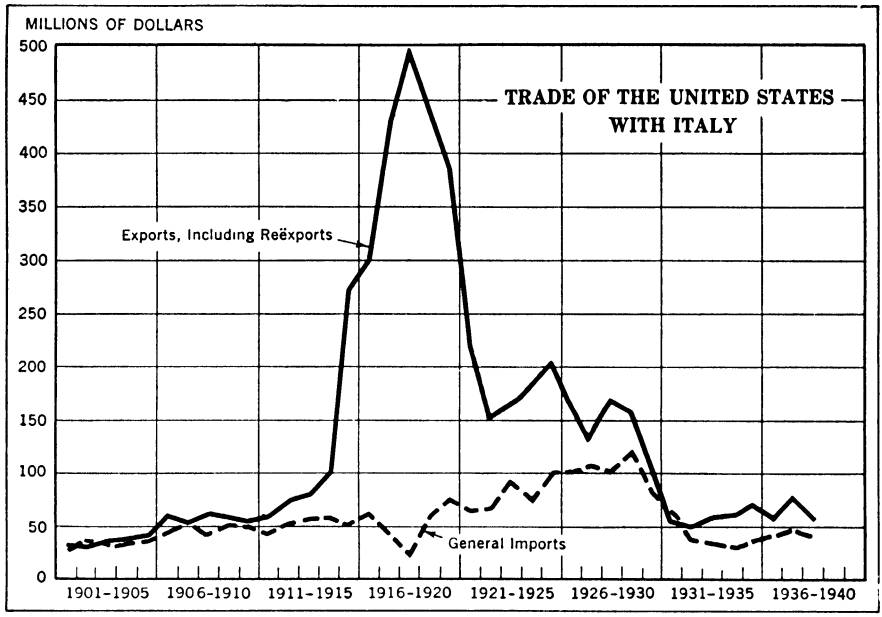


Photo by James Sawders

Ocean liners at Genoa's docks. This port and Naples are the leading ports for foreign trade.



Rayon too is manufactured on a large scale. Other important industries are the preparing and bottling of olives for the market, the making of olive oil, and the manufacturing of extracts of orange, lemon, and lime. Macaroni in many varieties is prepared from wheat; Leghorn hats from wheat straw; beads and necklaces from coral and crystal; and statuary from marble and alabaster. Naples is noted for its kid gloves and shoes; Venice for its exquisite glassware.

Cities of importance. Few countries have so many cities renowned throughout the world as Italy. Rome, on the seven hills above the Tiber River, is the capital and the largest city. Vatican City, the seat of the Pope, is the smallest independent state in the world. It is located near the Tiber and its area is only one sixth of a square mile. The chief ports are Genoa and Naples on the mainland and Palermo on the island of Sicily. Italy has many important industrial cities–Milan (Milano), Turin (Torino), Genoa (Genova), Naples (Napoli), Florence (Firenze), Venice (Venezia), Trieste, and Leghorn (Livorno). The historic and artistic appeal of many of these cities is so great that tourists flock from all quarters of the globe to visit them.

Italy's colonies. Italy's foreign dependencies are not extensive. They consist of Libya and Ethiopia, a recent conquest; Eritrea, on

the Red Sea; Somaliland, on the Indian Ocean; and certain Aegean islands, ceded by Turkey to Italy. The possession of these colonies has resulted, as yet, in no great enlargement of Italian commerce.

International trade. By reason of its limited resources Italy's imports exceed its exports in value. The United States sells to Italy raw cotton, metals, wheat, and petroleum products. From Italy we buy cheese, fruits, nuts, olive oil, raw silk, textiles, hats, marble, and alabaster. This trade is carried on through Naples and Genoa, the leading ports. In the interior the chief center for industry and commerce is Milan, the largest city of Italy after Rome. By means of Alpine passes and tunnels Milan carries on an extensive trade with Northern Europe.

Guides to Study

1. For what great contributions is the rest of the world indebted to Italy?
2. What does Italy offer the tourist?
3. It has been said that Italy was once at the front door of Europe, now it is at the back door. Explain the statement.
4. How do the surface and climate of Italy affect its agriculture?
5. How do the Alps influence the life and work of the people?
6. How do the crops of the South differ from those of the North? Why?
7. In what different ways does the olive serve the people?
8. What are Italy's handicaps? What are its advantages?
9. How are the artistic abilities of the Italians shown in their arts and industries?
10. Of what value are Italy's colonies?

Research for Students

1. Special reports to class on great Italian leaders.
2. "Artists and architects of the past bring Italy wealth today." Explain.
3. In the days of the "Merchant of Venice" the discovery of a new route to India around the Cape of Good Hope was considered a calamity by the Venetians. Why? "The opening of the Suez Canal in 1869 brought renewed opportunity to Italy." Explain.
4. Special reports on each of Italy's foreign possessions.
5. What are Italian leaders trying to accomplish at the present time?

2. SPAIN AND PORTUGAL–PIONEERS IN DISCOVERY AND COLONIZATION

Riches of the past. In the sixteenth century Spain was one of the wealthiest and most powerful nations in the whole world. This was due to its conquest and plunder of the Americas. The Italian Columbus, financed and outfitted by Queen Isabella of Spain, discovered the New World. Many Spanish expeditions followed to find and explore new regions of the unknown continents. They returned with riches and with claims of boundless wealth yet to be discovered. As a result Spain became possessed of a vast colonial territory, consisting of almost all of Latin America except Brazil. It also owned Florida, which then had the Mississippi River as its western boundary; much of our country beyond the Mississippi; and the Philippine Islands. Here was the wealth of a powerful empire.

Then disaster befell Spain. It had always been more eager to secure gold and silver than to build up strong colonies which, by agriculture, industry, and commerce, could become self-supporting provinces. As a result of its short-sighted policies all Spain's South American and Central American colonies, with Mexico, revolted about a century ago and declared themselves free and independent republics. As a result of the Spanish War, in the late nineties, Spain lost Cuba, Puerto Rico, and the Philippine Islands. Today the Canary Islands and a few other small possessions along the west coast of Africa are all that remain of Spain's former colonial empire.

Portugal, like Spain, was a leader in navigation and commerce. Under the stimulation of Prince Henry the Navigator, little Portuguese vessels crept farther and farther down the African coast. Later Vasco da Gama rounded the Cape of Good Hope and opened the route to India. In the new world Brazil fell to Portugal. This rich territory was a welcome source of wealth to the mother country. Portugal followed the same heedless policy as Spain in dealing with its colony and similar results followed. In 1822 Brazil declared its independence. Today the Portuguese possessions are the Azores, Madeira, and Cape Verde Islands in the Atlantic Ocean and Portuguese Guinea, Angola, and Mozambique in Africa.

The Iberian Peninsula. Spain and Portugal together occupy the most western peninsula of southern Europe, known as the Iberian Peninsula. As we have seen, after the discoveries by Columbus, there

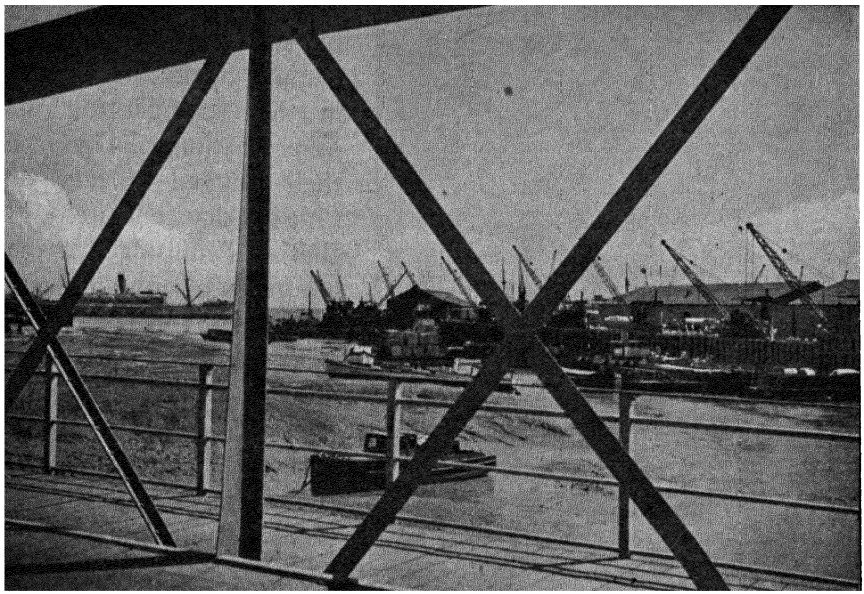


Photo by Burton Holmes

Copper and chrome ore from Portuguese East Africa keep the harbor machines of Beira busy. Beira is a fast-growing seaport of an important colony of Portugal.

was a tremendous awakening to discovery and exploration, but, in time, Spain and Portugal were surpassed by the northwestern nations. For a hundred years now Spain and Portugal have been lagging industrially and commercially. That their commerce is small for the present day the following comparisons will prove. France has an area a little less than that of the two countries combined, yet its foreign trade is about four times as great. Italy has about one-half the area, but its foreign trade has often been twice as large. Spain has about sixteen times the area of Belgium, but its foreign commerce is only about a third that of the busy little nation of the north.

Although the commerce of the peninsula is small, it is decidedly important. Certain special commodities, such as olives, oranges, raisins, and wines, produced here in abundance, are shipped to other nations. The business of the people is mainly concerned with the production of these leading commercial articles.

Spain and Portugal have recently begun to develop themselves industrially. This new policy is already stimulating trade in a marked degree.

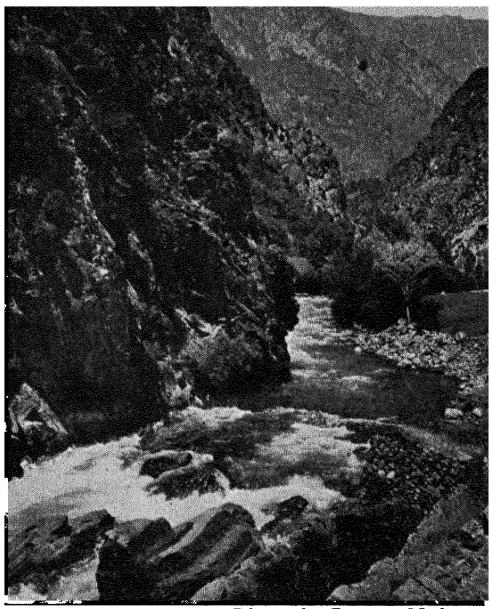


Photo by Burton Holmes

This swift-flowing stream in the Pyrenees between France and Spain furnishes hydroelectric power that benefits both countries. The rugged and precipitous mountains explain the difficulty of building railroads across the range that separates the two countries.

Varied handicaps. Two physical hindrances greatly hamper Spain and Portugal in their competition with other nations. These are their rugged surface and their dry climate. The Iberian Peninsula is a massive plateau with an average height of 2200 feet. From this central plateau rise lofty, snow-crowned mountains. The lowlands comprise the deep and narrow river valleys and a narrow coastal plain with few inlets edging the plateau. The slopes of both coastal plains and river valleys are so steep as to make their ascent difficult by both road and rail. The Guadalquivir is the only navigable river of any importance.

High and dry. The two countries have the typical Mediterranean climate. The scanty rainfall occurs in the winter, and the summer season is hot and dry. Spain is less fortunate than Portugal in the matter of rainfall. In the latter country prevailing westerly winds from the Atlantic bring much moisture to fall, as rain, on the Portuguese highlands.

Few railroads. Commerce and industry are always stimulated by the coming of railroads. This we have seen in the case of the nations of western Europe. Spain and Portugal are both handicapped by adverse physical conditions. The high plateau, cut by deep valleys, hampers railroad construction, and mountain ranges block the way. The expense of building both roads and railroads has been well-nigh prohibitive. For generations the lofty Pyrenees Mountains furnished almost a complete barrier to overland trade between the peninsula and the rest of Europe. Only through the ends of the

great mountain mass, through its eastern and western gates, as it were, could railroads penetrate into France. Not until 1928 did the first railroad cross the Pyrenees. The cost of construction was great; consequently freight rates are proportionately very high. In 1925 the Spanish government, thoroughly aroused to the need of improved transportation, established a special railroad fund to improve the railroad system throughout the country. At about the same time a national system of improved highways was undertaken. Government aid has resulted in good automobile roads.

In Portugal most of the towns are on the sea. Consequently travel is by water. There is little enthusiasm for overcoming the physical difficulties in the way of land travel.

The people. Because of its location the Iberian Peninsula was for centuries a very whirlpool of tribes and races from the shores of the Mediterranean and beyond. As these tribes in succession fought their way to the Atlantic, they overwhelmed and mingled with those who had preceded them. The Moors, who conquered and occupied Spain for about seven hundred years down to the time of Columbus, left a deep impression in art, architecture, and other standards of civilization. With the blood of all these hardy and venturesome races in their veins the Spanish and Portuguese people were quick to catch the spirit and follow the example of Columbus and become the pioneers in navigation, exploration, and ruthless conquest.

The Spanish people, once their enthusiasm for a cause is aroused, have always been most zealous. As proof of their fine qualities you have only to read the noble records of the Spanish missionaries to the American Indians. The days of conquest over, Spain settled down to enjoy its ill-gotten gains. Then began its steady decline, which ended in the loss of the last of its colonies at the time of the Spanish-American War. Handicapped by poor soil, lack of transportation, unsatisfactory methods of farming, and a not too stimulating climate, the Spaniard sank into apathy, with little desire to make the most of what he had.

The loss of its colonies, however, was really a blessing in disguise. Up to the time of the recent deplorable conflict in Spain the people of the peninsula were falling into line with other nations of Europe. Harbors were being improved, and roads and railroads were being built, and there was a general awakening on the part of the people. The Spanish and Portuguese are a music-loving people and have a passion for art and architecture as their beautiful cities testify. Edu-



Photo by Burton Holmes

Not straw houses—just wheat in the Basque province of Spain stacked to dry in the sun

cation is not far advanced; there are about as many illiterate people as those who can read and write. Many still cling to old-fashioned tools and methods in agriculture and industry.

Farming and crops. Agriculture is the chief occupation of Spain and Portugal. The lands best adapted to farming lie on the coastal plain bordering the Mediterranean and in the broader parts of the Ebro and Guadalquivir valleys. These are the sections most densely populated and best adapted to irrigation. Irrigation had been practiced centuries ago by the Moors who had occupied a large part of the peninsula. It was a great loss to Spain when they were conquered and driven from the country in the reign of Ferdinand and Isabella. Of late years, especially in the valley of the Ebro River, irrigation systems and electric-power plants have been combined for the development of both agriculture and manufacturing. The necessary water comes from the Pyrenees. Upon the central plateau the land is too rugged and too high above the rivers for irrigation to be much employed. Artesian wells are used somewhat, but dry farming is the method generally followed.

The most important drought-resisting crops are wheat, barley,

chickpeas, and, to some extent, grapes and olives. North and northwest of Madrid is an important wheat-growing area. Eighty percent of the wheat needed for native use is grown in the home country. As the summers are very dry, all of the plateau crops make their principal growth in the spring and fall. To the east and southeast many varied crops are grown on the irrigated land. Great quantities of Spanish onions, tomatoes, and other vegetables grown here find their way to the markets of northern Europe and even to distant America. The cane-sugar industry of southern Spain has been much reduced by the competition of sugar beets, grown in this eastern section. But Mediterranean fruits—the olive, the orange, and the grape—are here the leading crops.

Spain raises fifty percent more olives than Italy does. The most important olive-growing districts are near the cities of Seville (Sevilla) and Barcelona. The quality of the olive is unsurpassed; consequently Spain holds first rank in the production of this important fruit. Much olive oil and many pickled olives are exported to America. It is interesting to note that a goodly proportion of these products is prepared for market in factories on Spanish soil established and operated by enterprising Americans.

Spain formerly was the world's leading orange-growing country, and the Valencia orange is famous throughout the world. More than three quarters of all the Spanish oranges are grown near this little city. Most of the oranges that are eaten in Europe are exported from Spain.

Another valuable fruit crop comes from the vineyards. The vines are grown on terraced slopes along the Mediterranean. They are supported, sometimes on wire trellises, sometimes on the horizontal branches of living trees. The life in these tree supports keeps the vines at a more even temperature than wire trellises or stone walls. The grapes are made into wine or raisins. Malaga is a great center for this crop; large quantities of its grapes find a market in the United States. Port and Madeira, famous wines made in Portugal, owe their names to the city of Oporto (Porto) and the Madeira Islands. Other valuable fruits are the lemon and the fig. Almonds, filberts, or hazelnuts, and chestnuts are also raised in abundance.

Cork. Cork is a most important crop in the peninsula. Cork trees are found almost exclusively there and in northern Africa. They resemble oak trees and are planted in orchards. Cork which is the outer layer of bark is light and elastic and from one to two inches

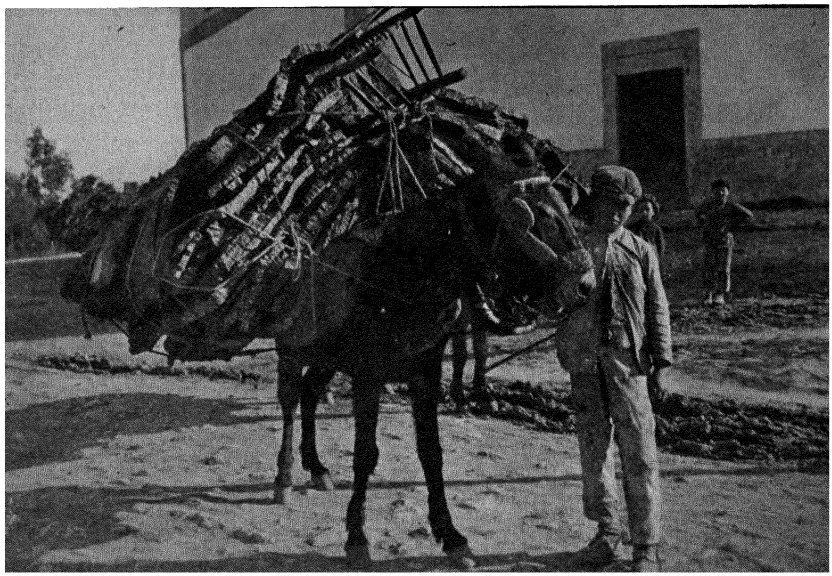


Photo from Gendreau

This little Spanish donkey is carrying a bulky load but one which weighs little–slabs of cork.

thick. A cork tree yields bark every six to ten years for about one hundred fifty years. Spain and Portugal together supply about eighty percent of the world's output of cork. Portugal alone furnishes fifty percent. Cork is used for stoppers, artificial legs, inner soles for shoes, and floats for nets. The making of corks is one of the chief industries of Portugal.

Domestic animals. Spain raises more sheep than any other country in Europe except Great Britain and Russia. There are numerous goats but comparatively few cows. The beasts of burden are mainly mules and donkeys since they are more hardy than horses and demand less food. The pastures of the central plateau are the large grazing areas of the peninsula.

Wealth of the mines. There is a great variety of minerals in Spain and Portugal, but little skill in mining and smelting. The people ship iron ore to Great Britain, Germany, and other countries for reduction. Abundant coal is found near the iron mines, but it is not mined to any great extent. Instead, Spain imports coal from Great Britain. Lead in crude form is shipped to other countries for manufacturing. Spain leads Europe in the production of copper; Italy is

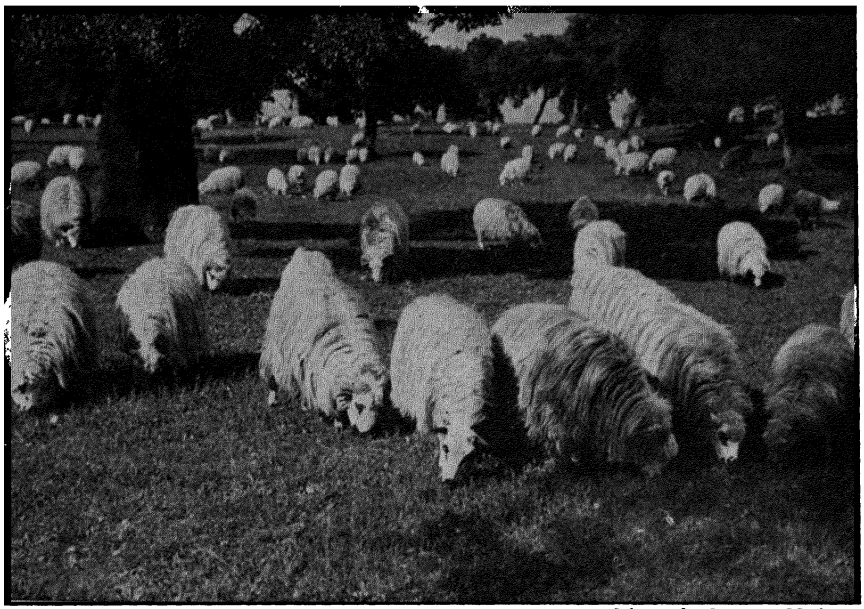


Photo by Burton Holmes

Merino sheep grazing among old olive trees in southwestern Spain. This section also raises many hogs that feed on chestnuts which are abundantly produced there.

a close rival in the production of mercury. Much foreign capital is invested in Spanish mines.

Salt is obtained from the sea by evaporation. The effect of sunshine and warm winds is to dry up the waters of the salty lagoons, and in this way tons of salt are thus obtained for the trade. Around Cadiz stand huge mounds of salt which look like low hills of glistening white sand. Salt is used extensively for curing fish.

The fishing industry. Excellent fishing grounds border the shores of Spain and Portugal. Hence many people "follow the sea." In the cool waters of the northwest are found large numbers of anchovy and sardines. These fish are cured, packed, and sent to other lands. Sea foods, cuttlefish, and clams are obtained in the warmer waters of the Mediterranean.

Tardy industrial development. Comparatively little manufacturing is carried on in Spain or Portugal. In the old days small local mills were erected to prepare food or partially to work certain minerals. For example, there were gristmills, sawmills, tanneries, and kilns for making bricks and lime. Of late years electric plants have

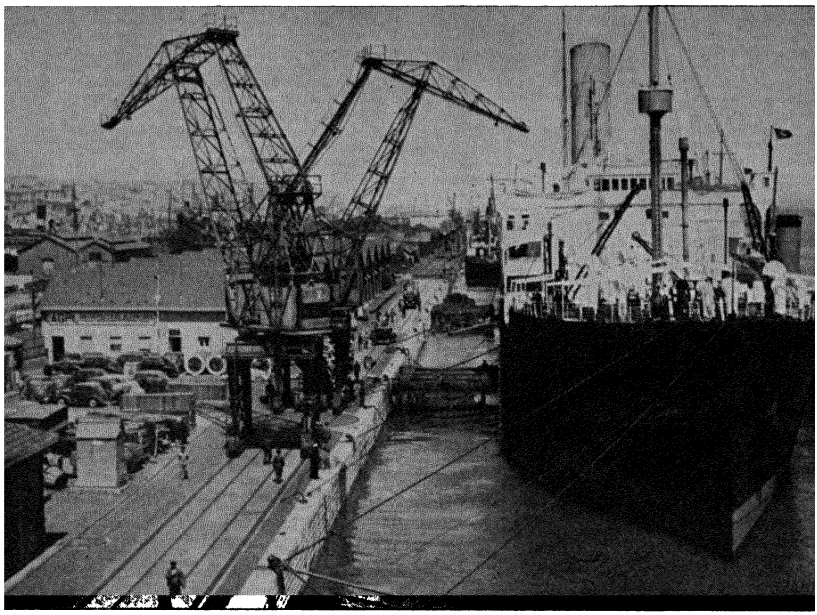


Photo by James Sawders

Lisbon, the capital of Portugal, is an important port and has become a center for the manufacture of cotton and woolen goods. Fruits and wines leave Lisbon for foreign ports.

been introduced which supply light and power. This new departure conserves the wood which long had been used too lavishly as a power-furnishing fuel. Barcelona and Lisbon (Lisboa) are today leading industrial cities. Barcelona employs much hydroelectric power, using for this purpose the streams from the Pyrenees Mountains. This city makes great quantities of woolens for home use and also cotton cloth. Lisbon is also a center for manufacturing cotton cloth. Bilbao builds ships and also manufactures pig iron and steel, employing British coal, brought in returning ore ships. Seville is an important center for preparing olive oil. Tobacco products are manufactured in northern Portugal.

Overseas trading. Until recently the imports of the peninsula far exceeded the exports. The chief exports are wines, fruits, olive oil, cork, lead, almonds, iron ore, and copper. The leading imports are chemicals, machinery, raw cotton, tobacco, and petroleum products. France and Great Britain offer the best markets for Spanish and Portuguese goods. Portugal trades more with England than with its close neighbor, Spain. The United States takes the lead in sup-

plying Spain with needed imports, but Portugal buys more from Great Britain and Germany than from us.

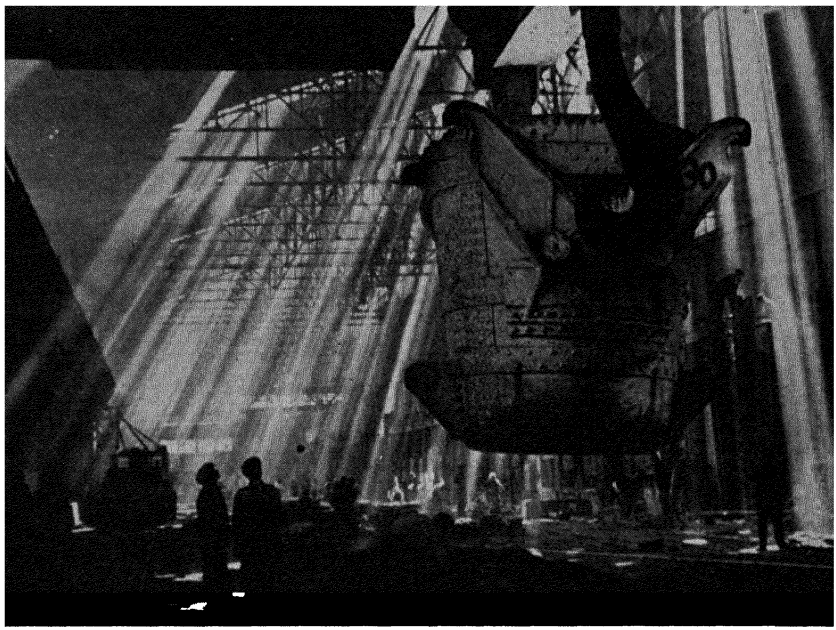
The chief ports of the peninsula are Barcelona, Bilbao, Cartagena, and Lisbon (Lisboa).

Guides to Study

1. Why did Spain lose nearly all of its colonial possessions?
2. What have been Spain's greatest handicaps?
3. How do the country's surface and climate affect its industries?
4. Why was it well for Spain and Portugal that they lost their colonies?
5. What parts of the Iberian Peninsula are best adapted to fruit-growing? Why?
6. Although Spain has supplies of iron and coal, iron ore is exported and coal is imported. Why is this done?

Research for Students

1. On a map of the world locate the areas once held by Spain and Portugal. Of what value are these regions today?
2. Let some member of the class report on the work of Prince Henry the Navigator.
3. Assign to some member of the class the topic, "The Spanish Armada."
4. Make a special study of the production and uses of cork.
5. On a map of Europe locate the most important cities of Spain and Portugal and learn for what industries or products each is noted.



Sovfoto

This crane-carried bucket loaded with metal is on its way to the open-hearth furnace in the Stalin Metallurgical Works in Magnitogorsk, one of the great iron and steel centers of Russia.

1. THE UNION OF SOVIET SOCIALIST REPUBLICS, FINLAND, AND THE BALTIC STATES

Soviet Russia—An Experiment in Government and Industry

Old and new Russia. Before the World War Russia was an absolute monarchy. The Czar ruled absolutely, and there was no popular self-government. The Revolution of 1917 led to the establishment of the present socialistic form of government. Under the Czars Russia's industries and commerce were very backward. The country's vast resources were undeveloped, and the people were poor and uneducated. The leaders of the Revolution, called *Communists*, have attempted to change all this. The new government took over all private productive property; so farms, forests, mines,



Sovfoto

Dairy cattle on a collective farm in Russia. There are many thousand such farms in the Soviet Union. Herd improvement is receiving much attention from the State.

On the collective farm all workers share the expenses and also receive a share of the profits. The state farm is owned and operated by the government, and all workers are paid a small wage and are furnished living quarters. Although the total agricultural yields in Russia are large, the country is so vast and the population is so great that crop exports are small, with the exception of flax. Southeast of the good farm lands there are large areas known as *steppes*, where the rainfall is very light, the soils are poor, and grazing is the leading occupation. On its farms and grazing lands Russia has as many cattle, nearly as many hogs, and a great many more sheep than has the entire United States. In fact Russia ranks second among the countries of the world in the number of its domestic animals. However, it will probably be many years before meat products are exported.

Forests and furs. Russia also has vast forest areas, especially in northern Siberian Region. The lumber of this region is now being taken down the Yenisei River to the Arctic Ocean and thence around to both European and Asiatic ports. A new city called Igarka has been built on this river to convert logs into lumber and to store them



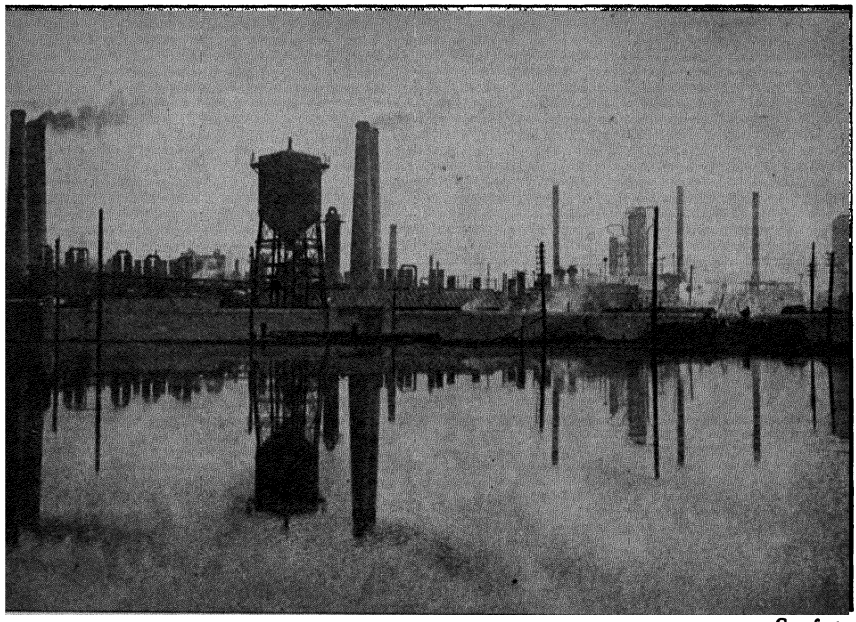
Sovfoto

Stakhanov cutting coal in a Russian mine. From his name the Russians have coined new words that indicate speed and proficiency in the accomplishment of tasks in the state-controlled industries.

until the river opens for navigation in the summer. In the list of Russia's exports lumber and lumber products now rank first. When transportation facilities are better, lumber exports will increase.

The forests contain many fur-bearing animals, and at Irbit, a small town just east of the Ural Mountains, a great fair (established in 1643) is held each winter to which furs, wool, hides, and skins are brought from all parts of the country. Russia now supplies about one fourth of the world's furs. Squirrel, fox, ermine, sable, and marten furs are obtained in the forests. Persian lamb and karakul come from domestic animals. Silver foxes, minks, and rabbits are raised on animal farms.

Mines and mining. Minerals abound in Russia although many of the deposits have scarcely been touched. In the Donets Basin, drained by the River Don, there are great coal fields and considerable deposits of iron ore. This has been the leading iron and steel region of Russia, but at present the coal and iron resources of Asiatic Russia are being rapidly developed. At Magnitogorsk in the Urals there are important deposits of iron ore and platinum. About fifteen



Sovfoto

Oil in Russia—a large cracking plant of an oil refinery at Baku, on an inlet of the Caspian Sea

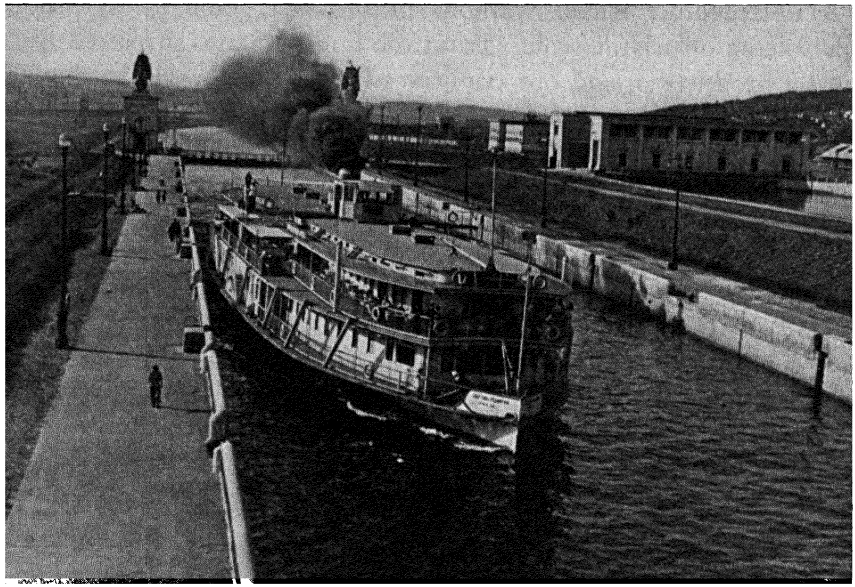
hundred miles farther east there is a newly opened coal field of great extent. Ore is now carried by rail west to the coal fields and there is smelted into pig iron. Coal is also taken back to the vicinity of the iron mines and used there in ironmaking. These great distances are a handicap to the Russian steel industry. However, Russia now produces almost one fifth as much coal, more than one half as much iron ore, one half as much pig iron, and one third as much steel as the United States. This is a great advance over the production of twenty years ago. This progress is due largely to the industrial development in Russia and to the improved methods resulting from the employment of foreign engineers who have instructed the Russian workmen in modern mining and industrial processes. Increased machine building and improved transportation have encouraged a wider use of the country's mineral resources. Russia is also rich in manganese ore, a large amount of which is imported into the United States for use in our steel mills. Asiatic Russia has valuable gold mines, the exact production of which is not definitely known, but which are being intensively worked by the Soviet government.

Petroleum. Russia was one of the first countries to produce petroleum on a large scale. Later the United States surpassed Russia in oil production, and our country still leads the world in this very valuable resource. But recently Russia has again become an important source of petroleum, and now is second only to the United States, although its production is less than one fifth of our output. The chief oil region is near Baku on the Caspian Sea. Pipe lines carry the crude oil more than 500 miles to the port of Batum on the Black Sea. This pipe line is built through a very rugged region and is one of the most costly projects of this kind ever constructed. A great deal of oil is used on river steamers, as fuel in factories, and in great refineries similar to those in our own country. Petroleum products are exported in large quantities.

The Russian manufacturer goes to school. Next in importance to the heavy iron and steel industries in Russia is the manufacture of textiles. Russia has for years had a considerable cotton industry, and the production of cotton goods is increasing as better methods are used and as the domestic market for these textiles improves. Recently rayon mills have been established and their production has already begun to appear among Russian exports. Russia has an abundance of wool for its mills as well as all the flax that it needs. Some cotton is raised in Asiatic Russia, but a large amount has to be imported from other countries. Cotton production is increasing, and less is being imported than formerly. The textile industries center in the region around Moscow, and the large population affords a great domestic market for both cotton and woolen goods. With the improved methods of manufacture and the resultant increase in production, Russia is exporting considerable amounts of textile goods.

The greatest advance in manufacturing in Russia has been in the so-called heavy metal industries. With the aid of foreign engineering experts and technical schools for the training of Russian mechanics, such industries as automobile and tractor plants, agricultural- and electrical-machinery factories, and locomotive and car works have been set up in great numbers and with considerable success. Chemicals and fertilizers are also being produced in much increased quantities.

Transportation speeds up. Transportation facilities in Russia are still very inadequate, but conditions are improving. As far as roads are concerned, the country is very poorly supplied. River transportation is hampered by many adverse conditions. The north-

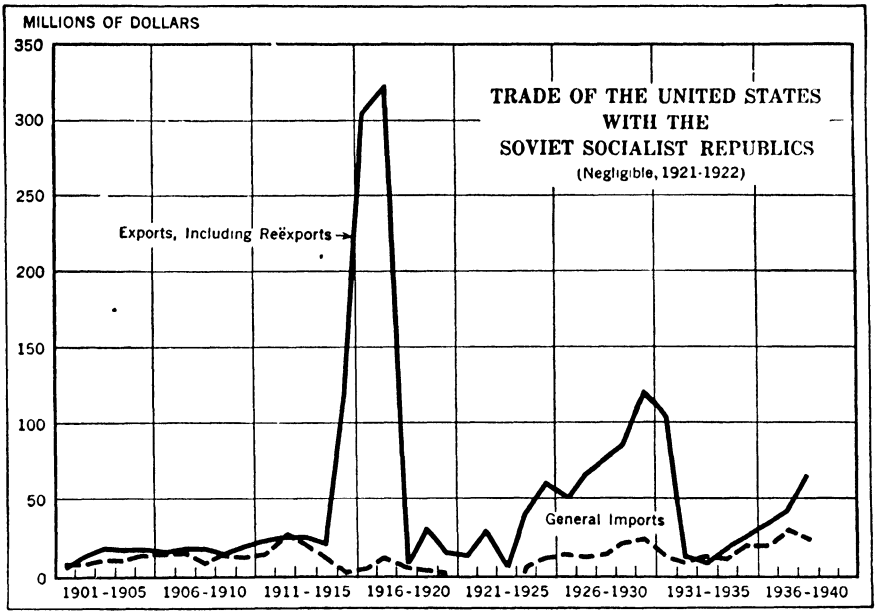


Sovfoto

A passenger vessel, *The Soviet Republic*, passing through lock No. 3 on the Moscow-Volga Canal. One year of operation was celebrated in July, 1938. In its first year 900,000 tons of merchandise and 1,200,000 passengers were transported on this canal.

ern rivers are frozen for several months, and the level plains cause all Russian rivers to flow very slowly and to have very shallow depths. The largest river of southern Russia, the Volga, flows into an inland sea, with no outlet. Many of the rivers become very shallow as they flow into dry regions; so only vessels of very light draft can be used. Nevertheless there is a large river traffic in the interior of the country. It is said that there are more than 3500 river ports in Russia and that more than 90,000,000 tons of freight are carried on the rivers every year. An increasing number of canals are being dug to improve this system of inland waterways.

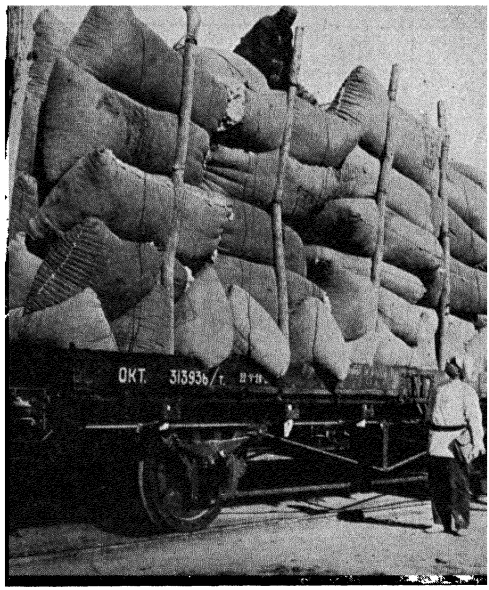
The railroads are also very inadequate. The Trans-Siberian Railroad has been a very expensive undertaking, and its length is so great that it still lacks sufficient double-tracking and rolling stock. Like everything else in Russia, however, this great transcontinental traffic artery is being improved as fast as conditions will permit, and branches are being built to tap the rich agricultural and forest lands along its route.



Civil aviation has developed rapidly since its start in 1922. The total length of air lines is approximately 60,000 miles, including one from Moscow to Vladivostok, the longest land line on the globe. Russian fliers are second to none in the world. They are noted for their skill, endurance, and courage.

Foreign commerce. Compared with other world powers, Russia's foreign trade is very small. The reason for this is the fact that Russia has tried to produce enough food to supply its vast population and thus has had very little to export. Its industrial production has so far been utilized to supply Russia's needs and to diminish the amount of manufactured goods which formerly had to be imported from other countries. With the increase in both agricultural and industrial production Russia hopes to be able to enlarge its exports of raw materials and manufactured products.

At present about ten percent of Russian imports are foodstuffs, about forty percent raw materials, and about fifty percent manufactured articles. Of its exports about fifteen percent are foods, about sixty-five percent raw materials, and about twenty percent manufactures. The leading imports are machinery, rubber, wool, cotton, tea, and various metals. The principal exports are furs, flax, lumber, mineral oil, dairy products, and cotton goods. The leading ports of Russia are Leningrad near the head of the Gulf of Bothnia, Odessa



Sovfoto

Cotton from the fields of Uzbekistan on its way to the mills. The Soviet Union expects to be self-sufficient in the production of cotton in a few years and possibly to enter the export market.

on the Black Sea, and Vladivostok on the Pacific Ocean side of Asiatic Russia. Archangel on the White Sea is being developed for use in an attempt to open a route around the northern coast of Asia. All these ports are subject to certain disadvantages. Leningrad is closed by ice for several months; Odessa is a long way from the Atlantic; and Vladivostok is of no use for trade with Europe. Even if the northern route can be developed, it will be of service for a very short time in summer. This lack of seaports is a great handicap to Russia.

Asiatic Russia—a land of the future. There are great possibilities for development in Russia in Asia. The agricultural lands are of vast extent and are very fertile; the mineral wealth is enormous; the forests contain the greatest supply of lumber left in the world; and the grazing areas are very extensive. The population of this region is still very small but is growing rapidly as the resources are developed. The Trans-Siberian Railroad is being extended to make the products of this part of Russia more accessible, and improved transportation will make it very valuable. At present wheat, minerals, furs, and lumber are its chief products.

The southwestern part of Asiatic Russia, containing such Soviet republics as Uzbekistan, Turkmenistan, and Tadzhikistan, is a grazing and desert region noted for its cotton, wool, and astrakhan.

Finland and the Baltic States

Estonia, Latvia, and Lithuania are called the Baltic States because they all face the Baltic Sea. Together with Finland, which also has

direct access to the Baltic, these states were formerly a part of Russia. But their people are not of the same race as the Russians, and at the end of the World War they became independent nations. Finland and Lithuania in particular had been great nations during earlier times, and their general level of educational and cultural development was much higher than that of Russia. All four of these small countries have the advantage of direct access to the sea, and their loss was a great blow to the maritime power of Russia. Russia also lost valuable resources in the Baltic region. Forests abound in all these states, and lumber, pulp, and paper are exported. Rye and flax are prominent agricultural crops and dairy cattle thrive. Much grain, butter, and meat are exported. Cooperative farming and marketing societies are highly developed in Finland. The exports go mostly to western Europe although wood pulp comes to the United States. Manufactured goods are the chief imports of the Baltic States.



Map showing the new states formed after the World War out of former Russian, German, and Austro-Hungarian territory.

Guides to Study

1. Why is modern Russia more progressive than the country was under the monarchy?
2. How can Russia increase its foreign trade?
3. How do farming methods differ from those of our country?
4. What use does Russia make of its forests?
5. Where are Russia's greatest mineral resources? How do they aid in the country's industrial development?
6. What are some of the country's advantages for manufacturing?
7. Why are the transportation problems more difficult than those of many other countries?
8. What do the imports and the exports tell of the resources and industries of the country?
9. For centuries Russia has been struggling for ocean ports. Why was this necessary?

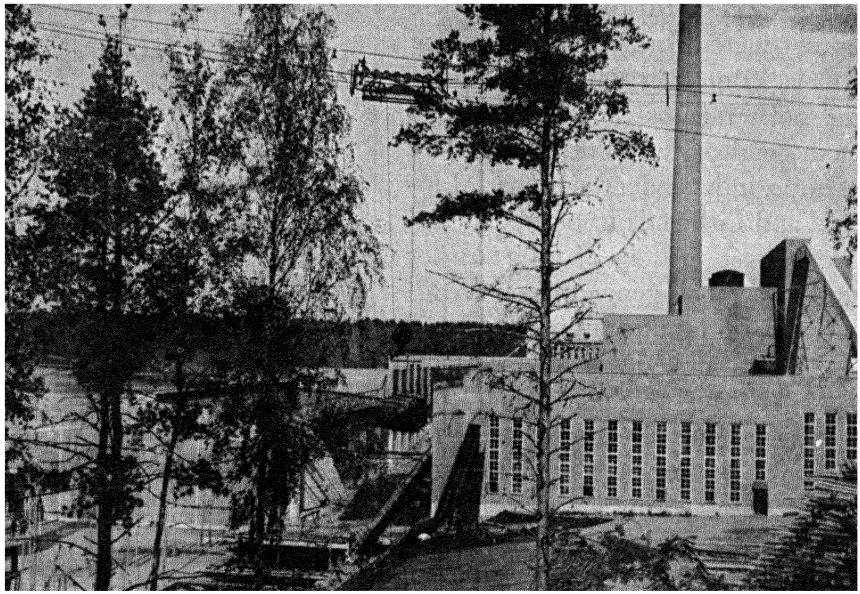


Photo by James Sawders

This largest pulp mill in Finland is said to be the largest mill of this kind in the world. Finland ships wood pulp to the United States. It also is the only European country that has paid regular instalments on the debt to us that it contracted as a result of the World War.

10. What are the leading resources and industries of Finland and the Baltic States?

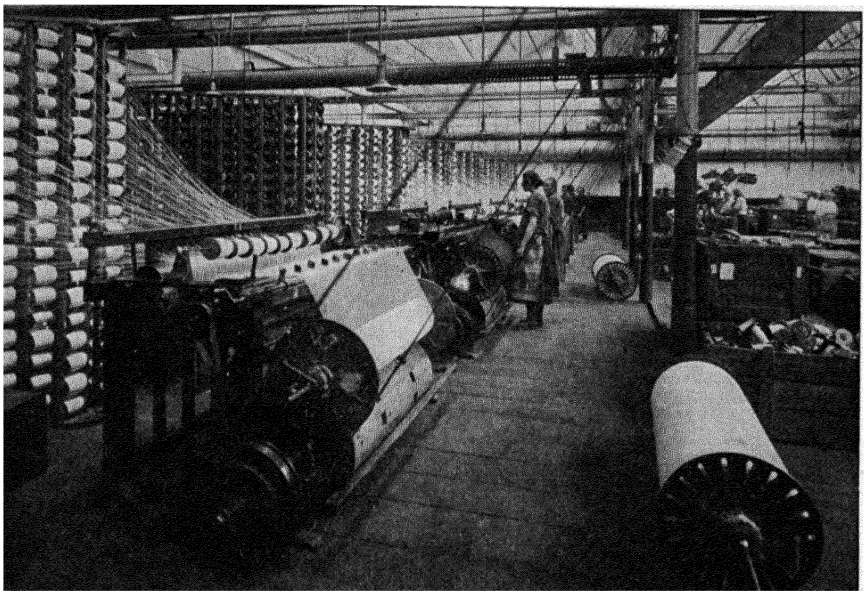
Research for Students

1. Appoint a committee to gather information concerning Russian methods of agriculture and industry.

2. Making use of the statistics in the Appendix and in reference books, make graphs comparing Russia with other leading countries in area, in population, in yield of chief crops, in production of minerals, and in value of its commerce.

3. Make a list of Russian accomplishments and draw a conclusion concerning the progress made in the past twenty years.

4. On a map of Eurasia trace the route of the Trans-Siberian Railroad. Study carefully to learn the value of this road to the country.



Courtesy of Gdynia-America Line

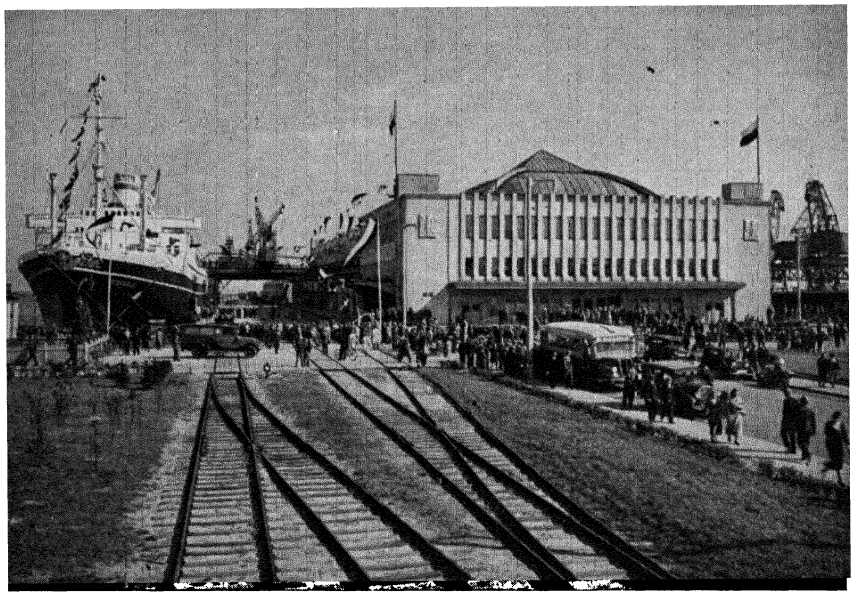
The cotton-yarn winding room in a textile mill at Łódź. Poland gets about twelve percent of its imports from the United States, raw cotton being one of the items.

2. CENTRAL EUROPE AND THE BALKANS–NEW PROBLEMS FOR ALL EUROPE

Poland

A nation destroyed and restored. Poland is called a new nation, but its civilization is very old. Poland was an independent country for many centuries, but it was conquered by Russia, Austria, and Germany, and its territory divided among these powers. Poland's independence was restored at the end of the World War, when its boundaries were so fixed as to unite the Polish people.

A land of many resources. Poland is in the great European lowland and has a climate generally suited for agriculture. Seventy-five percent of its workers are employed on farms and nearly one half of the land is cultivated. The leading crops are grains, potatoes, and sugar beets. In the production of potatoes Poland is exceeded only by Russia and Germany. Cattle, hogs, and poultry are raised in great numbers. Poland produces enough food for its own use and has



Courtesy of Orbis-Polish Travel Bureau

Gdynia, Poland's made-to-order port on the Baltic Sea, has grown from a hamlet of 500 people in 1924 to a city of over 100,000 in 1939. The new railroad station stands beside the dock. Passengers of the *Pilsudski* find trains waiting when the ship reaches port.

some to export. Scientific management is increasing the agricultural yields.

Forests cover nearly one quarter of Poland's area. Lumber and wood pulp are produced in amounts sufficient for home consumption, and forest products are the largest single item of export.

Poland is very rich in minerals. Upper Silesia, which formerly belonged to Germany, is rich in coal, lead, and zinc and has some iron ore. Poland has the third largest petroleum production in Europe, the largest salt deposit in the world, and some potash.

Industrial development. The greatest industrial region is in the southwest, where minerals and fuels make iron and steel manufacturing possible. In the northwest there are sugar mills, gristmills, breweries, and mills for the manufacture of starch, potato flour, and other food products. The textile industry leads all others, with Łódź and Warsaw (Warszawa) as important centers. Most of the raw cotton comes from the United States. Leather, paper, and chemicals are produced from Poland's own raw materials.

Favorable trade location. Poland's location in Europe midway between the industrial West and the agricultural East favors its international-trade relations. However, Poland is a *buffer state* between Russia and Germany and is thus in a dangerous position on account of the absence of natural barriers at the borders.

Transportation facilities. Poland has good railroad connections with the important markets of Europe. The Vistula is a good inland waterway. The Polish Corridor is a narrow strip of land through former German territory which was given to Poland in order to give the new nation an outlet to the Baltic Sea. Danzig at the mouth of the Vistula was made a *free port* so that Poland might send its exports out that way; but Poland has built its own port at Gdynia on the shore of the Polish Corridor some distance from Danzig. This port of Gdynia has become an important trade center. With its great resources, large population, and excellent location Poland has good prospects for future development and increasing strength among European powers. At the present time its foreign trade is smaller than that of other large countries, but coal, farm products, and manufactures of wood, steel, and other metals are exported while small quantities of food, raw materials, and manufactured products are imported.

Czecho-Slovakia

An industrial country. Until the loss of territory and resources to Germany, Poland, and Hungary in 1938, Czecho-Slovakia possessed great industrial resources. Coal and iron were abundant, making iron and steel important industries particularly in the western part of the country. Machinery of all kinds was manufactured. Bohemia, another name for western Czecho-Slovakia, had for many years been famous for a highly specialized and very valuable glass-making industry. Bohemian glassware is of very high quality, owing to its beautiful coloring and exquisite clearness. Cotton, woolen, and linen textiles, leather footwear, chinaware, beet sugar, wood products, and various metal goods were also produced in large quantities. Prague (Praha) and Brünn (Brno) are great industrial cities.

Agriculture. Large areas of fertile soil and good rainfall enable the country to supply most of its own food. The important crops are grains, sugar beets, potatoes, hops, hemp, and flax. Fruits, cattle, poultry, and bees add to the farm income. Forests supply lumber, bark for tanneries, and raw material for pulp, toys, and furniture.

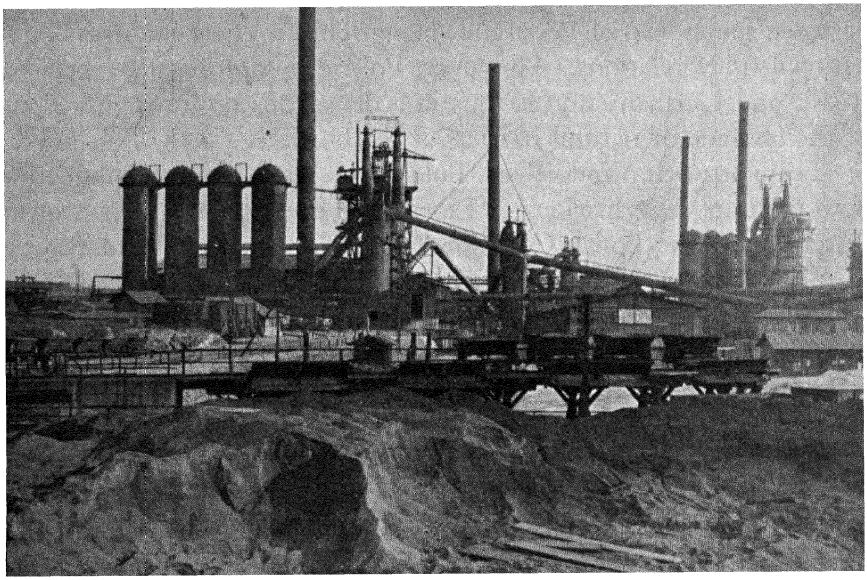


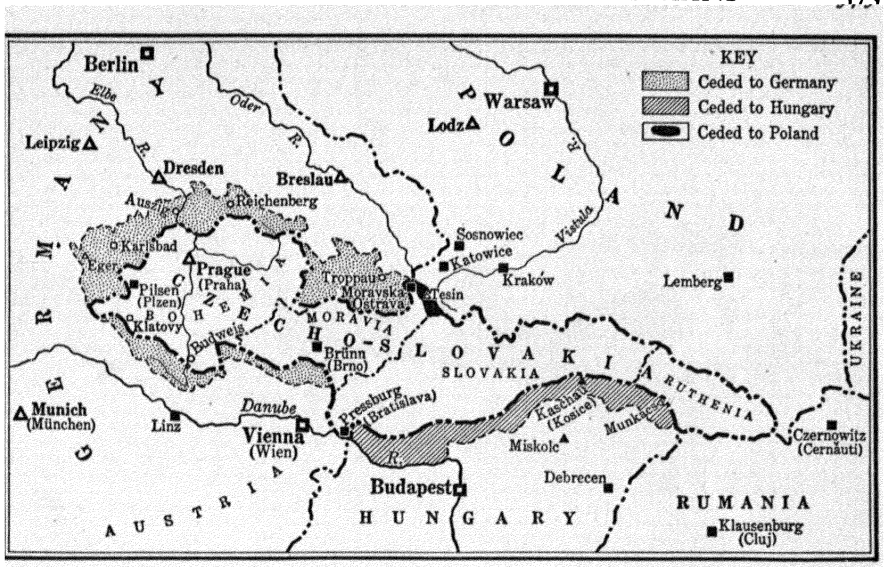
Photo by James Sawders

This steel-mill at Ostrava, Moravia, is the largest plant in the industry in Czecho-Slovakia. Fortunately it has remained in the possession of the state since the dismemberment.

Transportation. Prague (Praha), the capital, is a great railroad center having connections in all directions. Pressburg (Bratislava) is an important shipping point on the Danube River. The principal trade route to western Europe is by way of the Elbe River to Hamburg. By the Danube River and railroads goods reach all the countries of southeastern Europe. Some export trade goes through the port of Trieste, but Hamburg remains the chief gateway for the products of Czecho-Slovakia going to the sea routes.

Foreign trade. As one might expect, the exports of the country have been largely manufactured goods. The country has enjoyed friendly relations with most of the great commercial nations of the world. Exports went chiefly to Germany, the United States, and Great Britain. Almost every country in the world bought some Czech products. Imports were mostly raw materials and machinery; and they came largely from the countries which took the products of Czecho-Slovakia.

A mixed population. Czecho-Slovakia is essentially a Slavic nation, yet its population includes several different races. In the west-



The dismemberment of Czecho-Slovakia was one of the tragedies of 1938. This unfortunate country submitted to it at the insistence of Britain and France in the hope that it would keep peace in Europe. Whether a permanent peace will result, only the future can tell.

ern part of the country live the Czechs; in the eastern highlands live the Slovaks having a background and culture quite different from that of the Czechs. However, both Czechs and Slovaks worked together fairly well to make a real democracy of their nation. The chief difficulty was the presence in the country of large numbers of people of other nationalities, particularly Germans, of whom there were more than 3,000,000 in Bohemia. There were also many Poles and Hungarians, besides Jews and Ruthenians.

Loss of territory and resources. The minority peoples have long felt dissatisfied with Czech rule. The dissatisfaction of the Germans, Poles, and Hungarians steadily increased. Their antagonism toward the Czech government was encouraged by the attitude of the governments of Germany, Poland, and Hungary. Finally, the pressure of these bordering nations upon the government of Czecho-Slovakia became so great that in 1938 Czecho-Slovakia was compelled to cede considerable areas to these three countries. To Germany was allotted a region known as Sudeten Land, bordering Germany and occupied largely by Germans. This territory includes 10,000 square miles, three fourths of Czecho-Slovakia's textile industry, nearly all of its glassworks, and more than half of its smelting plants. A smaller

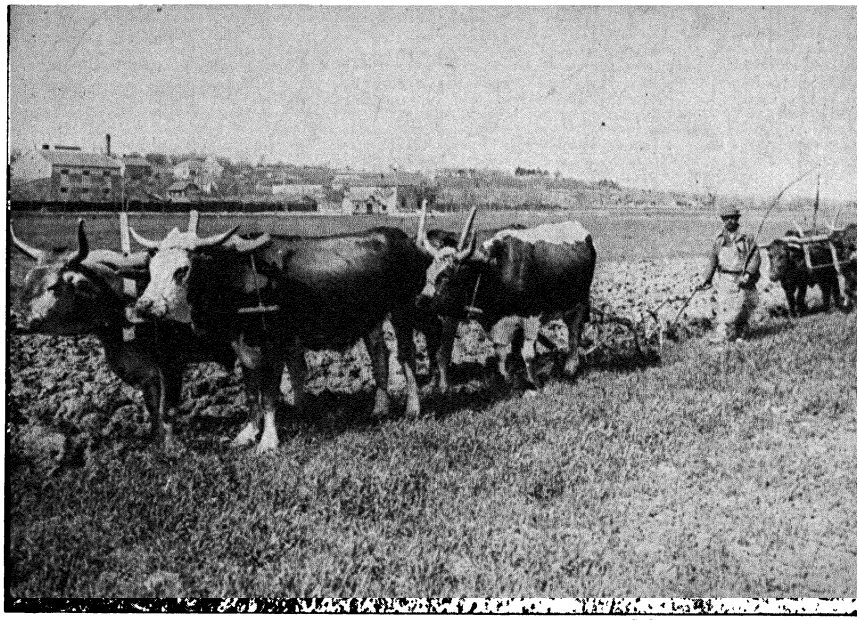


Photo by James Sawders

Hungarian agriculture is still primitive as is shown by the plow and ox teams. This scene is near the Danube River, a few miles south of Budapest.

area, containing many Polish people and known as the Teschen District, was ceded to Poland. With this area went rich deposits of coal and iron, besides important foundries and munition plants. On the southern borders of eastern Czecho-Slovakia other areas were ceded to Hungary to satisfy the demands of the Magyars or Hungarians who formed a majority of the inhabitants of the areas. These areas contain large tracts of forests, iron mines, and industrial plants. It will take years for Czecho-Slovakia to adjust itself to its restricted boundaries, its loss of resources, and to new international relations. What place the country will hold in the industrial and commercial world of the future, only time can tell.

Hungary

A farming country. Hungary was a great power at one time. Its area was formerly larger than it is now, for a large slice of its territory went to Rumania in the World War settlement. Its area has been increased by 4800 square miles by the 1938 cession of territory that was formerly part of Czecho-Slovakia. Hungary is mostly

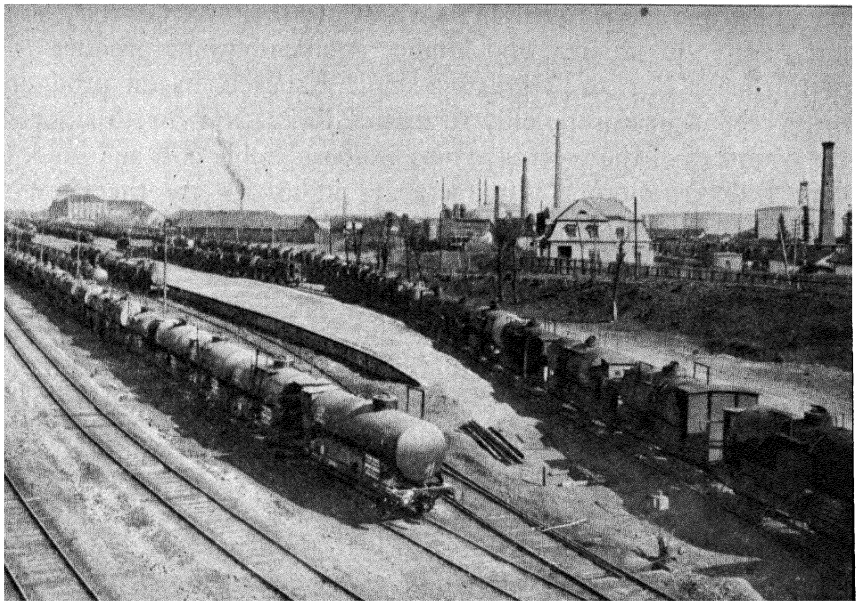


Photo by James Sawaers

Oil for all Europe—a trainload of oil tankers leaving Poesti, Rumania, shipping center for the country's oil production

lowland and very fertile; so more than half of its people are engaged in farming. The best land is in the west, and grains are the principal crop. Wheat leads, with corn largely produced. Tobacco, potatoes, and sugar beets are other important products; but the country needs more scientific methods of farming to increase its yields.

Resources and industries. Hungary has only small resources of metals, coal, water power, and forests and, therefore, has little industry. Some flour mills, distilleries, and machine works are operated, but the foreign trade is small. A valuable mineral found in some quantity is bauxite (p. 239).

The principal imports are raw materials, lumber, and manufactured articles; the chief exports are grains, dairy products, and other food products. Budapest, the capital, on the Danube, has a population of over a million and is a great railroad center.

Rumania

Grain and oil. Rumania is another great agricultural nation. Almost half of its area is farm land and eighty percent of its people work on farms. Rumania produces more corn than any other coun-

try in Europe and is fourth in its wheat yield. Forests occupy almost one quarter of its area, and lumber is an important product. But petroleum is Rumania's greatest single resource, its oil production being second in Europe only to that of Russia and fourth among all the countries of the world. There is considerable coal and gold, but very little iron ore. Manufacturing industries are therefore not greatly developed.

Foreign trade. With little industry Rumania's chief exports are grains, petroleum, lumber, and cattle. It imports machinery and other manufactured goods, with limited quantities of raw materials for its small manufacturing industries. The total amount of its foreign trade is very small.

Rumania's problems. Rumania was given so much new territory at the end of the World War that its area was almost doubled. But the new land was inhabited by people of several different races who have not been entirely satisfied with the Rumanian government. How to secure the loyalty of these *minorities* is a great problem for the government. Another problem is that of education, for schools are backward and a large percentage of the people are illiterate. Improved methods of farming and the development of industry are also needed to make the country prosperous.

Balkan Countries

A land of many races. The Balkan Peninsula is that part of Europe south of the Danube and Drave Rivers. Yugoslavia, Bulgaria, Albania, Greece, and parts of Turkey and Rumania occupy this area. It is a region of great mountains and hostile races. The mountains are rugged but forbidding; so tourists are not attracted to them. These mountains have tended to keep the different races isolated from one another, and so they have remained hostile instead of becoming united. The result has been frequent warfare and very little cultural or commercial development.

Importance of the Balkans. The Balkan Peninsula is crossed by three great trade routes. The first of these extends from İstanbul (Constantinople) on the Bosporus up through Belgrade (Beograd), Vienna (Wien), and Prague (Praha) to Berlin. This is the direct railroad route from Northwest Europe to Asia. The second route is the water route from the Mediterranean and Aegean Seas into the Black Sea and thence into Russia. The third route is down the Danube River into the Black Sea and thence either into Russia or



Courtesy of the Consul General of the Kingdom of Yugoslavia

Yugoslav women garnering wheat in the same simple fashion that may have been used in the fields of Boaz as told about in the Book of Ruth

out into the Mediterranean. The great Berlin to İstanbul railroad lines pass through several Balkan countries, which makes these countries important to the rest of Europe. Outside of this the Balkan States are of little importance. They have little mineral wealth, the forests are not especially valuable, and good farming land is scarce. Production, trade, and culture are all backward.

Yugoslavia

One country with three races. Yugoslavia was formerly called the Kingdom of the Serbs, Croats, and Slovenes since these three groups of people occupied its area. Farming and grazing are the principal occupations, with forestry and mining of some importance. Farm yields are small because of poor methods. Corn, wheat, tobacco, fruits, and hemp are the leading crops and make up the bulk of the exports. The chief minerals are iron ore, bauxite, and copper, all of which are exported. Lumber and wood products, as well as meats and livestock, are also important exports. The imports are mainly textiles, machinery, and other manufactured articles. But the foreign trade is very small. While there are excellent harbors on

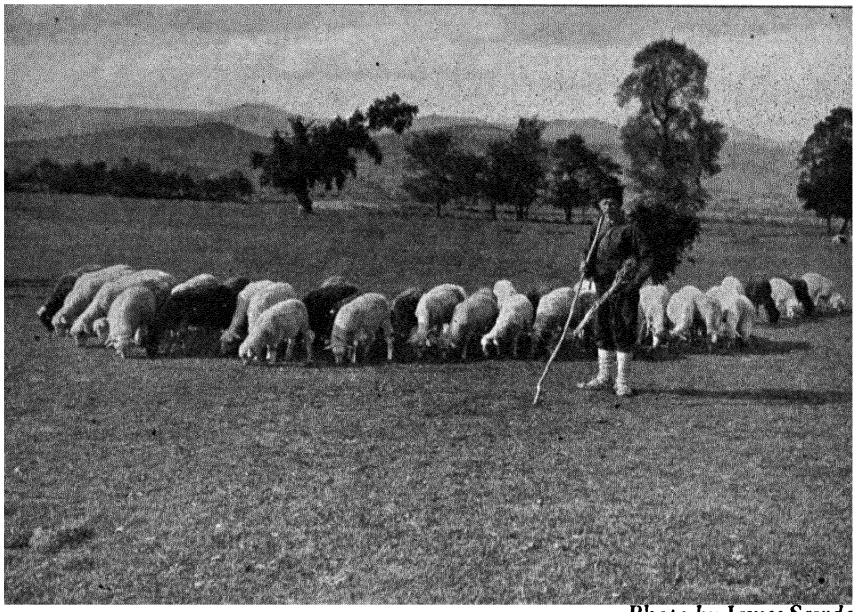


Photo by James Sawder

A Bulgarian shepherd tending his flock of sheep. The Balkan Mountains are seen in the distance.

the Adriatic Sea, they are unimportant except as fishing ports. Can you tell why there is little traffic through these ports? A point of historic interest about this country is that in 1914 an Austrian archduke was murdered at Sarajevo, a small city in Serbia, and the World War resulted from this event.

Bulgaria

Another backward country. Bulgaria lost both territory and resources in the World War. Like its neighbors it lacks minerals, water power, and manufacturing industries. More than eighty percent of its people are farmers, but the typical antiquated Balkan methods make farm yields poor. Crops are about the same as in Yugoslavia; but the most interesting products of Bulgaria are sunflower seeds and attar of roses. Sunflower seeds yield an oil and are also used as stock feed. Attar of roses is used in making perfume. Forests are extensive but not commercially important. Bulgaria's chief outlet to the sea is through the Danube River and its foreign trade is small. The chief imports are manufactures and the leading exports are tobacco, eggs, and cereals.

Albania

Albania, located on the eastern shore of the Adriatic Sea, is about two thirds as large as Switzerland. It was formerly Turkish territory but gained its independence in 1913. It is a very backward country and has practically no industries. There are only twenty-two miles of railroad and a little over one thousand miles of highways in the entire country. The only seaport of any value is Durazzo. The people are very independent and difficult to control. Education is poorly developed and living standards are low. Farming methods are crude and yields are small. Cattle and sheep are fairly abundant, and animal products are the principal exports. Trade is extremely small as the country is very poor. Efforts are being made by the present government to improve the general conditions, and some success is being attained. A defensive alliance has been made between Albania and Italy, which is to the advantage of the smaller country as well as to Italy. The position of Albania at the entrance to the Adriatic Sea accounts for Italy's interest.

Greece

From culture to agriculture. The culture of ancient Greece gave art, science, philosophy, democracy, and literature to the Western world. Many centuries ago Greek colonies dotted the Mediterranean and Greek merchant ships ventured even into the Atlantic, thus bringing Greek culture into Southern and Western Europe. While the great philosophers made Greece the intellectual center of the ancient world, Greek sailors penetrated into every corner of the known world of those days. This extensive commerce made ancient Greece a wealthy nation.

Modern Greece still profits from its merchant fleets, which today reach ports that did not exist in ancient times. But the dominating feature of Greek life today is agriculture. The country has few forests, practically no minerals, and only a little available water power.

Farm production. Almost one fifth of the area of Greece is farm land and about three fifths of the people are engaged in agriculture; but the yields are not large. The surface is very much broken, the soils are poor, rainfall is uncertain, and farming methods are backward. Wheat is the leading grain crop, but the most important products are grapes, currants, olives, and other Mediterranean fruits.

Tobacco is second in importance as a crop, and some cotton is raised. Sheep and goats are more numerous than cattle.

Greek trade. Tobacco and small fruits are the chief exports, while manufactured goods and some cereals and other foodstuffs are imported, for not enough wheat or meat are produced to feed the population. Some iron ore is mined and exported; but mining and industry are poorly developed. With its maritime location and history it is natural that Greece should devote most of its commercial energy to carrying the goods of other countries in its merchant ships.

Guides to Study

1. Why is Poland chiefly an agricultural country?
2. How are its industries related to its agriculture?
3. What are the advantages and the disadvantages of Poland's location?
4. What is the Polish Corridor and what purposes does it serve?
5. What resources of Czecho-Slovakia helped most in the development of that country's industries? What resources have been lost?
6. How will the loss of these resources affect Czecho-Slovakia's industries? Its foreign trade?
7. How is Czecho-Slovakia handicapped in getting its goods to world markets?
8. Why does Rumania not make the best use of its resources?
9. Many European conflicts have had their beginnings in the Balkans. Why?
10. Why do the Balkan States play so small a part in world industries and trade?

Research for Students

1. In Washington, D. C., are statues erected in honor of two Poles, Pulaski and Kosciusko. Why were these men so honored? Refer to an encyclopedia.
2. On an outline map of Europe print the names of all the countries of Central Europe and the Balkan Region. Print the names of large rivers and important cities. What is the value of these rivers for commerce as compared with the rivers of Western Europe? Give reasons for the importance of each of the larger cities.
3. Read newspapers and magazines and learn how racial differences affect the peace and progress of these countries.

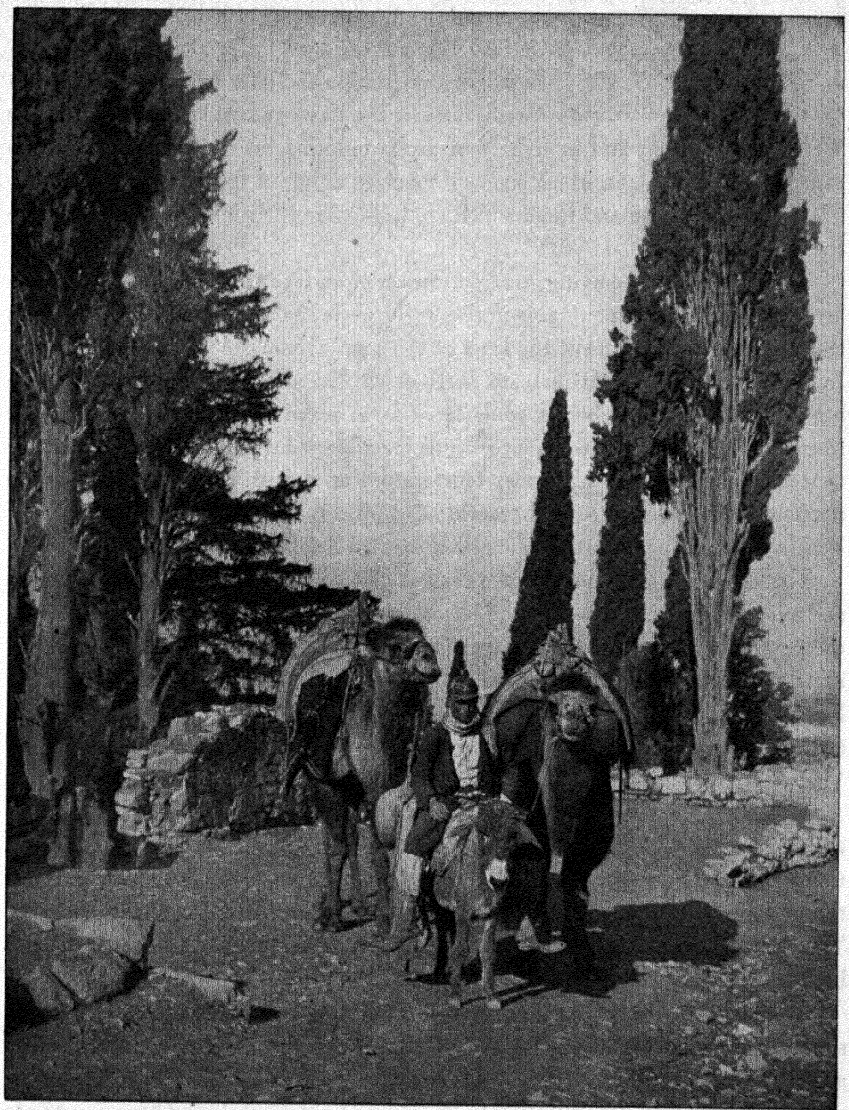


Photo by James Sawders

This country merchant is on his way to Smyrna to replenish his stock. A demure donkey is his steed. The plodding camels will transport his merchandise.

FORECAST OF UNITS FIFTEEN TO SEVENTEEN

WE are interested in Asia for a number of reasons. The Near East was the cradle of civilization and the center from which the great religions have spread to all parts of the world. It is the continent of greatest area and the dwelling place of half the world's population. Its culture and its products moved westward, first to Europe and later to the Americas. In recent decades the Eastern world has been stirred by Western civilization and in some measure is following in its footsteps. This is especially true of Japan which is now recognized as one of the great powers and to a less degree of China and India which are fashioning their industries according to the Western pattern.

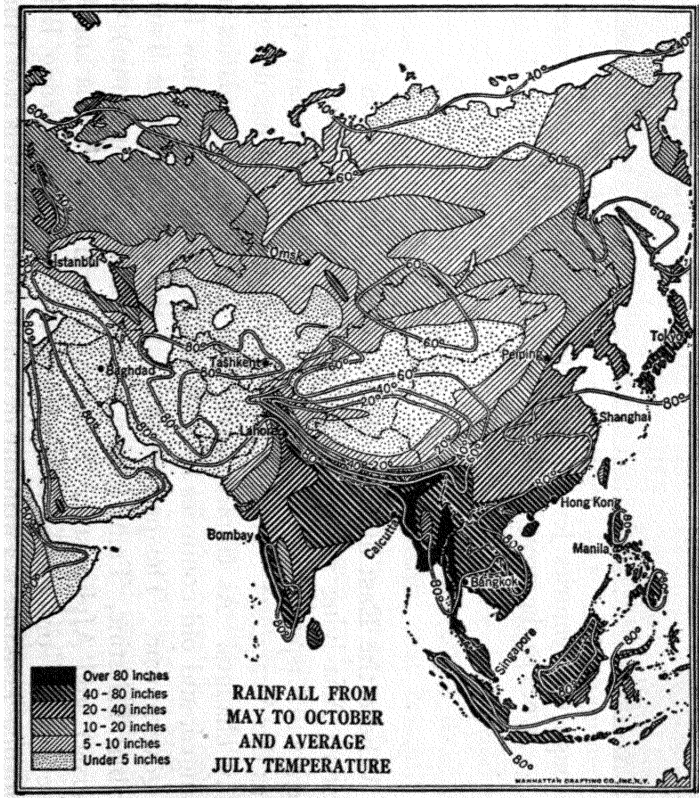
Asia is a continent having great differences of surface and climate. The Himalayas are the highest mountains in the world while the surface of the Dead Sea is thirteen hundred feet below the level of the sea. There are great flood plains in India and China and vast plateaus north of Mt. Everest. Parts of India have the heaviest rainfall in the world while large areas extending from Arabia and the Mediterranean northeastward into China have very little rain. Parts of southwestern Asia often have a summer temperature as high as 125° Fahrenheit in the shade while no other place in the world has winter temperatures so low as those of Verkhoyansk in the Yakutsk Republic of eastern Asiatic Russia.

The highlands are chiefly in the central part of the continent. On the north and west great plains extend to the Arctic Coast and to the European border. From the central highlands three great rivers — the Ob, the Yenisei, and the Lena flow north to the Arctic Ocean. Although these rivers are of little value for commerce, Russian ships now carry cargoes a few weeks in the summer from Arkhangelsk (Archangel) on the White Sea east through Arctic Seas and then south to Vladivostok.

From these same central highlands southward flow the great rivers of India — the Ganges, the Indus, and the Brahmaputra — carrying rich sediment and irrigation water to that densely peopled land. Eastward from the central highlands run the principal rivers of China — the Hwang, or Yellow River, and the Yangtze. These rivers are navigable and in the past they brought sediment eastward and built up the fertile flood plains upon which millions of Chinese people live.

Although half the people of the world live in Asia, large areas are very sparsely settled. Southwest Asia with its arid climate supports relatively few people. The same is true of the plateaus and deserts of central Asia. On the other hand the low moist plains of southeastern Asia in India, China, and French-Indo China constitute some of the most thickly settled regions of the world. The whole world looks to see greater development of the rich resources of northern and southeastern Asia.

The rest of the world is deeply interested in the conflict now going on in China because Japanese success may put an end to that country's "open door."


Istanbul
Omsk
Baghdad
Tashkent
Peiping
Tokio
Shanghai
Lahore
Hong Kong
Bombay
Calcutta
Manila
Bangkok
Singapore
Over 80 inches
40 - 80 inches
20 - 40 inches
10 - 20 inches
5 - 10 inches
Under 5 inches
RAINFALL FROM MAY TO OCTOBER AND AVERAGE JULY TEMPERATURE
MANHATTAN DRAFTING CO., INC., N.Y.

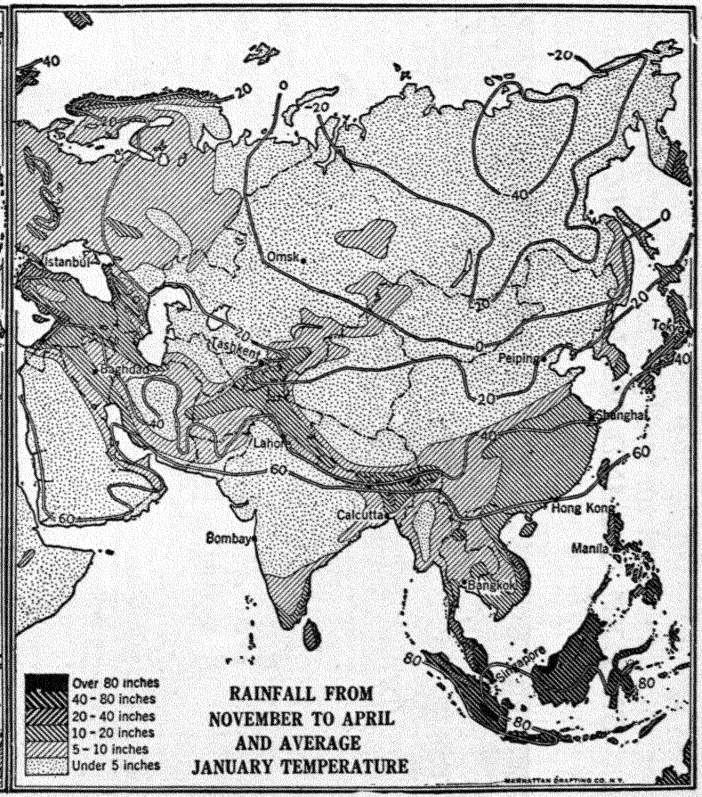

Istanbul
Omsk
Baghdad
Tashkent
Peiping
Tokio
Shanghai
Lahore
Hong Kong
Bombay
Calcutta
Manila
Bangkok
Singapore
Over 80 inches
40 - 80 inches
20 - 40 inches
10 - 20 inches
5 - 10 inches
Under 5 inches
RAINFALL FROM NOVEMBER TO APRIL AND AVERAGE JANUARY TEMPERATURE
MANHATTAN DRAFTING CO., N.Y.



Photo by James Sawders

Through the centuries Jews in Jerusalem have brought their cares and woes to the great Wailing Wall for prayer and comfort.

THE NEAR EAST

Where the East and the West meet. That portion of southwestern Asia lying south of Europe and separated from it by the Black and Caspian Seas and the Caucasus Mountains is usually spoken of as the *Near East.* The political map of the region has undergone many changes. As empires have risen and fallen, boundaries have changed, and old countries have given way to new or to new forms of government. The present map of the area comprises Turkey, Arabia, Palestine, Trans-Jordan, Syria, Iraq (Mesopotamia), Iran (Persia), and Afghanistan. Since the World War Arabia and Iraq have become practically independent but are under strong British influence; Palestine is a mandate of Great Britain as Syria is of France; Turkey, Iran, and Afghanistan are independent.

Because the story of these lands is told in the Bible, they are often referred to as the "Bible Lands." Until the beginning of the present century the life of the entire region was much the same as that in Bible times. Portions now are awakening or are having western methods forced upon them by their protectors. As a result of these changes and attempts at readjustment old racial and religious prejudices are seething and flaming anew and parts of the region are in turmoil.

Ancient glory. The countries comprising this area have cradled the oldest civilizations of the world. It has been said that, "There is a greater thing than the spirit of the age, that is the spirit of the ages." We are impressed by the truth of this saying as we trace the rise of our Western civilizations and find that our present arts and architecture, science and literature, religious and civic ideals all had their beginnings in these faraway lands. The study of the stars by the nomads and the shepherds led to the science of astronomy. The problem of providing food in the desert led to the development of irrigation. To the Arab we are indebted for our system of numbers and possibly for our alphabet. The natives of this region were probably the first to make use of the horse and wheeled vehicles. From Palestine (the Holy Land) came the Jewish and Christian religions. Mecca, in Arabia, toward which millions of faithful Mohammedans turn in their daily devotions was the birthplace of Mohammed, the founder of their faith.

From the ship of the desert to airships. If the life of the universe ever had a hub, it was certainly located here for untold centuries. Caravan routes radiated from this center in all directions. It was this caravan trade, carried in saddlebags, that brought the region much of its early importance. When the water route around the Cape of Good Hope was discovered, much of this trade was diverted to that route. Many years later the opening of the Suez Canal all but ended this picturesque mode of trade and travel. Not many railroad lines have been built. The use of the automobile is now threatening the possible extinction of the camel as a beast of burden here as it has the horse in our own country. Many air routes are established over this old trade lane and the airplane promises to be the magic carpet of the future.

Present decline. Although this region has had a great past, rated by present-day standards, it is now decadent. Living conditions are hard. Much of the country is desert. Farming is carried on mainly

on the flood plains of the river valleys, in oases of the desert, or on a few coastal margins where there is a slight rainfall. Although the climate is hot and dry in the uplands, the nights are cold. Many of the people have been and still are keepers of sheep. Since many of the people are nomadic rather than dwellers in fixed habitations there are few large towns or cities.

Turkey

Unsteady government. Tribal feuds due to racial and religious prejudices have made this region a difficult one for the development of orderly government. Turkey, which once occupied all the Balkan peninsula and a large part of Asia Minor, dominated this region for centuries. Its rule was one long story of political corruption. Turkey, known as the Ottoman Empire up to the time of the World War, was long spoken of as "the sick man of Europe." The greedy nations of western Europe kept close watch of its affairs and stealthily vied with each other in getting financial control of its railroads, mines, and banks. In other words this empire was the pivot around which much of the diplomacy and political intrigue of Europe revolved. The whole area suffered in consequence.

Turkey and the Young Turk. At the present time Turkey is confined almost wholly to the peninsula once known as Asia Minor. A small European area about the size of Maryland at the southeastern end of the Balkan Peninsula remains in Turkish possession. While this region is not important productively, it contains the great city of İstanbul (Constantinople, the former capital), which is the terminus of the railroad from Berlin across central and southeastern Europe. The control of this small area is therefore of great commercial value.

Under the influence of the Young Turk, Turkey is undergoing a political and social awakening. A new capital has been located at Ankara (Angora) at a cost of $100,000,000. Western methods are being adopted and a republican form of government has been established. Slavery and polygamy have been abolished, women have been enfranchised, and education and the adoption of family names have been made compulsory.

Agriculture. Farming and grazing are the chief industries. Antiquated wooden plows are slowly giving way to modern machinery. Tobacco is the chief crop. Turkish cigars and cigarettes have long been an important article of commerce in world trade. Raisins, Smyrna figs, nuts, and fruits are exported in large quantities. Cotton



Photo by James Sawders

İstanbul and the harbor from the top of the Galata Tower, looking across the Bosporus to the Asiatic side of Turkey. Ships from distant lands ride at anchor.

and cereals are grown extensively. Some cotton is exported to Mediterranean countries. The raising of livestock is an important branch of this industry. Horses, mules, and camels are raised and used as beasts of burden. Large flocks of sheep and goats are kept for their wool and mohair. These fibers are woven into the famous Turkish rugs and carpets, and camel's hair is also used for blankets and coats. Much of the rug weaving is done on hand looms in the home following patterns that have been used for centuries. Rugs are brought in from all parts of southwestern Asia to İstanbul, the center of the Oriental rug trade. So very desirable are these rugs and so great is the demand that American manufacturers are now copying the designs and making so-called American Orientals on power looms.

Minerals. Turkey has extensive mineral resources. Although some of the mines were worked for thousands of years before the Christian era, they are still largely undeveloped. Chrome ore, zinc, antimony, manganese, and copper are the chief ores. Meerschaum, a soft mineral used in the manufacture of the well-known pipe of that name, is mined here.

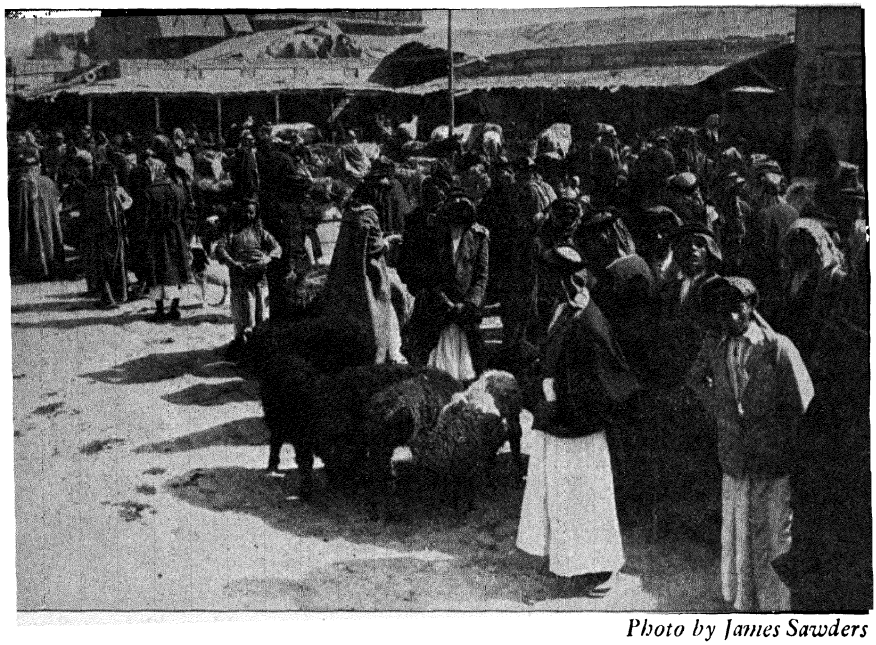


Photo by James Sawders

A holiday scene in Basra, Iraq. The occasion is the holding of a bazaar and cattle market.

Palestine

A strife-torn land. This region has again become a homeland for the Jews, a refuge for many of those persecuted in central and eastern Europe. There, with aid sent by the more fortunate members of their race in other lands, they are cultivating the soil, scientifically developing manufactures, and making use of the water power of the Jordan and of the oil brought by pipe line from Iraq. The city of Tel-Aviv is the leading Jewish center of industry and trade. The Arabs object strongly to Jewish immigration because they feel that the country and its resources belong to them and that the immigrants are usurping their rights. This presents a serious problem to Britain whose business it is to see that order is maintained.

Iraq

Iraq is the Arab name for Mesopotamia, the country that lies in the extraordinarily fertile valleys of the Tigris and Euphrates Rivers. Engineers estimate that the combined waters of the two rivers could irrigate 7,000,000 acres of land in the winter and 3,000,000 acres in

the summer. Irrigation projects were developed here in very early times. Later the region was overrun by Mongols and Turks who destroyed the irrigation systems and turned the region into pasture land for their flocks and herds. Under British influence and with British capital these irrigation systems are now being gradually rebuilt and the region may once again repeat its great fertility.

There is a great range of temperature here, varying from 120° in the summer to frosts in the winter. The greater part of the region is low and very unhealthful. The chief crops are wheat, barley, rice, and millet. Some tobacco is grown. On the tidal stretches of the rivers there are extensive groves of the date palm. In the north where it is cooler, sheep are raised and wool and skins are exported.

Iraq produces oil near Mosul. Nearly all the oil fields are controlled by the British, but other European nations and the United States have interests there. Pipe lines carry the oil west to Palestine and the Mediterranean Coast. For better communication the British have built automobile roads and extended the railroad lines.

The former German Kaiser's dream of a railroad from Berlin to Baghdad never materialized and, now that airplane service is becoming so dependable, its completion may never be attempted. Because this is so strategic a corridor to its possessions in India, Britain frowns on the attempts of any other nation to establish trade routes of any sort here.

Iran (Persia)

The mention of this name suggests Oriental rugs, rich embroideries, beautiful inlays, and a wide range of beautiful objects, but the country's outstanding possession is oil—one of the richest single oil deposits known. Great Britain owns a controlling interest in this field. American companies, however, have recently been granted concessions in eastern Iran. Some of the chief exports of Iran are petroleum, cotton, handmade Oriental rugs, wool, and hides.

Afghanistan

"It is absolutely forbidden to cross this border into Afghan Territory" is the world's most famous "keep-out sign." It is posted in Khyber Pass, a deep mountain gap on the boundary between India and Afghanistan. The country is occupied by warlike tribes who plunder and rob wayfarers. Britain permits this hostile attitude since it serves as a deterrent to rival nations who might otherwise be

tempted to gain a foothold there. Afghanistan is an agricultural country. Transportation is by camel or pony. Mohammedan laws and customs prevail.

Guides to Study

1. Why should we be interested in the Near East?
2. Why is the region less important than in ancient times?
3. Why have European nations for many years been interested in acquiring influence in this region?
4. As Turkey progresses, which of its resources are likely to prove most valuable? Why?
5. Iraq was for thousands of years the center of the world's wealth and culture. Why does it no longer hold that position?
6. Why is England's interest in Iraq greater than that of any other country?
7. What great contributions to civilization have been made by the Near East?
8. Why are these countries of little commercial importance today?

Research for Students

1. Refer to ancient histories or encyclopedias and learn something of the wealth, culture, and strength of ancient Assyria, Babylonia, Phoenicia, and Persia.
2. The Near East has made great contributions to world progress, yet its resources and general welfare today are subject to the influence of foreign powers. Explain.

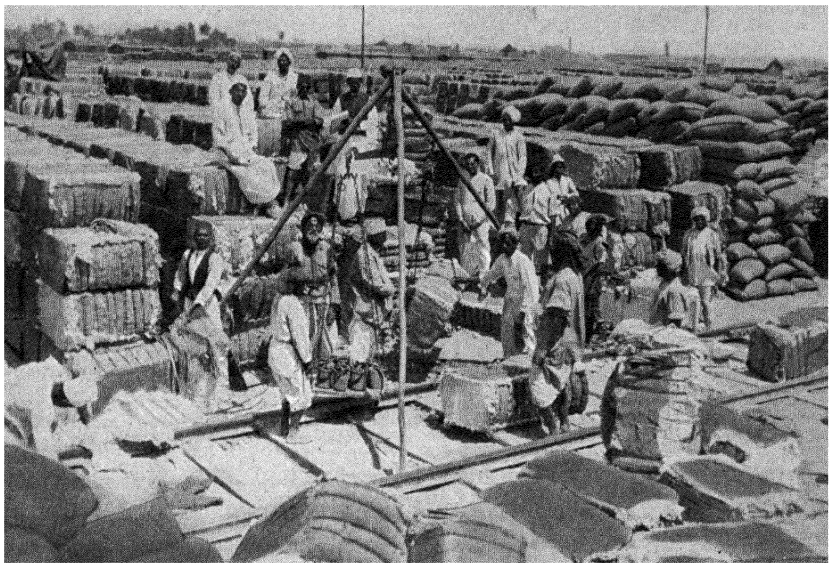


Photo by James Sawaers

Potential yards of cloth and gallons of oil on the wharf of the Indus River at Karachi, Sind, India–bales of cotton and sacks of cottonseed awaiting shipment

GREAT BRITAIN'S RICHEST COLONY

A land of contrasts. India is one of the most interesting countries in the whole world. It is a land of contrasts and contradictions. There we find snow-capped mountains towering higher than any others in the world, coastal plains so hot and moist that they rival the jungles of the Amazon; deserts as hot and dry as the Sahara; and other regions receiving the heaviest rainfall in the world. Other contrasts are shown in the lives of the people. Poverty is so great that millions of people are always on the border line of starvation. On the other hand wealth has been amassed and hoarded till its value is estimated to be more than $5,000,000,000.

For centuries Europe had its dream of India's splendor. An end-

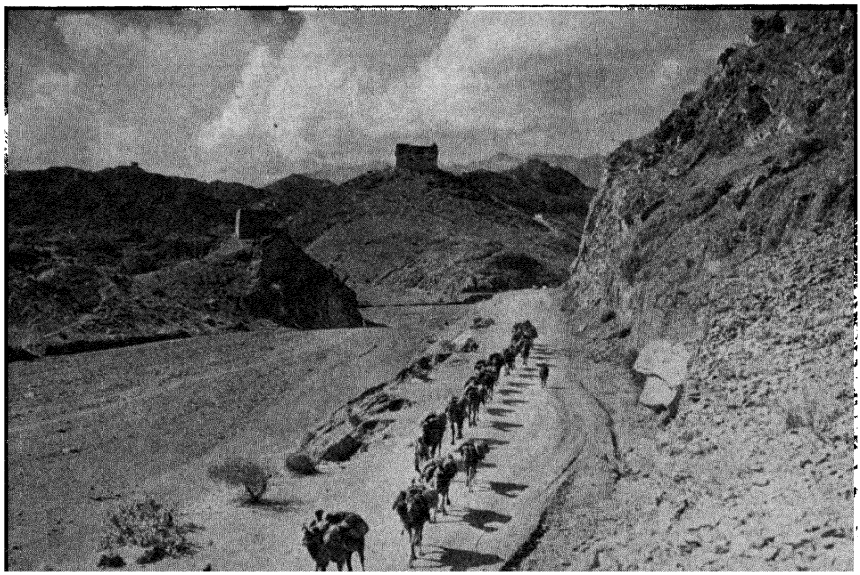


Photo by James Sawders

From time immemorial camel trains have marched with slow and stately tread through the Khyber Pass in the grim mountains that guard the northwest frontier of India.

less line of caravans bringing jewels, gold, silver, ointments, spices, fine textiles, and other articles of great value kept this dream alive. As we all know, it was the search for a short route to this vast treasure that led Columbus to make his famous voyage.

The "wealth of the Indies" still goes out to the larger world of today but we hear little of jewels, gold, silver, and ointments. Instead, huge ships bear loads of rice, wheat, rubber, tea, cotton, and jute to many distant lands. These goods are the necessities of life purchased and consumed by the common people, not by royalty alone.

This change in India's exports does not mean that India's products have greatly changed. Rather, modern means of transportation is so efficient and cheap that even the bulky necessities from India are brought within the reach of all. The India of today possesses wealth of which Columbus never dreamed.

Britain gains India. After the route around the southern tip of Africa was discovered, the nations of Western Europe including the British, Dutch, Spanish, Portuguese, and French all struggled with

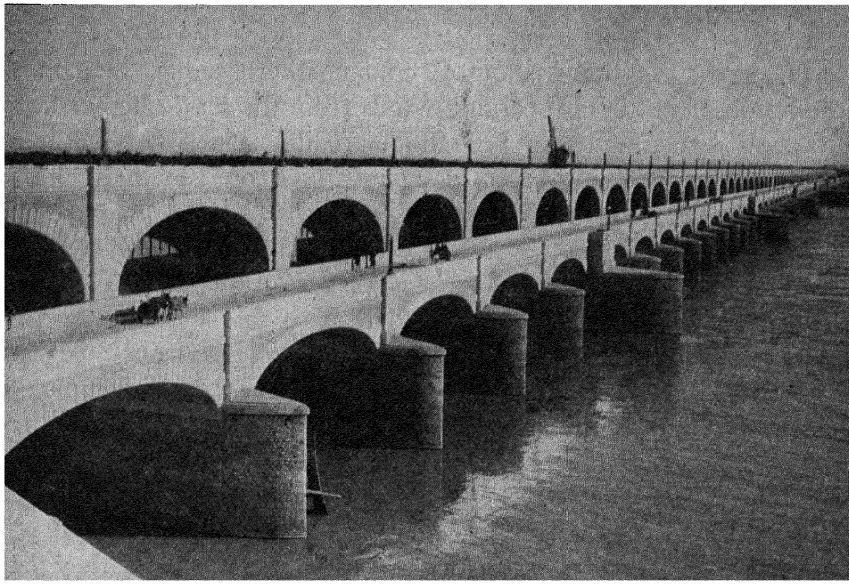


Photo by James Sawders

The lower side of the Sukkur Barrage with its sixty-four flood gates. This irrigation project—one of the world's largest—converts 13,000,000 acres of Sind desert into productive land with the waters of the Indus River.

one another for control of the lands of the East. Finally Britain succeeded in gaining India with its great resources and its great responsibilities which Kipling called the "white man's burden." By closely studying the map of India one readily finds along the coasts small areas still controlled by the French and the Portuguese. These are but remnants of the greater claims to the country of former years.

In winning possession of India, British brought under its control a land area more than ten times that of the mother country. India has proved to be one of Britain's best markets, and a source of much food and raw materials. To it have gone many Englishmen to establish industries and to engage in trade.

India—the land. *The Himalayas.* The country as we have noted presents a great variety of surface features. On the northern border are the Himalayas having the world's highest peaks, the summits of which have never been reached by mountain climbers. Here are the sources of India's great rivers, the Ganges, the Indus, and the Brahmaputra, which have built up the great plain to the south of the moun-

tains and supply irrigation water for the intensive agriculture of the valleys.

The great mountains shut off cold northern winds, help in the production of rainfall by forcing winds from the sea to higher levels, thus cooling them and bringing about precipitation. The mountains serve as a barrier, a protection against invasion, since the lowest passes are from 17,000 to 19,000 feet high.

The great river plains. South of the Himalayas lie great plains including valleys of the three great rivers already named. Geologists tell us that the triangular Deccan Plateau to the south of the plain was once an immense island and was joined to the mainland by the deposition of silt washed down by the great rivers, thus forming the plain.

More than half the people of India live on these plains, gaining their living from the stretches of fertile soil watered by the rivers. When the supply of irrigation is checked, the people are faced with starvation. Is it any wonder that through the centuries they have come to realize that their very lives depend upon the Ganges. It is regarded as India's sacred river and each year thousands of devout pilgrims journey to its banks to worship and bathe in its sacred waters.

The Deccan Plateau. This was the old island bordered on the east and on the west by mountain ridges known as the Eastern Ghats and the Western Ghats. Great lava flows in past ages overspread a large part of the plateau. The decayed lava proved to be excellent soil for cotton. Lying between the mountains and the sea both east and west are coastal plains on which rice, millet, and other crops are raised.

The climate of India. The winds which blow over India and the rest of southeastern Asia have been called by a noted geographer, "the pulse of Asia." This pulse quite unlike our own makes only one full beat a year. In the summer strong southwest and southeast winds blow from sea to land bringing rain for the summer crops. In the winter dry winds blow in opposite directions from northern lands. These winds blowing over the country one half of the year in one direction and the other half of the year in an opposite direction are known as *monsoons.*

Even in the summer parts of the country do not have sufficient rain for the crops. A great deal of irrigation is necessary in nearly all parts of India, especially on the river plains and coastal plains where rice is grown. At certain points along the Ganges all the

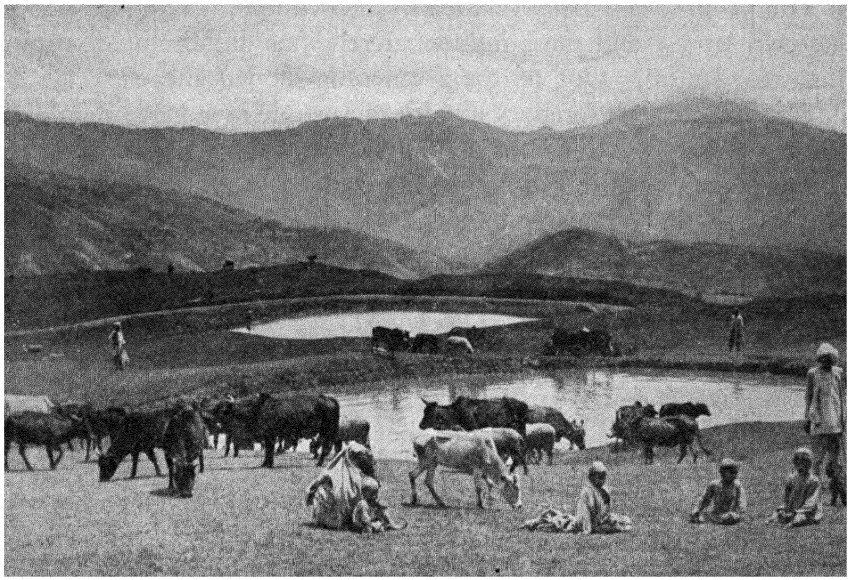


Photo by James Sawders

India's humped cattle graze on the succulent grass and drink from the tanks just a few miles from Simla, the summer capital.

water of the river is diverted from its bed for irrigation purposes. Water is also obtained by damming the rivers and thus retaining ponds of water for dry periods. These ponds are known as *tanks*. Water for irrigation is also obtained from wells. In the northwest there are large desert areas.

The country has a considerable range of temperatures because of its extent of latitude and because of differences in elevation. In the northwest where the rainfall is less and the climate cool, wheat is a winter crop. In the extreme southwest nearer the equator coffee is grown. Rubber plantations cover considerable areas in southern India.

The people of India. Notwithstanding the great mountain barrier India has been invaded by various peoples through the mountain passes of the northwest. The country was an early home of the white race and even today the greater part of its teeming millions are of that branch of the human family though their complexions are so very dark that they might easily be mistaken for colored people. There are altogether forty races speaking two hundred different languages or dialects.

The people are sharply divided by their different religious beliefs. The two largest and most influential religions are Brahmanism and Mohammedanism. Out of the former developed the caste system which with racial differences divides the people into more than 2000 different classes. A member of one caste cannot associate with the members of another and of course there can be no intermarriages. A person born in one caste cannot rise to the occupations or social standing of another caste. The 40,000,000 low-caste group are known as "untouchables." Their very shadow is a contamination to the high-caste Brahman.

Divisions such as these whether due to race, religion, or social position greatly retard a country's progress. There can be little coöperation or united effort for the good of all. Much progress has taken place as the result of British control. Orderly governments have been established, railroad systems extended over the country, and irrigation works greatly improved. These improvements have helped greatly to reduce the number and severity of famines which in years of light rainfall cost the lives of thousands of people.

India—a land of farmers. Almost seventy percent of the people till the soil. Nearly all the food of the estimated 370,000,000 people as well as the leading exports are the products of the soil. The land is cultivated by hand or with crude implements drawn by the humped-back cattle characteristic of India. The farms are very small and yield the owners a bare living. Much of the soil is poor owing to centuries of unscientific cultivation and the water supply is often insufficient.

The long growing season makes possible both summer and winter crops. The rainfall of summer monsoons must be conserved in tanks for dry seasons. Sometimes the summer rains come late and crops suffer even in summer unless irrigation water can be had from some source. Lack of rainfall is particularly serious in a hot country where plants grow quickly and evaporation is rapid.

Crops grown on Indian farms. *Rice.* No other grain grows so well or yields such large returns in this warm, moist climate as rice. The level plains of the coast and the flood plains and deltas of the rivers are admirably suited to rice farming. These favorable conditions give a surplus for export to other lands. India and Burma together export more rice than any other country.

Wheat. This is a winter crop in the cooler and drier climate of northwestern India. In recent years the only two countries raising



Photo by James Sawders

Primitive methods still prevail throughout most of the farming areas of India. Nevertheless enormous crops of wheat, rice, cotton, and other products are raised.

more wheat than India are Soviet Russia and the United States. The wheat of India found markets in Great Britain and other European countries soon after the opening of the Suez Canal in 1869. Karachi is the leading port of the wheat-growing region. Rye and millet, a grain-yielding grass, are also grown over large areas.

Sugar. In recent years India has led the world in the production of cane sugar. The sugar is prepared locally and is of low grade. All the sugar produced in the country is consumed at home. Even that is not enough to supply the demand and some is imported from Java.

Cotton. India is second only to the United States in cotton production. Although the acreage is usually more than three fourths as much as ours, the yield is less than half that of the United States. In our country more scientific methods of cultivation are used, and our cotton growers use large quantities of commercial fertilizers. The Indian cotton grower is too poor even if he so desired to supply himself with modern equipment and fertilizers. Much of India's cotton goes to foreign markets, especially to Japan.



Photo by James Sawders

The tobacco market in Sukkur, Sind, showing the natives screening tobacco and snuff. The women have the lower part of their faces covered.

Other crops. Jute, one of our most useful fibers, is raised in large quantities on the deltas of the Ganges and Brahmaputra Rivers. This fiber and its manufactures are one of India's most valuable exports. India leads all other countries in the production and exportation of tea. India is also one of the world's greatest tobacco producers. In some years India leads in production; at other times the United States. India consumes nearly all its crop at home while about a third of the United States crop is exported.

Because cattle are considered sacred, their meat is not eaten by the Brahmans. Peas and beans are extensively raised and take the place of meat. Since cattle are kept chiefly as work animals, vegetable oils are largely used in the place of butter. Oilseeds used are the peanut, cottonseed, flaxseed, and mustard seed. India is the home of the jungle fowl from which our domestic poultry is descended. The *Brama,* a well-known breed of poultry, gets its name from a Hindu god.

Forests. Trees producing timber grow chiefly on the mountain slopes. As in other tropical lands, the forests yield mainly hard-

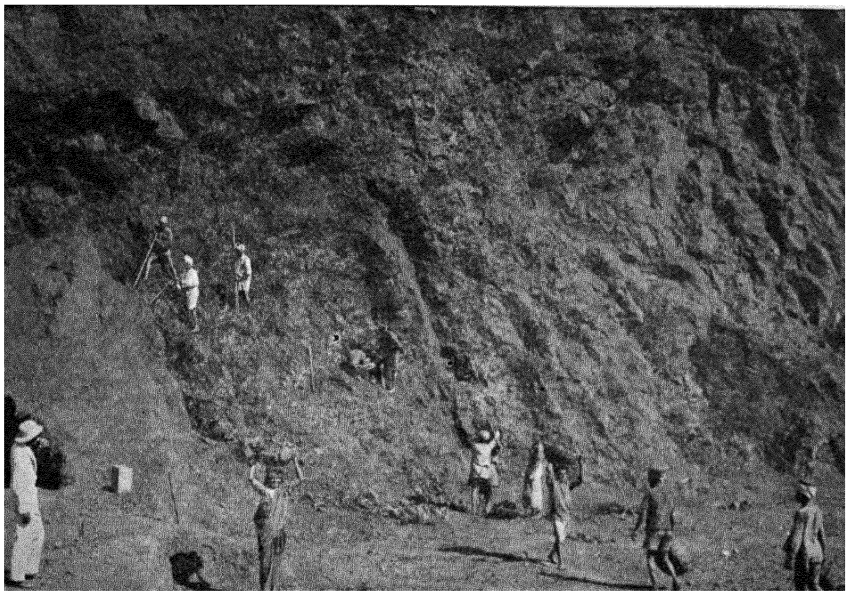


Photo by James Sawders

IRON ORE being dug from a mountain in Mysore State, India. The natives insist on transporting the ore in baskets carried on their heads.

woods. The most valuable wood is teak, which grows on the slopes of the Eastern and Western Ghats. It is customary to kill the trees by girdling and allow them to season for two years before being felled. The wood is used chiefly in shipbuilding and in making furniture. Another important forest product of both India and Ceylon is rubber. Trees which are of little commercial value but are of use locally and add to the interest of the landscape are the bamboo, coconut, mango, and the banyan tree.

Mineral resources. India's chief mineral is coal which is found in several localities and is sufficient for the country's needs. The annual production is about one twentieth that of the United States. Iron is mined in considerable quantities and pig iron is exported. Iron and steel products, however, are one of the country's leading imports. Manganese which is used in the manufacture of steel should be noted since India is one of the three regions leading in its production. The other two are Russia and the Gold Coast of Africa. India holds second place in this group being excelled only by Russia.

Manufacturing in India. For many centuries the people of India have done manufacturing by hand in their homes. Some of

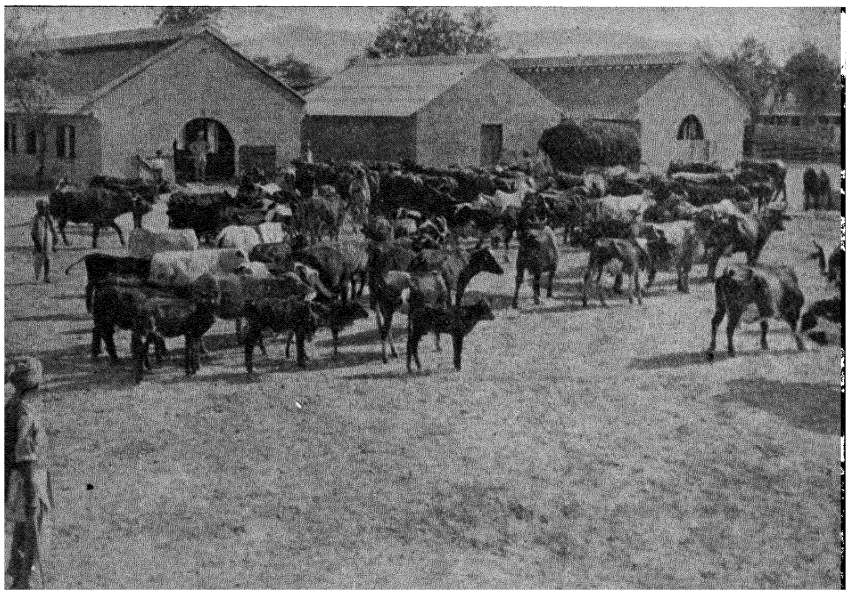


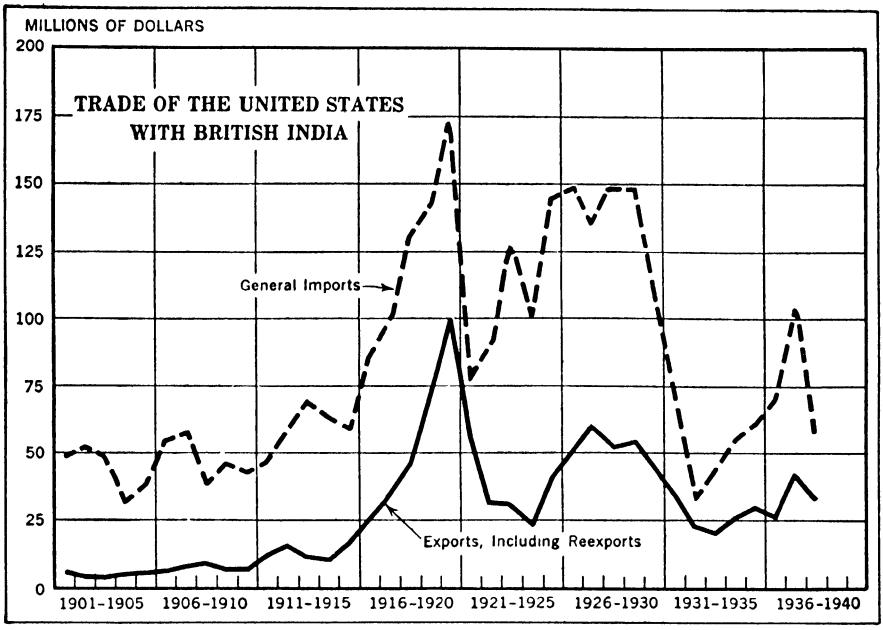
Photo by James Sawders

Cattle are raised in India only as work animals and for the dairy products, since the inhabitants do not eat meat. The British government, by importing English breeds, is attempting to improve the quality of the native cattle. This view shows a modern dairy farm established by the government.

their homemade textiles were very delicate and very beautiful. Even before the time of Columbus Indian handwork found a ready market in the countries of Europe.

In recent years the introduction of modern factories has made rapid progress. Many cotton and jute mills have been established by British and American capitalists. India offers great inducements to the textile industry. Its millions of people provide a ready market for cheap cotton goods; an abundance of raw cotton is raised in the country; and the supply of cheap labor is almost unlimited. Unfortunately for Britain, as the textile output of India increases, the Indian market for English cotton goods is lost. Nevertheless Indian cotton mills help British textile manufacturers who have invested in the mills of India to compete with the cheap cotton goods of Japan.

The Japanese, however, have invaded the markets of India with their low-priced cotton goods and have given English manufacturers no little concern. When Britain threatens to exclude Japanese



goods from India, Japan retaliates by refusing to buy Indian cotton. An agreement has been reached whereby a limited quantity of Japanese cotton goods may be sold in India provided the Japanese purchase a certain quantity of Indian cotton. There are in India nearly three hundred cotton mills and nearly one hundred jute mills. The iron and steel industry is assuming importance and will no doubt continue to grow.

The railways of India. India's manufactures are helped greatly by the country's railway system. India is surpassed only by the United States and Russia in its railway mileage. Besides aiding all the country's occupations the roads have done much to prevent famines by carrying food from regions of plenty to those of scarcity. The want of such means of transportation was one of the causes of the famines which formerly often caused great suffering and loss of life. The great seaports, Calcutta, Bombay, and Madras, have become important railway centers and in this way foreign commerce has been stimulated by the railways.

The country's foreign trade. India sells to other lands mainly foods and raw materials, such as rice, wheat, tea, jute, raw cotton, and rubber. The most valuable exports are jute and jute manufactures. Next on the export list is raw cotton which is sent largely

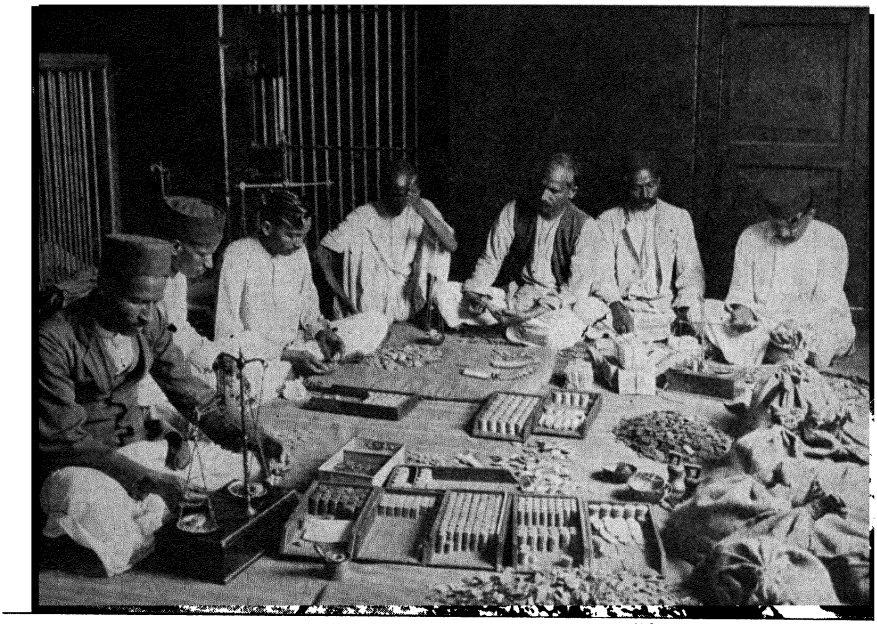


Photo by James Sawders

The counting house in a Bombay bank. There are 50,000 rupees on the floor in front of the counters, almost $20,000 in our money.

to Japan and Great Britain. Other exports in order of value are tea and oilseeds. The country's leading imports are cotton textiles and machinery.

More than a third of the foreign trade is with Great Britain and practically half is carried on within the British Empire. Next in importance is the trade with Japan which, as we have seen, sells India cotton goods and in turn buys raw cotton.

Exceeded only by trade with Great Britain and Japan is India's trade with the United States. Our chief imports from India are jute, burlaps, and jute bags needed for cotton bales, wool sacks, and many other uses. Other products of India coming to us are goatskins, nuts and fruits (including cashew nuts), tea, and rubber. We sell to India machinery for factories and mines. We also send office machinery, especially typewriters.

A bottomless pit for silver. For centuries India's exports have exceeded its imports in value. To pay for the excess of exports, the rest of the world has shipped to India vast quantities of silver and less gold. These precious metals were hidden and used as ornaments to adorn the bodies of the people. For want of banks such methods



Associated Screen News Ltd.

Emerald water washes the glistening sands, and native fishermen pull their square-sailed dugout craft upon the beach at Mt. Lavina on the island of Ceylon.

seemed to be necessary to make private property safe. The British endeavored in various ways to withdraw the hoarded silver of India from its hiding places and restore it to world circulation but with little success.

The seaports of India. *Calcutta* on the eastern coast of India is the chief commercial city and one of the busiest seaports in the world. Situated on the Hooghly River, one of the outlets of the Ganges, it has access to the densely peopled plains of northern India. It is also in the heart of the great jute-producing region. Jute, tea, hides, and skins are important exports from this port.

Bombay, "the gateway of India," lies opposite a pass in the Western Ghats which leads to India's great cotton fields. It has a magnificent harbor with extensive docks and is the terminus of many European steamship lines. It is a great railroad terminal too, boasting one of the world's finest railway stations. The location of the Suez Canal has been an important factor in Bombay's growth. Like Calcutta this is a predominantly Hindu city. It leads all other Indian ports in exporting raw cotton and has a large textile industry.

Madras is the chief port of the southeast. The coast is low and the harbor is man-made. Leather, skins, and cotton goods are the chief exports. *Karachi* has already been referred to as a wheat port. It is also a rival of Bombay in the export of cotton. *Rangoon,* the port of Burma, is noted as a rice-exporting center.

Ceylon

This large island off the southern coast of India is a separate colony of Great Britain. It is low and moist. There is practically one season, and that a hot summer. Many tropical products are grown for export. Tea, plantation rubber, and coconut oil are the most important. The island is noted for its beautiful vegetation and for the great variety of animal life found there. It is also famed for its sapphires, rubies, and other precious stones. Both Ceylon and India are seats of an ancient culture and civilization which have had a marked influence on all later civilizations.

Guides to Study

1. What may be meant by the "wealth of the Indies"?
2. In what way is India a "white man's burden" for Great Britain?
3. Compare the influence of the Himalayas on India with that of the Alps on Italy.
4. Why are the river plains the most densely settled part of India?
5. Describe the monsoons and state their effect on life in India.
6. Why is it difficult for the people to coöperate for the development of the country's resources?
7. What crops of India are of special value to Great Britain? Why?

Research for Students

1. Find and read selections from the stories and poems of Kipling which refer to the life and work of the people of India.
2. Draw or trace a map of India showing the location of its mountains, rivers, and cities. Indicate also the directions of the winds in summer and in winter. Why do only the summer winds bring rain?
3. India has more cattle than any other country; yet it exports no beef and uses little at home. Explain.
4. India produces more sugar than any other country; yet it imports sugar. Explain.
5. On a map of the world trace the route from England to India. What means has Britain for safeguarding this route? List strategic points along the route. Why might this route be called Britain's life line?

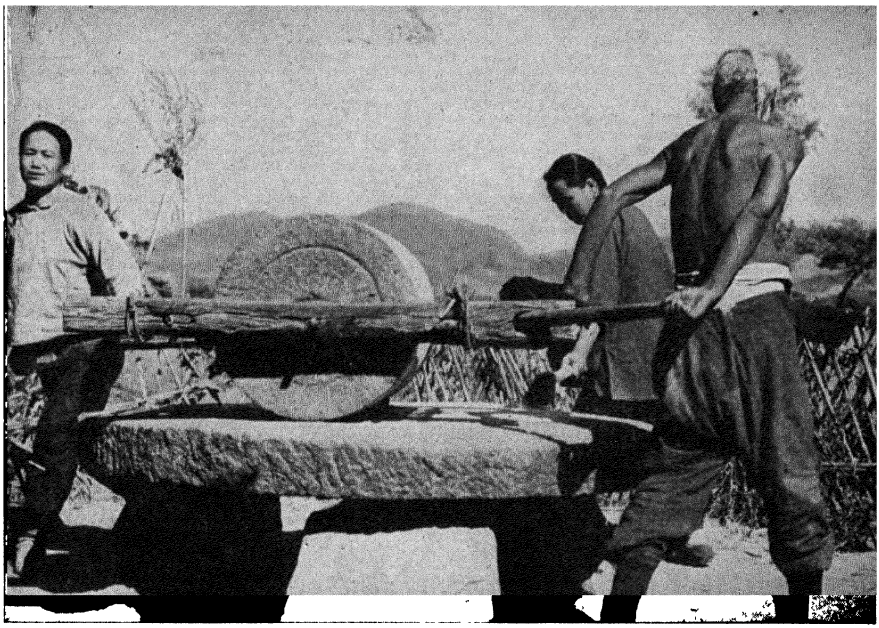


Photo by Julien Bryan

These great stones turned so patiently by the Chinese farmers are crushing the tiny millet seeds whose flour is the common food of the peasant class. Man power is cheap in China—cheaper even than that of beasts.

1. CHINA—A LAND OF MAN POWER

Old China. Chinese civilization is so ancient that we cannot be certain when it actually began. We do know that there was civilization in China before there were any established nations in Europe. In very ancient times the Chinese had learned how to grow tea, to produce silk, to make paper, gunpowder, and porcelain; had discovered the arts of printing and engraving; and had invented the mariner's compass. They had a distinctive art, literature, and music and knew something of astronomy, mathematics, and other sciences. Being shut in from the rest of the world by oceans, mountains, and deserts, the Chinese were entirely original and isolated from the

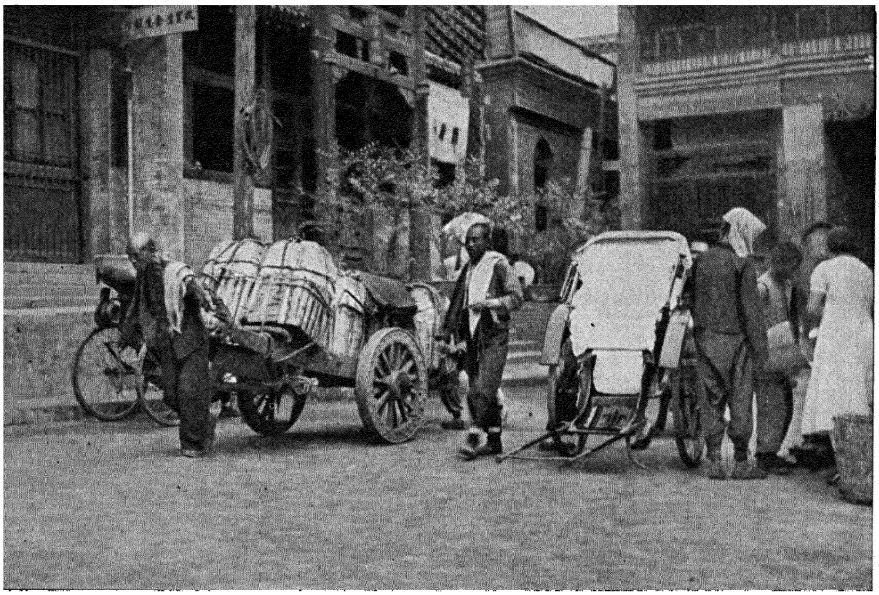


Photo by James Sawders

Transportation for passenger or cargo in the streets of Peiping near the Chien Men Gate. Each vehicle operates under one-man power.

changes that took place when more modern civilizations arose. Even their religion was very ancient and very unchanging. Among the ideals of Confucius, their great teacher, was ancestor worship, and the Chinese to this day have a great and unfailing respect for their parents and forefathers. One result of this ancestor worship has been to keep China unprogressive since the glories of the past were considered more important than the possibilities of the future. This attitude kept China for a long time opposed to all new ideas and methods and is one reason for its slow development as a modern nation.

The West comes to the East. It was inevitable, however, that Western nations should become interested in the mysterious and inviting East. The explorer Marco Polo brought to Europe almost incredible stories of China and its wonders. Early Christian missionaries ventured into its unknown cities in zealous attempts to bring their religious beliefs to the teeming millions of Cathay. Some of these missionaries became the first historical writers and map makers of the Chinese lands. Even Columbus hoped to reach China as well as the more or less obscure Indies.



© *Screen Traveler from Gendreau*

A busy scene in the British Crown Colony of Hong Kong—Connaught Road and the water front

About a hundred years ago European nations became interested in the Chinese markets for their growing manufactures. They were also attracted by the opportunities for profit afforded by the rich silks, furs, tea, and other products to be obtained in China. When the Chinese refused to allow foreign ships to enter their ports, Great Britain and other nations used force and several short wars followed. Finally China not only had to open most of its ports, but even had to give up complete possession of some of them and to grant special privileges to certain favored nations. Thus Hong Kong became British territory and still remains so.

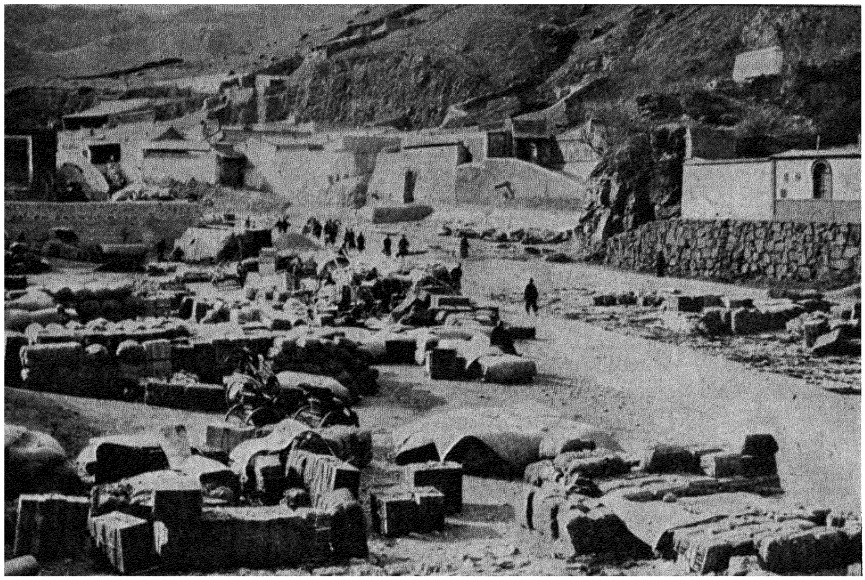
This forcible entry of Western nations into China naturally did not please the Chinese, who have ever since distrusted all foreigners whom they call "foreign devils." This feeling was intensified by the disastrous result of the Sino-Japanese War of 1894-1895. In this war Japan easily defeated China and took a portion of its territory. Later Japan took other valuable parts of China. It is to the credit of our country that we took no part in this forcible seizure of Chinese territory. We advocated and defended the so-called *open-door* policy, under which all nations were to have equal rights in Chinese trade.

We have never taken any Chinese territory, and our relations with China have always been friendly.

The East goes to the West. Gradually the Chinese leaders saw that their only hope was to learn the methods of the Western world as their neighbor Japan was doing. Chinese students, therefore, were sent to the universities and industrial plants of Europe and America, where they quickly acquired the knowledge and skill needed to advance the interests of their country. Returning to China, these men became its educational, political, and commercial leaders. The result was slow but steady progress. The old prejudice against new methods was overcome. Industries were established, railroads were built, education was modernized, and finally in 1912 a republican form of government was adopted. China was awake.

Yesterday and today. The original Chinese Empire had an estimated area and population larger than Europe; and, when the Republic was established in 1912, China included not only China Proper, the great agricultural and industrial area, but also Manchuria, Mongolia, and Tibet. China Proper is almost as large as the United States. It has a population of over 420,000,000 and a population density of 145 to the square mile, compared with a density of 43 in the United States. This very fertile portion of China has a heavy rainfall, and the growing season is long enough for the production of several crops. The crowded population, however, makes it difficult to supply enough food, and slight variations in the crops frequently cause famines. Manchuria possesses valuable farm and forest lands and minerals and has a large population. Mongolia and Tibet, both lofty plateaus, are mostly desert and mountain areas of little productive value and are sparsely populated. In 1931 and 1932 Japan again invaded Chinese territory and plunged the country into war. Japan overran all of Manchuria where the new state of Manchukuo was set up. A large part of Mongolia is now part of Russia's eastern empire, and Tibet is of little value.

The lay of the land. The Republic of China is one of the world's large countries. It occupies that portion of eastern Asia which lies between the Himalaya Mountains on the southwest and Russia on the north and extends from Russian Turkestan on the west to the Pacific Ocean on the east. The entire western half of the country is a vast inland desert of great elevation. To the north of the Himalayas and nearly parallel with them are two other mountain ranges—the Tien Shan and Altai Mountains, which extend nearly



China's lack of adequate transportation facilities is shown by this picture of Kalgan–only 110 miles northwest of Peiping. These bales of merchandise are waiting for camel caravans to carry it through Hanabar Pass and into Inner Mongolia.

across China from east to west. They roughly divide China Proper into three great river valleys: the Si, the Yangtze, and the Hwang (Yellow River). The two latter have their headwaters in Tibet. As eastern China lies in the summer monsoon belt of heavy rainfall, these rivers are periodically swollen and as a consequence have built up deltas of great fertility near the coast. The Hwang has changed its lower course about a dozen times in twice as many centuries. Because of their rich soil and heavy rainfall these flood plains constitute one of the most densely populated areas in the world.

Small farms but great crops. Since time immemorial the Chinese have been a farming people, lovers of "the good earth," and today seventy-five percent of the population are tillers of the soil. According to latest estimates there are less than 200,000 square miles of land under cultivation in China, which is only one fifth of the farm area of the United States. But on this area are raised the greatest crops of rice, tea, soybeans, sweet potatoes, and millet produced in any country of the world; the second largest crop of wheat; and



Photo from Ewing Galloway

More than six hundred girls with keen noses are employed in this egg-packing house in Shanghai, China. They break the eggs, and, if they find them fresh, they put them in containers whence a pump delivers the product to a central separating plant. The yokes and the albumen are separated and dried. Frozen eggs are also exported.

the third largest crop of cotton. Barley, corn, tobacco, peanuts, fruits, and vegetables are also produced in large quantities. Raw silk, which depends upon mulberry trees for its production, is second only to the Japanese production. On the farms are also raised enormous flocks of poultry which produce so many eggs that China is the greatest exporter of frozen and powdered eggs in the world. Pigs are also raised in great numbers, both for food and for their bristles, which are exported. So much food is produced on China's farms that in spite of its great population, except when floods destroy the crops, it is almost able to feed its own people. How can this be accomplished? The answer is found in two words: intensive cultivation. Chinese farms are small, averaging only four acres in size. From the experience of many centuries Chinese farmers have become expert users of natural fertilizers and skillful cultivators. Every kind of animal and vegetable refuse is carefully saved and mixed with the soil. The farms are so small that practically all labor is done by

hand and no machines are used. Some oxen are utilized for heavy work, but horses are very uncommon. The climate is so mild, the rainfall so good, and the soils so well cared for that two or more crops are usually obtained each year from each farm. Every acre of available land is used, and there is no waste. In fact, Chinese farms resemble what we would call market gardens. There is no room for the pasturage of cattle; and milk, butter, cheese, and beef are practically unknown as foods. Pork, eggs, chickens, and fish supply the proteins and fats needed in the people's diet, and they consume enormous quantities with their rice.

Food crops. Rice is the staple food of southern and central China where the warm, moist climate favors its growth. What wheat is to the United States, rice is to China. It takes a vast amount of hand labor to plant, cultivate, and harvest the enormous rice crop. Even with its great rice production China still finds it necessary to import some of this cereal, and strict laws forbid the exporting of any of the Chinese crop.

Wheat is now used much more widely in China than formerly. The best wheat lands are in northern China and in Manchukuo. The Japanese occupation has deprived China of a large part of its wheat crop.

Soybeans are also a northern crop. A valuable oil is obtained from the soybean. China has in the past profited greatly from the export of this product. The oil is also used as a substitute for animal fat in cooking. The bean, which is rich in protein, is a valuable article of diet. In this way the soybean supplies a substitute for meat, which is scarce in China. Recent chemical research has also discovered many uses for soybean protein material in making *plastics*. This is done by pressing the protein material into various shapes and allowing them to harden.

Tea is also one of China's great crops, and it is the national beverage. The people consume so large an amount that their tea exports are smaller than those of India and Ceylon. The tea area is in the south and west.

Raw materials. China grows more cotton than any other country except the United States and India, but so much of the raw cotton is consumed in Chinese mills that the exports of this product are much smaller than those of India and Egypt. Chinese cotton is mostly of rather coarse fiber, but it is suitable for the cheap cloth which is so much needed in a warm country. Recently China has had



Photo from Ewing Galloway

These Chinese girls are sorting cocoons in a Hangchow silk filature. The silk industry still thrives though it has a strong rival in rayon and similar products. China has its rayon factories, and Japan now leads the world in rayon manufacture.

to import some cotton to supply the increasing needs of its textile mills. Hemp, jute, ramie, and flax are other fiber crops.

The production of silk. Silk is a very important industry in China, where it has been produced for thousands of years. There is a legend that a Chinese princess was the first to unwind a cocoon and spin its silken thread. China sends a great deal of raw silk to the United States. Japan, however, produces and exports more silk than China although Japan has a much smaller area. The success of Japan in this industry is due to its scientific methods of combating silkworm diseases and insect pests, which do enormous damage to the Chinese crops. Better methods of culture would greatly increase the Chinese yield of this valuable fiber.

Whatever forests may once have existed in China Proper have long since disappeared, and lumber is consequently scarce.

Minerals awaiting use. China is rich in many kinds of minerals, some of which have been used for many centuries while others have been hardly touched. Among the minerals of considerable impor-

tance are antimony, tin, tungsten, manganese, mercury, lead, zinc, and many others. Both gold and silver are mined, but the minerals of greatest value to the future of China are its iron and coal. China is considered by experts to have both coal and iron deposits which are among the most extensive on the globe. In fact the iron industry of Shansi is said to be the oldest in the world. Hankow is a great iron and steel center, but the smelting industry has not yet developed to the point where China can be said to be among the great iron-producing nations, and only small use is made of the great mineral reserves.

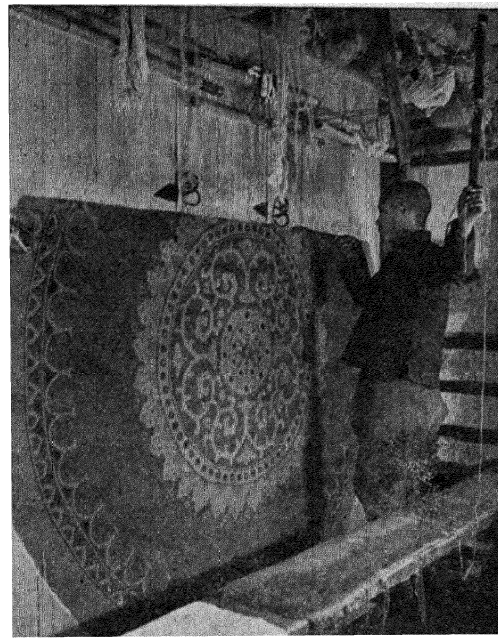


Photo from Ewing Galloway

A Chinese weaving a round rug on a hand loom in a Peiping factory. Such an Oriental rug will bring a good price in the American market.

Industries old and new. A great deal of China's manufacturing is still done in the homes by hand labor. A good example of this type of industry is the making of straw braid, from which hats, rugs, and matting are produced, often in the very shops where the goods are sold. On every farm there is some kind of home industry practiced. It may be spinning or weaving, flour milling, silk embroidery, or toy-making. It is impossible to estimate the value of the products of this Chinese home industry.

Besides this, however, China is making great strides in establishing mills and factories. Chief among the large-scale industries is the manufacture of cotton textiles. The importance of this industry in China today may be seen from the following facts: the number of mills is about 140, of which one third are Japanese owned; the number of spindles is over 5,000,000, which is one fifth as many as in the United States and one eighth as many as in Great Britain; and the raw cotton consumed is about one third as much as in the United

States or two thirds as much as in Japan. Shanghai and Canton are great textile centers, and there are many mills in other parts of the country.

Large flour and rice mills are now operated in many agricultural regions. Other industries are ironworks, tanneries, paper mills, and cement works. Most of the raw materials for these industries are found within the country, and they are so abundant that Chinese industry could easily be increased if capital were available. In recent years many Chinese mills and factories have been acquired by Japanese owners.

Transportation on land and water. China has excellent ports for foreign trade, but its inland transportation is still inadequate although much progress has been made in this respect. Good highways outside of the cities are still scarce, and an enormous quantity of freight is carried in great wheelbarrows or on the backs of coolie porters. What is a *coolie?* While human labor is very cheap in China, this means of transportation is very slow and therefore expensive in the end. The best means of travel and transportation are the rivers and canals which cover much of China in a great network.

The Yangtze, the Hwang, and the Si Rivers are the most important. The Yangtze is navigable by ocean-going steamers for nearly 800 miles. Beyond that for a distance of about 1000 miles it is alive with river steamboats and junks. Near the great cities these Chinese rivers are covered with houseboats in which many thousands of poor people make their permanent homes.

Railroads are the greatest transportation need of China. For a long time the Chinese feared and fought against the introduction of railroads. They feared that the railroads would deprive human porters of their livelihood and that they would in some way disturb the ancient dead. So much objection was raised to the first railroad built in the country that it was bought by the government and torn up. Thus the sedan chair, the cart, and the wheelbarrow are still in use over wide areas although some progress has been made. Many highways are being built, and there are now over 6000 miles of railroad in China. Compare this small total with the 20,000 miles of railroad in the small area of Great Britain and the 239,000 miles in the United States.

Like all other nations the Chinese are now becoming air-minded, having established several regular mail and passenger routes and many airports.



Photo by Burton Holmes

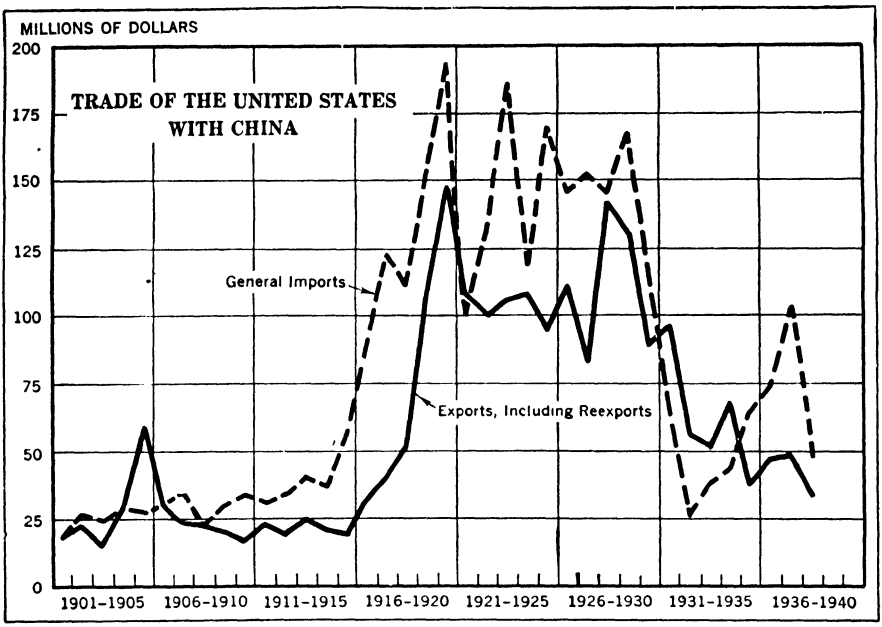
Despite the automobile signs and the American bicyclist, much of the traffic in Shanghai's streets is still that of the age-old carts drawn by man power.

Trade, domestic and foreign. We have referred to the small foreign trade of China, but the large population involves an enormous domestic trade in which many of the country's products are absorbed. In this internal commerce the rivers and canals are especially useful and they carry annually a vast traffic to and from the interior.

The principal imports are raw cotton, tobacco, metals, chemicals, petroleum products, machinery, and other manufactured articles. Exports include eggs, tin and other minerals, vegetable oils, silk, tea, bristles, and miscellaneous hides and skins. Imports come mostly from the United States, Japan, Germany, and Great Britain in that order; exports go to the same countries, in about the same order. It is interesting to note that China's greatest total trade is with our own country.

China tomorrow. The problems which China faces as a nation may be summed up as territorial, political, and economic. Let us see what these problems are.

Territorial problems. As you have read (p. 608), China has lost Manchuria, where the new state of Manchukuo has been set up



under Japanese control. This Manchurian area is rich in forests, farm land, and minerals. For many years Chinese immigrants have settled there, and the estimated population of 35,000,000 is almost entirely Chinese. Both Russia and Japan made frequent demands upon China for special privileges in this area until it was finally forcibly occupied by Japanese troops. A puppet government was set up, and Henry Pu Yi, the former Manchu "boy" emperor, was enthroned as Emperor Kang Teh in 1934. The Japanese now control the business and industry of the entire region, and the government is completely dominated by Japan. On account of the severe winter climate, however, not many Japanese colonists have settled in Manchukuo.

Mongolia is an unproductive region with a small population, but its position makes it important as a buffer between Japanese and Russian territory. Russia now controls Outer Mongolia while domination of Inner Mongolia is in dispute. Parts of western China are also under strong Russian influence.

Under these circumstances China's area has been reduced to the twenty-four provinces called China Proper, and Japan has occupied considerable of the eastern part of this territory, including the large seaboard cities and the chief cities from Peiping to Canton in the



Photo by James Sawders

Western influences are plainly seen in this view of Mukden, in Manchukuo. The rickshaws on the pavement and the strange characters on the street signpost alone give it the atmosphere of the East.

eastern populous section of China. In an unequal and undeclared war it seems likely that the Chinese Republic will in time become a vassal state of Japan as Manchukuo has.

Political problems. China became a republic in 1912, but for a long time it was difficult to unite the different parts of the great country and to secure efficient government. Several independent leaders called *War Lords* kept the country from uniting under one head, but the troubles with Japan have brought about a feeling of unity throughout China. If this can be continued, the country will be much stronger politically. There is still a great deal of illiteracy in China, which makes democratic government difficult. Poor communication between the cities and the great farm areas also tends to hold back the unification of China. A united agreement on some definite form of political system under responsible and effective leadership is China's greatest problem.

Economic problems. The two greatest economic problems of China for the future are the development of its transportation system and the increased use of its resources. The small railroad mile-



Photo from Philip Gendreau

The famous Nanking Road, one of the principal business thoroughfares in the great city of Shanghai

age and the resultant lack of cheap domestic travel and transportation retard trade within the country. More railroads, with modern equipment and efficient management, are urgently needed both to connect producing and consuming regions and to bring the people of different sections of the country into closer contact with one another.

The resources of China are enormous, but they have not yet been properly developed. It is hard to see how the yields of the present farm areas can be increased; but in the outer provinces there is still much poorly developed agricultural land awaiting use. There is also the possibility of better use of forest areas and the planting and scientific care of new forests. Experiments in this direction are already under way. The greatest opportunity for economic improvement in China is in the mining and manufacturing industries. More use of its iron and coal in steelmaking would render China less dependent upon Western nations for machinery of all kinds. There is also great opportunity for growth in the building and operation of mills and factories of all kinds. These industries would not only supply many of the needs of the Chinese, but they would also pro-



© *Screen Traveler from Gendreau*

At Hong Kong the British have one of their finest harbors, important strategically and commercially and as a naval station. It lies at the mouth of the Canton River and is about sixty miles from Canton. It is the gateway between the East and the West and one of the great transshipment ports of the world.

duce a surplus for export and thus add to the wealth of the country. When a country can export a large amount of both raw materials and manufactures, it secures profits which enable it to buy many more imports and thus increase its foreign trade. With the profits of this trade the people become more prosperous, and the standard of living is sure to be raised.

The imports of China constantly exceed its exports, giving the country an unfavorable trade balance. Without foreign investments, colonies, or shipping profits China must increase its exports in order to improve its economic condition and raise its standard of living. No country with so great a density of population as China can possibly be prosperous without extensive industries and a large foreign trade. These, therefore, are China's greatest economic needs.

Chinese cities. *Shanghai* is to China what New York is to the United States. Although it is twelve miles from the coast on one of the deltas of the Yangtze, it has a deep sea harbor. It has the most

advantageous position in China for domestic and foreign trade. It has a large international settlement. *Peiping* (Peking) and *Tientsin*, its port, are the chief cities of northern China. For 500 years, until 1928, Peking was the capital of China. It has important railroad connections with the Trans-Siberian Railroad. *Canton*, the chief city of southern China, has been in existence for 2000 years or more. It is the center of the silk trade. It also exports tea and many of the firecrackers, made from our old newspapers, come from there. Canton has a large river population. *Hankow*, an important river port on the Yangtze, is located at the head of ocean-going transportation; there is also an extensive river traffic for several hundred miles beyond. It is a great commercial city, the center of great iron and steel and cotton industries. *Nanking*, the ancient capital of China, has again been made the capital. It is a center for the manufacture of munitions. With the exception of Hankow, these cities each have a population of 1,000,000 or more.

Hong Kong. An island off the coast southeast of Canton is Hong Kong, a British Crown colony. It has one of the best harbors in the world and is an outlet for a large part of the exports of China, especially those of southern China. It is a very important naval base and has been heavily fortified by Great Britain.

Guides to Study

1. How has ancestor worship affected the development of China?
2. Why did foreign nations force themselves upon China?
3. Why has Japan been particularly interested in China?
4. How can China Proper support so dense a population?
5. How does Chinese agriculture differ from ours?
6. What becomes of the cotton and silk produced in China?
7. China has coal and iron. Why is it not then a great manufacturing country?
8. Why have foreign capitalists established cotton mills in China?
9. How has lack of means of communication affected China industrially? Politically?
10. Of what value was Manchuria to China?
11. Why does a great country like China have so much difficulty in protecting itself against foreign invasion?
12. What are the possibilities for industrial and commercial development in China?

RESEARCH FOR STUDENTS

1. On an outline map of Asia trace the boundaries and print the names of all the provinces of China. Locate regions which formerly belonged to China. Print the names of the bordering waters, rivers, and largest cities.

2. Make a list of contributions which ancient China made to civilization.

3. Topics for special reports: (*a*) The Boxer Rebellion; (*b*) The loss of Manchuria; (*c*) The Japanese invasion of China; (*d*) The value of Tibet, Mongolia, or Sinkiang; (*e*) Methods of Chinese agriculture.

4. Debate: It will be better for China if its resources are developed by foreigners.

2. JAPAN–A NEW POWER IN THE FAR EAST

Not a new nation. Japan, like China, is a country with a very old civilization although China was probably the more highly developed of the two regions in ancient times. It is certain that the early Japanese lacked the originality of the Chinese, who invented and discovered so many different things.

But, like China, Japan refused for a long time to have anything to do with foreigners and was a self-centered nation. It was not until 1853 that any Japanese ports were opened to foreign trade. In that year Commodore Matthew C. Perry of the United States Navy went to Japan, and in the following year a treaty was made which allowed foreign ships to enter five Japanese ports. The Japanese at that time were very backward. They still used bows and arrows for fighting; their government was an ancient form of feudalism; iron and steel and mechanical power were practically unknown; and living standards were very low.

Japan goes Western. While it took China a long time to see the wisdom of adopting Western methods, Japan began very early to copy the industrial, commercial, educational, military, and naval ways of Europe and America. The Japanese are very skillful, highly intelligent, extremely industrious, and intensely patriotic. Japanese students have gone to all parts of the world and have brought back home the most modern ideas in every branch of human activity. These ideas have been adapted to Japanese conditions with the result that Japan has made such rapid progress that it is now rated as one of the seven great powers of the world.

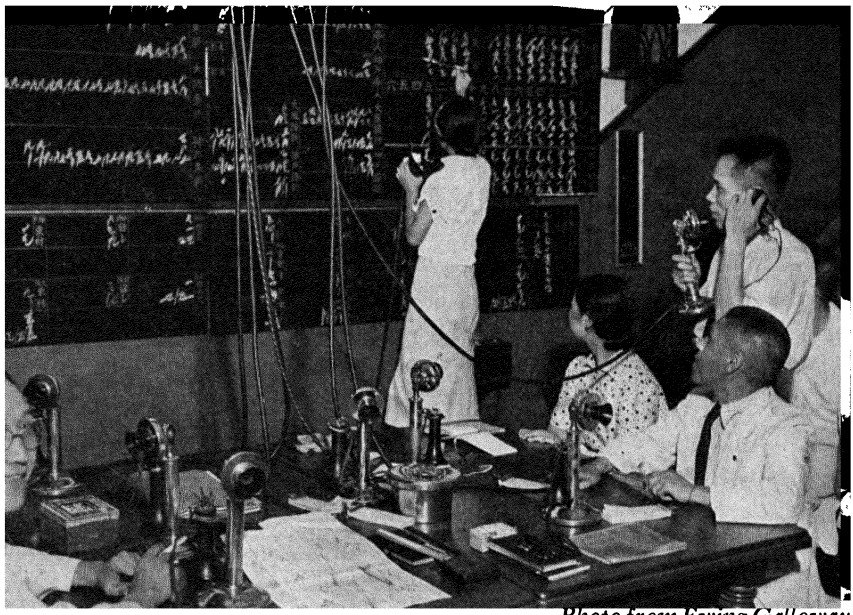


Photo from Ewing Galloway

Interior of a stock broker's office in Kobe, Japan. Since the beginning of its undeclared war on China, Japan's economic problems have caused exciting fluctuations in the prices of Japanese stocks and bonds.

The Britain of the East. Japan resembles Great Britain in many ways. Both are island empires. Japan Proper includes four large islands and a large number of small ones. But Honshu, the largest and most populous island, has almost exactly the same area as the island we call Great Britain (England, Scotland, and Wales). Moreover, the density of population in Japan is about 469 to the square mile, while in Great Britain it is about 498. Thus we see that both are crowded countries. As we might expect under such circumstances, there is much industry in both countries.

Differences. But there are great differences between Japan and Great Britain. The first concerns food. England has never in modern times been able to feed its own people; but Japan has always supplied most of its own food and imports largely luxury items. It is worth noting in this respect that forty-five percent of Great Britain's imports are articles of food and drink; while only eight percent of Japan's imports come under this classification. To understand this difference between Japan and Great Britain we have only to examine the food habits of the two peoples. The British eat large



Photo from Ewing Galloway

Cormorant fishing on the River Nagara near Nagoya. The birds, dexterous divers and fishers, can catch more than 100 fish an hour. A ring around the neck of the bird prevents the fish from being swallowed.

amounts of wheat bread, meat, milk, butter, and other dairy products, much of which they must import. The Japanese live largely on rice and fish, with tea as their ordinary beverage. They raise abundant crops of rice, take vast quantities of fish from the surrounding waters, and produce their own tea. Their diet of fish and rice is said to be well balanced since the fish supplies protein and the rice carbohydrates.

The second difference between the two countries has to do with industry. Japan has not enough coal for its growing industries and has to import a considerable amount. The total coal production of Japan is only one sixth that of Great Britain. Japan also has some iron ore, but not nearly enough, and must import most of its requirements. Great Britain also imports iron ore, as its own supply is not sufficient. But in iron-ore production Great Britain ranks fourth among the countries of the world, being exceeded only by the United States, France, and Russia in that order. Japan is far down on the list. The result of these conditions is that Japan is now annually seventh or eighth among the world's nations in the quantity of its

iron and steel production while Great Britain is fourth in the same list.

A third difference between Great Britain and Japan is in the areas of their colonial possessions. We need merely to mention the world-wide spread of the British Empire, on which Britons proudly boast that the sun never sets. This colonial empire of course supplies food, raw materials, markets, and a population outlet for Great Britain. On the other hand Japan has only Chosen (Korea), Taiwan (Formosa), Karafuto (part of the island of Sakhalin), and some small islands. Japan also has commercial and political control of the new state of Manchukuo (p. 615). These regions give some food and raw materials to Japan, but they do not seem to attract Japanese settlers as colonists. In the first place both Chosen and Manchukuo are already well populated by native Koreans and Chinese. Besides this the Japanese do not like to leave their warm climate to live in a colder region like Manchukuo or even in the hot Taiwan. An interesting example of this stay-at-home attitude of the Japanese people is the small population of Hokkaido, second largest of the four main islands, with an area almost as large as the state of Indiana. The climate of Hokkaido is somewhat like that of New England, and it has large areas of wheat and pasture lands. Practically the only cows in Japan are in Hokkaido, and this island could easily support a much larger population. But the winters are cold and people from the southern islands will not settle there permanently. Large numbers of Japanese have settled in Southern California, in Mexico, and in parts of South America where the climate is more to their liking. According to official reports less than a million Japanese are now living in other parts of the world.

Similarities. The most marked similarity between Japan and Great Britain is in their textile industries. Both are great cotton manufacturers. The British mills have four times as many spindles as the Japanese; but Japan consumes more raw cotton than Great Britain and about half as much as the United States. The explanation of this peculiar fact is that the British mills make a great many very fine fabrics requiring only a small amount of raw cotton, while Japanese mills manufacture large quantities of coarse and cheap goods which take much more raw material to produce. The British product is of course far more valuable than the Japanese; but the latter is well suited to the Asiatic markets, where cotton is the universal material for clothing and poverty is so general that only the



Photo from Ewing Galloway

American cotton being unloaded at a Japanese port. Japan also buys large quantities of this staple from Egypt, China, India, and Brazil.

cheapest goods can be sold. The low cost of labor in Japan enables the Japanese to sell their goods in all parts of the United States and Europe as well as in China and India. This condition helps us to understand why Japan uses more raw cotton than Great Britain. It is partly for this reason that many British mills are idle for long periods while there is usually no unemployment in Japan. Recently Japanese mills have been making textiles of higher grades, thus competing with British and American products in that field.

Japan and Great Britain both have large merchant marines. It is true that the British merchant fleet totals four times the tonnage of the Japanese; but we must remember that Great Britain has been the world's leading shipowner for centuries while Japan is comparatively a newcomer in this field. The progress of Japan in this respect is shown by the fact that during the ten years from 1927 to 1937 the Japanese fleets were increased by over half a million tons, while in the same period the British fleets decreased by more than one and a half million tons. As a result Japan now ranks third among the countries of the world in its merchant marine tonnage, being exceeded only by Great Britain and the United States.

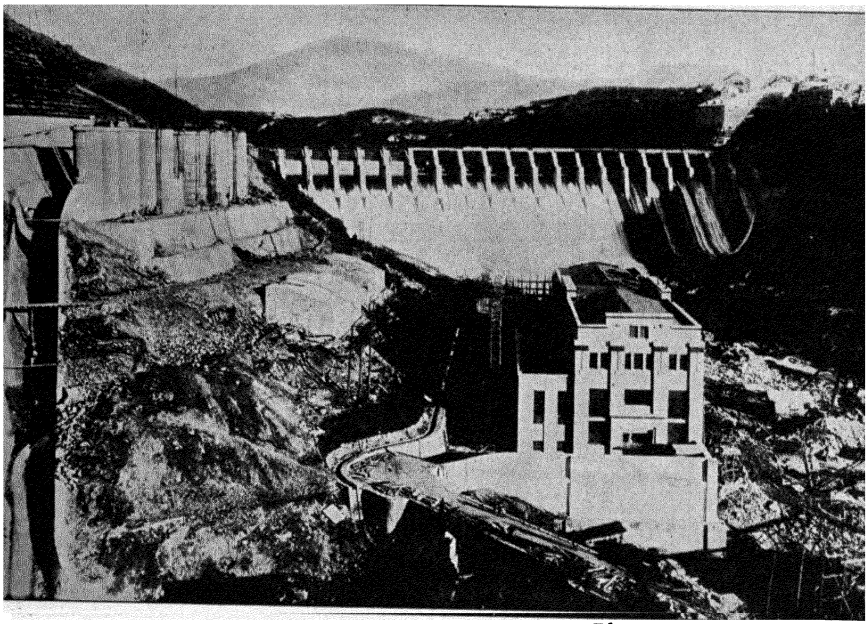


Photo from Ewing Galloway

Because of lack of coal the Japanese have been forced to develop their great resources of water power to enable them to become an industrial nation. This development in the Kiso River was directed by American engineers.

Great Britain produces a large amount of raw wool although its production is much less than that of several other regions. On the other hand Japan produces nearly eighty percent of the world's raw silk. These are both textile raw materials. But Great Britain uses all its wool in its own mills and imports an enormous quantity besides; while Japan sends most of its raw silk to other countries for manufacture.

Japan has one advantage to offset its lack of coal. Its many mountain streams produce abundant water power which is used to operate hydroelectric plants, supplying power for many mines, mills, and factories. Japan now secures over four million horsepower from its rivers, which is about equal to the water power of France and is exceeded only by that of three countries—Italy, Canada, and the United States.

Agriculture in Japan. Japanese agriculture, like that of China, is intensive; and rice is the chief crop of both countries. While only one sixth of Japan's area is agricultural land, more than half of its

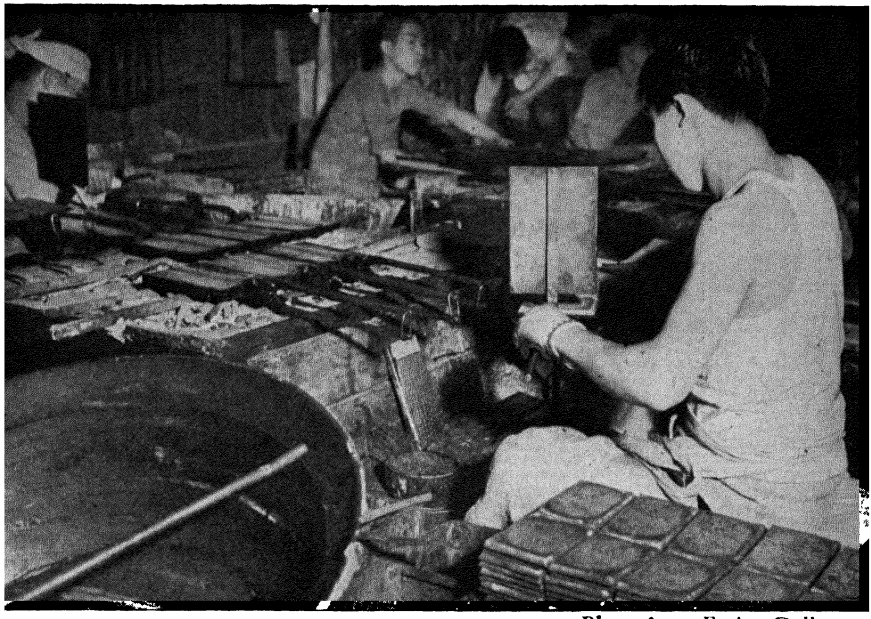


Photo from Ewing Galloway

Japanese bakers in Kobe cooking rice cakes. Rice is to the Far East what wheat is to the Western world–the staff of life.

people are farm workers, cultivating small gardenlike plots of land which average only one or two acres in extent. As in China, hand labor is the rule, fertilizers are skillfully used, crop rotation is practiced, and two or more crops per year are common. The monsoon region is featured by abundant summer rainfall and a long growing season. In the extreme south subtropical conditions favor hot-weather crops while farther north and in the highlands the more temperate climate gives good yields of various grains. Under modern conditions each region specializes in the crops which it is best able to produce, and improved transportation facilities make it possible to send these products to all parts of the country. There is no room for the pasturage of domestic animals except in Hokkaido. There are less than 50,000 sheep in all Japan, compared with 25,000,000 in Great Britain.

Rice to eat. About half the cultivated land in Japan is used for rice. Everything favors this crop. The abundant rains make it possible to keep the lowlands covered with water, which is essential in the growing of rice. The monsoon rains never fail; so there is never a crop failure due to lack of moisture. The temperature is

always mild, thus removing all danger from either frosts or excessive heat. The soil seems to be exactly right for rice.

With all these favorable conditions and the improved methods encouraged by the government, Japan's rice production averages over 2500 pounds per acre, which is a larger yield than that of any other country. Japan is not the largest rice producer in the world since India annually raises nearly four times as much as Japan Proper and nearly three times as much as Japan, Chosen, and Taiwan together. But in order to secure this greater crop India uses eleven times the acreage used in Japan Proper and more than six times the combined areas of the three Japanese producing regions. With all its production Japan still imports some rice from India and the United States as this grain is the staple food of the Japanese people. They even use it to make a very potent wine, called *saké*.

Silk and tea to sell. The two cash crops of Japan are silk and tea, and of these silk supplies the greater profit. A climate suitable for the growth of mulberry trees, on which the silkworm feeds, an abundance of cheap labor, and centuries of experience in the industry make Japan the world's greatest silk producer. The fibers of silk are produced by the worms as they weave their cocoons. Inside these cocoons the worms change into moths. If left to themselves these moths break through the cocoons and in doing so break and tangle the silk fibers. In order to prevent this the cocoons are heated to kill the moths. The cocoon is then softened in warm water, and the fibers are easily unwound and reeled into skeins. All of this requires a great deal of hand labor, which makes silk an expensive fiber to produce. The Japanese production is so great that it not only supplies the needs of the Japanese silk mills but leaves a large surplus for export. In recent years the value of this raw-silk trade has amounted to over $100,000,000 annually, adding greatly to the national income.

Tea is also a cash crop of Japan although not nearly so profitable as silk since a very large proportion of the tea is used by the Japanese themselves. A favorable climate and cheap labor make tea raising profitable. Much of the labor on the tea plantations is done by women and girls. In fact women and children do a vast amount of work on Japanese farms and in the mills and factories. Wheat is becoming more important in Japanese agriculture, and the exports of wheat flour now exceed in value the exports of tea. Various other grains and many fruits and vegetables are also raised.

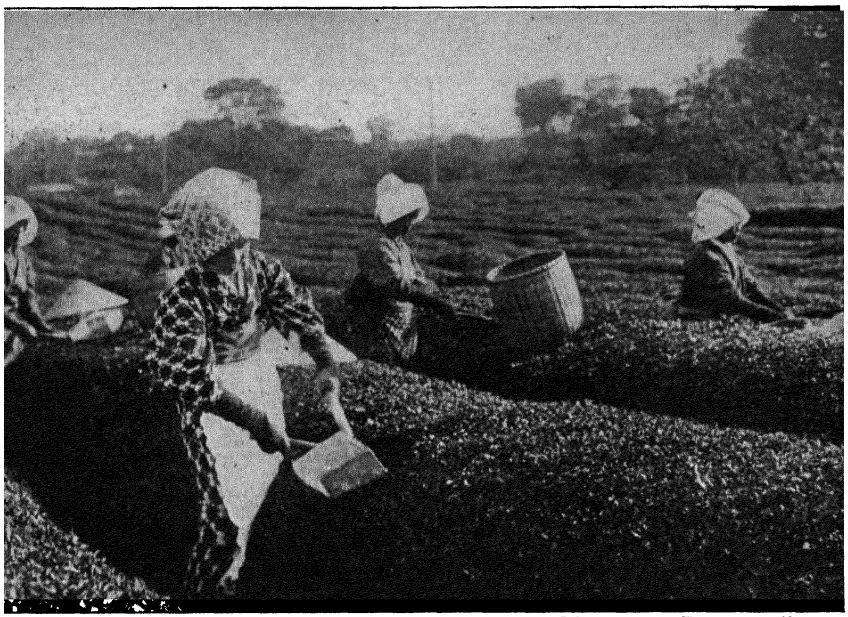


Photo from Ewing Galloway

Japanese women cutting leaves from the tea bushes with shears that resemble those with which we trim hedges

Food from the sea. The warm and deep waters surrounding Japan supply a great variety of fish, of which the Japanese consume a vast quantity. It is said that the per capita consumption of fish in Japan is more than three times that in the United States. Canned crab meat, salmon, and other fish are prominent in the list of Japanese exports. The canned crab meat has a large sale in the United States.

Japanese industry. Besides its great textile industry Japan has made enormous strides in iron and steel manufactures, particularly in shipbuilding. Nagasaki is a great shipbuilding center. Much of the iron and steel needed in this industry still has to be imported from the United States and Europe. For the manufacture of electrical machinery and apparatus Japan has a great asset in its copper production, in which it ranks sixth among the nations of the world. In fact some copper, brass, and electrical appliances are exported. Among other prominent industries are the manufacture of paper, pottery, matting, and various small artistic products. Japanese novelties are sold all over the world. Despite the lack of many raw materials Japanese industry is very profitable because of the low

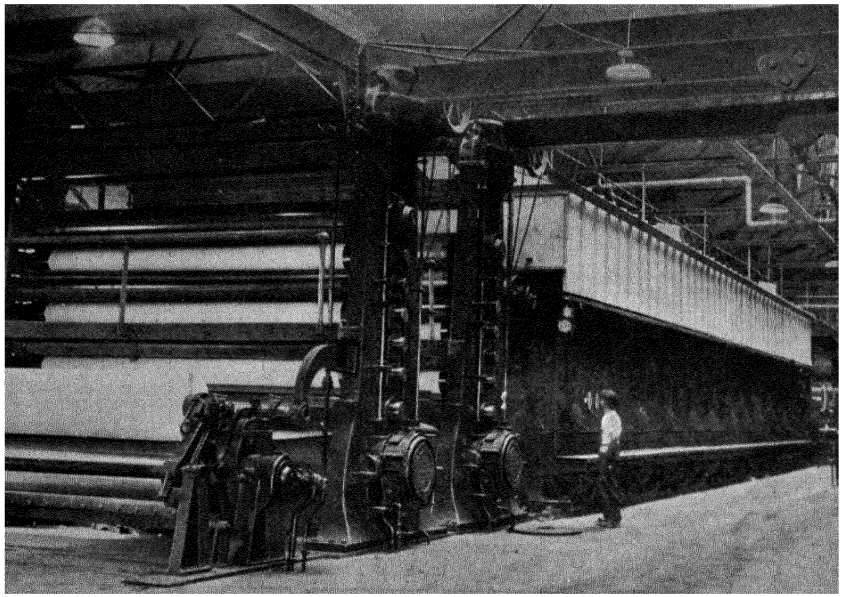
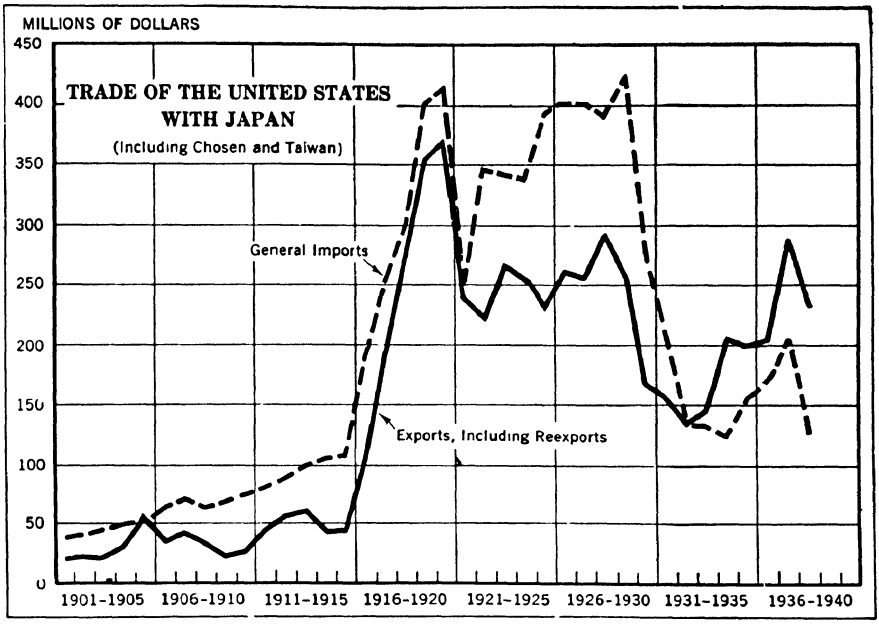


Photo from Ewing Galloway

A section of one of the mills operated by the Oji Paper Company near Tokyo. On this machine high-grade book paper is being manufactured.

labor cost. Large numbers of people from the farm regions go into the cities to work in the mills, giving a constant supply of cheap labor. One result of this condition is a very low standard of living, with poor housing and a very limited food supply. In spite of this, however, the Japanese government has tried to improve educational and social conditions, particularly in the crowded cities. Just as in China, there is a great deal of home industry in Japan. The Japanese are naturally skillful handworkers and are quick to learn all kinds of mechanical processes. The entertainment of tourists has been highly developed in Japan. Very fine hotels and excellent train services are everywhere in evidence and bring much profit to the country. The railroad mileage of Japan is more than twice as great as that of China. Japan is very well supplied with newspapers, and the publishing business is constantly growing.

Japanese trade. Compared with other great powers, the foreign trade of Japan is small. The imports in recent years have amounted to less than $800,000,000 and the exports slightly less. With the large population, the per capita total trade amounts to a little over $25. Exports are always slightly below imports, an unfavorable bal-



ance which is compensated for by foreign investments and shipping profits.

Nearly seventy percent of the imports are raw materials, of which raw cotton constitutes more than one quarter of the total. Crude petroleum, iron ore, wood pulp, coal, fertilizer materials, various metals, wool, rubber, and machinery are other important imports. Of the exports more than sixty percent are manufactured articles, principally cotton goods, rayon, silk, and other fabrics, together with a large variety of electrical goods, chemicals, paper, and small novelties. Japan is the greatest manufacturer and exporter of rayon in the world today, making more than one fourth of the world's production of this new fabric and exporting nearly $50,000,000 worth each year. Raw silk is the greatest single article of export, and the United States takes nearly ninety percent of this product from Japan. China and India buy most of the surplus Japanese cotton goods. Japanese competition in these Eastern markets is seriously felt by British and American textile manufacturers. Of Japan's imports about one third comes from the United States, with China and India next in order. More than a fifth of the exports goes likewise to United States, with China and India again the next best customers. Japan is one of our best customers since our exports to that country

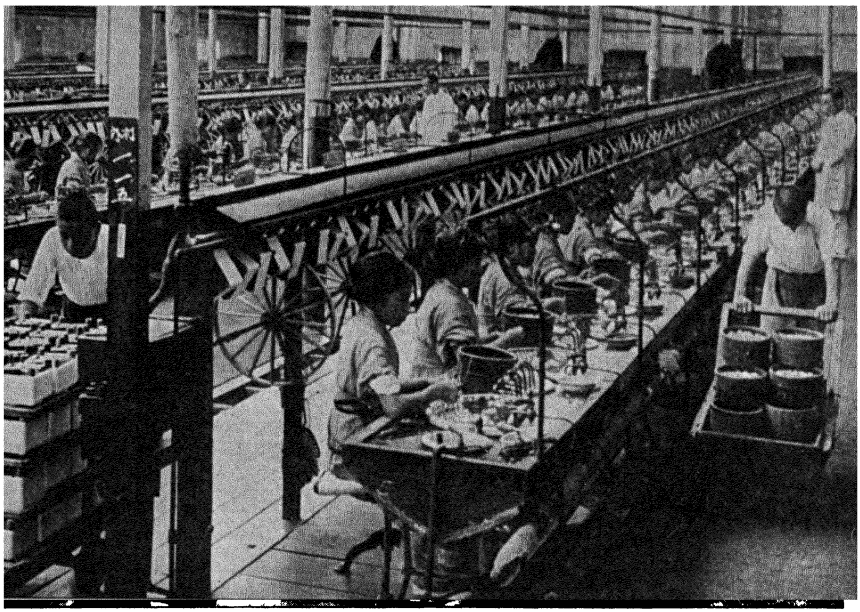


Photo by James Sawders

Spinning silk by modern methods in a Japanese factory. Silk is still spun in the homes and small local factories, but the Japanese have been quick to adopt new machinery and methods in their effort to industrialize the nation.

annually amount to fifty percent more than the value of the goods which Japan sells to us. Like other great powers Japan is constantly striving to increase its industrial production in order to gain a larger share in world trade by expanding both its exports and imports. The effect of this industrial and commercial growth is seen in the great increase in population and trade of such Japanese cities as Tokyo, the capital, Osaka, Nagoya, Kyoto, Kobe, Yokohama, and Nagasaki.

Cities of Japan. *Tokyo*, the capital and chief city of Japan, is really the heart of the Japanese Empire. The governmental departments, foreign embassies, legations, and many international trading companies have their headquarters there. It is one of the largest cities in the world, having an estimated population of 6,275,000. As a center of learning it ranks high, the Imperial University being one of the best in the world. *Yokohama*, the seaport for Tokyo and the chief importing port for the entire country, has an open harbor on the Pacific Ocean. It is an important naval base as well as a com-

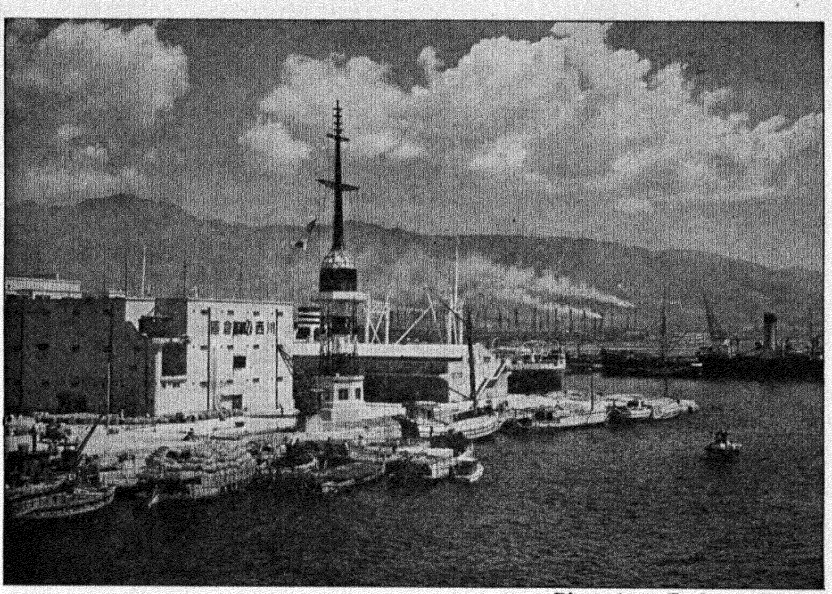


Photo from Ewing Galloway

Japan has four seaports that rank high among the ports of the world—Yokohama, Osaka, Kobe, and Nagasaki. The water front of Kobe, one of the great industrial centers of the islands, is partially shown here.

mercial port. The chief export is silk. Its population is more than 700,000. *Osaka* with a population of 3,213,000 is the second largest city in Japan. It is a very important airport where all the empire's air routes converge. It exports cotton textiles and imports automobiles. It is also a great rice and tea market. *Kobe*, an important seaport, with a population of over 900,000, is the center of Japan's great shipbuilding industry. Much of the trade with China passes through this port. The exports are cotton goods, rice, copper, porcelain, and camphor. *Kyoto*, the former capital and the most beautiful city in Japan, is a manufacturing city which specializes in fine silks, brocades, velvets, rich lacquer ware, and beautiful inlaid articles. It has over 1,000,000 inhabitants.

Guides to Study

1. How do the Japanese people differ from the Chinese?
2. How does Japan resemble Great Britain: (*a*) in location? (*b*) in resources? (*c*) in industries and trade?
3. How is it possible for a densely settled country like Japan to supply nearly all its own food?
4. How does Japan differ from Great Britain in its opportunities for commerce?
5. Account for the extensive trade carried on between Japan and the United States.
6. Why is fishing one of Japan's leading industries?
7. The United States is the greatest user of raw silk. Why do we buy it of Japan instead of producing it ourselves? Why isn't it manufactured in Japan?
8. Why does Japan need large supplies of coal and iron?
9. Why do few Japanese emigrate to foreign countries?
10. Why has our country passed laws strictly limiting Japanese immigration on our Pacific Coast?
11. It has been said that Japan's motto might well be—"Adopt, adapt, adept." Explain what that means as applied to Japan.

Research for Students

1. On the same outline map used for China print names of all islands belonging to Japan. Indicate parts of mainland controlled wholly or in part by Japan. Print names of surrounding waters.
2. Topics for special reports: (*a*) The opening of Japan's ports by Commodore Perry; (*b*) Japanese products in the United States; (*c*) Silk production in Japan; (*d*) Japan in China.
3. Bring to class newspaper clippings relating to Japan's activities in different parts of the world.
4. Make a list of Japanese products which compete in world markets with our own.

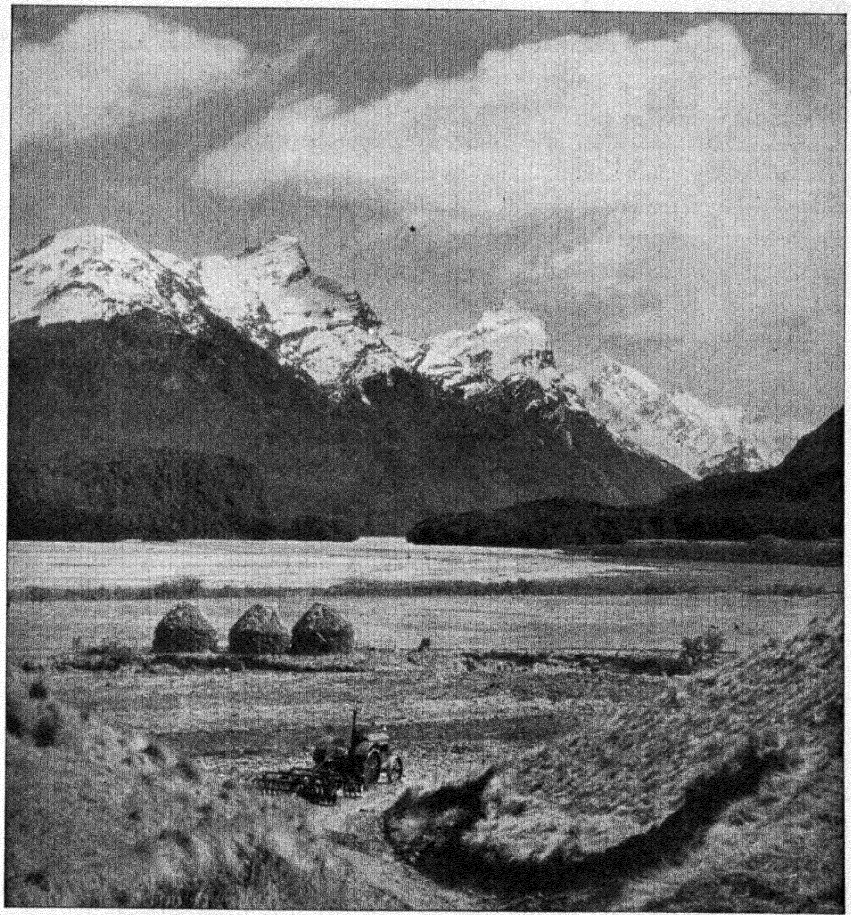


Photo by James Sawders

The melting snows of the mountains bring fertility to the farm lands of the Dart Valley, Wakatipu, South Island, New Zealand.

FORECAST OF UNIT EIGHTEEN

THESE two possessions of Great Britain are almost exactly on the opposite side of the world from the mother country. The prime meridian passes through Great Britain and the 180th meridian lies very close to East Cape, New Zealand. If Australia were ever connected with Asia, it must have become separated from it ages ago because many of its native plants and animals are unlike those of any other continent. One of the animals peculiar to Australia is the kangaroo. Another is the duck-billed platypus, a quadruped with a ducklike bill.

Portuguese, Spanish, and Dutch navigators were the first Europeans to visit Australia. Because of its exploration by the Dutch, Australia was called *New Holland* on many early maps. The island of Tasmania is so called because it was discovered by Tasman, the captain of a Dutch ship. New Zealand too was discovered by Tasman, but later Captain Cook, a noted English navigator, explored the coasts of both Australia and New Zealand, taking possession of the former in 1770. New Zealand did not become a British colony until 1840.

Both these British possessions are far removed from other continents and from each other. The nearest continent, Asia, is two thousand miles away and New Zealand is a four-day voyage from Australia. As if to guard Australia from invasion, there extends along the northeast coast the longest coral reef in the world. Notwithstanding the handicap of distance, both possessions carry on an extensive and profitable trade especially with European countries and the United States.

The native tribes of Australia, known as *Australian Bushmen*, have made little progress since the settlement of the country by the British. They resisted the encroachment of the English, with whom they had many skirmishes, defending themselves with boomerangs, wooden instruments that when thrown return to the thrower. Some of the tribes were reputed to be cannibals.

The English settlers and their descendants have developed the country's resources to a remarkable degree and have so governed Australia that today it is one of Britain's strong dominions. Unlike the Bushmen of Australia, the native tribes of New Zealand are a strong, progressive, and fine-looking people possessing a high degree of intelligence. They have added much to New Zealand's progress.

Australia has a great diversity of climate and consequently produces a variety of agricultural products. In the tropical north are hot, moist jungles, in the center a great desert, and in the south a large area of temperate lands. Products of the farms and orchards that can be transported over the long distance find a ready market in England. Meats and wool from the cattle and sheep ranches are bought in large quantities by the mother country, which in turn supplies many manufactures.

New Zealand to which the westerly winds bring abundant rains is an ideal cattle and sheep country. Its temperate lowlands are devoted to agriculture and grazing. Butter, cheese, and other animal products are exported to Britain.

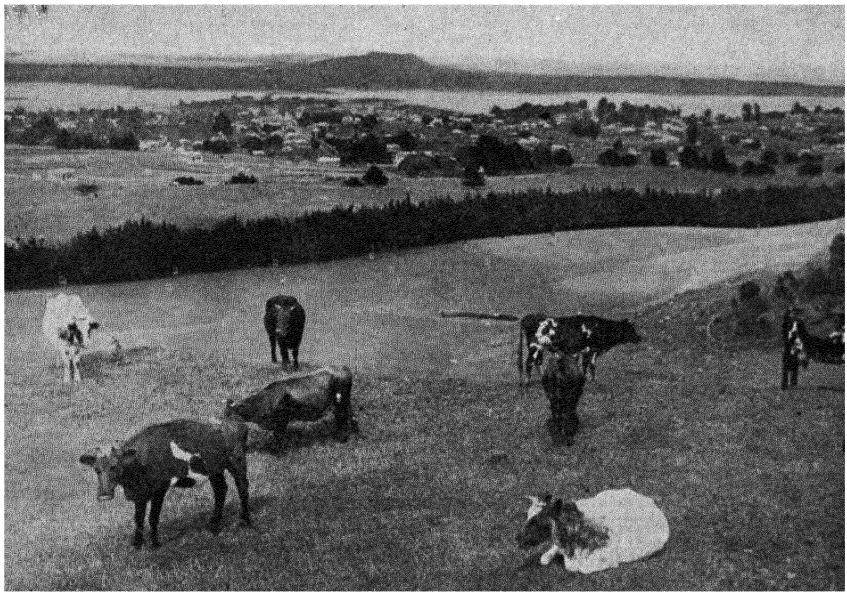


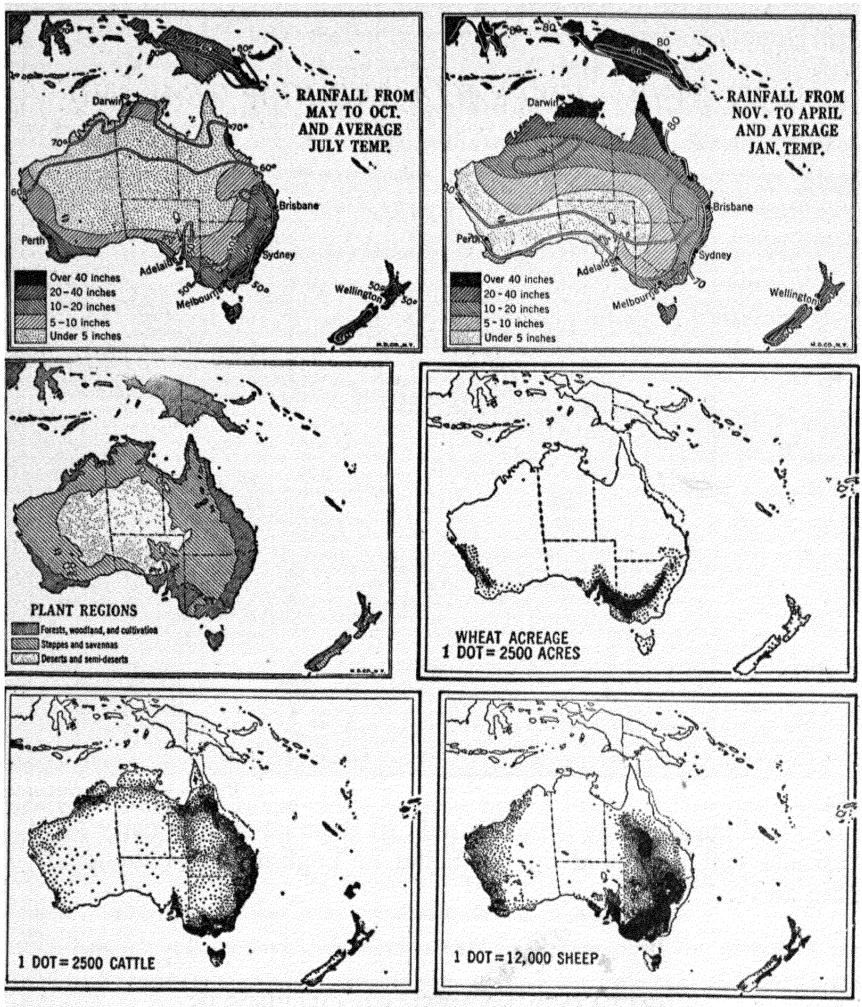
Photo by James Sawders

Butter and cheese made from the milk of these cows on a dairy farm in Australia will be served on the tables in English homes thousands of miles away.

BRITAIN'S FARTHEST OUTPOSTS

AUSTRALIA

The Island Continent. Australia is a continent with but few mountains. The so-called Dividing Range separates the great interior plain from the coastal area on the east. This interior plain, which increases in altitude westward, has many interior drainage areas resulting in salt lakes and basins. The Murray River is the largest in the continent. Its large open basin is the most valuable portion of the interior plain. The continent lies wholly in the southern hemisphere with the northern half in the torrid zone and the southern half in the temperate.



The most serious drawback to Australia's development is the extensive area of arid country, the greater part of the interior plain being a desert, often spoken of as "the dead heart of Australia." The continent lies largely in the belt of the southeast trade winds. The mountains on the eastern border intercept these winds, thus giving heavy rainfall on the eastern slopes. West of the mountains the rainfall gradually decreases for several hundred miles until extremely arid conditions prevail. The northern part of the continent is visited by the equatorial rain belt during the spring and summer of the southern hemisphere.

The large island of Tasmania lies off the southeastern coast and

is an important part of the dominion. Australia itself has an area but little less than that of the United States.



Australian Nat. Travel Assn.

Another of the strange animals peculiar to Australia is the Koala bear.

The People. When the Europeans first came to Australia, they found there a dark-skinned people, the Australian *bushmen*, one of the most primitive races of the world. They are a timid people and do not easily adopt the civilization of the Europeans. They live chiefly by hunting and fishing. The people of Australia can expect but little help from these simple people in the development of their resources. For a number of years Great Britain used Australia as a penal colony. Then regular settlements were established and British immigrants came in large numbers. The present population is distinctly English. Northern Australia is too hot to be developed by people of the white race. Chinese, Japanese, and other Asiatics would gladly come in to do the necessary work, but the British are not willing for other races than the white to become citizens of the dominion. The people have gathered mainly in the eastern and southeastern section of the country. The total population is a little less than 7,000,000. Their government is stable, their educational standards are high, and their business policies are progressive.

A natural sheep country. Australia is the leading wool-producing country of the world. Sheep products—wool, hides, mutton, and lamb—constitute the country's largest source of income. More than 110,000,000 sheep are raised in the dominion. These give an annual wool crop of close to 1,000,000,000 pounds. Most of the sheep are the wrinkled-skinned, heavy-fleeced Merinos with wool of highest quality. These animals have been so improved by the Australians that the weight of each fleece has been increased by several

pounds. Wool production is far more important than mutton production in Australia, but Southdowns are raised in some sections for their mutton.

The country for several hundred miles west of the eastern highlands is too dry for profitable agriculture, and it is this area and another in the extreme west that are used in the main for sheep-raising. These lands were formerly held in large estates sometimes comprising hundreds of thousands or even millions of acres. The ranches now are much smaller. Ranches are fenced in by wire fencing to confine the sheep and to keep out dogs and rabbits. Rabbits were brought to the country by the English as pets, but they have increased to such an extent that they have become a nuisance to the sheep ranchers. They eat so much of the grass that they seriously reduce the food supply for the sheep. So great a pest did these creatures become that for a time they were indiscriminately slaughtered. Their fur, skins, and meat are now among the profitable exports of both Australia and New Zealand. From Australia alone $1,000,000 worth of meat and $2,000,000 worth of fur (lapin) are exported annually. The fur is extensively used in the manufacture of felt, as well as of fur coats. The interior of the continent is so hot and dry that sometimes 15,000,000 sheep have been known to perish in a single year. They are not easily starved out, however, for they feed upon the desert shrubs as well as grass. Sheep from these arid regions do not make good mutton.

Australian wool goes to all countries manufacturing woolen goods of the finest quality. Great Britain is the principal importer, for these wools fit admirably into that country's extensive woolen industry. We buy much Australian wool both from the dominion and from Great Britain. That which comes to us from the latter country is sent to us as reëxports.

Australian beef and dairy products. Australia is noted for fine beef and dairy cattle. These are raised in the well-watered areas of the east and southeast between the mountains and the sea. Dairying is carried on mainly in the southeastern part. In the north cattle are raised mainly for beef and hides. Only ten percent of the beef is exported. Beef and dairy products find their chief markets in the mother country.

Crops. It should be remembered that the Australian crops are grown in our winter months and are offered in our markets in our spring or early summer. As faraway as Australia is from us. the

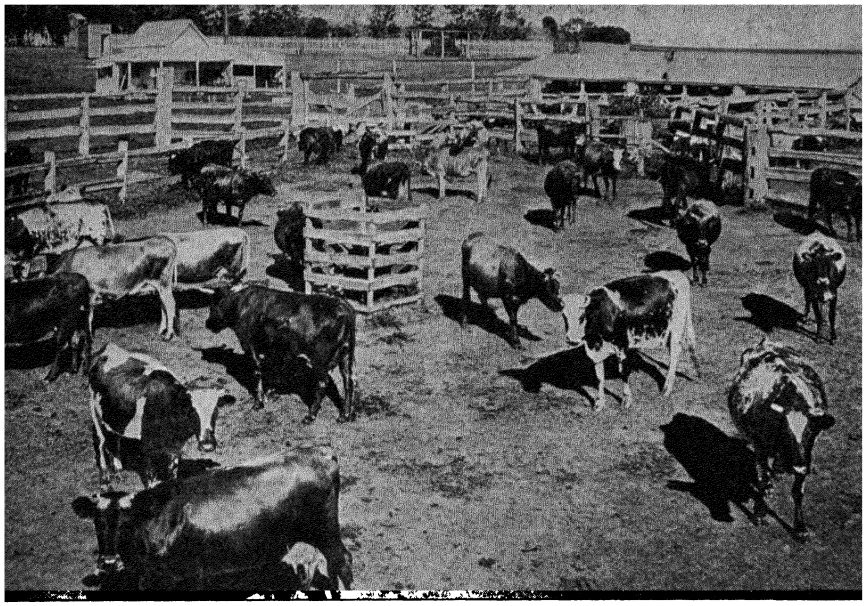


Photo from Ewing Galloway

An Australian dairy herd in the feeding lots, awaiting milking time

crops are not very unlike our own. Wheat, oats, hay, sugar cane, apples, and grapes are raised there.

Australia is one of the important wheat-exporting countries of the world. Several other countries produce more, but the small home consumption makes a large export possible. Modern machinery like our own is used in planting and harvesting the grain.

Hay, which is used as food for dairy cattle, is a highly important crop. Alfalfa and unripened oats are also used as fodder.

In northeastern Queensland where the climate is warm and moist, sugar cane is grown in amounts sufficient for home supply. With cheap labor tropical Australia could doubtless be more highly developed.

Australian fruit has become noted in the markets of Europe. It is harvested and ready for market in our spring when northern fruit is scarce. Apples are grown abundantly in Victoria and in the large island of Tasmania at the south. Grapes of high quality are grown in Victoria, South Australia, and in the country about Perth in the west. Raisins and wines are made from these grapes. Bananas, pineapples, and coconuts grow abundantly in the north.

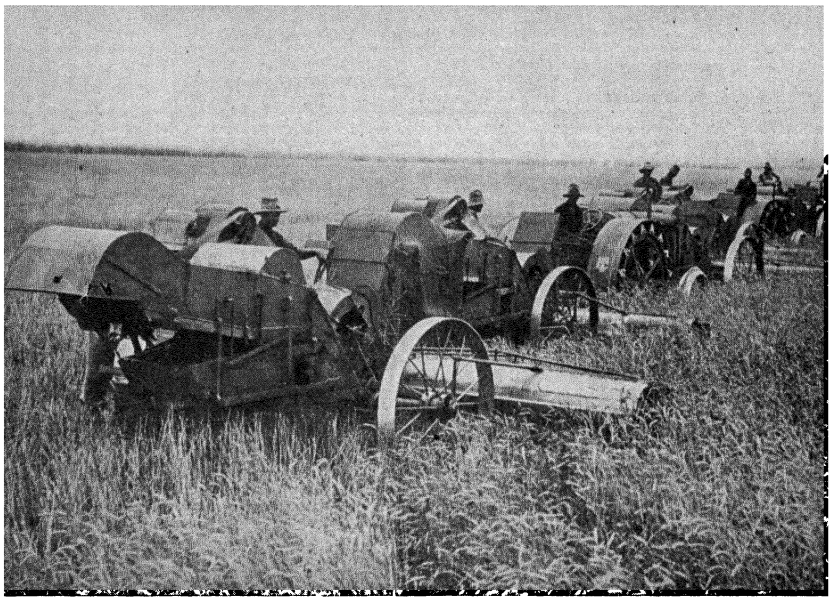


Photo from Ewing Galloway

Wheat headers in formation on a large wheat farm near Pittsworth, in Queensland. In a recent year Australia planted 14,000,000 acres to wheat and harvested over 214,000,000 bushels, much over half of which was exported.

Forest products. Australia is not a highly important forest area. The eucalyptus tree which reaches great size is by far the most valuable. Some species make good timber while others have but little value. The bark of the eucalyptus is much used in the tanning of leather. The wattle tree also furnishes valuable tanbark and has been transplanted in South Africa for this purpose. The eucalyptus of our Pacific Coast was introduced from Australia.

Minerals. Australia has considerable mineral wealth. Coal, lead, zinc, copper, silver, and gold are among the exports. The dominion is fairly rich in both coal and iron. The principal coal fields are those of New South Wales not far from Newcastle. The iron ore comes chiefly from South Australia. It is shipped to New South Wales for smelting.

With an annual production of nearly $50,000,000 worth of gold Australia may still be regarded as an important gold-producing country although the present output is much smaller than it was a generation ago.

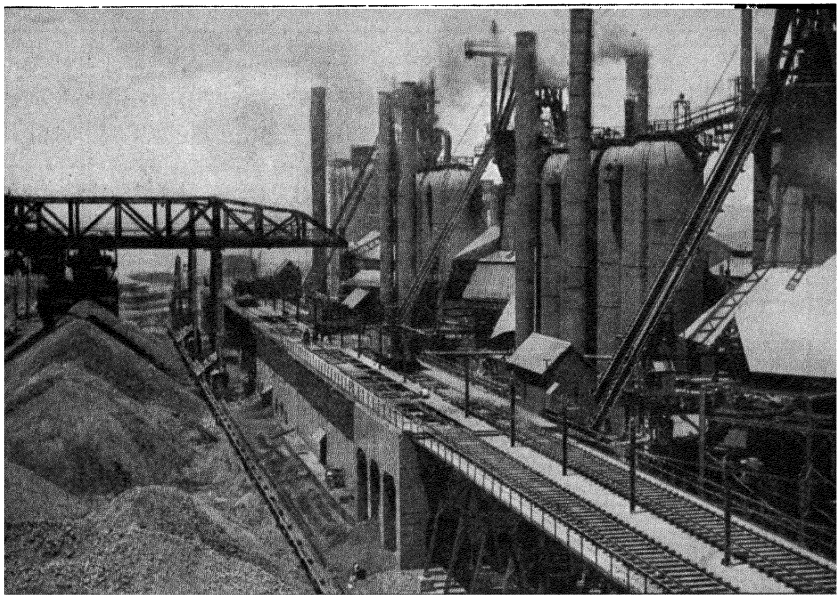
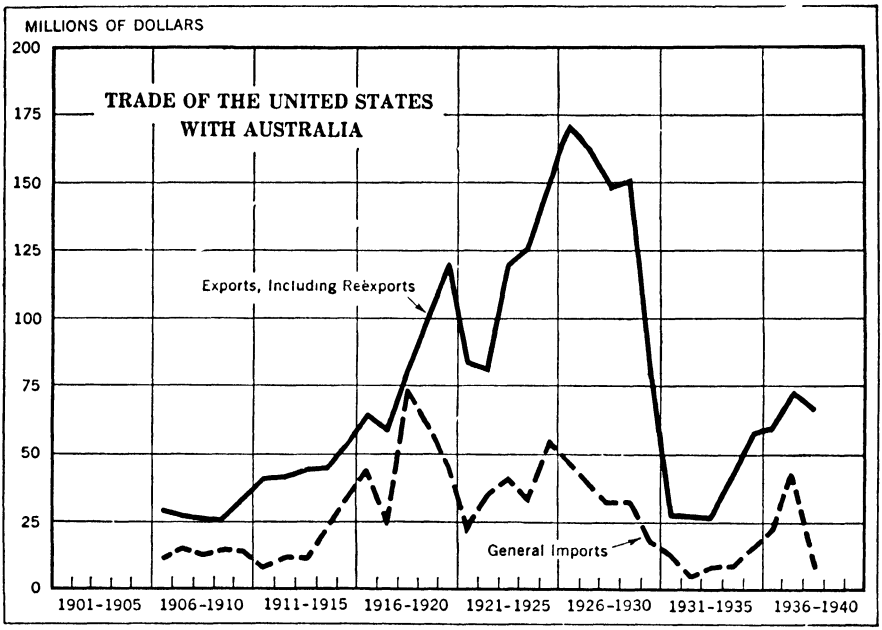


Photo by James Sawders

A partial view of the Broken Hill Steel Works at Newcastle, New South Wales. Iron ore from South Australia is brought to this plant which is located in the coal fields.

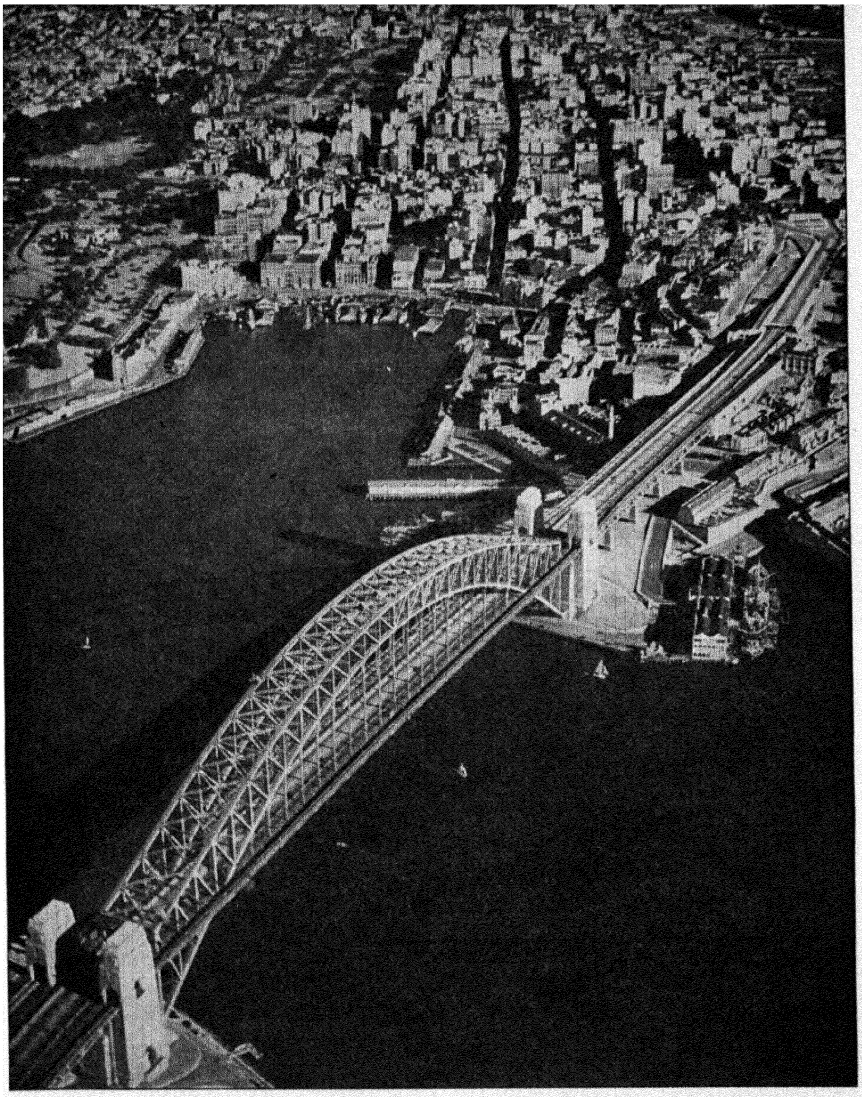
Few manufactures. Australia is primarily an agricultural and herding country. Manufacturing has not developed to a very great extent and the country depends largely upon others for its manufactured goods. The iron and steel industry, most highly developed at Newcastle, is the most important of the home industries. Many of the country's locomotives, steam engines, steel ships, and farm machines are of Australian make. Other manufactures are lumber, leather, shoes, furniture, flour, woolen goods, butter, cheese, and meat-packing products, all of which are closely related to the raw materials of the country. American and British capital are invested in the meat-packing industry.

Trade with other countries. The products of the animal industries, including wool, skins, meats, and dairy products, together with wheat, flour, and fruits constitute the bulk of the exports. These find their best market in the industrial countries of the world, especially the mother country and the United States. Australian imports are mainly special manufactures, such as automobiles, many kinds of machinery, petroleum products, paper goods, textiles, and clothing.



Commercial cities. *Sydney* is the metropolis of the dominion and ranks third in population among the cities of the British Empire. It is located on the eastern coast of New South Wales. It has a remarkably fine harbor which accounts, in the main, for the city's importance. It was the first British settlement made in Australia. It is the dominion's leading wool market and an important manufacturing center. *Melbourne* is the second largest city in the country. It has important exports consisting of hides, wool, and wheat. Flour, leather, woolens, and furniture are among the leading manufactures. *Adelaide* is the natural outlet of the Murray-Darling basin. It ships meat, wool, hides, dairy products, and wheat from that important area. Slaughterhouses, electric plants, and waterworks are owned and operated by the city. Government ownership and operation of many lines of business is characteristic of Australian cities and states. *Brisbane* is the most northern of the important Australian ports. Its nearness to coal fields and its location upon a small navigable river are important elements in its growth. Sugar, wool, and gold are some of its exports.

Railroads. Australia has 27,000 miles of government-owned railroads. Separate railroad systems serve the individual ports and each system has its own gauge or track width which makes it necessary to



Airview of Sydney, the capital of New South Wales and the largest city of the Commonwealth. Only two cities of the British Empire have more inhabitants than Sydney.

change cars when freight goes from one system to another. This is an unnecessary expense and a distinct hindrance to domestic commerce. Now a transcontinental railroad spans the southern portion of the continent. Other roads supply the more densely settled regions in the east and an area about Perth in the southwest.

Ocean routes. Australian goods for European or American markets may be shipped by one of several routes. Ships from eastern Australia going west usually pass to the south of the continent and touch at Perth. From here they may go around the Cape of Good Hope or through the Suez Canal, but many of the goods on their way east pass through the Panama Canal.

Importance of the dominion to the mother country. Great Britain needs food from many sources, and Australia's wheat, mutton, beef, dairy products, and fruits help greatly in supplying these needs. The great supply of wool means much to English factories. Much British capital is invested in the development of Australian industries. Although the population of the dominion is not large, there is a considerable market for the products of English mills With its many undeveloped resources Australia is an important outlet for British immigration. Immigrants remain British subjects after settlement in the dominion. The country is a valuable coaling station and naval base and is of great service to the mother country in time of war.

Australian problems. Eastern Australia, the most promising part of the dominion, is almost the greatest possible distance from the great markets of western Europe and the United States. Bulky cargoes must be shipped nearly halfway around the world to reach the important markets. This is a distinct disadvantage in competition with other nations which are much nearer to these markets. If the cargoes had greater value per pound, the disadvantage would not be so great.

Australia is an agricultural country and requires many workers. Labor is scarce and manufacturing suffers. There is much prejudice against all colored workers. Without such labor the development of the tropical regions will necessarily be slow. Sugar, cotton, bananas, and other tropical fruit may be more important in the future. The railroads of the country need to be brought to a common gauge and unified if best results are to be attained.

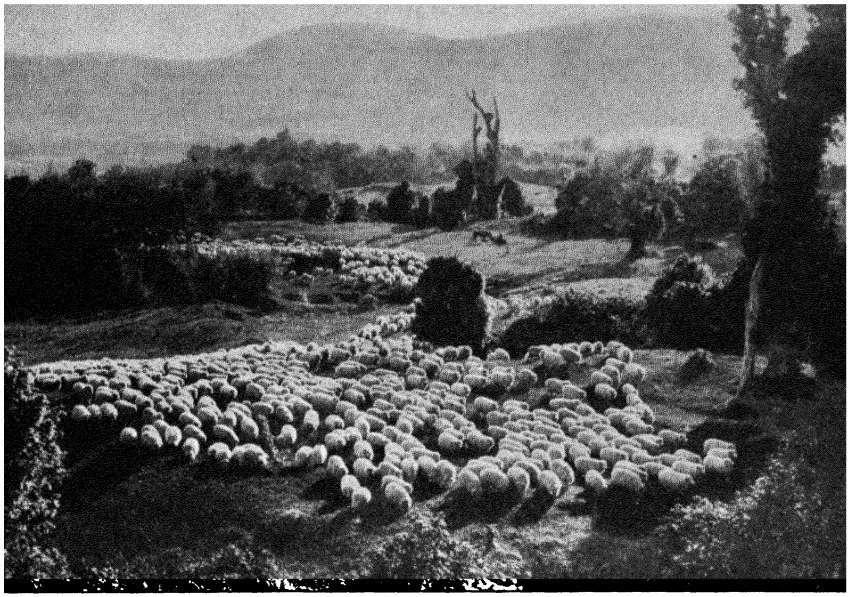


Photo by James Sawders

Yards and yards of wool on the hoof in this sheep muster at Gisborne, New Zealand, one of the principal wool-exporting countries of the world

New Zealand

The dominion. New Zealand, like Australia and Canada, is a self-governing dominion of Great Britain. It lies 1200 miles or more east of Australia and consists of two large islands—North Island and South Island. It is even more isolated than eastern Australia. It is about as far south of the equator as the northern half of the United States is north of it. Its climate is therefore temperate though the winters are somewhat warmer than in the United States because of the insular character of the country. Both islands have high and beautiful mountains as well as extensive lowlands well suited to agriculture. The northern island has volcanoes and hot springs. Some of the mountains on the western side are snow-capped throughout the year and are known as the Southern Alps. The area is only a little greater than that of Colorado and its population is about half as much again as the population of that state.

Animal industry. New Zealand, like Australia, raises many sheep and cattle. The cool, rugged land in the south is well suited to the wool-producing Merino while the big mutton-producing



Photo by James Sawders

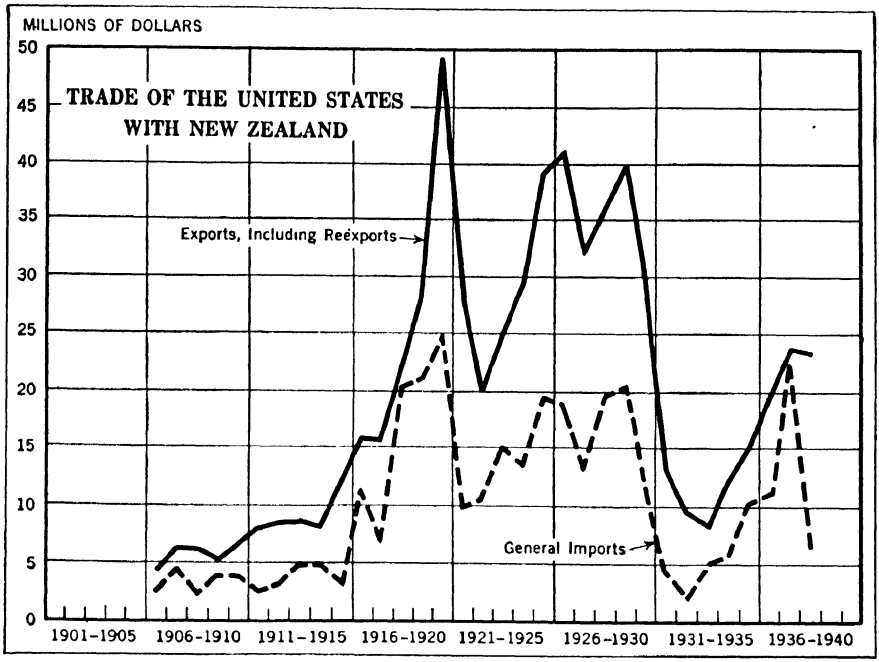
Farmer coöperatives have been in existence in New Zealand for many years. The Kaponga Dairy Factory, on North Island, to which the neighboring farmers bring their milk for processing, belongs to the coöperative system.

Southdown does well both in the north and the south. More than half of the wool goes to England and wool is New Zealand's leading export.

In New Zealand, as well as in Australia, the rabbit has become a pest and is being vigorously fought. It is a source of income, however, as more than $3,000,000 worth of skins are sold in some years.

Butter and cheese are produced in great quantities. New Zealand is second only to the Netherlands in the amount of cheese produced. The first cattle brought into the country were used wholly for beef and hides. Today, however, the finest dairy cattle are being bred. The most up-to-date methods and appliances are used to improve the quality and reduce the cost of the products. New Zealand's dairy products rank high in foreign markets.

Kauri pine. This is New Zealand's most valuable forest tree. It has been cut so much that it is becoming scarce. The tree grows to an enormous size, makes an excellent quality of lumber, and



furnishes a gum of great value in making varnishes and linoleums (p. 128). The resinous gum of ancient kauris is now dug from the ground as fossil gum and is as valuable as the recent product. Great lumps weighing nearly 100 pounds are sometimes found but the pieces are generally of much smaller size. When found, it looks much like amber. This substance is highly valued but it is becoming scarce as the years pass.

Products and trade. The manufactures are almost wholly those of the dairies and packing houses. It must be remembered that these products must cross the torrid zone on their long journey to market and must be prepared accordingly. Cold storage is necessary to these shipments. Coal and gold are mined in sufficient quantities to export. New Zealand's chief exports are wool, frozen meats, hides, and dairy products. Hay, wheat, oats, and potatoes are raised extensively for home consumption. The five leading imports are automobiles, petroleum and petroleum products, clothing, and tea. Auckland and Wellington are the chief ports. The railroads are nearly all government-owned as in Australia. Ships must sail halfway round the earth to reach the British markets.

Guides to Study

1. How does it happen that most people in Australia live in the eastern part?

2. Why is New Zealand's population more evenly distributed than Australia's?

3. Why are neither Australia nor New Zealand important industrial nations?

4. How is Australia important to Great Britain?

5. In what season of the year is Christmas celebrated in New Zealand?

6. Wool is more important than mutton in Australia. Why?

7. Why do we not import more goods from Australia and New Zealand?

8. As a whole which of the two countries is better adapted to farming? Why?

Research for Students

1. How did the native inhabitants of Australia differ from those of New Zealand? How have they differed in later development?

2. On a map of the world trace the routes taken by the products of Australia and New Zealand to their foreign markets. How are these countries handicapped?

3. On an outline map of Australia and New Zealand indicate the regions noted for cattle, sheep, grains, and fruit. What advantages has each region for its product?

4. On the same outline map locate the chief cities of each dominion. For what product or industry is each city important?

5. What is the meaning of the names Australia and New Zealand? Why were these countries so named?

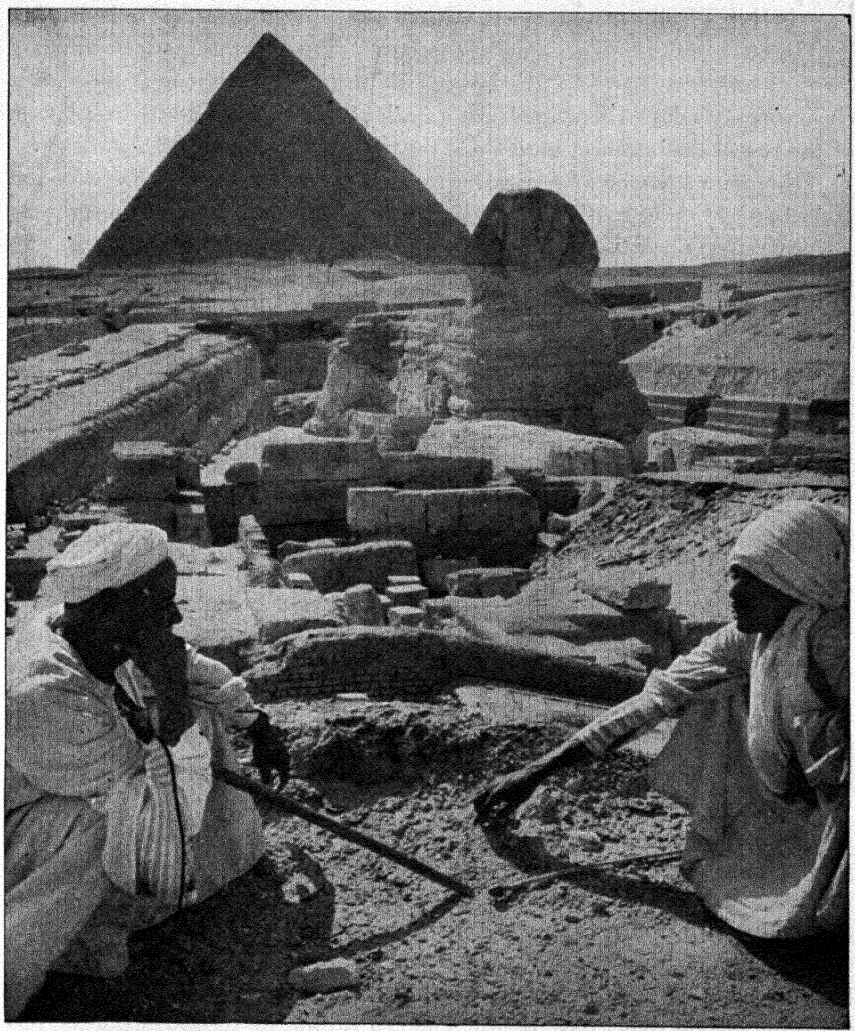


Photo from Keystone View Co.

Perhaps these two men of Egypt are discussing the relative merits of ancient Egypt *versus* ancient Rome. Between them and the Sphinx are the ruins of old Roman walls and of an altar.

FORECAST OF UNIT NINETEEN

AFRICA is next to Asia the largest of the continents. Until the digging of the Suez Canal it was connected with Asia by the Isthmus of Suez and in ages past it was connected with Europe by broad peninsulas. Although it lies so near Asia and Europe, until very recent times it was referred to as the "unknown" or "dark" continent. It is true that along the banks of the Lower Nile there developed one of the earliest civilizations, yet Egypt constitutes but a small part of Africa and little was known of the rest of the continent until about the time of the discovery of America.

There were a number of geographic factors that made difficult the exploration and settlement of the continent. Unlike the continent of Europe it has no projecting peninsulas or penetrating seas that would open up the continent to approach by sea. Although Africa is three times as large as Europe, it has less shore line. Much of the continent is a plateau with narrow lowlands bordering the sea. Where the large rivers pass from plateau to lowland, there are falls which prevent ships from ascending the rivers. Since the continent lies mostly within the tropics, the bordering lowlands are hot, moist, and unhealthful, not at all suited to habitation by white men.

The unhealthful climate characteristic of the bordering plains also exists throughout a large part of central Africa which lies in the rainy belt of tropical calms. Such a climate discouraged exploration of this part of the continent even when the low plains of the coast had been crossed. On the north the Great Desert (Sahara) barred passage overland toward the south. For centuries Europeans have explored, settled, and traded along the Mediterranean shores of Africa, but there was little penetration southward into the Great Desert. This northern border once boasted the famous city of Carthage, a rival of the Roman Empire.

The discovery by Vasco da Gama of the sea route around Africa to India brought to Europeans a knowledge of South Africa, a portion of the continent well adapted as a home for Europeans because of its temperate climate and its agricultural and mineral resources. Emigrants from Europe found throughout Africa primitive peoples who were easily overcome. It is for this reason that we find the continent divided up into colonies belonging to European countries and the resources of Africa almost wholly under the control of races who are not natives of the land.

Egypt and Liberia are the only independent countries left in Africa and the former has a close relationship with Great Britain. While its sovereignty is unimpaired, certain rights have been granted to Britain by treaty. Ethiopia, formerly an independent kingdom, was forcibly annexed by Italy and its conquest has been formally recognized by the great powers of Europe. Italy is trying to colonize Libya and Ethiopia in order to secure raw materials needed for its industries and to provide a colonial market for its surpluses.

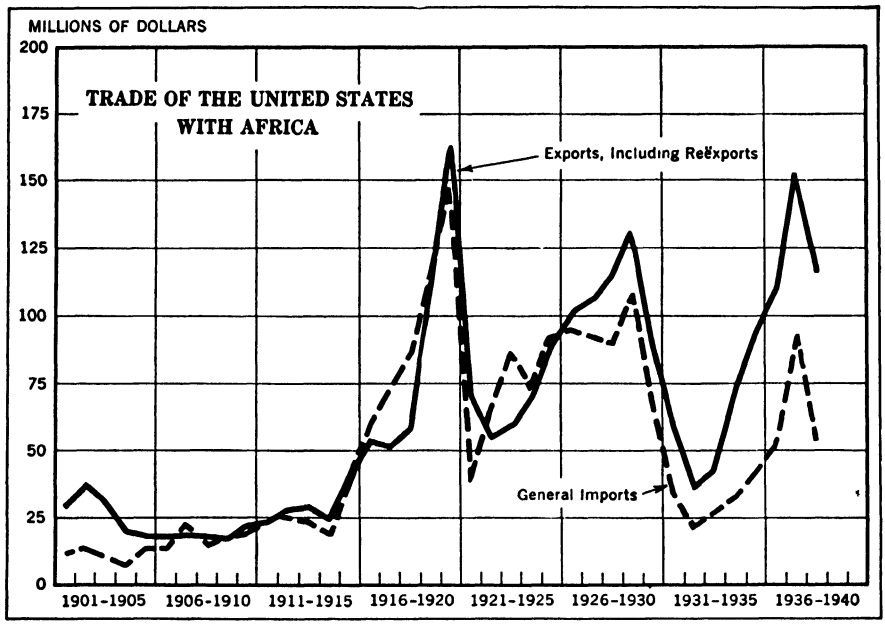


Photo by James Sawders

A typical small village scene in Egypt not far from Cairo where architectural styles have changed not at all through the centuries

A LAND PARTITIONED BY EUROPEAN NATIONS

Africa—the dark continent. The land mass of Africa is really an extension of the land forms of Europe and Asia. During long geologic periods it was connected with them by broad isthmuses. Yet, notwithstanding its nearness to Europe, Africa today is still to a large extent an unknown land. Why is this so? The northern part is largely a forbidding desert, the central part is a tropical jungle, and the greater part of the continent is a high plateau with its rim near the coast. There are several large rivers in Africa, but many of them have steep falls near their mouths or along their courses, making exploration by river routes almost impossible. With the exception of southern Africa the climate of the continent is not suitable for the life of the white man. The early voyagers on their



way to India usually stopped just after rounding the Cape of Good Hope to take on supplies of wood and water or to make repairs to their vessels. No attempt at colonization was made, however, until after a shipwrecked crew was stranded there for several months. Their report of the region was so favorable that the Dutch East India Company organized a settlement near Table Bay (the harbor of Capetown) in 1652. This was the beginning of the Dutch influence in Africa.

Egypt—the gift of the Nile. This country in the northeastern corner of Africa is really a part of the Sahara. It has practically no rainfall, but it is traversed by the River Nile which has its source in the equatorial lake, Victoria Nyanza. The heavy periodic rainfall in its upper reaches causes the Nile to overflow its banks regularly. In this way the extremely fertile flood plains and deltas of the Nile have been built up. For six thousand years and more it has been the giver of life to people known as Egyptians. The flood waters begin to rise in June, reaching a peak of thirteen feet at Cairo in October. Several great dams regulate the flow of the river. The most recently constructed dam, finished in 1937, is about three miles long, the longest in the world. The basin system of irrigation still practiced in certain areas is the same system that was in vogue 6000 years ago.

Water to the depth of several feet is admitted to an area and allowed to stand for five or six weeks. It is then drained off and the ground is seeded. Cereals, beans, and lentils are grown under this system Ditch irrigation was introduced about a hundred years ago. The British have helped improve this system by the construction of a network of canals. Under this system cotton and sugar cane can be grown as well as vegetables and cereals. The season admits of two or three crops a year.

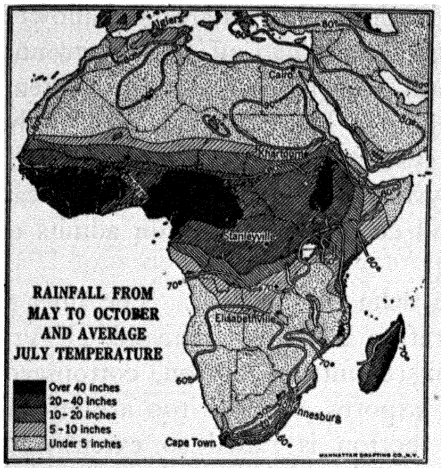
Cotton is raised chiefly on the delta of the Nile. The fiber is of the long-staple variety and therefore is in great demand. Egypt ranks fourth as a cotton-producing country. Cotton, cottonseed, and cottonseed cake are the chief exports. Onions too are an important article of export. Since cotton is raised so extensively, Egypt is obliged to import large quantities of foodstuffs. Although cotton is the chief crop, there is practically no manufacturing carried on. Cotton goods are imported, chiefly from England. There are a few sugar refineries. Cigarettes are manufactured for domestic consumption and some are exported.

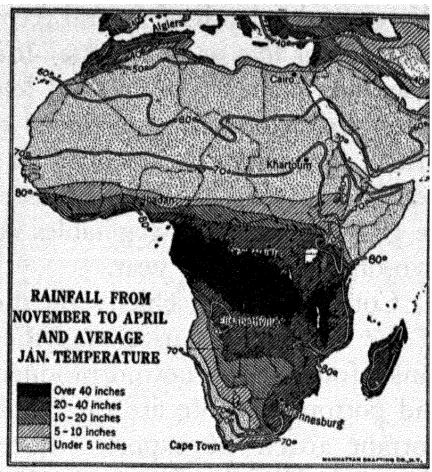
Alexandria, founded by Alexander the Great in 332 B. C., is Egypt's most famous Mediterranean seaport and one of the world's large cities. Cairo, the capital of Egypt, is one of the largest cities in Africa. The present Cairo is at least the fifth city built upon its site. It is in many aspects a modern city. Port Said, at the Mediterranean end of the Suez Canal, is important commercially and as a port of call. Much of Egypt's cotton is exported through this city and vessels of all nations coal there.

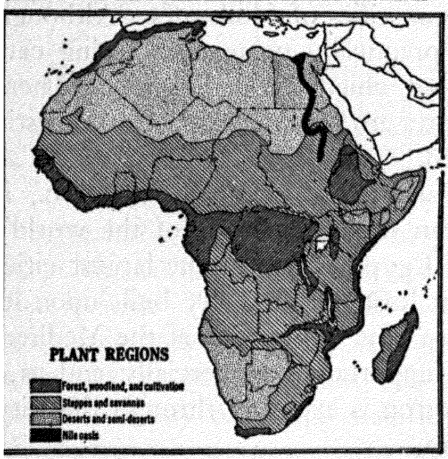
Home rule. Egypt, long under the control of the British government, is now free of British domination and occupation except for garrisons maintained for the protection of the Suez Canal. The British also have the right to use Alexandria and Port Said as naval bases in case of need and in the event of war to move troops over Egyptian territory.

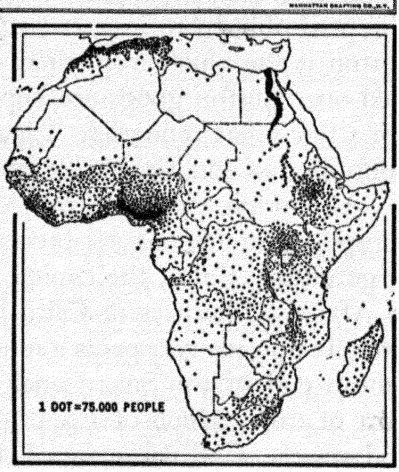
Anglo-Egyptian Sudan

The Sudan is that part of Africa lying between the Sahara on the north and the equatorial forests on the south. The Anglo-Egyptian Sudan is that portion of the Sudan which lies directly south of Egypt. As its name implies this colony is jointly controlled by Egypt and Great Britain and flies both the Egyptian and the British flags. Its northern portion lies in the great Libyan Desert; and its









southern portion in the tropical jungle. It is in the heart of this colony that the Blue Nile and the White Nile unite to form the River Nile. This portion of the Sudan is a grassland having two seasons, one wet and one dry. Agriculture and grazing are the chief occupations. By the aid of irrigation long-staple cotton is grown in the north. Great Britain looks to this region for much of its supply of raw cotton and hence is ready to supply capital for irrigation dams to insure the crop.

The world's supply of gum arabic comes from the forests in the south. The gum which is an exudation on the bark of a tree is of great commercial importance. It is widely used in the finishing of paper and textiles, in medical prescriptions, and in the making of candy, mucilage, and ink. Dates are raised and dried for local con-

sumption. Some are exported into Egypt. Egypt also looks to the Sudan for its meat supply.

British East Africa

Uganda, Kenya, and Tanganyika are grouped in this territorial division of Africa. It is bordered by the Indian Ocean on the east and is directly crossed by the equator. In the heart of this region is Victoria Nyanza, the source of the Nile. Because of its location and climate it is inhabited chiefly by native colored races and Asiatics.

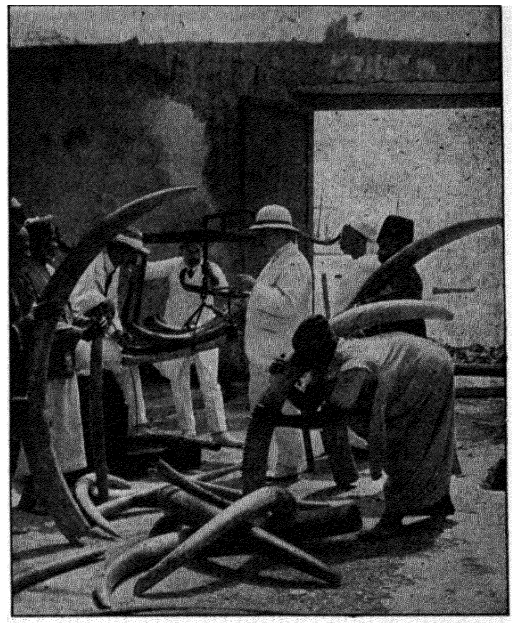


Photo by James Sawders

Weighing elephant tusks at the port of Mombasa. Natives bringing in a part of the 45,000 pounds of ivory that is shipped annually from Kenya, British East Africa, to all parts of the world.

The lowlands bordering the coast have a hot, moist climate well adapted to the growing of sugar and coconuts. Much copra is exported. In the interior there is an extensive plateau having an altitude of over 4000 feet. Although this lies directly in the path of the equator, because of its elevation it has a climate much like that of California. This region is better adapted than any other part of central Africa to the life of the white man; yet it is at present a wilderness abounding in game and occupied chiefly by roving tribes. Corn is grown for native consumption, and some cotton and sisal are raised for export. It has been claimed that enough cotton could be grown here to supply all of Britain's needs if the natives could be induced to apply themselves to regular work. Like so many primitive peoples the men are content to leave the routine drudgery of providing a living to their womenfolk.

Big game. Although western Tanganyika is sometimes referred to as the *gorilla country*, the elephant and many other kinds of big game abound there. It is a happy hunting ground not only for the natives, but for hunters from all over the world as well. Some ivory

is exported from this region. For many years the ivory exported was secured from elephant "cemeteries" where the old and sick elephants had withdrawn to die. Today about fifty percent is secured from animals that are slaughtered chiefly to restrict the size of the herds. Tons of fodder is consumed by them in the course of a year; so, as settlements grow, it is very necessary to limit their number. Civilized man has always appreciated the beauty of ivory, fashioning it into objects of use and adornment. It is now used chiefly for toilet articles, chessmen, billiard balls, and piano keys.

Off the coast lie the islands of Zanzibar and Pemba. These might reasonably be called *spice islands* as nine tenths of the world's supply of cloves is grown here. Coconuts are also raised and some copra exported. Tanganyika is one of Germany's lost colonies, since the World War being mandated to Great Britain.

British South Africa

With the exception of Mozambique British South Africa occupies the whole southern part of the continent. The Union of South Africa has a dominion status in the British Commonwealth of Nations. It is made up of four provinces: the Orange Free State, the Transvaal, Natal, and the Cape of Good Hope. South-West Africa, another of Germany's lost colonies, is mandated to the Union of South Africa. Rhodesia and Bechuanaland lie north of the Union of South Africa. Northern Rhodesia is a Crown colony, Southern Rhodesia is a self-governing colony, and Bechuanaland is a protectorate. As this portion of Africa lies almost wholly within the temperate zone, it is peopled by a larger proportion of Europeans than any other part of the continent.

The veld and the bush. From a very narrow coastal margin the surface of South Africa rises in a succession of hills separated by barren wastes until an elevation of a mile and more is reached; then it extends north in a vast plateau. Portions of this plateau consist of grassy rolling prairies, known as the *veld;* other parts are covered with a growth of scrubby trees, known as the *bush.* This continental plateau is higher in the east than it is in the west. Lying as it does in the belt of the southeast trade winds, the eastern highlands of this region have a heavy rainfall which becomes much lighter in the west.

The Great Karroo. Grazing is a very important industry on the semiarid uplands where the *karroo,* a low, scrubby plant, grows luxuri-

antly in the wet season. Some portions of the terraced uplands near the coast are called the Great Karroo because of the abundance of this plant growing there. The karroo makes excellent pasturage for sheep, goats, and ostriches. The Union of South Africa exports more wool than any other countries except Australia and Argentina. Breeds of sheep are constantly being improved by importation of animals from Australia and Europe. Herds of Angora goats are kept on the portions of the plateau that have too scanty a vegetation for sheep. The long, glossy Angora hair is extensively used in the manufacture of such pile fabrics as velour, plush, and imitation fur. South Africa leads in the production and export of Angora. Ostrich farming is also an important industry.

Cultivated crops. Indian corn is the principal farm crop. It is raised chiefly by the natives for home consumption, but there is usually a surplus for export. On the eastern lowlands there are many sugar plantations operated by Europeans. Some cotton and tobacco are also grown. In the lowlands and in the mountain-protected valleys much fruit is raised. As the seasons here are the reverse of those in the northern hemisphere, the crops mature when the demand is greatest. Pears, grapes, peaches, and citrus fruits find a good market in European countries and even in the United States when their own supplies are exhausted. Some subtropical plants, such as the pineapple, mango, and banana, are raised in the moist lowlands.

A shining industry. Until the year 1867 the chief industries of this entire region were farming and grazing. The settlers were principally Dutch (Boers). One day some Boer children were found playing with a pretty stone which they had picked up on their father's farm. It proved to be a diamond of the first water and sold in Paris for $2500. From that day the whole history of South Africa was changed. The diamond rush was on. For many years South Africa led the world in diamond production. Tons of diamonds were produced. It still ranks high—many of the gems found there being of exceptional beauty and value.

The value of a diamond depends not only on its size and brilliance, but also on the purity of its color as well. The largest and most flawless stone ever found came to light in the Transvaal in 1905. It is named the Cullinan diamond from the name of its discoverer. It measured 4 by $2\frac{1}{2}$ by $1\frac{1}{4}$ inches and weighed a little more than one and one-third pounds. Its surface indicated that it was only a part of a still larger crystal. It was cut into nine stones. One

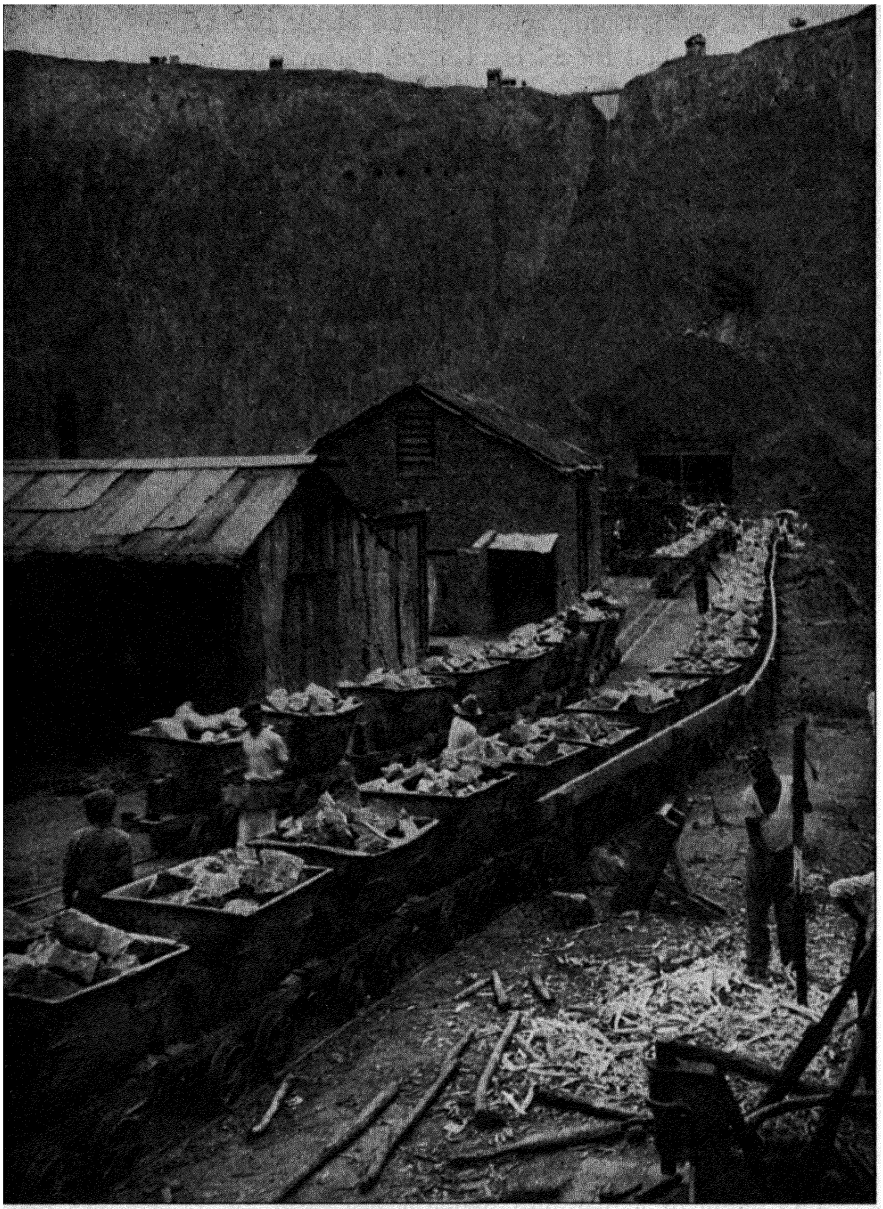


Photo by James Sawders

Pretoria diamond mine—cars loaded with rock—blue earth—ready to be lifted to the crusher on the surface. After going through the mill, it is weathered. It takes about 70,000 tons of blue earth to produce ten pounds of diamonds.

is in the scepter and another in the crown of the king of England.

In the alluvial lands of the Orange River and its tributaries diamonds are found. The diamonds are panned as gold is panned. This form of diamond mining yields comparatively few stones. It is the *dry diggings* that yield the largest returns. The dry diggings are circular or oval deposits of carboniferous shale, *blue earth*, which extend far below the surface in the pipes of very ancient extinct volcanoes. A diamond, you know, is pure carbon crystallized. Some geologists believe that the crystals were formed in the shale by the heat of the molten lava; others believe that the crystals were formed far below the earth's surface and forced up from below by the force of the volcanic eruption.

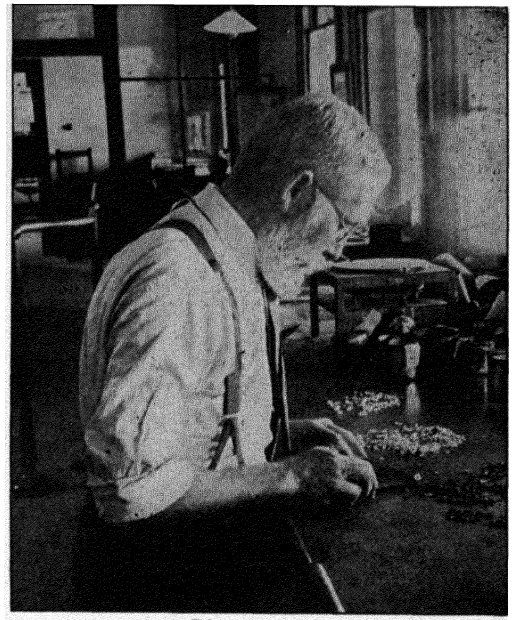


Photo from Keystone View Co.

The diamonds near the end of the line at Kimberley, South Africa. Careful judgment and keen sight are necessary at the sorting and grading table.

Shafts are sunk and tunnels excavated beside these old volcanic pipes. The soft rock in the pipe is dynamited, brought to the surface, and spread out to weather. It is allowed to soften for several months. It is then put through washing machines to separate the diamonds and other stones from the debris The stones are then passed over vibrating tables covered with grease, to which only the diamonds adhere. The yield is usually ten pounds of diamonds to 70,000 tons of blue earth.

Every possible precaution is made to prevent the theft of stones. The mines are surrounded by barbed-wire inclosures. The employees, chiefly natives, are compelled to live within the inclosure during the period of employment. They are always under the watchful eyes of the overseers, and little opportunity is given for stealing a stone.

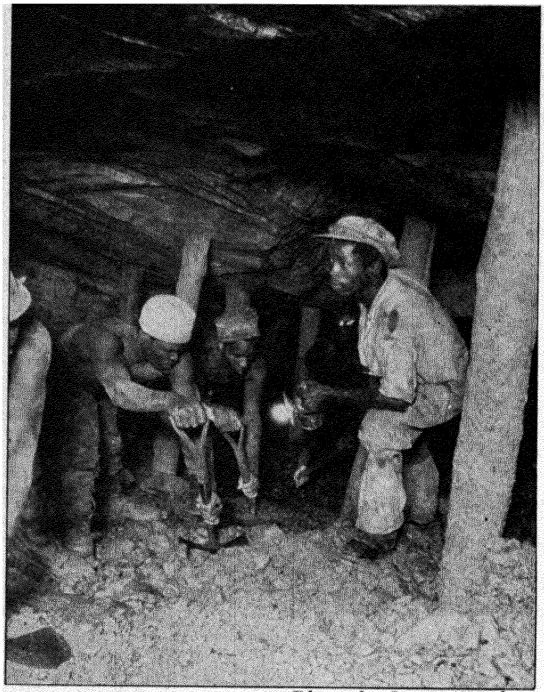


Photo by James Sawders

Working under difficulties in a low-ceilinged shaft of a gold mine near Johannesburg.

Kimberley, Pretoria, and Johannesburg are the chief diamond centers. The great diamond companies not only control the industry locally and regulate the prices in the world market, but they also exert a strong political influence.

The diamond put to work. We usually think of diamonds solely as articles of adornment. The demand for this purpose is very great, but it is not the chief use to which the precious stone is put. In addition to its brilliancy and beauty a diamond is also hard, the hardest substance known. It takes a sharp edge which is most useful as a cutting implement. Stones not suitable for gems are imbedded on the edge of a hollow cylinder to make a diamond drill for drilling rock and other hard substances. The widespread use of alloys in modern industry, especially in the manufacture of armaments, calls for a corresponding use of the diamonds as an abrasive. Diamond abrasive wheels, in which diamonds or diamond dust is imbedded, drills, dies, and bits are widely used in this as well as in many other metallic industries. Diamonds used in this way wear out—slightly more than half must be replaced each year. Because of this fact there is a steady demand for industrial diamonds. In 1937 South Africa's diamond output amounted to 1,030,434 metric carats worth about $17,000,000.

The chief diamond-cutting centers of the world are Amsterdam in the Netherlands and Antwerp in Belgium. The United States is a large importer of diamonds both for jewelry and for industrial purposes.

A trek that led to gold. One hundred years ago (1836) descendants of the Dutch colonists in Cape Colony, dissatisfied with British domination, began their famous trek to the northwest, through a region later to become the Orange Free State and across the Vaal River into a region now known as the Transvaal. It was nearly fifty years, however, (1884) before gold was discovered in the great *Witwatersrand* (White Water Range), the richest gold-producing region in the world. The mines extend along the range for a distance of more than fifty miles and the combined length of all their shafts and tunnels would reach from the Cape to Cairo, the whole length of Africa. A quarter of a million men find work here. Coal is near at hand. This fact coupled with the abundance of cheap native labor gives a great impetus to the industry. Johannesburg is the center of the gold-mining area as it is also one of the diamond centers. Unlike the diamond the gold here is invisible, occurring in particles too small to be seen by the naked eye, yet the yield is so great that this is one of the most important gold-producing areas of the world—producing about a third of the world's supply.

The Union of South Africa has a world-wide trade. In the order of value the exports are gold, wool, diamonds, fruits, and hides and skins. Naturally the bulk of these exports go to Great Britain. Since there are many Europeans settled there, automobiles, petroleum, cotton goods, and wearing apparel are imported. The imports come from Great Britain, the United States, and Germany. Capetown, Port Elizabeth, East London, and Durban are the chief ports.

West Africa

That portion of Africa lying north of the Belgian Congo and extending from the Gulf of Guinea to Morocco and Algeria is commonly referred to as West Africa. Within this area lie Nigeria and the Gold Coast which are British possessions and Senegal, Ivory Coast, Dahomey, French Equatorial Africa, and French West Africa—all belonging to France. Mandated to Great Britain and France jointly are the Cameroons and Togoland, former German colonies. The coastal plains here are low and swampy. The interior is a part of the extensive African plateau. The coastal plains and the southern portion of the plateau are in the belt of heavy equatorial rains. The climate is hot and not adapted to the white man.

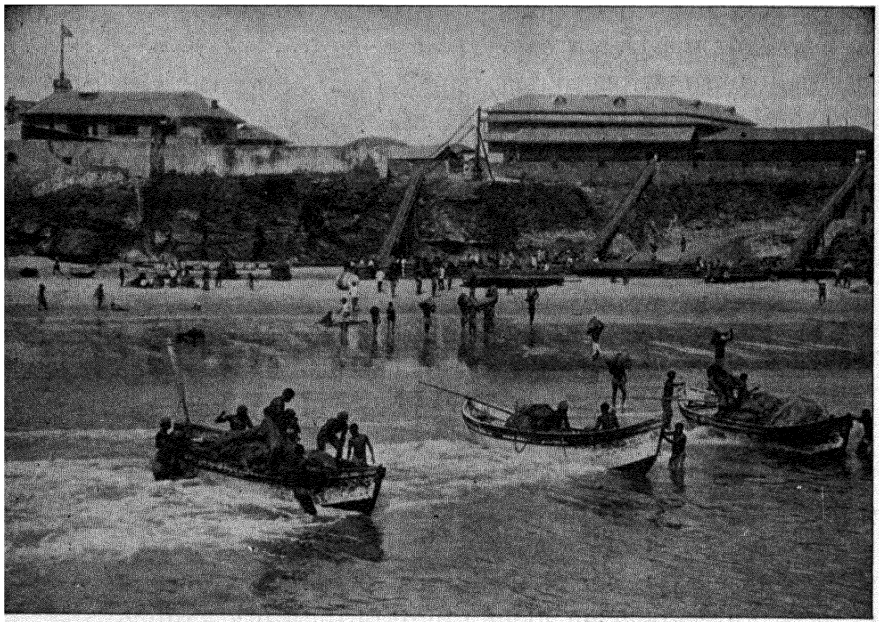


Photo from Ewing Galloway

The Gold Coast is an important cocoa-producing region of Africa. These surf boats transport the bags of cacao beans to the waiting steamers that must anchor some distance offshore because of a lack of harbors.

In the moist plains of the lowlands there are tropical forests. Mahogany, ebony, and wild rubber are important exports. The oil palm (p. 126), a tree prized by the native for the oil that it yields, grows in abundance. Much of its oil is exported. This is the largest cacao-producing region in the world. Attempts are being made to establish cacao and rubber plantations, but here as in tropical East Africa it is difficult to secure competent labor. The tropical forests gradually merge into the grassy uplands of the Sudan where the natives carry on some agriculture and grazing. Millet, corn, rice, and cotton are grown here for home consumption and for export.

Gold Coast. As its name implies the Gold Coast is a coast and it does yield gold, but its coast is not extensive and gold is not the leading product. Early explorers gave it its name from the abundance of gold in the gravel along its riverbanks. The same river gravels now yield diamonds as well as gold. The diamonds are small, useful chiefly for cutting and abrading, but their export value is now second only to that of the Belgian Congo.

The region is a dense tropical jungle which is difficult to tame. In places, however, the land has been successfully cleared and cacao and oil-nut plantations have been established. Cacao is now the leading export. The Gold Coast leads the world in its production. Mahogany, ebony, and teak are also important exports, as is manganese, so necessary in the manufacture of modern alloys.

The Gold Coast exports in the order of their importance cocoa, gold, and diamonds. Much ivory is exported from the Ivory Coast and neighboring regions. Senegal exports nearly half a million tons of peanuts annually.

Belgian Congo

The Belgian Congo is situated in the heart of Africa with only a narrow corridor leading to the Atlantic Ocean on the west. It embraces practically all of the region drained by the Congo River and its tributaries. At the mouth of the Congo, which is navigable for about ninety-five miles, there is a fine natural harbor. Railroads have been built around the several falls; so the colony has an extensive system of communication and transportation. The upper headwaters of the river are in almost impenetrable tropical forests where wild rubber, cacao, and palm nuts flourish. Forest products, coffee, and ivory are exported. There is a valuable deposit of copper in this colony and copper mining is the chief industry. Pitchblende, the ore from which radium is obtained, is also found here, not far from the copper deposits. The ore is refined in Belgium and the yield is about two ounces a year. In recent years the Belgian Congo has become the world's greatest producer of diamonds.

Sahara

This great desert occupies the greater part of northern Africa. It is about as large as the continent of Europe. The surface is somewhat diversified. Large areas are vast wastes of sand that shifts and drifts almost like the waves of the ocean. Some of the dunes are three or four hundred feet high. The sand contains all the mineral elements necessary for growing vegetation. All that is lacking is water. In the valley of the Nile where irrigation is carried on, abundant crops are raised. The region lies in the northeast trade-wind belt. These winds are warmed as they blow toward the equator; so their capacity for holding water is increased. The surface here being comparatively level there are no highlands to force the

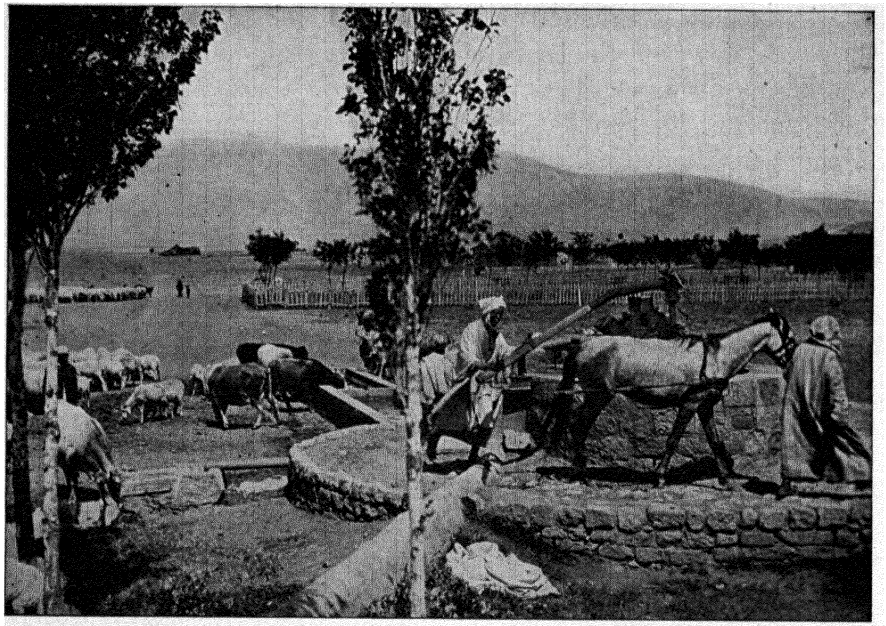


Photo by James Sawders

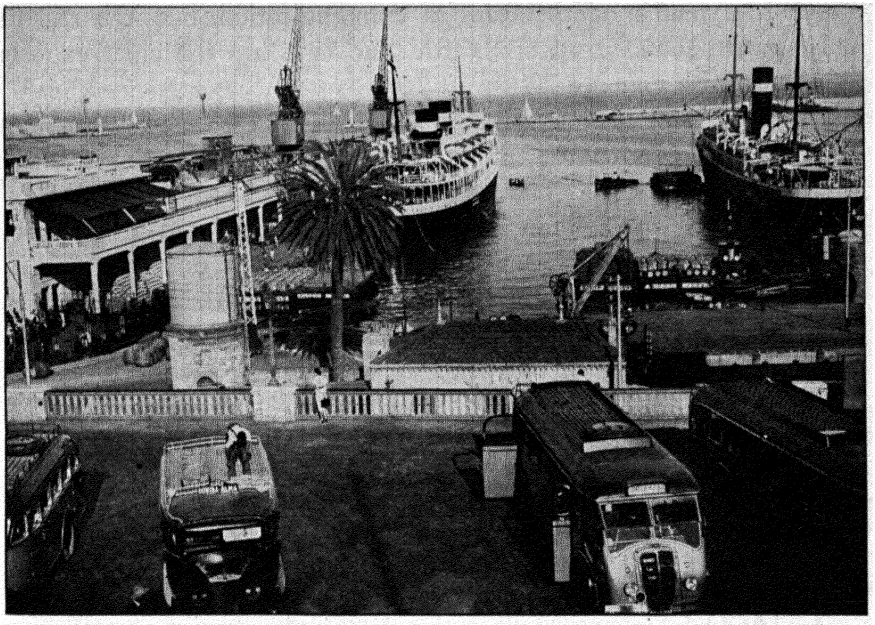
This is a model Algerian farm in the shadow of the Atlas Mountains. Water from this one-horse-power well supplies the cattle troughs and irrigates the vineyards, the grain fields, and the orchards where dates and figs are grown.

winds to higher altitudes, compelling them to give up their moisture in the form of rain.

Oases are fertile spots in the desert fed by underground waters which have their sources in distant highlands. Since water is always seeking ocean level, it seeps out in various hollows in the desert giving life to groves of date palms and oranges and to other tropical vegetation. Onions, melons, tobacco, and cotton are grown in some of these areas. The oases made possible the caravan routes of the desert.

Northwest Africa

The states of Morocco, Algeria, and Tunisia occupy the northwestern coast of Africa from a point on the Atlantic opposite the Canary Islands nearly to the toe of Italy. For international reasons Tangier near the Strait of Gibraltar has been set apart as a neutral zone. With the exception of a small part of Morocco these states are under French control, Algeria being a political division of France. Many French as well as Italians and Spaniards live there.



Port of Algiers—under French rule Algeria's coast cities have become modernized.

The Atlas Mountains, rising to a height of 12,000 feet and extending nearly east and west, form the backbone of the region. They shut out the scorching winds from the Sahara on the south and condense the moisture from the ocean winds blowing from the west so that the narrow coastal strip is comparatively productive.

Barbary Coast. Formerly known as the *Barbary Coast*, this region was for centuries infested by bands of pirates, known as *corsairs*, who preyed upon shipping and ravaged coasts as far away as Iceland. The United States paid them tribute until the year 1815 when Stephen Decatur of the United States Navy after a series of bombardments succeeded in making a treaty with them. Our country was the first to put a check upon their depredations.

The inhabitants of these countries, mostly Arabs and Berbers, who once struck terror to the hearts of all maritime nations, now depend chiefly upon agriculture and grazing for a living. The chief exports of Morocco today are phosphate rock, grains, cattle, and eggs. The agricultural products are much the same in all three states: wheat, barley, olives, linseed, fruit, nuts, and dates. There are mineral deposits, but mining is not a major industry. France is doing

much to extend modern means of communication, but it is still in a backward state. Iron ore, cattle, and eggs are the chief exports of the Spanish zone.

The port of Tangier situated within the neutralized zone near Gibraltar is governed by an international assembly. It is a well-known health resort. The city of Algiers, with a population of over a quarter of a million people, is quite modern and progressive. It supports many schools and one university. The city of Tunis in Tunisia is on the site of ancient Carthage, one of the greatest cities of antiquity, the rival of Rome and at the height of its power the arbiter of the destiny of the whole of the western Mediterranean.

Guides to Study

1. Why was Africa for so long a time an unknown continent?
2. Why is Britain deeply interested in Egypt?
3. What does artificial irrigation do for Egypt which the natural overflow of the river could not do?
4. When and why does the Nile overflow its banks?
5. The Old Testament tells us that Joseph's brothers came to Egypt to buy grain when there was a famine in their own land. Why was there plenty in Egypt when there was famine elsewhere?
6. Why have the British built dams in Egypt and in the Anglo-Egyptian Sudan?
7. Why is East Africa one of the best parts of the continent for the white man? What crops brought from other lands are raised very successfully in East Africa?
8. South Africa is almost the only part of the continent which is self-governing. How do you explain that fact?
9. Why have the British invested much capital in South Africa?
10. Why do the fruits of South Africa find a ready market in the United States and Europe?

Research for Students

1. Study a population map of Africa. Explain why there are many people in some parts and few in others.
2. Prepare and report to the class a talk on the Cape to Cairo Railroad.
3. Topics for other special studies: David Livingston. Why was his heart buried in Africa while his body was buried in England? Write a brief story of his life. Who was Henry M. Stanley? Write a brief story of his work in Africa.
4. Learn something of the work of Cecil Rhodes in South Africa. Of Kitchener at Khartoum.

APPENDIX

Books for Reference

Agricultural Statistics—U. S. Department of Agriculture.
Compton's Pictured Encyclopedia—F. E. Compton.
Encyclopædia Britannica.
Foreign Commerce Yearbook (Annual)—U. S. Department of Commerce.
Goode's School Atlas—Rand, McNally.
Minerals Yearbook—U. S. Department of the Interior.
Philip and McConnell, *Appleton's Modern Atlas*—Appleton-Century.
Publications of the U. S. Department of Commerce.
Publications of the U. S. Department of Agriculture.
The Canada Yearbook—Dominion Bureau of Statistics.
The Statesman's Year-Book—Macmillan.
Statistical Abstract of the United States (Annual)—U. S. Department of Commerce.
The World Almanac and Book of Facts—The New York World-Telegram.
World Book Encyclopedia.
Yearbook of Agriculture—U. S. Department of Agriculture.

Books for Supplementary Reading

Barrett, Otis Warren, *The Tropical Crops*—Macmillan.
Blanchard and Visher, *Economic Geography of Europe*—McGraw-Hill.
Bogart, E. L., *An Economic History of the United States*—Longmans, Green.
Bogart and Landon, *Modern Industry*—Longmans, Green.
Bowman, Isaiah, *The New World: Problems in Political Geography*—World Book.
Brown, N. C., *The American Lumber Industry*—Wiley.
Buechel, Frederick A., *The Commerce of Agriculture*—Wiley.
Chisholm, George G., *Handbook of Commercial Geography*—Longmans, Green.
Clark, F. E., *Principles of Marketing*—Macmillan.
Copeland, E. B., *The Coconut*—Macmillan.
Copeland, E. B., *Rice*—Macmillan.
Day, Clive, *History of Commerce*—Longmans, Green.
Du Puy, William Atherton, *The Nation's Forests*—Macmillan.
Huntington, Ellsworth, *Civilization and Climate*—Yale University.
Huntington and Cushing, *Principles of Human Geography*—Wiley.
Huntington and Williams, *Business Geography*—Wiley.
Jones, Clarence F., *Commerce of South America*—Ginn.
Keir, R. M., *Industries of America*, Vol. I, "Manufacturing"—Ronald Press.
Killough and Killough, *Raw Materials of Industrialism*—Crowell.
Lippincott, Isaac, *Economic Resources and Industries of the World*—Appleton-Century.
Martens and Karstedt, *The African Handbook and Traveller's Guide*—Macmillan.
Miller and Parkins, *Geography of North America*—Wiley.
Pack and Gill, *Forests and Mankind*—Macmillan.
Packard and Sinnott, *Nations as Neighbors*—Macmillan.
Packard, Sinnott, and Overton, *The Nations at Work*—Macmillan.
Pigman, Augustus, *The Story of Water*—Appleton-Century.
Smith, D. H., *An Economic Geography of Europe*—Longmans, Green.
Smith, J. Russell, *The World's Food Resources*—Holt.
Stamp, L. Dudley, *Asia: An Economic and Regional Geography*—Methuen.
Toothaker, Charles R., *Commercial Raw Materials*—Ginn.
Warshow, H. T., *Representative Industries in the United States*—Holt.
Whitbeck, R. H., *Economic Geography of South America*—McGraw-Hill.
Whitbeck and Finch, *Economic Geography*—McGraw-Hill.

Geographical Magazines

Economic Geography—Clark University, Worcester, Massachusetts.
The Geographical Review—American Geographical Society, New York.
The Journal of Geography—A. J. Nystrom, Chicago, Illinois.
The National Geographic Magazine—National Geographic Society, Washington, D. C.
Bulletin of the Pan-American Union.
Bulletin of the Philadelphia Geographic Society.

Table 1

Continent, Country, State, etc	Area in Sq. M.	Population	Population of Principal Cities (U. S. in 1930)			Fraction of All Workers Engaged in		
			Capital		Other Cities	Agr.	Mfg.	Trade and Transp.
North America:	*9,355,000	*173,200,000						
Alaska	586,400	59,000	Juneau	4,000	Ketchikan 4,000, Anchorage 2,000	.23	.1	.17
Bermuda Islands	20	32,000	Hamilton	3,000	St. Georges 1,000			
Canada	3,684,700	10,374,000	Ottawa	166,000	Montreal 1,098,000, Toronto 809,000	.33	.27	.20
Alberta	255,300	727,000	Edmonton	86,000	Calgary 102,000, Lethbridge 14,000	.53	.08	.14
British Columbia	355,900	689,000	Victoria	39,000	Vancouver 308,000, New Westminster 18,000	.16	.22	.21
Manitoba	251,800	700,000	Winnipeg	336,000	Brandon 17,000, St. Boniface 16,000	.40	.14	.22
New Brunswick	28,000	408,000	Fredericton	9,000	Saint John 60,000, Moncton 20,000	.39	.21	.19
Nova Scotia	21,400	512,000	Halifax	64,000	Sydney 23,000, Glace Bay 21,000	27	.18	.16
Ontario	412,600	3,426,000	Toronto	807,000	Ottawa 166,000, Hamilton 160,000	26	.29	.19
Prince Edward Island	2,200	89,000	Charlottetown	12,000	Summerside 3,000	59	.09	.10
Quebec	594,400	2,870,000	Quebec	142,000	Montreal 1,038,000, Verdun 75,000	28	.27	.17
Saskatchewan	251,700	921,000	Regina	53,000	Saskatoon 50,000, Moose Jaw 20,000	.65	.05	.12
Northwest Terr.	1,309,700	7,000						
Yukon	207,100	4,000	Dawson	1,000	White Horse 300			
Central America	215,000	6,539,000						
British Honduras	8,600	56,000	Belize	17,000				
Costa Rica	23,000	592,000	San José	64,000	Limón 17,000, Heredia 10,000	*.50	*.20	*.10
Guatemala	42,400	2,420,000	Guatemala	134,000	Quezaltenango 30,000, Cóbán 27,000	*.65	*.12	*.06
Honduras	46,300	963,000	Tegucigalpa	35,000	La Esperanza 11,000, Santa Rosa 11,000	*.70	*.10	*.08
Nicaragua	49,500	830,000	Managua	80,000	León 60,000, Granada 22,000	*.70	*.10	*.08
Panama	32,400	497,000	Panama	83,000	Colón 33,000, David 6,000	*.50	*.20	*.10
Panama Canal Zone	550	39,000	Balboa Heights	400	Silver City 4,000 La Boca 3,000			
El Salvador	13,200	1,823,000	San Salvador	100,000	Santa Ana 80,000, San Miguel 42,000	*.50	*.20	*.10
Greenland	827,300	16,000	Sydproven	1,000				
Mexico	760,300	18,852,000	Mexico City	1,030,000	Guadalajara 185,000, Monterrey 138,000	*.70	*.15	*.08
Newfoundland	42,700	290,000	St. John's	41,000	Bona Vista 4,000, Corner Brook 6,374	*.50	*.15	*.08
Labrador	120,000	4,000			Battle Harbor, Hopedale (both under 5,000)			
United States	3,026,800	122,775,000	Washington	487,000	New York 6,930,000, Chicago 3,376,000	.22	.29	.25
Alabama	52,000	2,646,000	Montgomery	66,000	Birmingham 260,000, Mobile 68,000	.49	.18	.14
Arizona	113,900	436,000	Phoenix	48,000	Tucson 33,000, Douglas 10,000	.24	.17	.24
Arkansas	53,300	1,854,000	Little Rock	82,000	Fort Smith 31,000 Pine Bluff 21,000	.59	.11	.15
California	158,300	5,677,000	Sacramento	94,000	Los Angeles 1,238,000, San Francisco 634,000	.14	.25	31
Colorado	103,900	1,036,000	Denver	288,000	Pueblo 50,000, Colorado Springs 33,000	26	.17	.27
Connecticut	5,000	1,607,000	Hartford	164,000	New Haven 163,000, Bridgeport 147,000	.05	.50	.24
Delaware	2,400	238,000	Dover	5,000	Wilmington 107,000	.18	.36	.23
District of Columbia	70	487,000	Washington	487,000		.00	.17	.26
Florida	58,700	1,468,000	Tallahassee	11,000	Jacksonville 130,000, Miami 111,000	.25	.21	.24
Georgia	59,300	2,909,000	Atlanta	270,000	Savannah 85,000, Augusta 60,000	.43	.20	.16
Idaho	83,900	445,000	Boise	22,000	Pocatello 16,000, Idaho Falls 9,000	.45	.13	.20
Illinois	56,700	7,631,000	Springfield	72,000	Chicago 3,376,000, Peoria 105,000	.11	.35	.30
Indiana	36,400	3,239,000	Indianapolis	364,000	Fort Wayne 115,000, South Bend 104,000	.20	.35	.24
Iowa	56,100	2,471,000	Des Moines	143,000	Sioux City 79,000, Davenport 61,000	.36	.17	.25
Kansas	82,200	1,881,000	Topeka	64,000	Kansas City 122,000, Wichita 111,000	.33	.16	.27
Kentucky	40,600	2,615,000	Frankfort	12,000	Louisville 308,000, Covington 65,000	.40	.17	.19
Louisiana	48,500	2,102,000	Baton Rouge	31,000	New Orleans 459,000, Shreveport 77,000	.38	.18	.21
Maine	33,000	797,000	Augusta	17,000	Portland 71,000, Lewiston 35,000	.19	.33	.22
Maryland	12,300	1,632,000	Annapolis	13,000	Baltimore 805,000, Cumberland 38,000	.13	.33	.27
Massachusetts	8,300	4,250,000	Boston	781,000	Worcester 195,000, Springfield 150,000	.04	.46	.26
Michigan	58 000	4,842,000	Lansing	78,000	Detroit 1,569,000, Grand Rapids 169,000	.14	.43	.22
Minnesota	84,700	2,564,000	St. Paul	272,000	Minneapolis 464,000, Duluth 101,000	.31	.20	.27
Mississippi	46,900	2,010,000	Jackson	48,000	Meridian 32,000, Vicksburg 23,000	.67	.09	.11
Missouri	69,400	3,629,000	Jefferson City	22,000	St. Louis 822,000, Kansas City 400,000	.26	.25	.27

Table 2

Continent, Country, State, etc.	Principal Products: Agricultural (including Forest and Fishery)	Principal Products: Manufactured	Principal Products: Mineral	Principal Exports	Principal Imports
North America:					
Alaska	Reindeer, fish	Canned fish	Gold, copper, silver	Fish, minerals, fur	Foodstuffs, I–S, machinery
Bermuda	Vegetables, lily bulbs			Vegetables, lily bulbs	Foodstuffs, textiles
Canada	Wheat, oats, hay	Paper & pulp, foodstuffs, I–S	Coal, gold, copper, nickel	Wheat, foodstuffs, paper	Textiles, I–S, coal
Alberta	Wheat, oats, livestock	Flour	Coal, nat gas, petroleum		
Br. Columbia	Fruit, mixed farm products	Lumber products	Copper, lead, coal, zinc		
Manitoba	Wheat, barley, oats	Flour, other foodstuffs	Building stone, gypsum		
N. Brunswick	Dairy products, vegetables, fruit	Paper & pulp	Coal		
Nova Scotia	Apples, oats, dairy products, fish	I–S, paper & pulp	Coal, iron ore		
Ontario	Dairy products, wheat, furs	Autos, flour, paper & pulp	Gold, nickel, silve		
Pr. Edw Isl.	Potatoes, dairy products, furs, fish	Foodstuffs			
Quebec	Dairy products, potatoes, furs, oats	Paper & pulp, textiles, foodstuffs	Asbestos		
Saskatchewan	Wheat, oats, dairy products	Flour	Coal		
N. W. Terr	Furs				
Yukon	Furs		Silver, gold		
Central America	Corn chief food crop			Bananas, mahogany	Foodstuffs, textiles, I–S
British Honduras	Mahogany, bananas			Coffee, bananas, cacao	Textiles, I–S, foodstuffs
Costa Rica	Bananas, coffee, cacao	Shoes, soap, candles	Gold, silver	Coffee, bananas, mahogany	Textiles, foodstuffs, I–S
Guatemala	Coffee, bananas, lumber		Gold, mica	Bananas, sugar, silver	Foodstuffs, textiles, I–S
Honduras	Bananas, sugar	Tobacco products, hats	Silver	Coffee, bananas, lumber	Textiles, foodstuffs, I–S
Nicaragua	Coffee, bananas, lumber			Bananas, cacao, coconuts	Foodstuffs, textiles, I–S
Panama	Bananas, cacao, coconuts				
Panama C. Z.				Coffee, sugar	Foodstuffs, textiles, I–S
El Salvador	Coffee, sugar, henequen	Textiles, shoes		Furs, animal oils	Foodstuffs
Greenland	Furs, animal oils			Petroleum, metals, coffee, sisal	Textiles, foodstuffs, chemicals, I–S
Mexico	Corn, vegetables, coffee, cotton	Textiles, tobacco products	Petroleum, silver, lead	Fish, iron ore, paper &pulp	Foodstuffs, textiles, coal, I–S
Newfoundland	Lumber, fish, vegetables	Paper & pulp	Iron ore		
Labrador	Fish, lumber	Pulp			
United States	Livestock, corn, cotton	I–S, textiles, foodstuffs	Coal, petroleum, iron	{ Cotton, machinery, autos, petroleum products, foodstuffs, metals	{ Raw silk, coffee, rubber, sugar, paper, hides & skins, copper
Alabama	Cotton, corn, livestock	I–S, textiles, lumber	Iron, coal, clay, stone		
Arizona	Livestock, cotton	Smelter products (copper, etc)	Copper, gold, silver		
Arkansas	Livestock, cotton, corn	Lumber, cottonseed products	Petroleum, coal, bauxite		
California	Fruits & nuts, vegetables, cattle	Petroleum prod, canned goods	Petroleum, gold, silver		
Colorado	Livestock, sugar beets, wheat	Beet sugar, other foodstuffs	Coal, silver, gold, zinc		
Connecticut	Tobacco, dairy products	Textiles, hardware, brass	Clay, stone		
Delaware	Truck garden products	Explosives, leather, can goods			
D C					
Florida	Fruits, vegetables	Lumber, naval st, tobacco prod	Phosphate rock, stone		
Georgia	Cotton, corn, fruits, vegetables	Textiles, lumber, naval stores	Stone, clay		
Idaho	Wheat, potatoes, livestock	Lumber, dairy prod, grain prod	Lead, silver, zinc		
Illinois	Corn, cattle, hogs	Meat products, printing, I–S	Coal, petroleum, natural gas		
Indiana	Corn, cattle, hogs	I–S, auto access, meat products	Coal, petroleum, stone		
Iowa	Corn, cattle, hogs	Meat, dairy, other food products	Coal, gypsum, sand		
Kansas	Wheat, cattle, corn	Food & petroleum prod, cement	Petroleum, zinc, coal		
Kentucky	Tobacco, corn, livestock	I–S, tobacco products	Coal, petroleum		
Louisiana	Cotton, rice, garden truck	Petroleum & lumber prod, sugar	Petroleum, sulphur, salt		
Maine	Potatoes, other garden truck	Lumber products, shoes, textiles	Feldspar, granite		
Maryland	Garden truck, fruits	Clothing, food products	Coal, clay products		
Massachusetts	Dairy products, garden truck, fish	Textiles, shoes, hardware	Stone and clay products		
Michigan	Dairy products, potatoes, corn	Autos, other I–S, furniture	Iron ore, copper, cement		
Minnesota	Dairy products, grain	Flour, other food products	Iron ore		
Mississippi	Cotton, corn, garden truck	Lumber, cottonseed products	Clay, sand, gravel		
Missouri	Corn, cattle, hogs	Meat products, shoes, I–S	Lead, clay, cement, coal		

I–S means iron and steel or products made principally of iron and steel. Estimates are indicated by asterisks (*). Daggers (†) indicate that the population given includes that of near-by suburbs.

Table 1—Continued

Continent, Country, State, etc.	Area in Sq. M.	Population	Population of Principal Cities (U. S. in 1930)			Fraction of All Workers Engaged in		
			Capital		Other Cities	Agr.	Mfg.	Trade and Transp.
North America (Cont.):								
Montana	147,000	538,000	Helena	12,000	Butte 40,000, Great Falls 29,000	.38	.12	.22
Nebraska	77,500	1,378,000	Lincoln	76,000	Omaha 214,000; Grand Island 18,000	.39	.14	.26
Nevada	110,700	91,000	Carson City	2,000	Reno 19,000, Las Vegas 5,000	.21	.13	.28
New Hampshire	9,300	465,000	Concord	25,000	Manchester 77,000, Nashua 31,000	.21	.46	.20
New Jersey	8,200	4,041,000	Trenton	123,000	Newark 442,000, Jersey City 317,000	.04	.43	.30
New Mexico	122,600	423,000	Santa Fe	11,000	Albuquerque 27,000, Roswell 11,000	.53	.14	.26
New York	49,200	12,588,000	Albany	127,000	New York 6,930,000; Buffalo 573,000	.05	.36	.30
North Carolina	52,400	3,170,000	Raleigh	37,000	Charlotte 83,000, Winston-Salem 75,000	.45	.25	.13
North Dakota	70,800	681,000	Bismarck	11,000	Fargo 29,000, Grand Forks 17,000	.56	.07	.18
Ohio	41,000	6,647,000	Columbus	291,000	Cleveland 900,000, Cincinnati 451,000	.12	.40	.26
Oklahoma	70,100	2,396,000	Oklahoma City	185,000	Tulsa 141,000, Muskogee 32,000	.37	.13	.21
Oregon	96,700	954,000	Salem	26,000	Portland 302,000; Eugene 19,000	.25	.24	.27
Pennsylvania	45,100	9,631,000	Harrisburg	80,000	Philadelphia 1,951,000; Pittsburgh 670,000	.07	.39	.25
Rhode Island	1,250	687,000	Providence	253,000	Pawtucket 77,000; Woonsocket 49,000	.03	.55	.22
South Carolina	31,000	1,739,000	Columbia	52,000	Charleston 62,000; Greenville 29,000	.50	.21	.12
South Dakota	77,600	693,000	Pierre	4,000	Sioux Falls 33,000; Aberdeen 16,000	.53	.09	.19
Tennessee	42,000	2,617,000	Nashville	154,000	Memphis 253,000; Chattanooga 120,000	.40	.21	.19
Texas	265,900	5,825,000	Austin	53,000	Houston 292,000, Dallas 260,000	.38	.16	.23
Utah	85,000	508,000	Salt Lake City	140,000	Ogden 40,000; Provo 15,000	.24	.19	.27
Vermont	9,600	360,000	Montpelier	8,000	Burlington 25,000; Rutland 17,000	.28	.28	.22
Virginia	42,600	2,422,000	Richmond	183,000	Norfolk 130,000, Roanoke 69,000	.32	.23	.21
Washington	69,100	1,563,000	Olympia	12,000	Seattle 366,000, Spokane 116,000	.21	.26	.28
West Virginia	24,200	1,729,000	Charleston	60,000	Huntington 76,000; Wheeling 62,000	.22	.21	.19
Wisconsin	56,100	2,939,000	Madison	58,000	Milwaukee 578,000; Racine 68,000	.26	.33	.22
Wyoming	97,900	226,000	Cheyenne	17,000	Casper 17,000; Laramie 9,000	.34	.12	.23
West Indies	91,100	11,381,000				*.60		
Bahama Islands	4,400	61,000	Nassau	13,000		.49	.20	.17
Cuba	44,200	4,011,000	Habana	581,000	Santiago de Cuba 104,000; Camaguey 133,000	*.85	*.05	*.05
Dominican Republic	19,300	1,545,000	Ciudad Trujillo	71,000	Santiago 34,000, San Pedro de Macorís 20,000	*.85	*.06	*.06
Haiti	10,200	3,000,000	Port au Prince	115,000	Cap Haitien 13,000, Cayes 12,000	*.64	*.12	*.10
Jamaica	4,700	1,122,000	Kingston	63,000	Spanish Town 9,000, Montego Bay 7,000	*.85		
Lesser Antilles	4,800	1,402,000			Fort de France 43,000; Bridgetown 13,000	*.60	*.12	*.10
Puerto Rico	3,400	1,742,000	San Juan	137,000	Ponce 53,000, Mayagüez 37,000	*.85		
Virgin Islands	133	22,000	Charlotte Amalie	7,000	Christiansted 4,000; Frederiksted 3,000			
South America:	*7,242,000	*92,890,000						
Argentina	1,153,000	12,400,000	Buenos Aires	2,291,000	Rosario 510,000, Córdoba 302,000	*.35	*.27	*.13
Bolivia	*547,000	*3,171,000	Sucre	35,000	La Paz 200,000, Cochabamba 52,000	*.60	*.20	*.06
Brazil	3,286,000	47,795,000	Rio de Janeiro	1,711,000	São Paulo 1,120,000, São Salvador 364,000	*.70	*.12	*.08
British Guiana	89,500	323,000	Georgetown	58,000		*.65	*.10	*.10
Chile	290,100	4,554,000	Santiago	696,000	Valparaíso 191,000; Concepción 78,000	.37	.24	.14
Colombia	*497,300	*8,665,000	Bogotá	420,000	Barranquilla 180,000; Cali 123,000	*.65	*.20	*.08
Ecuador	*110,000	*2,759,000	Quito	118,000	Guayaquil 140,000; Cuenca 45,000	.70	.12	.05
French Guiana	34,800	47,000	Cayenne	14,000				
Paraguay	*176,000	997,000	Asunción	142,000	Villarica 36,000, Luque 16,000	*.60	*.18	*.10
Peru	*532,000	*6,237,000	Lima	370,000	Callao 77,000, Arequipa 45,000	*.75	*.10	*.05
Surinam	54,300	251,000	Paramaribo	53,000				
Uruguay	72,200	2,037,000	Montevideo	683,000	Salto 30,000; Paysandú 31,000	*.50	*.25	*.12
Venesuela	394,000	3,452,000	Caracas	202,000	Maracaibo 110,000; Valencia 37,000	*.75	*.10	*.06
Europe:	*3,690,000	*518,500,000						
Albania	10,600	1,050,000	Tirâna	31,000	Scutari 29,000, Koriza 23,000			
Andorra	191	5,000	Andorra La Vielle	1,000		*.90		

Table 2—Continued

Continent, Country, State, etc.	Principal Products			Principal Exports	Principal Imports
	Agricultural (including Forest and Fishery)	Manufactured	Mineral		
N. America (Cont.):					
Montana	Wheat, sheep & wool, cattle	Foodstuffs	Copper, zinc, silver		
Nebraska	Corn, wheat, livestock	Meat, dairy & grain products	Cement, clay		
Nevada	Cattle, sheep		Copper, silver, gold		
New Hampshire	Dairy products	Textiles, shoes, paper	Stone, sand, gravel		
New Jersey	Dairy products, garden truck	Textiles, petroleum prod., I–S	Clay, zinc, cement, stone		
New Mexico	Cattle, sheep, cotton		Copper, coal, zinc		
New York	Dairy products, fruits, potatoes	Clothing, printing, paper, textiles	Cement, stone, clay		
North Carolina	Cotton, tobacco, garden truck	Tobacco prod., textiles, furniture	Stone, clay, mica		
North Dakota	Wheat, dairy products, flaxseed	Foodstuffs	Coal		
Ohio	Dairy products, corn, hogs	I–S, rubber products, foodstuffs	Coal, natural gas, clay		
Oklahoma	Cotton, wheat, corn	Petroleum prod., cottonseed prod	Petroleum, zinc, lead		
Oregon	Wheat, livestock, fruits, fish	Lumber & food products	Stone, sand, gravel		
Pennsylvania	Dairy products, garden truck	I–S, textiles, printing	Coal, cement, clay		
Rhode Island	Dairy products	Textiles, jewelry	Stone		
South Carolina	Cotton, corn, tobacco	Textiles, lumber & naval stores	Stone		
South Dakota	Corn, wheat, cattle	Foodstuffs	Gold		
Tennessee	Corn, cotton, tobacco	Lumber, foodstuffs, textiles	Coal, stone, cement		
Texas	Cotton, corn, livestock	Petrol. & cottonseed prod, foodst	Petrol., natural gas, sulphur		
Utah	Sheep, sugar beets, fruits	Smelter products, foodstuffs	Copper, silver, gold		
Vermont	Dairy products, fruits, maple sugar	Textiles, paper	Marble, granite, slate		
Virginia	Corn, tobacco, garden truck	Tobacco & lumber prod., textiles	Coal, stone, clay, cement		
Washington	Wheat, fruits, dairy products, fish	Lumber & food products	Coal, cement, sand, clay		
West Virginia	Corn, cattle, fruit	I–S, lumber, glass	Coal, nat. gas, clay, petrol.		
Wisconsin	Dairy products, corn, potatoes	Foodstuffs, machinery, paper	Stone, iron ore, sand		
Wyoming	Sheep, cattle, sugar beets	Petroleum products	Petroleum, coal, natural gas		
West Indies					
Bahamas	Sponges, sisal, vegetables			Sponges, tomatoes, sisal	Liquor, I–S, textiles
Cuba	Sugar, tobacco	Tobacco products	Iron ore, copper	Sugar, tobacco	Foodstuffs, textiles, machinery
Dom. Republic	Sugar, cacao, coffee			Sugar, cacao, coffee	Foodstuffs, textiles, mfgd. goods
Haiti	Coffee, cotton, lumber			Coffee, cotton, lumber	Foodstuffs, textiles, mfgd. goods
Jamaica	Bananas, pimentos, sugar, coffee			Bananas, sugar, coffee	Foodstuffs, textiles, mfgd. goods
Les. Ant.	Bananas, sugar, coffee			Bananas, sugar, coffee	Foodstuffs, textiles, mfgd. goods
Puerto Rico	Sugar, tobacco, coffee	Tobacco products, hats		Sugar, tobacco, coffee	Foodstuffs, textiles, mfgd. goods
Virgin Islands	Sugar, cattle	Sugar products		Sugar products	Foodstuffs, textiles, mfgd. goods
South America:					
Argentina	Wheat, corn, cattle, sheep	Foodstuffs, textiles, leather	Petroleum	Wheat, corn, animal products	Textiles, I–S, lumber products
Bolivia	Corn, potatoes, barley, rubber		Tin, silver, copper	Tin, rubber, silver	Textiles, machinery, foodstuffs
Brazil	Coffee, corn, sugar	Textiles, paper	Manganese, coal	Coffee, cotton, animal prod.	Wheat, textiles, I–S
British Guiana	Sugar, rice, coconuts		Diamonds, bauxite	Sugar, diamonds, rice	Foodstuffs, I–S, textiles
Chile	Wheat, livestock	Foodstuffs, leather, textiles	Nitrates, copper	Nitrates, copper, animal prod.	Textiles, foodstuffs, I–S
Colombia	Coffee, bananas, livestock		Gold, platinum, petroleum	Coffee, petroleum, bananas	Textiles, foodstuffs, mfgd. goods
Ecuador	Cacao, coffee, ivory, nuts	Panama hats	Petroleum, gold, silver	Cacao, coffee, petroleum	Textiles, foodstuffs, mfgd. goods
French Guiana	Rice, cacao		Gold	Cacao, gold	Foodstuffs, mfgd. goods
Paraguay	Maté tea, quebracho, livestock	Meat & its by-products		Animal prod., maté, quebracho	Textiles, other mfgd. goods
Peru	Corn, potatoes, cotton, sugar, wool	Textiles	Petroleum, copper, silver	Metals, petroleum, cotton	Foodstuffs, textiles, mfgd. goods
Surinam	Rice, sugar, coffee		Gold, bauxite	Sugar, coffee, bauxite	Foodstuffs, textiles, mfgd. goods
Uruguay	Livestock, wheat, corn	Animal products	Sand, stone	Animal products, wheat	Foodstuffs, textiles, mfgd. goods
Venezuela	Coffee, cacao, livestock	Petroleum products, textiles	Petroleum, asphalt	Petroleum, coffee, cacao	Foodstuffs, textiles, mfgd. goods
Europe:					
Albania	Livestock, wheat			Animal products	Textiles, cereals, metals
Andorra	Livestock, grain				
Austria	Grain, potatoes, dairy products	I–S, electrical machinery, textiles	Coal, iron	Textiles, lumber products, I–S	Cotton, wool, coal

Table 1—Continued

Continent, Country, State, etc.	Area in Sq M.	Population	Population of Principal Cities (U. S in 1930)			Fraction of All Workers Engaged in		
			Capital		Other Cities	Agr	Mfg.	Trade and Transp.
Europe (Cont.)								
Belgium	11,800	8,300,000	Brussels	†905,000	Antwerp 299,000, Liége 168,000	.19	.40	.18
Bulgaria	39,800	6,090,000	Sofia	287,000	Philippopolis 100,000, Varna 70,000	.82	.08	.04
Czecho-Slovakia	38,600	10,500,000	Prague	849,000	Brünn 265,000, Moravska Ostrava 133,000	40	.34	.10
Denmark	16,600	3,706,000	Copenhagen	843,000	Aarhus 91,000, Odense 76,000	.35	.27	.17
Estonia	18,400	1,130,000	Tallinn	147,000	Tartu 67,000; Narva 27,000	.66	.13	.06
Finland	151,000	3,787,000	Helsinki	284,000	Turku 71,000, Viborg 73,000	.69	.13	.06
France	212,700	41,906,000	Paris	2,871,000	Marseille 914,000; Lyon 571,000	42	.28	.17
Germany	225,000	78,700,000	Berlin	4,243,000	Hamburg 1,129,000, Cologne 757,000	.31	.38	.16
Grt. Britain & Nor. Ire.	94,600	46,189,000	London	8,576,000	Glasgow 1,120 000, Birmingham 1,019,000			
England	50,900	37,355,000	London	8,576,000	Birmingham 1,019,000, Liverpool 855,000	.07	.40	.21
Northern Ireland	5,200	1,288,000	Belfast	438,000	Londonderry 48,000			
Scotland	30,400	4,953,000	Edinburgh	469,000	Glasgow 1,120,000, Dundee 179,000	.11	.48	.16
Wales	7,500	2,593,000			Cardiff 224,000, Swansea 165,000	.07	.40	.21
Greece	49,900	6,930,000	Athens	393,000	Piraeus 200,000, Salonika 237,000	.54	.16	.11
Hungary	39,900	9,849,000	Budapest	1,052,000	Szeged 140,000; Debrecen 125 000	.58	.19	.08
Iceland	39,700	116,000	Reykjavik	26,000	Akureyri 4,000. Hafnarfjördur 3,000	.56	.12	.12
Eire (I. F. S.)	27,000	2,972,000	Dublin	468,000	Cork 81 000, Limerick 41,000	.52	.15	.14
Italy	119,700	42,875,000	Rome	1,156,000	Milan 1,116,000, Naples 866,000	.56	.24	.10
Latvia	25,400	1,950,000	Riga	385,000	Libau 57,000, Dvinsk 45,000	.68	.11	.08
Lithuania	*21,500	*2,540,000	Kovno	107,000	Memel 39,000, Shavli 25,000	.79	.06	.03
Luxemburg	1,000	297,000	Luxemburg	58,000	Esch-am-Alz 27,000, Differdange 16,000	.45	.25	.11
Monaco	8	25,000	Monaco	2,000	La Condamine 12,000, Monte Carlo 11,000			
The Netherlands	13.200	8,557,000	The Hague	487,000	Amsterdam 783,000, Rotterdam 599,000	.23	.36	.21
Norway	125,100	2,895,000	Oslo	258,000	Bergen 97,000, Trondheim 55,000	.37	.27	.20
Poland	*150,400	32,347,000	Warsaw	1,233,000	Lódź 653 000, Posen 265,000	.76	.09	.06
Portugal	35,800	7,275,000	Lisbon	594,000	Oporto 232,000; Setúbal 37,000	.58	.22	.09
Rumania	122,300	19,423,000	Bucharest	675,000	Kishinev 115,000, Czernowitz 115,000	.80	.08	.05
Russia (U.S.S.R.) Europe	1,607,800	123,336,000	Moscow	3,663,000	Leningrad 2,776,000; Kiev 539,000	.87	.06	.03
Spain	196,600	24,583,000	Madrid	1,048,000	Barcelona 1,148,000, Valencia 353,000	*.60	*.20	*.07
Sweden	173,100	6,249,000	Stockholm	544,000	Göteborg 262,000, Malmö 144,000	.41	.30	.14
Switzerland	15,900	4,167,000	Bern	112,000	Zurich 313,000, Basel 147,000	.26	.44	.17
Turkey in Europe	9,000	1,403,000	(See Turkey in Asia.)		Istanbul 741,000, Adrianople 36,000			
Vatican City	108 7 acres	1,025						
Yugoslavia	96,100	15,290,000	Belgrade	267,000	Zagreb 186,000, Subotica 100,000	* 75	* 09	*.05
Asia.	*16,900,000	*1,121,500,000						
Afghanistan	245,000	*9,000,000	Kābul	100,000	Herat 30,000, Kandahar 60,000	*.80	* 06	*.05
Aden	9,000	55,000	Aden	25,000				
Baluchistan	134,600	869,000	Quetta	60,000	Gwādar 5,000, Kalat 3,000			
Bhutan	18,000	300,000	Punakha	5,000				
Burma	262,700	14,667,000	Rangoon	400,000	Mandalay 150,000, Prome 27,000			
Ceylon	25.300	5,631,000	Colombo	285,000	Jaffna 44,000, Galle 40,000	* 62	* 12	*.11
Chinese Republic	*4,283,000	*490,000,000	Nanking	†1,019,000	Shanghai †3,490,000, Foochow †323,000			
Chinese (Proper)	*1,534,000	*459,000,000	Nanking	†1,019,000	Shanghai †3,490,000, Foochow †323,000	* 85	* 07	* 04
Manchuria	*363,600	23,800,000	Mukden	†527,000	Harbin †458,000, Antung †166,000			
Mongolia	*1,370,000	*2,500,000	Urga	100 000				
Sinkiang	*550,000	*2,688,000	Urumchi	64 000	Kashgar 80,000, Yarkand 50,000			
Tibet	*465,000	*1,500,000	Lhassa	18,000	Shigaste, Gartok (both under 5.000)			
Cyprus	3,580	348,000	Nicosia	24,000	Limasol 13,000, Larnaka 10,000	* 80		
Hong Kong	391	966,000	Victoria	382,000	Kowloon 328,000			
India	1,408,000	340.500 000	Delhi	447,000	Calcutta †1,486,000, Bombay 1,176,000	.72	11	.07
Indo-China	285.000	23,250,000	Hanoi	142,000	Cholon 193 000, Saigon 124,000	*.82	* 05	*.06
Iraq (Mesopotamia)	*177,100	*3,561,000	Baghdad	*250,000	Basra 85,000, Mosul 70,000	* 75	* 09	*.06

Table 2—Continued

Continent, Country, State, etc.	Principal Products			Principal Exports	Principal Imports
	Agricultural (including Forest and Fishery)	Manufactured	Mineral		
Europe (Cont.):					
Belgium	Grain, potatoes, sugar beets	I–S, textiles, chemicals, glass	Coal	I–S, textiles, glass	Foodstuffs, raw materials
Bulgaria	Wheat, corn, livestock	Simple mfg of farm products	Coal	Tobacco, grain, animal prod.	Textiles, I–S
Czecho-Slovakia	Grain, potatoes, sugar beets	Textiles, glassware, I–S, sugar	Coal, iron ore	Textiles, sugar, I–S, fuels	Cereals, raw cotton & wool, mach.
Denmark	Livestock, dairy products, fish	Foodstuffs		Dairy & meat products	Grain, manufactured goods
Estonia	Grain, potatoes, dairy products	Textiles, lumber products	Oil shale	Dairy & lumber prod , textiles	Foodstuffs, cotton, I–S
Finland	Rye, oats, potatoes	Lumber products, textiles		Lumber products	Foodstuffs, textiles, mfgd goods
France	Grain, grapes, sugar beets	Textiles, I–S, artistic goods	Iron ore, coal	Textiles, I–S, artistic goods	Raw materials, fuel, I–S
Germany	Grain, potatoes, sugar beets	I–S, textiles, food products	Coal, potash	I–S, textiles, chemicals	Foodstuffs, raw materials
Grt. Brt , N. I.	Grain, livestock, fish	Textiles, I–S	Coal, iron ore	Textiles, I–S, coal	Flour, meat, raw materials
England	Wheat, cattle, sheep, fish	Textiles, I–S	Coal, iron ore		
Nor Ireland	Grain, potatoes, livestock, fish	Linen products, ships	Peat, stone		
Scotland	Livestock, oats, fish	Ships, I–S, textiles	Coal, iron ore		
Wales	Livestock, fish	I–S, textiles	Coal		
Greece	Tobacco, olives, grapes, wheat	Textiles, leather goods, soap	Several metals	Tobacco, wine, currants	Foodstuffs, textiles, mfgd goods
Hungary	Grain, livestock, sugar beets	Food products, I–S	Coal, bauxite	Foodstuffs, I–S	Textiles, lumber, mfgd goods
Iceland	Fish, sheep, potatoes	Textiles		Fish & animal products	Foodstuffs, textiles, lumber
Eire (I. F. S)	Oats, potatoes, livestock, fish	Foodstuffs, textiles		Animals & animal products	Foodstuffs, coal, I–S
Italy	Wheat, grapes, olives	Textiles, I–S, foodstuffs	Sulphur, marble	Textiles, autos, veg , fruits	Foodstuffs, raw mat , mfgd goods
Latvia	Grain, potatoes, dairy products	Foodstuffs, lumber		Lumber, animal products	Foodstuffs, textiles, machinery
Lithuania	Rye, oats, potatoes	Lumber products	Peat	Lumber, animal products, flax	Textiles, foodstuffs, fertilizers
Luxemburg	Oats, potatoes, livestock	I–S, leather	Iron ore	I–S, leather	Foodstuffs, coal
Monaco	Grapes, olives				
Netherlands	Dairy & horticultural products, fish	Textiles, ships, foodstuffs	Coal, salt	Foodstuffs, textiles, other mfgs	Raw materials, fuel, I–S
Norway	Livestock, fish	Lumber products, chemicals	Pyrites, iron ore, copper	Lumber & fish prod , minerals	Foodstuffs, raw mat , machinery
Poland	Rye, potatoes, livestock	I–S, textiles, lumber products	Coal, iron ore, potash	Animals, lumber, metal prod	Raw mat , machinery, foodstuffs
Portugal	Grain, fruits, fish	Textiles, tile cork	Coal, copper, pyrites	Wine, fish, cork	Foodstuffs, fuel, mfgd goods
Rumania	Corn, wheat, fruits	Refined metals, textiles, foodstuffs	Petroleum, lignite	Food, petrol , lumber products	Textiles, machinery, mfgd. goods
U.S.S.R. (Russia)	Grain, potatoes, livestock	Lumber & text prod , ref metals	Petroleum, iron ore, coal	Grain, lumber, oil	Raw material machinery, textiles
Spain	Wheat olives, grapes	Textiles, paper	Coal, iron, copper	Wine, olives, fruits	Foodstuffs, raw mater , machinery
Sweden	Grain, potatoes, livestock	Lumber products, I–S, ships	Iron ore	Lumber prod , machinery, I–S	Foodstuffs, textiles, coal
Switzerland	Dairy products, grain, wine	Watches, clocks, mach , textiles		Textiles, machinery, dairy pr	Foodstuffs, raw materials, fuel
Turkey	Wheat, tobacco, livestock	Rugs, perfume, embroideries		Tobacco, rugs	Manufactured goods
Vatican City					
Yugoslavia	Grain, livestock, fruits	Foodstuffs, carpets	Lignite, iron ore, bauxite	Animal prod , wheat, lumber	Textiles, I–S, fuel
Asia.					
Afghanistan	Grain, fruits, sheep	Rugs, simple clothing		Fruits, rugs, skins	Textiles, sugar, metals
Aden	Coffee, gum, hides, skins	Cigarettes	Salt	Coffee, gum, hides & skins	Textiles, foodstuffs
Baluchistan	Grain, fruit, sheep, camels	Simple, homemade products		Grain, fruits, wool	Manufactured goods
Bhutan	Rice, corn, millet	Guns, swords			
Burma	Rice, millet, teak	Simple, homemade products	Petroleum, silver	Petroleum, rice, teak	Textiles, I–S, coal
Ceylon	Rice, coconuts, tea, rubber	Simple, homemade products	Gems	Tea, rubber, coconut prod.	Rice, textiles, coal
Chinese Republic					
China	Rice, wheat, vegetables, cotton	Simple, homemade products	Antimony, tungsten, coal	Silk, bean products, tea	Textiles, I–S, rice, tobacco
Manchuria	Wheat, beans, millet	Foodstuffs	Coal, oil shale	Bean products	Manufactured goods
Mongolia	Cattle, sheep			Wool, hides & skins	Manufactured goods
Sinkiang	Grain, fruits, vegetables	Carpets, other textiles	Jade, gold	Gold, jade, carpets	Manufactured goods
Tibet	Barley, livestock	Rugs, crude print cottons		Hides, skins, rugs	Mfgd goods, foodstuffs
Cyprus	Grain, grapes, potatoes	Foodstuffs, handmade cloth	Asbestos, copper, gypsum	Copper ore, asbestos, fruits	Foodstuffs, fuel, mfgd. goods
Hong Kong					
India	Rice, wheat, cotton, sugar	Cotton & jute textiles	Coal, manganese, lead	Jute, cotton, grain, oilseeds	Textiles, I–S, sugar
Indo-China	Rice, bananas		Coal	Rice, coal, fish	Textiles, I–S, foodstuffs
Iraq	Grain, fruits, sheep	Simple, homemade products	Petroleum	Grain, fruits, petroleum	Manufactured goods

Table 1—Continued

Continent, Country, State, etc.	Area in Sq M.	Population	Population of Principal Cities (U. S. in 1930)			Fraction of All Workers Engaged in		
			Capital		Other Cities	Agr.	Mfg.	Trade and Transp.
Asia (Cont.):								
Japanese Empire	265,100	97,657,000	Tokyo	5,876,000	Osaka 2,990,000, Nagoya 1,083,000			
Japan (Proper)	152,400	70,258,000	Tokyo	5,876,000	Osaka 2,990,000; Nagoya 1,083,000	*.55	*.18	*.11
Chosen (Korea)	84,900	21,891,000	Keijô (Seoul)	404,000	Heijô 173,000; Fusan 180,000	*.85	*.07	*.04
Karafuto	13,900	295,000	Otomari (under 25,000)					
Taiwan (Formosa)	13,800	5,213,000			Taihoku 274,000; Tainan 90,000	*.85		
Lebanon	*4,000	863,000	Beirut	135,000	Zahlah 21,000; Tripoli 99,000	.60	.18	.12
Malay Peninsula	56,600	3,920,000	Singapore	445,000	Georgetown 123,000; Kuala Lumpur 80,000			
Nejd	*373,000	*4,000,000	Riyâdh	30,000	Mecca 85,000; Medina 30,000			
Nepal	*54,000	*5,600,000	Kâtmându	*80,000	Danda 23,000	* 90	*.03	*.03
Oman	*82,000	*500,000	Muscat	*10,000	Matrah 10,000			
Palestine	*10,000	1,337,000	Jerusalem	125,000	Jaffa 71,000, Tel-Aviv 140,000	*.65	*.12	* 10
Persia (Iran)	628,000	*15,000,000	Tehrân	*360,000	Tabriz 219,000, Isfahân 100,000	*.80	*.08	*.05
Russia in Asia	*6,632,700	42,677,000	(See Russia in Europe.)		Omsk 227,000, Sverdlovsk 401,000	*.87	* 06	*.03
Siam	200,100	13,506,000	Bangkok	931,000	Chiengmai 50,000, Mekong 10,000	*.83	* 05	*.07
Syria	77,200	*3,630,000	Damascus	194,000	Aleppo 177,000, Homs 53,000	*.60	* 18	*.12
Trans-Jordan	*35,000	*300,000	Amman	2,000				
Turkey in Asia	273,800	14,797,000	Ankara	123,000	Smyrna 171,000; Adana 76,000	*.65	*.15	*.10
Yemen	*75,000	*2,500,000	San'â	25,000	Hodeida 35,000, Mocha 5,000			
Africa:	*11,000,000	*161,500,000						
Algeria	848,000	7,235,000	Algiers	264,000	Oran 201,000, Constantine 114,000	*.75	* 15	*.08
Anglo-Egyptian Sudan	1,008,100	5,780,000	Khartoum	47,000	Omdurman 111,000, Port Sudan 23,000	*.85	*.06	*.03
Angola	486,100	3,098,000	Nova Lisboa	1,000	Loanda 16,000, Mossâmedes 5,000	*.95	* 02	*.02
Belgian Congo	*938,000	*10,000,000	Leopoldville	39,000	Elisabethville 25,000, Matadi 15,000	*.95	*.02	*.02
British East Africa	*694,000	*12,400,000			Nairobi 50,000, Mombasa 39,000	*.90	*.03	*.03
Egypt	*383,000	15,905,000	Cairo	1,307,000	Alexandria 682,000, Port Said 127,000	*.69	*.11	*.08
Ethiopia	*350,000	*10,000,000	Addis Ababa	*150,000	Harar 50 000, Dire Dawa 30,000	*.85	*.06	*.03
French Equat Africa	*915,000	*3,423,000			Yaunde 30,000, Brazzaville 2,000	*.95	*.02	*.02
French West Africa	*1,855,000	*14,705,000	Dakar	93,000	Porto Novo 27,000, St. Louis 19,000	*.85	*.06	*.03
Liberia	*46,000	*2,000,000	Monrovia	10,000		*.95	*.02	*.02
Libya	423,000	*720,000	Tripoli	99,000	Benghazi 49,000, Murzuq 10,000	*.95	*.02	*.02
Madagascar	*241,000	3,798,000	Tananarive	120,000	Antsirabe 19,000; Tamatave 21,000	*.90	* 03	*.03
Mozambique	297,800	4,029,000	Lourenço Marques	43,000	Inhambane 17,000, Beira 17,000	*.95	*.02	*.02
Morocco	*180,000	*5,000,000	Rabat	83,000	Marrakesh 190,000, Casablanca 257,000	*.85	*.06	*.05
Nigeria	*375,700	*20,200,000	Lagos	137,000	Ibadan 387,000, Kano 100,000	*.90	* 03	*.03
Northern Rhodesia	*287,900	*1,378,000	Livingstone	*1,000	Fort Jameson 1,000	*.85	*.06	* 03
Southern Rhodesia	*149,000	*1,392,000	Salisbury	33,000	Bulawayo 29,000	*.85	*.06	*.03
South-West Africa	*322,800	*260,000	Windhoek	18,000	Grootfontein, Outjo (both under 50,000)			
Tunisia	48,300	2,660,000	Tunis	220,000	Sfax 43,000, Susa 28,000	*.75	*.10	*.08
Union of South Africa	471,900	9,559,000	Pretoria	77,000	Johannesburg 258,000, Capetown 172 000	.65	.15	.08
Australasia & Pacific Is.:	*3,300,000	*9,500,000						
Australia	*2,974,600	6,739,000	Canberra	8,000	Sydney †1,267,000, Melbourne †1,018,000	.23	.31	.24
New South Wales	309,400	2,585,000	Sydney	†1,267,000	Newcastle 109,000, Broken Hill 27,000	.20	.32	.26
Northern Territory	523,600	*25,000			Darwin Alice Springs (both under 1,000)	.34	.18	.18
Queensland	670,500	992,000	Brisbane	313,000	Townsville 31,000, Rockhampton 30 000	.31	.26	.22
South Australia	380,100	581,000	Adelaide	†325,000	Port Pirie 10,000, Mt. Gambier 4,000	.25	.31	.25
Tasmania	26,200	266,000	Hobart	64,000	Launceston 33,000, Zeehan (under 10,000)	.30	.27	.19
Victoria	87,900	1,884,000	Melbourne	†1,018,000	Geelong 40,000, Ballarat 38,000	.21	.35	.24
Western Australia	*975,900	419,000	Perth	212,000	Fremantle 33,000, Boulder 7,000	.28	.22	.25
New Zealand	103,700	1,574,000	Wellington	152,000	Auckland 213,000, Christchurch 133,000	.30	.23	.26
Borneo (British)	31,000	277,000	Sandakan	12,000	Kuching, 25,000, Brunei, 12,000			
Dutch East Indies	733,700	49,344,000			Batavia 437,000, Surabaya 337,000	*.85	*.04	*.04
Philippine Islands	114,400	13,267,000	Manila	355,000	Cebu 110,000, Albay 36,000	*.85	* 05	* 04
Hawaiian Islands	6,400	384,000	Honolulu	148,000	Hilo 19.000, Wailuku 7.000	.43	.14	.16

Table 2—Continued

Continent, Country, State, etc.	Principal Products			Principal Exports	Principal Imports
	Agricultural (including Forest and Fishery)	Manufactured	Mineral		
Asia (Cont.):					
Japanese Emp.					
Japan	Rice, tea, silk, fish	Textiles, metal prod., foodstuffs	Coal, copper, gold	Raw silk, textiles, pottery	Raw cotton, I–S, foodstuffs
Chosen	Grain, beans, cotton	Textiles, metal prod , foodstuffs	Coal, gold, iron ore	Rice, beans	Textiles, machinery
Karafuto	Fish, forest products	Fertilizer, wood pulp	Coal	Fish, fertilizer, pulp	Mfgd goods, foodstuffs
Taiwan	Rice, sugar, camphor		Coal	Sugar, tea, camphor	Fertilizer, textiles, rice
Lebanon	Grain, fruits, livestock	Textiles		Wool, cotton, olive oil	Textiles, other mfgd. goods
Malay Pen.	Rice, coconuts, rubber		Tin	Rubber, tin, copra	Foodstuffs, fuel, I–S
Nejd	Livestock, fruits, grain			Horses, camels	Textiles, foodstuffs
Nepal	Livestock, grain			Animal & forest products	Textiles, other mfgd goods
Oman	Dates & other fruits, camels			Dates, pomegranates, fish	Rice, coffee, textiles
Palestine	Grain, fruits, sheep	Wine, soap, olive oil	Stone, salt	Grain, fruits, wool	Foodstuffs, textiles, machinery
Persia	Grain, livestock, furs	Rugs	Petroleum	Petroleum, rugs, opium	Textiles, I–S, foodstuffs
Russia in Asia	Rice, tobacco, corn, teak	Foodstuffs, crude textiles	Coal, gold	Grain, wool, furs	Textiles, manufactured goods
Siam	Grain, fruits, livestock	Rice prod , other simple prod.	Tin	Rice, tin, teak	Textiles, I–S, other mfgd. goods
Syria	Grain, cotton, sheep			Wool, cotton, olive oil	Textiles, other mfgd. goods
Trans-Jordan	Products of desert nomads				
Turkey in Asia	Grain, tobacco, fruits, livestock	Rugs, homemade products	Coal	Tobacco, wool, cotton, fruits	Textiles, sugar, I–S
Yemen	Grain, coffee, livestock			Coffee, hides	Textiles
Africa:					
Algeria	Livestock, wheat, barley, fruits	Olive oil, wine	Iron ore, phosphate, zinc	Wine, grain, olive oil	Foodstuffs, textiles, I–S
Ang.-Eg. Sud.	Livestock, millet, cotton, gum arabic	"Morocco" leather	Gold, salt	Gum, ivory, other animal pr	Foodstuffs, textiles, machinery
Angola	Coffee, corn, coconuts		Diamonds	Coffee, corn, diamonds	Textiles
Belgian Congo	Palm nuts & oil, bananas, cassava		Copper, diamonds, gold	Copper, palm prod., cotton	Machinery, foodstuffs, textiles
Br. E. Africa	Livestock, corn, cotton, coconuts		Gold, tin, salt, diamonds	Cotton, coffee, forest prod.	Textiles, manufactured goods
Egypt	Corn, wheat, cotton, livestock	Simple, homemade products	Phosphate rock, petroleum	Cotton, cottonseed, onions	Textiles, foodstuffs, fertilizer
Ethiopia	Livestock, millet, barley, coffee		Gold, iron ore	Hides & skins, coffee	Textiles, hardware
Fr. Eq. Africa	Livestock, forest products			Forest products	Manufactured goods, foodstuffs
Fr. W. Africa	Livestock, peanuts, cacao	Simple, homemade products	Salt	Oilseeds, animal pr , cacao	Foodstuffs, text , other mfgd. prod.
Liberia	Coffee, bananas, forest products			Coffee, palm products	Foodstuffs, textiles
Libya	Fruits, fish, livestock	Tobacco & fish products	Salt	Animal prod., fish, sponges	Textiles, sugar
Madagascar	Livestock, grain, vegetables	Foodstuffs, textiles	Graphite, gold, mica	Animal prod., graphite, raffia	Textiles, I–S, other mfgd goods
Mosambique	Sugar, corn, copra			Copra, sugar, corn	Foodst., text , other mfgd. goods
Morocco	Grain, fruits, livestock	Flour, soap, cigarettes	Phosphate, lead, manganese	Phosphate, grain, animal prod.	Textiles, I–S, sugar
Nigeria	Palm products, livestock, cacao		Tin	Palm products, peanuts, cacao	Textiles, fish, mfgd goods
N. Rhodesia	Corn, tobacco, fruits		Zinc, copper, vanadium	Copper, zinc, tobacco	Textiles, mach , other mfgd. goods
S. Rhodesia	Livestock, corn, fruits		Gold, asbestos, coal	Minerals, tobacco, corn	Foodstuffs, textiles, I–S
S.-W. Africa	Livestock		Diamonds, gold, copper	Diamonds, animal products	Manufactured goods
Tunisia	Grain, fruits, livestock	Textiles, leather	Phosphate, iron ore, lead	Grain, minerals, wine	Textiles, other mfgd. goods
U. of S. Africa	Grain, livestock, fruits	Foodstuffs, metals, bldg. mat.	Gold, diamonds, asbestos	Gold, diamonds, animal prod.	Foodstuffs, textiles, I–S
Austr. & Pac. Is.:					
Australia	Wheat, animals, animal products	Foodstuffs, textiles, I–S	Coal, silver, gold	Wool, wheat, butter, meat, sugar	Textiles, I–S, tea, tobacco, petroleum products
New S. Wales	Wheat, sheep, cattle	Foodstuffs, metal prod., textiles	Coal, silver, lead		
Northern Terr.	Cattle		Tin, mica		
Queensland	Sheep, cattle, sugar, wheat	Foodstuffs	Coal, copper, gold		
South Australia	Wheat, fruit, livestock	Foodstuffs, clothing, metal prod.	Copper, iron, gypsum		
Tasmania	Sheep, oats, fruits	Canned fruits, chemicals	Copper, zinc, lead		
Victoria	Wheat, sheep, cattle	Foodstuffs, textiles, metal prod.	Gold, coal, stone		
Western Austr.	Wheat, livestock, pearl shells	Forest products, foodstuffs	Gold		
New Zealand	Wool, beef, mutton, dairy products	Farm & forest prod , clothing	Gold, coal	Wool, meat, dairy products	Textiles, I–S, petroleum products
Borneo (Br.)	Rice, forest products, tobacco		Petroleum	Forest prod., tobacco, petrol.	Manufactured goods
Dutch E. Ind.	Rice, corn, sugar, rubber	Textiles, foodstuffs, bicycles	Tin, petroleum, coal	Sugar, rubber, tea, copra	Rice, textiles, I–S
Philippine Is.	Rice, copra, sugar, Manila hemp	Lumber prod , tobacco prod.		Sugar, hemp, coconut prod.	Textiles, I–S, foodstuffs
Hawaiian Is.	Sugar, pineapples, coffee	Sugar, canned pineapples		Sugar, pineapples, coffee	Foodstuffs, I–S, other mfgd. goods

Table 3 WHEAT: Acreage and Production

	Acreage (millions of acres)					Production (millions of bus.—60 lbs.)				
	1909–13 average	1925–26 average	1930–31 average	1936–37	1937–38	1909–13 average	1925–26 average	1930–31 average	1936–37	1937–38
World total[1]	**278.2**	**314 2**	**339 9**	**345.8**	**366.6**	**3,798**	**4,414**	**4,722**	**4,667**	....
United States	47.1	58.3	54 2	48.9	64.5	690	823	733	627	874
Canada	9.9	23.1	25.7	25.6	25.6	197	431	349	219	182
Argentina	16.1	19.0	17.7	15.9	15.3	147	243	244	249	184
Europe:										
United Kingdom	1 8	1.6	1.5	1 8	1.8	56	52	51	65	55
France	16.5	13.2	13.3	12 9	12.8	326	291	305	255	254
Spain	9.5	10 7	11.2	10 8	. .	130	146	158	122	
Italy	11.8	12.0	12.2	12.7	12.8	184	229	253	225	296
Germany	4 0	4.1	5.3	5 2	4 9	131	120	170	163	164
Yugoslavia	4 0	4 6	5.1	5 5	5.3	62	81	80	107	86
Hungary	3 7	3.8	3 9	4 0	3 8	71	80	77	88	70
Rumania	9 5	7.7	7.7	8 5	8 8	159	106	103	129	138
Poland	3 3	3.3	4 3	4 3	4 2	62	61	74	78	68
Russia (including Asiatic)	74.0	71 0	85 8	96.1	101.7	757	791	925	1,333	.
Bulgaria		2 7	3.1	3 0	3.2		40	53	60	65
Czecho-Slovakia		1 8	2 1	2.3	2.1	. .	46	54	56	51
Africa: Egypt		1 6	1 6	1 5	1.4		40	43	46.	45
Morocco		2 6	2 9	3 2	2.7		25	30	12	18
Algeria	7.8	3 7	3.9	4 3	4 1	92	30	33	30	34
Tunisia		1 7	2.0	1 2	2 4		12	13	8	18
Asia: India	29.2	31.5	33.3	33 6	33.2	352	320	356	352	366
Turkey		6 7	7 6	8 8	8 3		68	93	138	140
Australia	7.6	12 8	15 2	12 3	13 8	90	136	186	151	181

Table 4 WHEAT: Yield per Acre (Bushels)

	1909–13 average	1926–30 average	1931–35 average	1936–37	1937–38		1909–13 average	1926–30 average	1931–35 average	1936–37	1937–38
United States	14 7	**14.1**	13 5	12 8	13 6	Hungary	19 3	20 8	19.4	21 8	18.5
Canada	19 8	18.6	13.6	8 6	7 1	Rumania	16 7	13.6	13.4	15.2	15 7
United Kingdom	31 2	35 8	35.6	34 3	34 5	Poland	18.4	18.3	17.4	18.2	16.2
France	19 7	22 0	23 0	19 8	19 9	U S S R (Russia) (including					
Spain	13 7	13.7	14 1	11 3		Asiatic)	10 2	11 1	10.8	13.9	13.5
Italy	15 6	19 0	20 8	17.7	23 1	India	12 0	10 2	10.7	10.5	11.0
Germany	32 6	29 4	32 1	31 6	33 6	Argentina	9.2	12.8	13.8	15 7	12.1
Yugoslavia	15.6	17.7	15 6	19 7	16 4	Australia	11.9	10.6	12.2	12.2	13.1

Table 5 WHEAT: World Trade (Including Flour in Terms of Wheat)

[In thousands of bushels of 60 pounds]

	1925–1929 average		1930–1934 average		1935		1936	
	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports
Principal exporters:								
Canada	306,094	821	224,270	376	187,647	521	264,867	383
United States	173,535	14,676	84,021	14,913	15,731	38,933	19,079	53,226
Argentina	163,164	7	137,034	1	146,313	0	63,209	0
Australia	95,770	3	124,500	3	101,433	3	97,860	2
Hungary	22,164	105	18,111	2	14,820	0	24,044	0
U. S. S. R. (Russia)	16,153	3,449	49,678	1,394	27,960	1,221	4,968	633
British India	13,275	7,706	4,760	3,988	2,304	742	9,287	580
Rumania	6,237	498	11,208	14	9,278	5	22,443	3
Principal importers:								
United Kingdom	12,360	217,084	9,859	227,408	6,915	208,375	6,162	208,209
Germany	11,898	87,909	15,203	33,056	1,166	5,976	3,227	2,752
Italy	2,328	82,586	6,193	40,337	10,456	20,322	7,735	19,654
France	633	46,713	18,415	53,678	37,908	28,793	18,343	22,015
Belgium	2,960	43,576	3,684	47,709	2,293	38,928	2,078	43,994
Brazil	19	32,522	11	32,190	0	34,697	0	36,371
Netherlands	1,297	20,647	1,080	20,447	1,381	21,562	279	20,404
Japan	5,819	22,840	10,737	22,003	14,637	16,458	6,576	12,540

[1] Excluding China.

Table 6 RYE: Acreage and Production

	Acreage (millions of acres)					Production (millions of bushels of 56 pounds)				
	1909–13 average	1921–25 average	1926–30 average	1936–37	1937–38	1909–13 average	1921–25 average	1926–30 average	1936–37	1937–38
World total[1]	**111.2**	**107.3**	**114.2**	**122.8**	**111.6**	**1,768**	**1,559**	**1,812**	**1,752**	
United States	2.2	4.8	3.5	2.8	3.8	36	64	45	26	49
Canada	1	1.4	1.0	.6	.9	2	20	15	4	6
Europe.										
Sweden	1.0	.8	.7	.5	.5	24	22	18	14	17
Belgium	.7	.6	.6	.4	.4	24	21	21	14	14
France	3.1	2.2	1.9	1.6	1.6	53	41	33	28	29
Spain	2.0	1.8	1.7	1.5	1.4	28	28	22	18	20
Germany	12.7	10.7	11.6	11.0	10.0	368	256	296	291	366
Austria	1.1	.9	.9	.9	.9	24	16	20	19	17
Czecho-Slovakia	2.6	2.1	2.4	2.9	2.4	64	52	62	57	58
Hungary	1.6	1.6	1.6	1.6	1.5	31	27	29	28	23
Poland	12.6	12.9	13.7	14.4	14.1	225	207	244	251	222
Lithuania	1.7	1.4	1.2	1.2	1.3	24	23	20	21	24
U. S. S. R. (Russia) (including Asiatic)	61.9	59.7	66.8	64.4		743	680	867	841	

Table 7 BARLEY: Acreage and Production

	Acreage (millions of acres)					Production (millions of bushels of 48 pounds)				
	1909–13 average	1921–25 average	1926–30 average	1936–37	1937–38	1909–13 average	1921–25 average	1926–30 average	1936–37	1937–38
World total	**91.3**	**78.7**	**107.2**	**109.6**	**111.3**	**1,842**	**1,514**	**1,894**	**2,186**	**2,152**
United States	7.6	7.2	11.2	8.4	10.0	185	160	278	147	220
Canada	1.6	3.0	4.7	4.4	4.3	45	77	114	72	83
Denmark	.6	.7	.9	.9	.9	27	32	44	41	50
United Kingdom	1.8	1.5	1.2	.9	.9	65	52	47	34	30
France	2.0	1.7	1.8	1.8	1.8	53	44	50	47	46
Czecho-Slovakia	2.3	1.7	1.8	1.6	1.7	71	50	59	47	51
Germany	3.5	3.2	3.7	4.0	4.2	134	100	134	156	167
Poland	3.1	2.5	3.0	2.9	3.0	68	50	69	64	63
U. S. S. R. (Russia)	26.2	14.8	18.2	20.2	21.6	418	188	271	374	
Spain	3.5	4.3	4.5	4.5		75	92	94	37	
Rumania	3.4	4.3	4.5	4.0	3.8	62	55	88	74	42
Turkey			3.1	4.5	4.4			61	99	105
Algeria	3.4	3.0	3.5	3.1	3.0	46	31	35	29	27
Morocco, French	3.0	2.9	3.0	4.1	4.2	38	40	39	70	35
India, British	8.9	7.5	7.4	6.1		145	134	112	109	
Japan (proper)	3.0	2.6	2.3	1.9	1.9	96	82	81	69	72
Chosen	1.6	2.1	2.2	2.6	2.7	32	37	37	47	63
China			16.3	16.2	14.7			362	374	293

Table 8 OATS: Acreage and Production

	Acreage (millions of acres)					Production (millions of bushels of 32 pounds)				
	1909–13 average	1921–25 average	1926–30 average	1936–37	1937–38	1909–13 average	1921–25 average	1926–30 average	1936–37	1937–38
World total.	**143.2**	**132.6**	**149.0**	**140.0**	**140.4**	**4,526**	**3,992**	**4,685**	**4,040**	**4,437**
United States	37.4	42.4	41.5	33.4	35.1	1,143	1,251	1,275	786	1,146
Canada	9.6	14.6	13.0	13.3	13.0	374	487	411	289	285
Sweden	2.0	1.8	1.7	1.7	1.6	86	75	83	83	87
Denmark	1.2	1.1	1.0	.9	.9	61	61	67	58	70
United Kingdom	4.0	3.4	3.0	2.5	2.3	207	163	169	139	129
Eire (Irish Free State)		.7	.7	.6	.6		36	46	36	40
Belgium	.7	.7	.7	.5	.5	44	41	47	38	36
France	10.1	8.5	8.6	8.7	8.0	368	301	346	290	314
Czecho-Slovakia	2.5	2.0	2.1	1.9	1.9	96	82	98	84	95
Germany	9.5	8.2	8.6	6.9	7.0	527	363	451	387	408
Poland	6.8	4.4	5.8	5.6	5.7	194	121	196	182	161
U. S. S. R. (Russia)	41.3	25.8	42.4	43.5	43.2	925	523	1,060	1,259	
Italy	1.3	1.2	1.3	1.1	1.1	38	38	41	33	43
Spain	1.3	1.6	1.9	1.4		29	36	42	38	
Rumania	2.1	3.1	2.8	2.0	1.9	60	63	76	38	35
Argentina	2.0	1.8	2.6	2.0	1.8	54	59	63	55	48

[1] Excluding China.

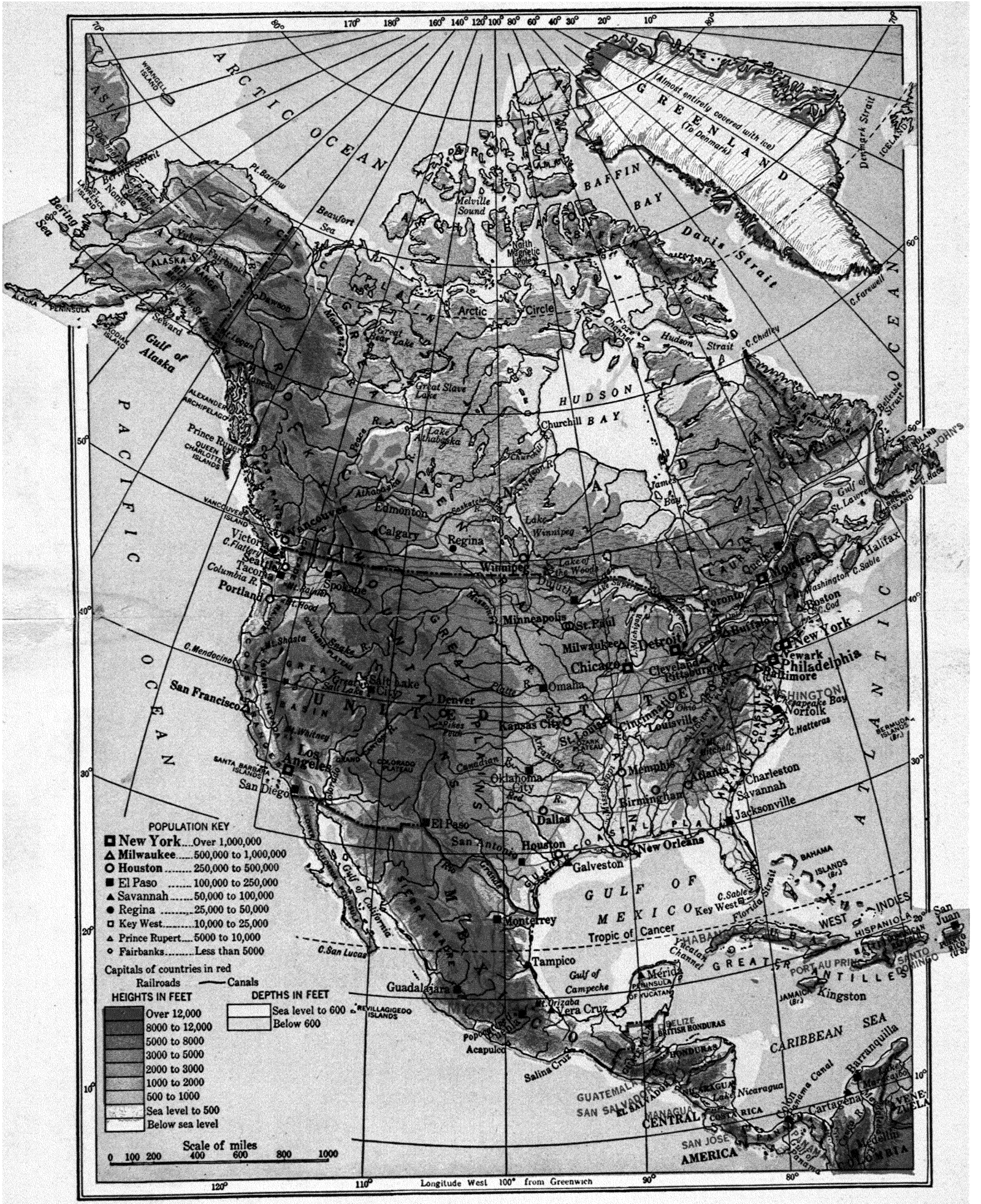


PLATE 1—PHYSICAL-POLITICAL MAP OF NORTH AMERICA

Table 9 CORN: Acreage and Production

	Acreage (millions of acres)					Production (millions of bushels of 56 pounds)				
	1909–13 average	1921–25 average	1926–30 average	1936–37	1937–38	1909–13 average	1921–25 average	1926–30 average	1936–37	1937–38
World total	**175 6**	**180.8**	**194 2**	**214 0**	**209.1**	**4,190**	**4,291**	**4,402**	**4,003**	**4,942**
Northern Hemisphere.	153 7	154 8	160 0	174 8	175 1	3,745	3,702	3,707	3,141	4,256
United States	104 2	102.6	99 5	93 0	93 8	2,712	2,724	2,591	1,507	2,645
Percent of world total	59 3	55 9	51.2	43 5	44 9	64 7	63.8	58 8	37 6	53.5
Mexico... .	6.1	7 6	7 7	7 0		133	85	73	63	
Europe .	29 6	30.4	36 8	39.4	39.1	633	591	705	922	915
Italy	4.1	3 8	3 7	3.7	3 6	103	95	97	120	135
Yugoslavia	4 8	4 8	5 4	6 7	6 5	112	109	118	204	210
Hungary	2 2	2.4	2 6	2 8	3 0	61	58	64	102	106
Rumania	9 6	8 8	10 9	13.0	12 8	193	141	183	221	186
U. S. S. R. (Russia)	3.2	5 2	8 6	6 8	6 6	52	91	136	110	
Egypt...	1 7	2.0	2 1	1 6	1 6	64	69	76	63	65
India...	6 4	5 9	6 4	6 4		83	82	84	91	
Southern Hemisphere.	21 9	26 0	22 1	39 2	34 0	445	569	695	862	664
Brazil	6 0	7 0	9 0			140	177	172	222	
Argentina	8 7	8 1	10 2	11 9	7 5	192	227	305	360	177
Union of South Africa	2 3	4 5	5 4	6 1		34	57	68	100	65
Java and Madura	3 0	3 9	4 8	5 5		42	58	71	87	

Table 10 CORN: Yield per Acre (Bushels of 56 Pounds)

	1909–13 average	1921–26 average	1926–30 average	1936–37		1909–13 average	1921–26 average	1926–30 average	1936–37
United States .	26 0	26 5	26 0	16 2	Egypt	37 7	34 8	37 0	39 8
Mexico .	13 5	11 3	11.2	8 9	India ..	13 9	13 9	13 3	14 2
Italy	25.1	24 9	26 1	32.6	Brazil	23 3	25 4	18 6	
Yugoslavia	23 4	23.0	21 7	30 5	Argentina	22 0	28 0	29 6	30 1
Hungary	27 7	23 9	24 1	36 3	Union of South Africa	14 6	12 8	12 0	11 0
Rumania	20 0	16 0	16 9	17 0	Java and Madura	14 0	14 9	16.1	15 2
U. S. S R. (Russia)	16 1	17 4	16 4	16 2					

Table 11 RICE: Acreage and Production

	Acreage (thousands of acres)					Production (millions of pounds)				
	1909–13 average	1921–25 average	1926–30 average	1936–37	1937–38	1909–13 average	1921–25 average	1926–30 average	1936–37	1937–38
World total[1]						**109,000**	**126,000**	**128,800**	**140,000**	
United States .	716	921	966	969	1,093	660	990	1,196	1,361	1,472
India, British	67,004	81,400	80,527	83,556	68,807	64,144	70,270	68,451	73,835	69,655
Japan (proper)	7,300	7,705	7,825	7,859	7,884	15,787	18,107	19,137	21,155	20,835
Chosen (Korea)	2,905	3,824	3,922	3,924	4,015	3,293	4,556	4,964	6,098	8,275
Taiwan (Formosa)	1,193	1,262	1,443	1,685	1,623	1,413	1,747	2,122	3,097	2,941
Indo-China, French	8,550	11,949	13,577	12,355		7,332	7,704	8,183	8,519	
Siam .	4,555	5,964	6,665	5,525	7,196	4,258	6,065	6,275	4,450	6,390
Philippine Islands .	2,817	4,229	4,434			1,213	2,744	3,097	2,901	2,778
Brazil	228	1,029	1,363			100	1,033	1,264		.
Madagascar	1,009	1,298	1,370			896	1,322	992		. .
Java and Madura	6,903	8,014	8,627	7,524	7,506	6,433	7,055	7,776		

Table 12 RICE: World Trade (Millions of Pounds)

	1909–13 average		1921–25 average		1925–29 average		1935		1936	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
World total	**10,718**	**12,454**	**11,239**	**13,593**	**10,769**	**13,855**	**10,236**	**12,453**	**8,392**	**8,496**
Principal exporters:										
United States	210	16	59	317	60	252	52	165	113	22
Italy	4	142	5	242	3	429	7	281	3	313
India, British	278	5,338	272	4,558	224	4,888	548	3,772	358	3,023
Indo-China (French) .	0	2,288	13	2,974	0	3,493	2	3,585	5	3,735
Siam . .	0	1,929	0	2,795	1	3,101	0	3,282		
Principal importers:										
Cuba .	262	0	393	0	461	0	494	0		
France ...	518	79	467	75	532	169	918	51	1,825	37
Germany . . .	914	397	708	203	848	325	421	61	381	56
Netherlands . . .	779	476	217	98	272	224	216	213	324	251
United Kingdom	769	91	398	21	269	16	244	5	249	4
Malaya, British.	2,000	1,299	1,385	567	1,960	623	1,777	434	1,919	430
Ceylon..	822	0	859	0	1,048	0	1,228	0	1,190	0
China	705	0	1,549	5	2,024	6	2,329	14	580	59
Netherland India	1,178	132	1,231	55	1,303	51	856	54		
Japan	656	62	988	18	961	14	87	47	122	17

[1] Excluding China whose 1936–37 crop was estimated at 109 649,088,000 pounds.

Table 13 RICE: Yield per Acre (Pounds)

	1909–1913 average	1921–1925 average	1936–1937	1937–1938		1909–1913 average	1921–1925 average	1936–1937	1937–1938
United States ..	922	1,075	1,405	1,290	Indo-China, French .	858	645	689	
India	957	863	884	1,018	Siam	935	1,017	805	888
Japan	2,163	2,350	2,692	2,643	Philippine Islands	431	649		
Chosen (Korea) .	1,134	1,191	1,554	2,061	Madagascar	888	1,018		
Taiwan (Formosa)	1,184	1,384	1,838	1,812	Java and Madura	932	880	1,170	1,130

Table 14 POTATOES: Acreage and Production

	Acreage (1,000 acres)				Production (1,000 bushels of 60 pounds)			
	1925–26 to 1929–30 average	1930–31 to 1934–35 average	1936–37	1937–38	1925–26 to 1929–30 average	1930–31 to 1934–35 average	1936–37	1937–38
World total[1] .	**43,000**	**48,000**	**52,000**		**6,660,800**	**7,562,100**	**8,815,500**	
United States	3,064	3,426	3,063	3,177	349,434	369,907	331,918	391,159
Canada	552	556	496	531	74,579	76,934	65,057	71,055
United Kingdom	800	753	722	715	198,500	185,008	171,178	183,530
Eire (Irish Free State)	369	345	334	326	87,856	92,054	90,378	101,036
Norway	120	119	127	128	31,592	31,986	34,753	31,636
Sweden	366	331	330	329	63,397	68,888	67,098	64,925
Denmark	173	175	187	200	36,243	43,094	47,344	49,236
Netherlands	432	395	322	336	118,097	109,253	92,099	91,858
Belgium	408	412	392	392	124,585	131,758	118,512	113,567
France	3,606	3,495	3,513	3,512	523,939	574,531	560,371	540,941
Spain	812	1,031			139,671	172,759		
Italy	868	981	1,038	965	72,837	87,017	96,668	105,517
Germany	6,945	7,069	6,900	7,136	1,400,991	1,681,628	1,702,070	2,032,274
Austria	453	489	519	538	83,216	96,563	87,032	118,314
Czecho-Slovakia	1,727	1,777	1,876	1,906	312,867	336,044	393,217	454,221
Hungary	652	711	733	731	72,221	64,821	90,069	95,497
Yugoslavia	560	605	648		41,930	53,530	59,818	.
Rumania	495	521	582		75,865	68,085	77,622	
Poland	6,125	6,742	7,150	7,360	972,152	1,129,238	1,259,609	1,388,889
Lithuania	347	423	442	456	53,811	73,428	76,400	92,196
Latvia	200	251	296	314	28,477	46,478	59,208	65,476
Finland	171	191	215	230	27,496	39,028	48,596	49,162
U S S R. (Russia)	13,411	14,695	18,723	16,920	1,578,964	1,758,036		
Chile	93	125	126		13,557	17,696	17,036	
Argentina	313	338			29,325	34,184		
Australia	140	141			13,315	13,137		

Table 15 POTATOES: Yield per Acre (Bushels)

	1926–1930 average	1931–1935 average	1936–1937	1937–1938		1926–1930 average	1931–1935 average	1936–1937	1937–1938
United States .	114 0	108 0	108 4	123 1	Germany .	201 7	237 9	246 7	284 8
Canada	135 1	138 4	131 2	133 8	Austria	183.7	197 5	167 7	219 9
United Kingdom	248 1	245 7	237 1	256 7	Czecho-Slovakia	181 2	189.1	209 6	238 3
Eire (I. F. S)	238 1	266 8	270 6	309.9	Hungary	110.8	91 2	122.9	130 6
Norway	263 3	268 8	273 6	247 2	Yugoslavia	74 9	88 5	92 3	
Sweden	173 2	208 1	203.3	197 3	Rumania	153 3	130.7	133 4	
Netherlands	273.4	276 6	286 0	273 4	Poland	158 7	167 5	176 2	188 7
Belgium	305 4	319.8	302.3	289 7	Lithuania	155.1	173 6	172 9	202 2
France ..	145 3	164 4	159.5	154.0	Finland	160 5	204 3	226 0	213 7
Spain . .	172 0	167 6			U. S. S. R (Russia) ...	117 7	119.6		
Italy	83.9	88 7	93.1	109.3	Chile.	145.8	141.6	135 2	.

[1] Excluding China.



PLATE 2—PHYSICAL-POLITICAL MAP OF UNITED STATES (EAST HALF)

Table 16 SUGAR BEETS: Acreage and Production

	Acreage (1,000 acres)				Production (1,000 short tons)			
	1925–26 to 1929–30 average	1930–31 to 1934–35 average	1936	1937	1925–26 to 1929–30 average	1930–31 to 1934–35 average	1936	1937
World total	**6,824**	**8,068**	**8,212**	**8,218**	**64,805**	**68,939**	**79,423**	**90,304**
United States	676	801	776	759	7,355	8,944	9,028	8,798
Canada	32	42	56	46	265	429	595	433
Great Britain	165	322	355	314	1,439	3,215	3,869	3,307
Sweden	77	106	127	126	962	1,620	1,984	2,000
Denmark	92	95	94	102	1,208	1,336	2,003	2,447
Netherlands	157	111	106	103	2,317	1,886	1,806	1,561
Belgium	164	133	118	118	2,035	1,824	1,644	1,517
France	601	666	769	702	6,367	8,607	9,101	8,438
Spain	182	223	217	200	1,908	1,772	.	
Italy	226	238	302	317	2,573	2,825	2,928	3,653
Germany	1,062	887	961	1,125	11,856	11,642	13,333	17,307
Austria	62	107	93	100	686	1,201	1,006	1,078
Czecho-Slovakia	677	424	381	448	7,952	5,171	4,623	6,599
Hungary	168	128	122	117	1,647	1,134	1,239	1,216
Yugoslavia	110	96	64	37	822	700	681	470
Rumania	167	81	72	82	1,207	614	471	610
Poland	510	327	300	365	4,609	3,147	2,817	3,582
U S S R (Russia)	1,620	3,144	3,104	2,943	9,074	11,680	18,552	23,259

Table 17 SUGAR BEETS: Yield per Acre (Short Tons)

	1925–26 to 1929–30 average	1930–31 to 1934–35 average	1936	1937		1925–26 to 1929–30 average	1930–31 to 1934–35 average	1936	1937
United States	10 9	11 2	11 6	11 6	Spain	10 5	7 9		
Canada	8 3	10 5	10 6	9 4	Italy	11 4	11 9	9 7	11 5
United Kingdom	9 0	10 0	10 9	10 5	Germany	11 2	13 1	13 9	15 4
Sweden	12 5	15 3	15 6	15 9	Czecho-Slovakia	11 7	12 2	12 1	14 7
Denmark	13 1	14 1	21 3	24 0	Hungary	9 8	8 9	10 2	10 4
Netherlands	14 8	17 0	17 0	15 2	Poland	9 0	9 6	9 4	9 8
Belgium	12 4	13 7	13 9	12 9	U S S R (Russia)	5 6	3 7	6 0	7.9
France	10 6	12 9	11 8	12 0	Rumania	7 2	7 6	6 5	7 4

Table 18 SUGAR: Production of Raw Beet Sugar (Thousands of Short Tons)

	1925–26 to 1929–30 average	1930–31 to 1934–35 average	1936–37	1937–38		1925–26 to 1929–30 average	1930–31 to 1934–35 average	1936–37	1937–38
World total	**9,488**	**9,979**	**10,998**	**12,096**	Italy	352	397	380	382
					Germany	1,937	1,838	1,810	2,330
United States	1,066	1,396	1,395	1,376	Czecho-Slovakia	1,301	825	801	818
United Kingdom	202	498	650	510	Hungary	219	158	158	132
Sweden	144	252	325	358	Poland	745	546	505	620
Denmark	166	173	238	254	U S S R (Russia)	1,148	1,371	2,203	2,800
Netherlands	306	202	259	248	Rumania	139	112	87	96
Belgium	297	274	268	266	Canada	38	66	89	61
France	879	1,112	960	1,034	Japan	22	25	53	58
Spain	242	216	249	226	Australia	3	6	5	5

Table 19 SUGAR: Production of Raw Cane Sugar (Thousands of Short Tons)

	1925–26 to 1929–30 average	1930–31 to 1934–35 average	1936–37	1937–38		1925–26 to 1929–30 average	1930–31 to 1934–35 average	1936–37	1937–38
World total	**19,684**	**19,223**	**23,780**	**23 905**	Europe and Asia	8,165	9,169	11,879	12,020
					India	3,341	4,909	7,523	7,355
North and Central America and West Indies	7,934	6,114	7,393	7,433	Taiwan	681	886	1,088	1,474
					Java	2,867	1,731	1,568	1,568
United States and possessions	1,678	2,124	2,484	2,529	Philippine Islands	819	1,170	1,121	1,103
					South America	2,155	2,237	2,359	2,229
United States	123	236	437	510	Argentina	440	384	486	414
Puerto Rico	687	894	996	997	Brazil	1,056	1,134	1,100	1,055
Hawaii	861	991	1,042	1,014	Peru	428	441	455	448
Cuba	5,221	2,803	3,374	3,360	Africa	763	928	1,120	1,170
Dominican Republic	391	439	500	504	Oceania	668	785	1,030	1,053
					Australia	564	667	869	896

Table 20 SUGAR: World Production of Raw Cane and Beet Sugar (Thousands of Short Tons of 2,000 Pounds)

	Estimated world total	Estimated world total, cane	Estimated world total, beet	Selected countries							
				United States	Cuba	India	Java	Germany	Czecho-Slovakia	Poland	France
1909–10	16,828	9,670	7,158	883	2,021	2,481	1,411	2,147			861
1910–11	18,834	9,870	8,964	903	1,661	2,587	1,617	2,770		..	763
1911–12	17,908	10,622	7,286	1,005	2,124	2,745	1,550	1,552			546
1912–13	20,542	10,896	9,646	907	2,720	2,862	1,616	2,902			1,029
1913–14	21,154	11,640	9,514	1,089	2,909	2,573	1,549	2,886			841
1914–15	20,875	11,952	8,923	1,023	2,922	2,736	1,454	2,721		376	355
1915–16	18,885	12,278	6,607	1,078	3,398	2,949	1,797	1,678		239	159
1916–17	18,592	13,255	5,337	1,193	3,422	3,093	2,009	1,721		293	217
1917–18	20,293	14,790	5,503	1,068	3,890	3,839	1,960	1,726		263	235
1918–19	18,604	14,076	4,528	1,102	4,491	2,752	1,473	1,297	714	249	129
1919–20	17,989	14,338	3,651	902	4,184	3,404	1,681	774	553	106	182
1920–21	19,546	14,225	5,321	1,345	4,406	2,825	1,853	1,195	797	195	358
1921–22	20,833	15,311	5,522	1,425	4,517	2,928	1,994	1,434	731	200	326
1922–23	20,879	15,130	5,749	1,024	4,083	3,410	1,981	1,604	811	335	522
1923–24	22,987	16,478	6,509	1,111	4,606	3,715	2,201	1,263	1,115	423	524
1924–25	26,926	18,011	8,909	1,256	5,812	2,852	2,535	1,724	1,574	540	880
1925–26	27,750	18,717	9,033	1,119	5,524	3,334	2,140	1,763	1,662	638	796
1926–27	27,163	18,779	8,384	1,008	5,050	3,659	2,592	1,834	1,153	634	763
1927–28	29,249	19,511	9,738	1,242	4,527	3,603	3,223	1,846	1,383	624	911
1928–29	30,865	20,633	10,232	1,271	5,775	3,028	3,165	2,054	1,165	822	957
1929–30	30,813	20,784	10,029	1,307	5,231	3,082	3,214	2,188	1,142	1,010	968
1930–31	31,575	19,343	12,232	1,508	3,495	3,615	3,056	2,808	1,258	855	1,271
1931–32	29,246	20,058	9,188	1,421	2,917	4,452	2,822	1,760	903	544	923
1932–33	27,145	18,759	8,386	1,717	2,234	5,237	1,513	1,202	695	461	1,079
1933–34	28,788	19,184	9,604	2,007	2,527	5,484	701	1,574	569	380	999
1934–35	29,255	18,769	10,486	1,508	2,842	5,757	562	1,844	708	492	1,291
1935–36	31,606	20,919	10,687	1,651	2,899	6,611	663	1,845	631	490	977
1936–37	34,778	23,780	10,998	1,832	3,374	7,523	1,568	1,810	801	505	960
1937–38	36,000	23,904	12,096	1,886	3,360	7,355	1,568	2,330	818	620	1,034

Table 21 SUGAR: World Trade (Short Tons of 2,000 Pounds)

	1925–29 average		1930–34 average		1935		1936	
	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports
Principal exporters.								
Cuba	5,032,658	525	2,911,526	23	2,680,798	53		
Netherland India	2,380,762	3,634	1,672,683	2,582	1,138,706	1,612	974,489	18
Czecho-Slovakia	792,566	628	381,607	720	216,294	8	211,185	9
Philippine Islands	612,260	2,398	1,046,077	803	569,043	174	991,892	187
Dominican Republic	353,915	196	383,422	4	549,132	3	479,288	5
Peru	332,668	106	369,999	195	358,724	357	358,851	453
Poland	253,202	2,291	251,286	5,706	118,360	15	68,167	34
Mauritius	242,199	3	214,838	43	257,059	0	307,776	0
Australia	179,533	911	333,787	4,274	306,142	88		
Germany	174,357	92,758	165,659	19,224	8,672	19,038	19,695	11,362
Belgium	152,164	77,890	95,714	93,160	118,085	106,748	134,253	152,125
British Guiana	113,607	447	140,662	80	195,049	42	197,683	60
U. S. S. R. (Russia)	105,024	57,858	128,940	81,635	84,294	280	179,507	342
Union of South Africa	82,951	10,307	172,725	3,604	223,459	1,139	152,083	1,334
Principal importers								
United States	167,360	4,428,566	73,260	3,102,806	113,956	2,954,988	61,716	2,969,297
United Kingdom	105,263	2,135,293	309,079	2,266,067	374,181	2,198,681	394,878	2,532,159
British India	40,084	904,568	40,259	555,898	36,331	251,596	36,950	42,090
China	2,072	823,225	182	495,504	12	287,357	30	175,049
Canada	89,914	524,446	9,250	441,572	2,790	450,377	6,012	520,511
France	251,691	460,753	309,839	435,730	286,321	403,361	244,341	345,790
Japan	204,103	414,134	162,154	158,690	182,839	154,889	209,660	238,109
Netherlands ..	284,204	316,951	62,874	142,193	57,668	128,586	53,675	162,695
Switzerland	74	148,736	893	177,673	1,193	166,707	1,075	149,735
British Malaya .	31,068	125,180	14,954	112,806	18,164	129,739	19,020	143,968
Morocco	0	121,576	469	155,696	8,656	169,261	8,635	185,698

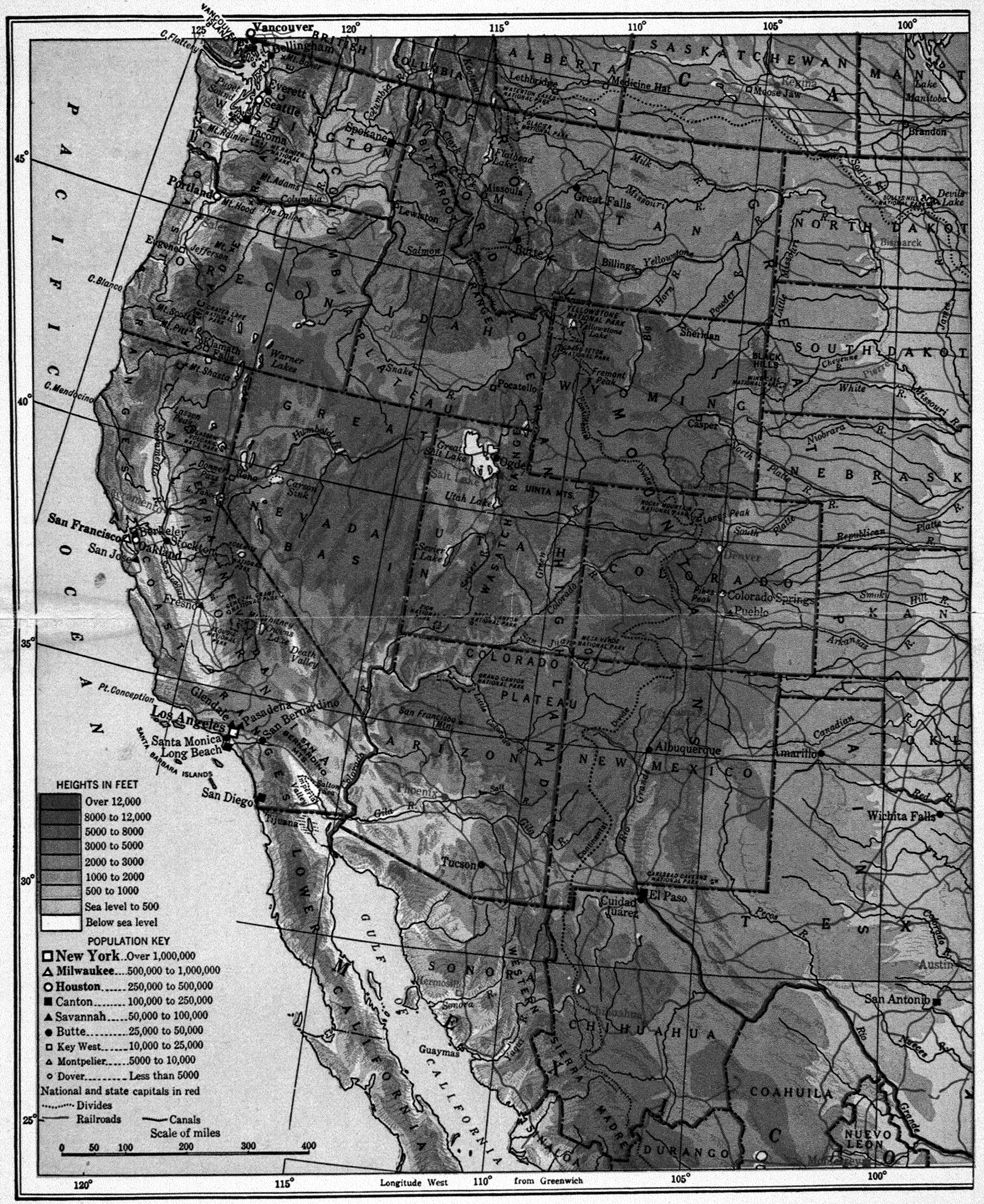


PLATE 2—PHYSICAL-POLITICAL MAP OF THE UNITED STATES (WEST HALF)

Table 22 COFFEE: World Trade (Thousands of Pounds)

	1925–29 average		1930–34 average		1935		1936	
	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports
World total	**3,086,405**	**3,006,773**	**3,361,270**	**3,269,082**	**3,511,625**	**3,424,778**	**2,737,987**	**3,344,561**
Principal exporters:								
Brazil	1,865,392	0	1,975,720	0	2,027,631	0	1,876,432	0
Colombia	324,155	6	418,078	3	498,526	0	512,900	0
Netherland India	187,523	3,035	175,039	2,485	179,612	1,731	67,007	30
Venezuela	118,217	0	120,925	5	118,273	24		
Guatemala	100,953	0	98,394	0	90,151	0		0
El Salvador	96,466	0	114,182	11	110,384	0		0
Principal importers.								
United States	17,699	1,429,825	7,375	1,590,445	7,654	1,755,809	9,046	1,739,191
France	219	360,039	117	411,227	34	415,686	69	411,281
Germany	365	266,650	1,052	318,355	185	325,554	132	342,616
Netherlands	36,978	113,722	17,286	104,385	9,615	81,625	3,089	71,459
Italy	4	99,761	40	91,970	15	89,301	50	69,946
Sweden	25	90,654	113	100,096	17	106,853	22	102,954
Belgium	890	88,285	3,139	109,317	308	107,986	1,224	115,508

Table 23 TOBACCO: Acreage and Production

	Acreage (thousands of acres)					Production (millions of pounds)				
	1925–26 to 1929–30 average	1930–31 to 1934–35 average	1935–36	1936–37	1937–38	1925–26 to 1929–30 average	1930–31 to 1934–35 average	1935–36	1936–37	1937–38
World total	**5,597**	**5,688**	**5,535**			**4,867**	**4,864**	**5,103**		
United States	1,757	1,706	1,437	1,438	1,732	1,357	1,337	1,297	1,155	1,553
Canada	37	48	47	55	65	35	45	54	46	71
Mexico	41	33	36			24	24	27		
Cuba	150	120	115	109	122	61	56	42	42	55
Dominican Republic	40					35	16	9		
Puerto Rico	51	29	44	45		33	22	26	27	
Argentina	23	37	39			26	32	34		
Brazil	221					182	216	213		
Paraguay	22	23				24	31			
France	39	41	45			61	71	83		
Hungary	52	53	38	37	35	58	67	47	50	47
Germany	21	27	31	32	32	44	60	75	73	68
U. S. S. R. (Russia)	214	459	487	501	491	346	341	534	608	493
Italy	96	97	82	80	80	91	106	102	97	95
Bulgaria	83	67	85	92	101	61	54	62	67	69
Greece	221	195	198	273	226	138	104	102	179	141
Rumania	79	40	44	45	35	43	24	29	33	29
Yugoslavia	33	37	30	44	51	23	26	20	37	55
Poland	8	12	13	15	18	10	16	25	24	29
Czecho-Slovakia	14	23	25	24	23	16	29	30	33	33
Turkey	156	124	133	148	185	115	85	79	99	139
India	1,281	1,285	1,357			1,367	1,370	1,458		
China		1,299	1,353	1,345			1,358	1,393	1,404	
Java and Madura	69	73	58	64		63	58	50	51	
Sumatra	49	39	28	31		43	34	28	30	
Philippine Islands	194	179	153			102	92	63		
Japan	91	86	86	87	85	142	145	142	133	142
Chosen	46	35	40	43	46	42	37	48	45	56
Algeria	65	54	57	55	53	54	40	42	39	

Table 24 TOBACCO: Yield per Acre (Pounds)

	1925–26 to 1929–30 average	1930–31 to 1934–35 average	1936–37	1937–38		1925–26 to 1929–30 average	1930–31 to 1934–35 average	1936–37	1937–38
United States	772	783	803	897	Greece	623	530	654	622
Canada	942	947	838	1,092	Rumania	551	603	735	817
Puerto Rico	647	742	600		Turkey	734	683	670	751
France	1,574	1,720			Java and Madura	912	799	790	
Hungary	1,115	1,259	1,360	1,336	Philippine Islands	524	515		
U. S. S. R. (Russia)	1,618	742	1,215	1 004	Japan (proper)	1,563	1,685	1,533	1,675
Italy	952	1,097	1,210		China		1,046	1,044	
Bulgaria	734	793	725	684	India	1,048	1,066		

Table 25 TOBACCO: World Trade (Thousands of Pounds)

	1925–29 average		1930–34 average		1935		1936	
	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports
Principal exporters								
United States	525,232	78,243	479,027	63,588	396,330	63,296	425,269	67,519
Netherland India	170,071	11,967	143,887	8,204	108,486	1,444	81,269	1,588
Greece	109,224	40	88,048	50	111,178	55	88,083	
Turkey	78,023	0	57,537	114	51,357	313	54,451	1
Brazil	67,864	3,869	67,101	2,101	72,670		69,405	
Bulgaria	57,616	0	48,886	0	53,546	0	44,116	0
Philippine Islands	47,940	674	44,917	1,604	52,679	447	31,840	668
Cuba	42,279	0	38 551	0	31,339	0		0
British India	40,432	16,192	35,810	12,121	36,375	12,350	38,155	11,355
Principal importers								
Germany	679	217,778	888	191,864	73	201,201	0	200,162
United Kingdom	6,211	202,589	8,976	199,485	7,066	240,364	5,479	260,395
China	24,737	104,548	20,276	98,744	29,915	26,371	37,921	38,243
France	403	92,321	1,387	104,127	412	71,990	685	66,090
Netherlands	3,115	70,090	4,044	71,961	3,562	61,095	2,158	62,209
Spain	37	53,921	0	62,733	0	61,038		
Belgium	82	45,005	436	47,198	369	44,490	212	43 598
Czecho-Slovakia	7	38,996	0	21,474	0	25,251	0	20,472

Table 26 COTTON: Acreage and Production

	Acreage (thousands of acres)					Production (thousands of bales of 478 pounds net)				
	1921–22 to 1925–26 average	1925–26 to 1929–30 average	1930–31 to 1934–35 average	1936–37	1937–38	1921–22 to 1925–26 average	1925–26 to 1929–30 average	1930–31 to 1934–35 average	1936–37	1937–38
World total	**73 500**	**84.580**	**79,628**	**85,700**	**92,190**	**21,500**	**27,158**	**25,820**	**30.900**	**38,159**
United States	37,616	42,601	34,658	30,028	33,930	11,516	15,268	13,343	12,399	18,746
Mexico	330	472	349	844	856	187	253	195	359	326
Peru	282	305	328	445		203	246	274	374	
Brazil	1,475	1,492	2,457	6,425		568	504	772	1,749	2,205
Argentina	156	241	436	713	1,035	61	115	191	144	
Egypt	1,768	1,828	1,743	1,781	2,053	1,361	1,587	1,482	1,887	2,282
A.-E. Sudan	134	270	349	475	443	46	126	159	268	
Belgian Congo		253	452				26	71	141	
Uganda	420	615	991	1,487	1,437	107	131	206	269	314
U. S. S. R. (Russia)	741	2,017	4,883	5,023		306	1,022	1,775	3,250	3,482
Iran			203				95	110	157	
India	23,818	26 192	23,625	25,219	25,583	4 523	4,724	4,029	5,278	4,867
China	4,498	5,563	6,451	8,447	9,300	2,021	2,552	2,730	3,870	3 600

Table 27 COTTON: World Trade (Thousands of Bales)

	1925–29 average		1930–34 average		1935		1936	
	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports
World total	**14,210**	**19,155**	**12.574**	**12,796**	**11,888**	**11,759**	**12,128**	**13,224**
Principal exporters								
United States	8,805	393	7,672	169	6,169	105	5,652	177
British India	3,023	169	2,492	288	2,631	408	3,336	253
Egypt	1,480	0	1,510	0	1,773	0	1,618	0
Brazil	109	0	175	1	639	0	924	0
Argentina	78	1	119	0	168	0	227	0
Principal importers								
United Kingdom	0	3,208	0	2,487	0	2,505	0	3,109
Japan	0	3,108	0	3,289	0	3 392	0	4,200
Germany	304	1,819	309	1,668	190	1,430	34	1,092
France	105	1,638	34	1,320	30	1,032	19	1,491
Italy	1	1,072	1	897	0	686	0	466
China	289	636	187	878	145	253	170	188
Czecho-Slovakia	1	566	1	392	0	350	1	421
Belgium	12	391	72	368	142	445	144	506
Poland	0	290	0	261	0	303	0	326
Canada	0	277	0	233	0	252	0	313
Netherlands	2	187	1	194	1	188	3	229
Austria	1	154	0	114	0	160	0	181



Physical-Political Map of South America

Table 28 COTTON: Consumption, Years Ended July 31

	Bales consumed (thousands)					Percent of total	
	1913	1921–25 average	1926–30 average	1936	1937	1926–30 average	1937
World total	**21,963**	**20,166**	**25,149**	**27,627**	**30,820**	**100 0**	**100 0**
United States (lint only)	5,483	5,869	6,735	6,351	7,950	26.8	25.8
United Kingdom	4,644	2,810	3,054	2,846	3,020	12.1	9.8
Continental Europe	7,514	5,362	7,668	8,041	8,539	30 5	27.7
India.....	1,843	1,800	1,840	2,550	2,560	7.3	8 3
Japan...	1,435	2,179	2,733	3,602	3,960	10 9	12 8
China....		1,181	2,004	2,488	2,690	8 0	8 7
Canada	131	181	239	263	305	1 0	1 0

Table 29 RAYON: Production (Metric Tons of 2,204.6 Pounds)

	1930	1935	1936	1937	1938		1930	1935	1936	1937	1938
United States	57,758	116,827	125,931	141,632		Belgium	5,750	6,225	6,450	7,711	
Italy	30,139	38,988	38,000	47,310		Switzerland	4,592	3,687	5,000		
Germany	26,772	46,406	50,800	49,896		Poland	2,727	5,119	5,129	6,260	
France	22,950	23,950	19,300	21,772		Czecho-Slovakia	2,303	2,785	3,377		
United Kingdom	22,668	50,775	51,174	54,296		Canada	1,796	6,010	6,153	7,110	
Japan	16,311	99,212	130,000	149,687		Spain	1,523	2,722	700		
Netherlands	8,000	9,400	9,500	10,297		U. S. S. R. (Russia)	600	5,600	5,600		

Table 30 WOOL: Production (Millions of Pounds)

	1926–30 average	1931–35 average	1936	1937		1926–30 average	1931–35 average	1936	1937
World total	**3,593**	**3,540**	**3,614**		U. S. S. R. (Russia)	363	159	200	259
					Spain	74	69	71	
United States	364	432	427	433	United Kingdom	112	114	108	106
Canada	20	20	19	19	Yugoslavia	28	31	33	35
Argentina	327	361	373	375	Union of S. Africa	294	270	264	230
Uruguay	140	111	116	128	Algeria	42	38	48	49
France	47	37	37	38	Turkey	31	30	42	49
Germany	35	30	35	38	China	78	78	78	78
Italy	53	41	36	37	Australia	926	1,011	975	1,014
Rumania	67	64	60		New Zealand	258	281	303	314

Table 31 WOOL: World Trade (Thousands of Pounds)

	1925–29 average		1930–34 average		1935		1936	
	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports
World total	**2,073,339**	**2,339,500**	**2,142,485**	**2,400,227**	**2,281,955**	**2,505,240**	**2,354,906**	**2,337,218**
Principal exporters.								
Australia	739,123	3,990	831,595	3,108	919,076	5,401	797,514	9,370
Argentina	294,973	302	298,497	97	300,842	85	307,762	108
Union of South Africa	254,431	576	277,504	866	270,420	3,050	220,285	2,665
New Zealand	220,228	103	237,843	15	222,656	155	314,408	119
Uruguay	117,856	0	114,502	11	111,080	0	101,432	0
China	58,272	568	28,737	763	50,327	1,457	41,359	1,185
British India	50,373	27,843	38,276	15,637	49,885	22,757	46,479	27,330
Chile	26,196	435	23,536	149	22,001	526	20,970	1,281
Algeria	24,047	3,632	11,616	1,903	9,681	1,932	18,293	2,611
Principal importers·								
France	53,286	633,028	50,173	588,871	49,821	502,267	69,223	465,510
United Kingdom	54,037	473,061	45,112	576,471	56,143	595,634	46,560	662,465
Germany	24,109	361,447	18,545	835,535	3,619	287,163	945	247,093
United States	322	288,346	151	133,397	20	202,733	16	257,725
Belgium	19,091	135,887	72,853	164,322	117,155	235,327	247,458	106,214
Italy	7,188	99,134	4,959	144,051	884	115,985	1,117	42,312
Japan	0	93,489	0	186,681	0	245,245	0	219,584
U. S. S. R. (Russia)	4,024	46,095	20	62,649	0	70,395		57,082

Table 32 SILK· Commercial Production of Raw Silk (Pounds)

	1909–13 average	1921–25 average	1930–34 average	1936	1937
Total countries specified	**56,389,000**	**75,501,000**	**121,040,000**		
Italy	8,524,000	9,487,000	8,144,000	6,200,000	
France	992,000	548,000	199,000		
Spain	182,000	177,000	98,000		
Levant and Central Asia [1]	6,611,000	1,874,000	4,766,000		
China (exports)	17,722,000	16,874,000	12,342,000	9,788,000	
Japan (exports)	21,898,000	46,336,000	94,980,000	99,427,000	
India (exports)	428,000	121,000	136,000	238,000	
Indo-China (exports)	32,000	84,000	375,000	375,000	
United States (imports)	23,488,000	52,119,000	74,427,000	66,889,000	

Table 33 RUBBER: World Exports (Long Tons of 2,240 Pounds)

Year	World	Middle eastern plantation		American			Africa
		British [2]	Other [3]	Brazil	Other	Mexican guayule	
1911	94,055	14,979	2,522	35,970	15,129	7,172	18,283
1912	114,276	28,722	4,584	41,619	14,241	6,192	18,918
1913	120,123	46,391	7,253	35,659	12,856	1,969	15,986
1914	123,173	64,259	10,328	33,001	7,601	265	7,719
1915	170,826	96,266	20,104	34,610	10,322	1,386	8,138
1916–20, average	290,735	185,000	58,690	28,541	9,190	1,035	8,280
1921–25, average	414,205	244,832	139,159	20,387	3,451	1,333	5,043
1926–30, average	716,639	437,197	246,369	21,923	1,691	2,954	6,505
1931	805,869	517,966	272,498	12,121	222		3,072
1932	707,500	470,690	228,600	6,420	39		1,751
1933	850,820	533,400	304,800	9 883	639		2,098
1934	1,016,210	586,346	417,976	8,903	34	398	2,553
1935	872,722	513,639	339,862	11,275	2,462	459	5,025
1936	855,278	448,000	387,000	14,763		1,229	5,905

Table 34 RUBBER: Net Imports of Principal Countries (Long Tons of 2,240 Pounds)

	1910–15, average	1926–30, average	1933	1934	1935	1936	1937
United States	50,885	439,190	393,728	439,172	467,146	488,145	
United Kingdom	19,952	78,541	44,086	158,482	126,764	73,214	
France	4,970	46,571	40,948	49,560	51,450	62,053	
Germany	14,783	38,818	45,019	59,330	62,899	71,793	
Canada	1,708	28,167	19,941	28,439	26,882	27,867	
Japan	940	26,154	56,028	69,905	58,178	61,700	
Italy	2,543	13,854	15,289	21,398	26,053	16,535	
U S S R	9,457	12,626	30,047	47,271	37,667	30,994	
Australia	627	9,588	12,576	9,642	9,978		
Belgium	2,374	7,426	9,519	9,115	7,599	9,626	
Czecho-Slovakia		3,357	9,463	10,999	11,226	8,781	
Sweden	897	2,934	4,256	7,366	4,838	4,538	
Austria	1,804	2,735	1,954	3,417	3,650	3,571	
Netherlands	1,774	2,299	2,851	3,758	4,069	2,890	
Spain	552	1,997	4,342	6,900	8,553		

[1] Includes Hungary, Czecho-Slovakia, Rumania, Bulgaria, Greece, European Turkey, Crete, The Caucasus, Turkistan, Central Asia, and Iran.
[2] Including British Malaya, Ceylon, India, British North Borneo, Sarawak, Brunei, and Fiji Islands.
[3] Including Netherland India, Siam, French Indo-China, and Philippine Islands.



PLATE 5—PHYSICAL-POLITICAL MAP OF EUROPE

Table 35 LIVESTOCK: Number of Cattle, Hogs, and Sheep in Principal Countries (in Thousands)

	Cattle			Hogs			Sheep		
	1921–1925 average	1926–1930 average	Latest available year	1921–1925 average	1926–1930 average	Latest available year	1921–1925 average	1926–1930 average	Latest available year
Total (estimated)	**648,300**	**684,300**	**759,669**	**256,300**	**284,800**	**284,540**	**644,400**	**742,300**	**683,878**
North America:									
United States	66,725	59,191	65,930	62,088	56,844	44,418	37,662	45,560	52,918
Canada..	9,588	8,860	8,820	4,344	4,387	4,139	3,027	3,431	3,370
Mexico	2,492	7,834	10,083	1,125	3,300	6,544	1,362	3,186	3,674
Cuba .	4,841	4,496	4,651	591	591	952		102	42
South America.									
Colombia	7,468	6,857	8,337	1,352	1,400	1,622	776	794	872
Venezuela	2,689	3,000	2,750	512	512	500	113	113	125
Ecuador	1,500	1,282	1,280	150	153	150	1,000	1,100	700
Peru	1,198	1,806	2,310	429	689	933	11,363	11,209	
Bolivia	2,145	1,918	2,064	362	375	398	3,436	4,742	5,232
Chile ..	1,957	2,153	2,570	255	331	331	4,332	6,263	6,263
Brazil	34,271	47,000	40,864	16,169	22,000	24,774	7,933	10,700	13,049
Uruguay	8 432	7,128	8,000	278	308	300	14,443	19,958	20,000
Paraguay	4,600	4,500	3,750		45	29	600		142
Argentina	37,065	32,000	33,101	1,437	3,769	3,769	36,209	44,413	43,790
Europe:									
United Kingdom	7,782	7,985	8,622	2,963	2,879	4,561	22,233	24,675	25,040
Irish Free State	4,266	4,059	4,014	947	1,048	1,017	2,804	3,255	3,062
Norway (rural only)	1,128	1,221	1,348	216	303	410	1,380	1,596	1,749
Sweden	2,418	2,980	2,919	1,056	1,574	1,293	1,384	680	444
Denmark	2,613	2,981	3,167	2,314	3,741	3,572	380	213	179
Netherlands	2,063	2,366	2,570	1,519	2,018	1,679	668	485	655
Belgium	1,550	1,719	1,783	1,081	1,159	1,054	126	122	
France	13,582	14,886	15,762	5,302	5,942	7,089	9,777	10,574	9,788
Spain	3,457	3,714	4,215	4,500	5,024	5,141	19,229	19,989	17,326
Portugal	754	853	778	1,019	1,163	1,139	3,721	4,450	3,224
Italy	6,812	7,108	7,245	2,630	3,086	3,206	12,014	11,310	8,862
Switzerland	1,425	1,598	1,567	640	782	875	245	170	175
Germany	16,786	17,776	20,088	15,776	19,715	25,892	5,889	3,953	3,923
Austria	2,241	2,313	2,349	1,399	1,965	2,823	526	272	263
Czecho-Slovakia	4,337	4,693	4,596	2,201	2,814	3,242	986	848	592
Hungary	1,866	1,814	1,742	2,424	2,503	2,554	1,661	1,604	1,350
Yugoslavia	4,122	3,749	3,982	2,875	2,743	2,932	7,683	7,807	9,211
Greece		926	1,016		422	624		6,799	8,185
Bulgaria	1,928	2,266	2,183	832	1,002	916	8,186	8,384	8,349
Rumania	5,570	4,820	4,326	2,976	2,915	2,969	11,660	12,936	11,282
Poland	8,063	9,019	10,569	5,287	5,736	7,053	2,193	2,244	3,020
Lithuania	1,149	1,245	1,185	1,521	1,189	1,190	1,314	1,335	656
Latvia	867	977	1,261	465	499	674	1,240	1,030	1,352
Estonia	508	623	676	299	317	281	654	587	552
Finland	1,847	1,841	1,882	378	404	510	1,526	1,196	1,024
U. S. S. R. (Russia) .	58,263	64,900	46,500	21,184	21,040	20,400	98,100	122,780	53,500
Africa:									
Morocco, French	1,711	1,971	2,055		117	90	7,533	8,364	9,284
Algeria	853	903	840		87	56	5,943	6,170	6,416
French West Africa	3,251	2,536	2,536		210	209	5,915	4,563	5,556
Nigeria and Br. Cameroons	2,919	3,117	2,763		27	49	1,711	3,004	1,947
Egypt	1,310	1,551	1,852		11	14	1,013	1,138	1,430
Kenya .	3,038	3,812	5,208		15	15	2,600	2,908	3,237
Uganda	1,109	1,605	2,186		470	1	386	831	1,051
Union of South Africa .	9,459	10,640	11,081	888	888	523	32,561	43,129	39,866
Rhodesia	2,083	2,683	3,066		101	130	333	373	352
Tanganyika Territory	3,806	4,823	4,793		3	8	3,893	2,032	14,478
Madagascar	7,708	7,191	5,693	369	415	504	110	131	204
Asia:									
China	....	...	23,000			81,000	. .		26,000
Turkey	4,821	5,464	6,100				10,458	11,853	14,800
India, British	146,759	151,847	165,760				22,412	23,733	24,044
India, Native States	33,982	38,532	49,629				12,299	18,330	18,568
Japan	1,440	1,474	1,684	590	688	1,063		24	47
Chosen .	1,567	1,586	1,671	1,078	1,244	1,584			
Siam	6,701	8,783	10,635	864	864				
Philippine Islands	2,303	2,909	3,616	5,768	2,236	2,966	260	125	127
Java and Madura	5,287	5,708	6,066			995	915	1,292	1,588
Oceania:									
Australia	13,789	11,873	13,492	918	985	1,294	85,556	103,329	110,243
New Zealand	3,393	3,439	4,254	396	525	808	23,382	27,516	31,211

Table 36 BEEF AND BEEF PRODUCTS: World Trade (Thousands of Pounds)

	1925–29 average		1930–34 average		1935		1936	
	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports
World total	**3,054,704**	**3,007,402**	**2,193,083**	**2,207,810**	**2,049,074**	**2,173,664**	**1,834,419**	**2,084,382**
Principal exporters:								
Argentina	1,552,601	93	1,058,746	57	1,004,426	40	982,921	35
Uruguay	334,616	0	255,162	2	255,843	0	178,482	0
Australia	284,476	1,711	231,881	1,653	306,163	722	248,664	736
Netherlands	237,540	159,721	91,431	90,083	24,782	44,130	27,691	36,403
United States	144,303	84,233	98,860	53,524	51,873	343,633	52,345	164,819
New Zealand	115,286	626	131,293	451	148,366	412	154,029	461
Brazil	109,765	7,221	130,415	2,088	53,001	.....	21,292	
Principal importers								
United Kingdom	34,345	1,795,364	28,466	1,575,517	69,871	1,495,624	49,227	1,506,829
Germany	4,267	386,911	7,275	97,386	20	37,884	21	119,283
France	35,518	146,920	29,109	82,915	41,984	27,181	22,287	24 047
Belgium	38,559	122,183	9,745	68,510	3,014	24,197	3,934	19 405
Japan	0	68,201	0	59,129	0	38,774	0	45,887

Table 37 PORK AND PORK PRODUCTS: World Trade (Thousands of Pounds)

	1925–29 average		1930–34 average		1935		1936	
	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports
World total	**2 331,267**	**2,336,415**	**2,148,833**	**2,162,811**	**1,425,974**	**1,439.931**	**1 469 904**	**1,467 976**
Principal exporters								
United States	1,136,855	10,459	742,920	3,795	191,746	10,531	187,046	41,846
Denmark	557,264	2,869	755 835	1,534	472,345	112	420,893	0
Netherlands	249,396	15,089	214,742	3,554	112,300	5,5 0	92,969	4,396
Eire (Irish Free State)	92,656	55,011	69,620	26,473	80,695	88	84,532	0
Canada	90,757	17,247	60,153	8,614	146,208	485	203,777	2,940
Poland	48,032	37,238	109,121	6,318	78,190	46	109,348	39
Sweden	41,205	9,796	54,649	4,908	30,618	8,861	30,043	7,092
Principal importers								
United Kingdom	5,883	1,371,607	4,362	1,579,594	3,153	1,169,678	7,021	1 141,079
Germany	4,584	322,127	5,969	242,038	194	144,816	81	184 498
Cuba	0	130,315	0	50,440	0	33,101	0	
France	3,135	88,097	1 193	45 249	13,735	5,834	2 328	6,862
Czecho-Slovakia	3,665	79,769	1,096	45,846	279	21,464	219	37,245
Mexico	12	58,269	1	47,419		529	.	

Table 38 COAL RESERVES OF THE WORLD

	Millions of metric tons		Millions of metric tons
World total	**7,863,556**	Europe (continued)	
		Belgium	11,000
North America	4,871,000	Norway and Svalbard	8,750
United States and Alaska	3,536,000	Spain	5,500
(16,000,000,000 of which is anthracite)		Holland	5 000
Canada	1,361,000	Russia in Europe	12,000
(2,000,000,000 of which is anthracite)		Old Austria and Hungary	1,000
Mexico and Central America	10,000	Asia	1,900,000
South America	130,000	China	1,100,000
Colombia	30,000	(427,000,000,000 of which is anthracite)	
Brazil, Chile, Peru, and Venezuela	100,000	Russia in Asia	192,000
Europe	522,200	India	87,000
British Isles	166,000	Indo-China	22,000
Germany	148,200	Japan	9,000
Poland	68,800	Australasia	200,000
Ukraine	55,600	(183,000,000,000 of which is in the Commonwealth of Australia)	
Czecho-Slovakia	24,500	Union of South Africa	62,000
France	18,600		

Total coal mined in world (metric tons of 2,204.6 lbs.) 1936—1,446,000,000, 1937—1,515,000,000

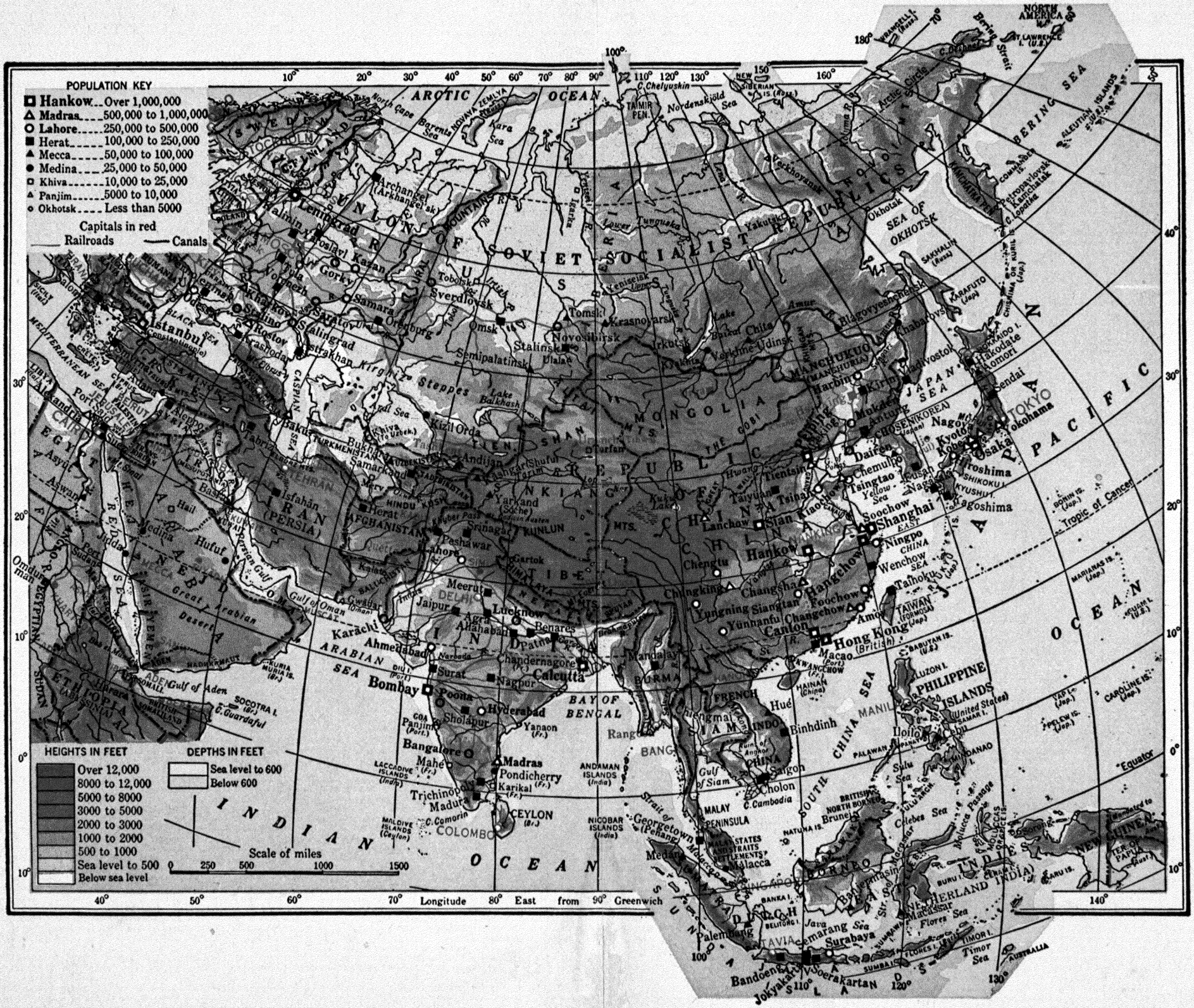


PLATE 6—PHYSICAL-POLITICAL MAP OF ASIA

COAL AND LIGNITE: Production (Thousands of Metric Tons of 2,204.6 Pounds)

Table 39	1913	1921–25 average	1926–30 average	1934	1935	1936	1937
World total ..	**1,342,000**	**1,290,000**	**1,456,000**	**1,284,000**	**1,329,000**	**1,446,000**	**1,515,000**
United States	517,057	507,065	540,223	377,873	385,126	443,293	447,575
Anthracite	} 517,057	70,440	69,507	51,862	47,317	49,513	46,189
Bituminous and lignite .		436,625	470,716	326,011	337,809	393,780	401,386
Europe:							
Austria—							
Coal	16,460	156	192	251	260	244	230
Lignite .	27,378	2,824	3,175	2,851	2,971	2,897	3,242
Belgium	22,842	22,468	26,949	26,389	26,506	27,876	29,681
Czecho-Slovakia—							
Coal . .	.	12,515	14,742	10,789	10,894	12,233	16,951
Lignite .		19,168	20,069	15,071	15,114	15,949	18,042
France . .	40,844	38,500	53,549	48,657	47,120	46,146	45,334
Germany—							
Coal	190,109	115,985	151,179	124,910	132,379	146,707	171,140
Lignite	87,233	138,678	155,142	135,995	146,033	160,276	184,681
Saar Territory		11,406	13,439	11,318	10,624	11,673	13,371
U. S S R (Russia)	35,976	13,143	36,679	66,399	72,818	83,055	79,400
United Kingdom	292,044	243,662	226,939	224,269	225,816	232,115	236,935
Asia and Oceania·							
British India	16,468	20,331	22,932	22,971	23,386	22,974	
China	13,779	21,547	24,921	32,725	26,750	27,050	
Japan and Taiwan	21,838	30,571	35,052	38,667	40,896	40,668	
Australia	12,617	13,452	13,435	12,618	13,320	14,637	15,582
Russia in Asia .	2,162	2,386	4,033	28,867	36,242	42,945	43,200
U. of S. Africa	7,984	11,798	12,700	12,195	13,574	14,842	15,491

CRUDE PETROLEUM: Production (Thousands of Barrels of 42 U. S. Gallons)

Table 40	1913	1921–25 average	1926–30 average	1934	1935	1936	1937	1938
World total	**385,345**	**944,777**	**1,316,382**	**1,521,445**	**1,654,688**	**1,801,786**	**2,040,500**	**1,977,189**
America.								
United States	248,446	647,961	895,762	908,065	996,596	1,099,687	1,277,653	1,112,837
Mexico	25,696	156,091	57,782	38,172	40,241	41,028	46,907	
Trinidad	504	3,259	7,234	10,894	11,671	13,237	15,503	
Venezuela		7,313	95,987	136,103	148,529	154,794	185,701	
Peru .	2,071	6,465	11,753	16,314	17,067	17,593	17,467	
Argentina	131	3,855	8,789	14,025	14,297	15,458	16,236	
Colombia		453	16,417	17,341	17,595	18,752	20,293	
Europe·								
U S S R (Russia)	62,884	40,322	93,459	174,986	182,386	197,418	199,475	
Rumania	13,555	11,819	31,594	62,011	61,310	63,655	52,176	
Poland	7,818	5,483	5,314	3,913	3,812	3,788	3,708	
Asia and Africa:								
Persia	1,857	26,312	41,394	57,851	57,304	62,699	78,741	
Netherland India	11,172	19,158	32,366	46,925	47,171	50,026	56,275	
India	7,930	8,472	8,484	9,201	9,219	9,566	9,852	
Sarawak	141	3,324	5,061	5,140	5,546	5,343	6,026	
Japan and Taiwan .	1,940	1,964	1,918	1,821	2,250	2,445	2,487	
Egypt	98	1,169	1,632	1,546	1,295	1,277	1,149	

IRON ORE: Production (Thousands of Metric Tons of 2,204.6 Pounds)

Table 41	1913	1926–30 average	1937	1938		1913	1926–30 average	1937	1938
America					Europe (Continued)				
United States	62,972	65,636	73,251	28,444	Sweden	7,476	9,100		935
Cuba	1,608	456	496		Yugoslavia	220	400	629	.
Newfoundland	1,457	1,309	1,636		Asia:				
Chile .	14	1,603	1,490		China	423	1,459	.	
Europe·					Chosen	142	503		
Austria	3,039	1,539	1,885		British India	377	1,999		
Czecho-Slovakia		1,658		1,772	Unfederated Malay				
France	21,918	46,709	37,772	5,872	States	7,544	559	...	.
Germany	28,608	5,811	8,522	22,962	Philippine Islands .			754	.
United Kingdom	16,254	10,446	10,500	10,587	Africa·				
Hungary	2,059	187	290		Algeria	1,349	2,009	2,326	
Italy	603	613	900	2,286	Morocco			1 487	
Luxemburg	7,333	7,254	7,750	1,422	Tunisia	598	842	947	
Norway	545	518	1,050		U of S Africa			462	
Poland		547	780	1,463	Australia·				
U. S. S. R (Russia) .	9,514	6,283	28,365	18,699	New South Wales	76	143	..	
Spain	9,862	5,195		239	Queensland	41	2		
					South Australia	62	752		

PIG IRON: Production (Thousands of Long Tons of 2,240 Pounds)

Table 42	1913	1920	1921-1925 average	1926-1930 average	1931-1935 average	1936	1937	1938
World total	**77,714**	**61,846**	**60,481**	**85,064**	**56,047**	**90,238**	**101,378**	**79,345**
North America:								
United States	30,653	36,401	30,166	37,387	15,655	31,073	37,146	19,341
Percent of world total	39 4	58.9	49 9	44 0	27 9	34 4	36 6	24 4
Canada	1,015	999	628	922	396	753	975	748
Europe:								
Germany	19,000	6,931	7,905	11,345	7,267	15,062	15,705	18,200
France	5,126	3,380	5,946	9,600	6,327	6,139	7,791	5,650
United Kingdom	10,260	8,035	5,705	6,029	4,787	7,685	8,352	6,700
Belgium	2,445	1,099	1,972	3,644	2,904	3 157	3,780	2,330
U. S. S R (Russia)	4,563	113	588	3,636	8,165	14,317	14,370	14,845
Luxemburg		682	1,688	2,636	1,929	1,955	2,473	1,415
Czecho-Slovakia		725	763	1,378	696	1,090	1,624	1,200
Poland		42	412	553	321	578	713	930
Spain	418	247	390	596	366	247	295	206
Italy	420	87	244	565	569	787	850	850
Austria	2,344	98	302	389	129	244	383	
Sweden	730	477	373	475	438	575	640	650
Hungary			99	275	128	301	352	
Asia:								
Japan	236	718	774	1,414	1,703	2,184	1,969	3,100
India, British	204	312	618	1,126	1,172	1,560	1,575	
China	239	125	212	168	434	640	640	
Oceania:								
Australia	47	344	324	426	395	679	680	
All other	100	1,031	1,381	2,608	2,256	1,212	1,067	

COPPER: Mine Production (Metric Tons of 2,204.6 Pounds)

Table 43	1921–25 average	1926–30 average	1935	1936	1937	1938
World total	**1,111,611**	**1,659,200**	**1,496,000**	**1,723,000**	**2,200,000**	
United States	562,765	779,294	345,174	557,566	760,008	508,936
Canada	35,465	93,216	190,053	190,974	240,875	265,626
Cuba	10,927	9,059	6,960	11,163	13,191	15,241
Mexico	39,465	68,763	39,373	29,713	46,077	44,000
Bolivia	8,987	7,304	1,913	3,249	3,699	3,460
Chile	173,622	262,612	267,083	256,209	413,186	
Peru	36,928	51,745	29,653	33,352	36,649	34,669
Austria	2,167	2,380	55	12		
Finland			11,987	11,391	12,032	
Germany	20,518	27,031	27,420	26,906	32,000	
U. S. S R (Russia)	2,744	21,820	63,247	82,999	93,000	
Spain	27,165	55,200	30,000	30,000	31,300	
Yugoslavia	6,884	15,600	41,700	39,600	42,300	42,184
Japan (proper)	59,594	71,480	70,914	77,973	87,600	
Australia	14,379	10,966	17,263	18,859	20,000	18,144
Belgian Congo	69,231	111,638	107,682	95,667	150,500	
Northern Rhodesia		4,800	171,366	173,468	212,700	

LEAD: Smelter Production (Metric Tons of 2,204.6 Pounds)

Table 44	1913	1921–25 average	1926–30 average	1935	1936	1937
World total	**1,151,000**	**1,233,400**	**1,699,000**	**1,381,000**	**1,478,000**	**1,702,000**
United States	385,643	502,732	615,544	294,075	362,055	423,232
Canada	17,202	59,014	134,112	148,558	164,857	181,162
Mexico	57,488	123,906	218,810	177,630	214,376	223,678
Argentina		5,284	8,439	4,103	10,700	
Peru		132	9,837	6,452	8,899	19,054
Great Britain	18,420	4,905	8,065	22,350	13,800	10,172
Belgium	53,590	60,887	86,813	68,890	67,000	93,804
France	28,817	17,251	22,797	14,575	14,500	38,860
Austria	22,312	4,271	7,241	8,048	8,732	10,246
Germany	188,000	54,591	91,260	122,300	139,100	166,100
Poland		15,296	34,253	18,819	15,021	17,587
Italy	21,674	17,374	23,115	35,803	36,307	39,088
Spain	198,829	135,640	138,101	62,742	46,600	30,000
Yugoslavia		9,006	10,775	7,554	5,804	4,039
India (Burma)	5,951	44,305	72,880	73,217	74,329	77,728
Tunisia		14,234	18,525	25,390	21,497	27,150
Australia	110,444	114,101	166,437	221,431	196,051	238,833
U. S S R (Russia)				44,853	50,800	55,000

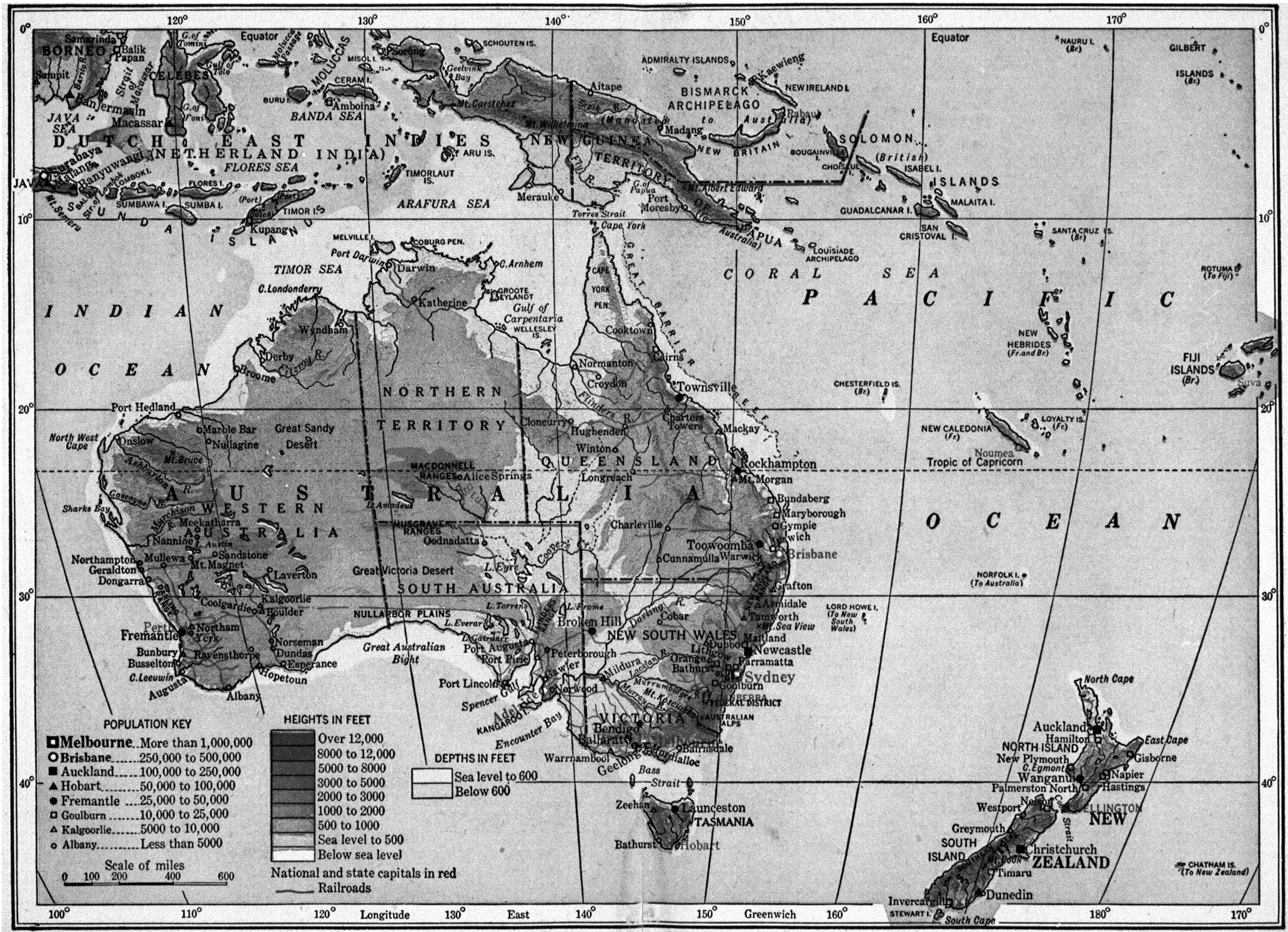

POPULATION KEY
Melbourne..More than 1,000,000
Brisbane.....250,000 to 500,000
Auckland.....100,000 to 250,000
Hobart.....50,000 to 100,000
Fremantle ....25,000 to 50,000
Goulburn .....10,000 to 25,000
Kalgoorlie.....5000 to 10,000
Albany.....Less than 5000
Scale of miles
0 100 200 400 600
HEIGHTS IN FEET
Over 12,000
8000 to 12,000
5000 to 8000
3000 to 5000
2000 to 3000
1000 to 2000
500 to 1000
Sea level to 500
Below sea level
National and state capitals in red
Railroads
DEPTHS IN FEET
Sea level to 600
Below 600
INDIAN OCEAN
PACIFIC OCEAN
CORAL SEA
AUSTRALIA
NEW ZEALAND
DUTCH EAST INDIES (NETHERLAND INDIA)
NEW GUINEA
TERRITORY OF PAPUA (To Australia)
NORTHERN TERRITORY
WESTERN AUSTRALIA
SOUTH AUSTRALIA
QUEENSLAND
NEW SOUTH WALES
VICTORIA
TASMANIA
FEDERAL DISTRICT
CANBERRA
BISMARCK ARCHIPELAGO
SOLOMON ISLANDS (British)
NEW HEBRIDES (Fr. and Br.)
NEW CALEDONIA (Fr.)
FIJI ISLANDS (Br.)
GILBERT ISLANDS (Br.)
NAURU I. (Br.)
NORFOLK I. (To Australia)
LORD HOWE I. (To New South Wales)
CHESTERFIELD IS. (Br.)
LOYALTY IS. (Fr.)
ROTUMA (To Fiji)
CHATHAM IS. (To New Zealand)
Tropic of Capricorn
Great Barrier Reef
Great Australian Bight
NULLARBOR PLAINS
Great Victoria Desert
Great Sandy Desert
Gulf of Carpentaria
Arafura Sea
Timor Sea
Banda Sea
Flores Sea
Java Sea
Celebes Sea
Spencer Gulf
Encounter Bay
Bass Strait
Cook Strait
Torres Strait
Equator
Longitude East Greenwich
Perth
Fremantle
Adelaide
Darwin
Brisbane
Sydney
Melbourne
Hobart
Canberra
Auckland
Wellington
Christchurch
Dunedin
Launceston
Broken Hill
Alice Springs
Townsville
Cairns
Rockhampton
Mackay
Newcastle
Albany
Geraldton
Kalgoorlie
Port Hedland
Broome
Derby
Wyndham
Katherine
Darwin
Mt. Isa
Mt. Gambier
Mildura
Bendigo
Ballarat
Launceston
Hobart
Gisborne
Napier
Hastings
Palmerston North
Wanganui
New Plymouth
Hamilton
Rotorua
Greymouth
Westport
Nelson
Timaru
Invercargill
Suva
Noumea
Port Moresby
Rabaul
Madang
Aitape
Merauke
Kupang
Dili
Ambon
Sorong
Jayapura
Samarinda
Banjermasin
Macassar
Surabaya
Malang
Banyuwangi
Cilacap
Bandung
Batavia
Semarang
Palembang
Pontianak
Balikpapan
Tarakan
Menado
Ternate
Kendari
Bau-Bau
Ende
Waingapu
Port Darwin
Coburg Pen.
Melville I.
Groote Eylandt
Wellesley Is.
Cape York Pen.
Cape York
Gulf of Papua
Louisiade Archipelago
Solomon Is.
Guadalcanar I.
Malaita I.
San Cristoval I.
Santa Cruz Is. (Br.)
Choiseul I.
Isabel I.
Bougainville I.
New Britain
New Ireland I.
Admiralty Islands
Schouten Is.
Misol I.
Ceram I.
Buru I.
Aru Is.
Timorlaut Is.
Flores I.
Sumba I.
Sumbawa I.
Lombok I.
Timor I. (Dutch)
Timor I. (Port.)
Mt. Senyeru
Mt. Carstenz
Mt. Wilhelmina
Mt. Albert Edward
Mt. Victoria
Mt. Kosciusko
Mt. Cook
Mt. Sea View
Mt. Morgan
Mt. Bruce
Mt. Magnet
Mt. Barker
Mt. Lofty
Mt. Gambier
Mt. Isa

Table 45 ZINC: Smelter Production (Metric Tons of 2,204.6 Pounds)

	1913	1921–25 average	1926–1930 average	1934	1935	1936	1937
World total	**839,000**	**823,000**	**1,355,000**	**1,168,000**	**1,332,000**	**1,461,000**	**1,621,000**
United States	314,498	391,085	532,879	329,842	381,591	446,452	505,212
Canada		27,319	76,973	122,394	135,645	137,211	143,964
Norway	9,287	3,893	12,743	45,027	45,019	45,028	41,270
Great Britain	60,243	26,835	45,153	52,022	61,433	61,768	63,138
Belgium	201,220	131,608	193,657	174,900	181,710	195,320	225,579
France	67,890	47,037	82,853	47,248	47,443	54,009	60,427
Netherlands	24,323	15,030	25,378	19,911	13,747	15,428	24,645
Germany	109,361	38,832	89,980	71,196	123,198	133,760	163,200
Poland		72,046	155,849	92,921	84,606	92,580	107,174
Italy		3,945	12,145	24,864	27,579	26,575	37,767
Spain	6,003	10,366	13,733	8,184	8,916	7,800	5,300
Japan	900	13,540	20,071	32,145	34,191	39,066	45,500
Australia	4,187	32,078	51,515	55,506	68,752	71,641	70,869
Mexico		139	13,600	29,148	32,327	31,913	31,412
Northern Rhodesia			10,100	19,854	21,012	21,063	14,256
U. S. S. R. (Russia)		732	3,000	27,084	47,910	66,000	65,000

Table 46 LUMBER: Foreign Trade of Specified Countries (Millions of Board Feet)

	United States		Canada Exports	Sweden Exports	Finland Exports	Norway Exports	U. S. S. R. Exports
	Exports	Imports					
1921–1925 average	2,145	1,593	2,019	1,690	1,718	190	
1926–30 average	2,819	1,572	1,988	1,927	2,188	183	1,275
1931–35 average	1,334	424	1,195	1,481	1,646	75	1,824
1936	1,256	617	1,750	1,579	1,926	52	1,974
1937	1,398	617	1,855				

Table 47 COTTON SPINDLES: Number in Principal Countries (in Thousands)

	1933	1934	1935	1936		1933	1934	1935	1936
Total	**157,548**	**156,831**	**153,972**	**151,782**	Czecho-Slovakia	3,627	3,627	3,618	3,562
					Spain	2,070	2,070	2,070	2,070
United States	30,893	30,942	30,093	28,147	Belgium	2,087	2,106	2,090	2,009
Percent of total	19 6	19 7	19.5	18 5	Switzerland	1,176	1,295	1,265	1,241
Canada	1,240	1,187	1,155	1,110	Poland	1,818	1,696	1,688	1,707
Mexico	832	862	862	862	Netherlands	1,224	1,236	1,219	1,220
Brazil	2,620	2,702	2,709	2,712	Austria	758	774	760	773
United Kingdom	49,001	45,893	42,688	41,391	Other Europe	2,774	2,833	2,741	2,822
Percent of total	31.1	29 3	27 7	27 3	India	9,506	9,572	9,613	9,705
France	10,144	10,170	10,157	9,932	Japan	8,209	9,115	9,944	10,867
Germany	9,850	10,109	10,109	10,109	China	4,585	4,680	4,810	5,010
U S S R. (Russia)	9,200	9,800	9,800	9,800	All other	600	625	1,000	1,250
Italy	5,334	5,487	5,481	5,483					

Table 48 ELECTRIC POWER: Output in Principal Countries

	Output of electric current, Total, million kilowatt-hours				Output of electric current, Total, million kilowatt-hours		
	1925	1936	1937		1925	1936	1937
World total, estimate	**160,000**			Europe (continued)			
				Germany	11,521	42,487	50,000
North America:				Italy	7,600	13,563	14,961
United States	73,791	113,602	120,997	Netherlands	896	2,336	2,576
Canada	10,480	25,402	27,584	Norway	4,200	7,985	
Mexico	561	2,246	2,480	Poland	1,300	2,863	3,356
South America:				Russia		32,800	
Argentina	1,292	1,951		Sweden	3,500	7,425	8,000
Europe:				Switzerland	4,190	6,055	6,855
Belgium	3,214	4,943	5,549	United Kingdom	8,320	25,925	28,760
Czecho-Slovakia		3,509	4,000	Yugoslavia		796	913
Denmark	223	621	754	Asia: Japan	6,400	24,112	26,714
France	9,700	16,300	17,600	Oceania: Australia	..	3,528	

WATER POWER: Developed and Estimated Potential, 1939

Table 49

	Horsepower	
	Developed	Potential
World total	**61,480,000**	**666,000,000**
North America total	**26,000,000**	**77,000,000**
United States	17,284,400	33,500,000
Alaska	36,600	1,100,000
Canada	8,112,800	25,500,000
Mexico	450,000	8,500,000
Newfoundland	270,000	600,000
Central America	101,000	7,000,000
West Indies	40,000	200,000
South America total	**1,100,000**	**74,000,000**
Argentina	67,000	5,400,000
Bolivia	13,500	3,600,000
Brazil	719,000	36,000,000
Chile	189,000	3,600,000
Colombia	25,000	5,400,000
Ecuador	16,000	1,300,000
Guiana, British		3,600,000
Guiana, French		700,000
Surinam (Dutch Guiana)		1,100,000
Paraguay	500	2,800,000
Peru	55,000	6,400,000
Uruguay		400,000
Venezuela	15,000	4,300,000
Europe total	**27,200,000**	**71,000,000**
Albania	1,000	700,000
Bulgaria	64,000	400,000
Czecho-Slovakia	310,000	700,000
Estonia, Latvia, and Lithuania	24,000	235,000
Finland	438,000	1,400,000
France	5,250,000	6,000,000
Germany	3,550,000	3,550,000
Greece	10,000	350,000
Hungary	5,000	160,000
Italy	6,000,000	5,400,000
Norway	2,900,000	16,000,000
Poland	50,000	1,350,000
Portugal	72,000	450,000
Rumania	127,000	3,000,000
Spain	1,400,000	5,700,000
Sweden	1,874,000	4,000,000
Switzerland	2,800,000	2,300,000
U S S R (Russia)	1,463,000	14,000,000
United Kingdom	400,000	700,000
Yugoslavia	250,000	4,000,000

	Horsepower	
	Developed	Potential
Asia total	**6,300,000**	**148,000 000**
Afghanistan	2,000	700,000
Arabia	18,500	
Chinese Republic	3,500	22,000,000
Chosen (Korea)	225,000	700,000
French Indo-China		6,000,000
India	500,000	39,000,000
Iran (Persia)		300,000
Japan	5,200,000	7,200,000
Siam and Malay States	50,000	5,700,000
Taiwan (Formosa)	237,000	1,000,000
Russia in Asia	77,000	64,000,000
Africa total	**180,000**	**274,000,000**
Algeria	400	300,000
Angola	4 000	5,700,000
Belgian Congo and Mandate	70,000	130,000,000
British Central Africa		1,700,000
British East Africa	6 200	6,700,000
Egypt	1,000	850,000
French Congo		50,000,000
French Guinea		3,000,000
French Cameroon Mandate		18 500,000
French Sudan		1,400,000
Gold Coast and (Brit h) Togo		2,000,000
Ivory Coast, Dahomey and (French) Togo		4,000,000
Liberia		5,700,000
Madagascar	4,500	7,000,000
Morocco	73,000	350,000
Nigeria and (British) Cameroon	6,000	13,000,000
Portuguese East Africa		5,000,000
Rhodesia	2,500	3,500,000
Sierra Leone		2,500,000
Tanganyika	800	4,000,000
Union of South Africa	10,000	2,300,000
Oceania total	**700,000**	**22,000,000**
Australia and Tasmania	139,000	2,000,000
Borneo including New Guinea and Papua	5,000	10,500,000
Celebes	500	1,400,000
Hawaii	26,000	150,000
Java	60,000	1,100,000
New Zealand	400,000	1,500,000
Philippine Islands	21,500	2,000,000
Sumatra	20,000	3,000,000

RAILWAYS, HIGHWAYS, AND MOTOR VEHICLES OF THE WORLD

Table 50

	R R Main-track mileage	High-way mileage	Number of motor vehicles
North America:			
United States	238,539	3,200,000	29,400,000
Alaska	800	1,978	3,732
Hawaii	347	3,095	57,911
Canada	42,916	410,808	1,306,139
Newfoundland	974	3,662	4,665
Mexico	14,157	56,923	100,156
Central America:			
British Honduras	25	150	246
Costa Rica	430	1,830	2,833
Guatemala	720	4,020	4,020
Honduras	950	511	1,225
Nicaragua	283	1,670	797
Panama	230	977	12,579
El Salvador	375	2,796	3,152
West Indies:			
Cuba	3,079	2,264	43,630
Dominican Republic	145	930	2,595
Haiti	158	1,337	2,650
Puerto Rico	338	5,737	20,967
West Indies, British	420	12,187	25,780

	R R Main-track mileage	High-way mileage	Number of motor vehicles
South America:			
Guiana, British	79	552	1,835
Surinam (Dutch Guiana)	83	230	365
Colombia	1,980	14,637	22,176
Venezuela	589	5,667	23,330
Argentina	24,652	214,628	264,000
Brazil	20,571	93,135	159,000
Paraguay	752	3,728	1,945
Uruguay	1,700	22,487	60,992
Bolivia	1,421	7,997	2,160
Chile	5,434	26,799	40,815
Ecuador	773	1,938	3,622
Peru	2,624	11,786	20,682
Europe:			
Sweden	10,273	89,617	101,947
Norway	2,688	25,289	79,759
Denmark	3,201	32,211	144,901
Great Britain	20,121	178,103	2,418,728
Eire	2,880	48,066	61,855
Belgium	5,098	20,246	223,770
France	41,379	393,761	2,192,471

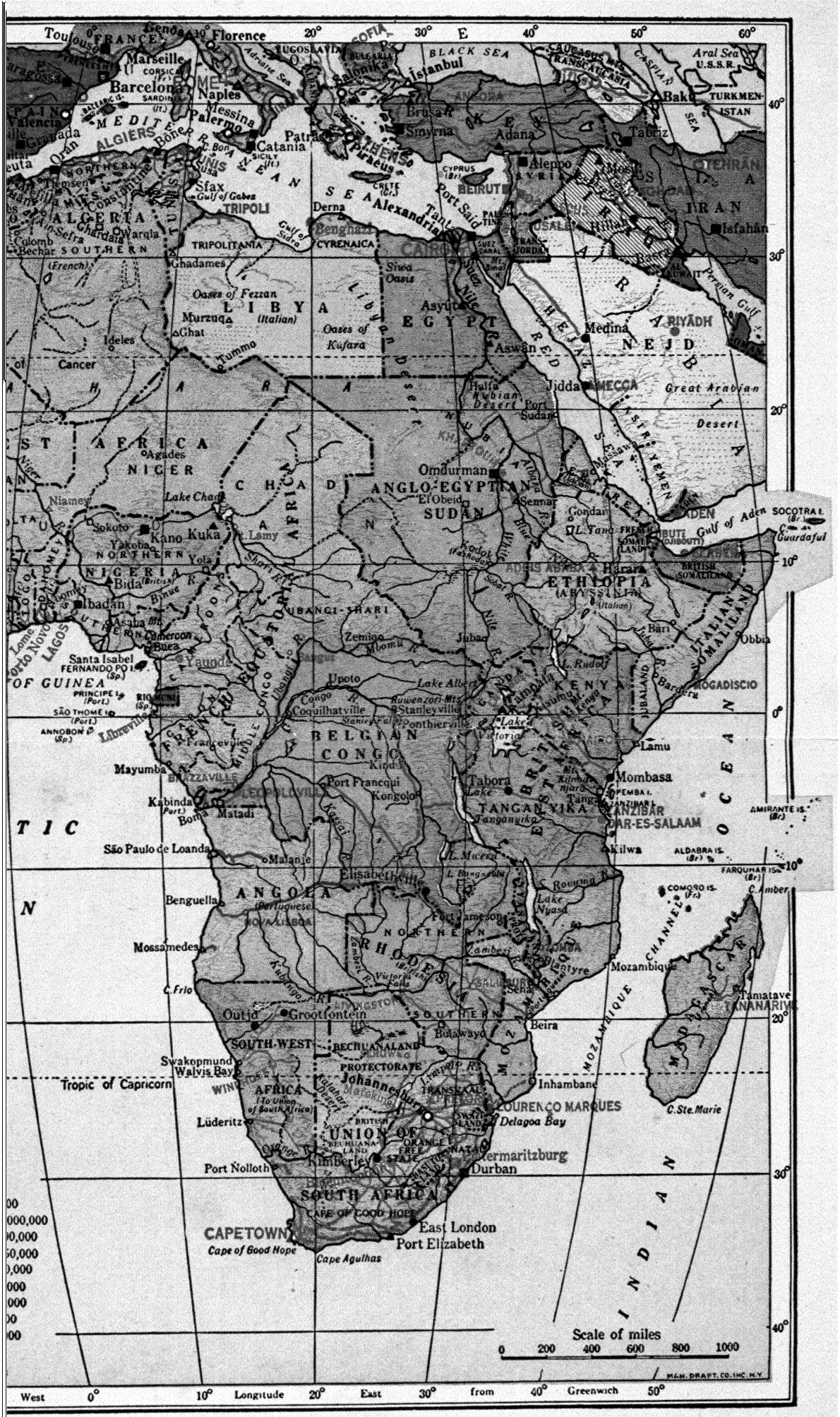


PLATE 8—POLITICAL MAP OF AFRICA

RAILWAYS, HIGHWAYS, AND MOTOR VEHICLES OF THE WORLD—Continued

Table 50	R. R Main-track mileage	High-way mileage	Number of motor vehicles		R R Main-track mileage	High-way mileage	Number of motor vehicles
Europe (Continued):				Asia (Continued):			
Netherlands	2,348	16,031	147,905	Iraq	796	4,841	7,441
Czecho-Slovakia ...	8,368	43,564	105,527	Iran (Persia)	613	12,278	12,735
Hungary	5,665	38,891	21,237	India, British	43,128	277,471	105,160
Germany	45,347	236,306	1,564,600	Ceylon	951	17,802	26,997
Switzerland .	3,233	10,263	73,200	Netherland India	4,561	42,587	69,196
Estonia ..	891	13,489	5,254	Indo-China, French	1,967	21,023	17,151
Finland .	3,418	40,910	42,267	Philippine Islands	867	10,404	48,654
Latvia	2,033	21,185	5,834	Siam	1,925	2,445	10,000
Lithuania	1,419	19,632	2,679	China	9,497	62,100	38,316
Poland	12,817	208,579	34,324	Japan (proper)	13,560	665,626	175 751
U. S S. R (Russia) (including Asiatic)	86,299	1,682,109	514,440	Chosen	2,982	13,830	9,500
Italy	14,267	151,392	430,994	Taiwan	936	10,740	4,200
Portugal	2,159	19,407	46,705	Malaya, British	1,068	6,482	44,827
Spain	10,340	70,760	125,000	Oceania			
Bulgaria	2,000	16,030	4,111	Australia	28,019	482,644	749,753
Greece	1,719	9,181	14,000	New Zealand .	3,320	57,802	239,668
Rumania	6,348	84,951	25,070	Africa.			
Yugoslavia	6,339	26,197	14,784	Algeria	3,001	47,879	64,550
Asia:				Tunisia	1,306	7,492	18,004
Turkey	4,220	23,745	9,504	Morocco, French	1,148	5,131	58,437
Syria	890	6,362	10,439	Egypt	2,764	5,013	31,212
Palestine	329	1,895	7,715	Union of South Africa	14,753	83,616	324,084
				Madagascar	534	15,757	6,834

Table 51 MERCHANT MARINE OF PRINCIPAL COUNTRIES

(Number of Vessels)

	World total	United States	United Kingdom	British Dominions	France	Germany	Italy	Netherlands	Norway	Sweden	Japan	All other
1895	30,288	3,220	9,227	2,309	1,164	1,730	1,239	458	3,041	1,432	339	6,129
1900	27,840	3,135	8,914	1,924	1,214	1,710	1,176	406	2,380	1,433	484	5,064
1905	29,750	3,457	9,348	2,017	1,497	1,996	1,209	505	2,210	1,548	691	5,272
1910	30,053	3,469	9,417	2,078	1,465	2,178	1,080	628	2,065	1,472	846	5,355
1915	30,720	3,219	9,285	2,068	1,539	2,166	1,177	809	2,174	1,462	1,155	5,636
1920	31,595	5,457	8,561	2,270	1,758	1,138	1,115	987	1,777	1,297	1,940	5,295
1925	32,916	4,882	8,559	2,430	1,828	2,028	1,353	1,099	1,805	1,389	2,087	5,456
1926	32,615	4,627	8,369	2,477	1,769	1,986	1,401	1,109	1,844	1,380	2,087	5,566
1927	32,175	4,503	8,216	2,439	1,752	1,090	1,429	1,156	1,805	1,371	2,035	5,479
1928	32,408	4,435	8,204	2,479	1,682	2,080	1,429	1,290	1,787	1,383	2,048	5,591
1929	32,482	4,383	8,172	2,507	1,662	2,127	1,380	1,339	1,807	1,385	2,059	5,661
1930	32,713	4,223	8,238	2,516	1,651	2,157	1,380	1,401	1,916	1,417	2,060	5,754
1931	32,344	4,007	8,157	2,529	1,653	2,171	1,347	1,429	1,990	1,428	1,969	5,664
1932	32,247	3,946	7,971	2,567	1,644	2,151	1,323	1,445	2,008	1,433	1,964	5,795
1933	31,700	3,845	7,705	2,528	1,627	2,084	1,278	1,413	1,970	1,395	2,019	5,836
1934	30,997	3,739	7,469	2,498	1,567	2,043	1 242	1,426	1,908	1,339	1,949	5,817
1935	30,979	3,692	7,349	2,483	1,479	2,080	1,231	1,414	1,862	1,294	2,146	5,949
1936	30,923	3,376	7,246	2,458	1,420	2,094	1,246	1,420	1,858	1,259	2,367	5,978
1937	31,183	3,485	7,264	2,447	1,366	2,191	1,270	1,416	1,901	1,249	2,564	6,030

MERCHANT MARINE OF MINOR COUNTRIES

(Thousands of Tons)

	1933	1934	1935	1936	1937		1933	1934	1935	1936	1937
Argentina	342	340	343	331	319	Latvia	198	193	190	170	185
Belgium .	456	415	402	388	420	Mexico				36	41
Brazil	494	499	491	479	476	Panama	287	272	137	429	512
Chile	156	157	146	143	142	Peru	60	49	44	46	37
China	401	398	455	492	600	Poland			95	92	93
Cuba .	39	40	35	33	34	Portugal ..	266	263	260	255	258
Danzig	256	264	266			Rumania	93	92	92	91	88
Denmark . .	1,168	1,104	1,101	1,136	1,118	U S S R	843	942	1,114	1,218	1,258
Estonia	126	121	126	155	168	Spain .	1,232	1,178	1,178	1,157	1,054
Finland. .	421	469	481	481	549	Turkey ..	188	193	199	196	195
Greece .	1,417	1,507	1,711	1,801	1,855	Yugoslavia .	374	357	347	373	379
Honduras . .	77	75	72	69	70	All other	564	505	557	690	393

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