

235. What barriers are there to the spread of animals? What kinds of animals most easily overcome them?

236. What is the nature of the Bermuda plant and animal life? How has this life reached the islands? What is the condition in other islands?

237. What are the peculiarities of life in Australia? Explain this.

238. What does the South American fauna indicate?

239. What is indicated by the faunas of other continents?

240. What are the reasons for the zones of life? Name the realms. Name the regions of the northern realm (Fig. 515).

241. Why is man an enemy of many animals? Give illustrations of his influence in extermination. In increasing the range of animals. How is his power limited in this respect?

242. Of what advantage are domestic animals? Give instances of domestic animals in various parts of the world. What domestic animals has the New World supplied? What about the bison?

SUGGESTIONS.—No special suggestions are made for this chapter, largely because of the difficulty of offering suggestions adapted to large numbers of schools. Yet a teacher especially interested in this phase of the subject will find opportunity for illustrative work,—with books, pictures, specimens, and museums, if in a city; in the field, if in the country.

Reference Books.—WALLACE, *Island Life*, Macmillan Co., New York, 1892, \$1.75; *Geographic Distribution of Animals*, Harper Bros., New York, 1876, \$10.00; HEILPRIN, *Distribution of Animals*, Appleton & Co., New York, 1886, \$2.00; BEDDARD, *Zoogeography*, Macmillan Co., New York, 1895, \$1.50; LYDEKKER, *Geographical History of Mammals*, Macmillan Co., New York, 1896, \$2.60; LE CONTE, *Evolution*, Appleton & Co., New York, 1891, \$1.50; JORDAN, *Factors in Organic Evolution*, Ginn & Co., Boston, 1894, \$1.25.

CHAPTER XIX.

MAN AND NATURE.

DEVELOPMENT OF MANKIND.

243. **Early Man.**—The origin of man is not known, although scientists generally agree that he has developed, by the process of evolution, from some high form of animal. This belief is based upon the close resemblance between the body of man and ape, and receives support from the fact that, in habits and mode of living, some savages are little above animals. But even the least civilized men have powers that no animal possesses, while civilized man is so far above the highest animals that some people believe it impossible that he is the descendant of an animal.

Whatever man's origin, it is certain that in his early stages he lived the life of a savage. When the Roman Empire was developing, the Germans and English were rude savages; and still earlier, the inhabitants of the Italian peninsula were in the same condition. To-day, both in the Old and New World, there are races that have not yet risen above savagery.

Summary.—*Man's ancestry is unknown; but it is generally believed that he has been evolved from some high form of animal. It is certain that early man was a savage.*

244. **Dependence of Man on Nature.**—Even the most civilized men are dependent on nature, as animals and plants are. Man must have air to breathe, water to drink, and food to eat. Furthermore, his sight depends on sunlight, and his speech and hearing on sound waves, transmitted through the

air. If his home is in a cool climate, he must have clothing and shelter; and he obtains materials for these from nature.

In these respects both savages and civilized men are dependent on nature; but to live as civilized men do, we must rely on other things as well. For warmth and light we depend on coal and oil; for manufacturing, upon coal and water power; for transportation, upon coal and wind; for communication, upon electricity; for many objects of daily use, upon mineral substances. The resources of the world are drawn upon by civilized man, and his powers have so developed that he has learned to adapt to his needs many of the products and forces of nature. Each year his ability to do this increases. In this respect man has risen immeasurably above all other forms of life.

Summary. — All men depend on nature for air, water, and food; and civilized man is dependent for many other things. Each year he is learning better how to make use of nature.

245. Food Supply. — Man began his conquest of nature because of the need of food. The steam engine, the factory, and wireless telegraphy are the climax of a series of inventions which began when, to the teeth and claws with which animals secure food, man added simple implements.

By using stone implements, such as spear and arrow points, hammers, and hatchets; by fashioning wood for handles and for bows; and by making simple hooks for fishing, early man greatly increased his ability to obtain animal food. Even to this day, savage races make use of such primitive implements (Fig. 522).

As an important source of food, primitive man made use of plants, especially the seeds, fruits, bulbs, and roots. The mandioca, sweet potato, potato, yam, plantain, banana, cocoanut, date, and the grains, including wheat, barley, rye, corn, rice, and millet, are among the leading plant foods. To gather these, scattered as they are in nature, required much work, and early man naturally found it profitable to plant



FIG. 522. — Philippine natives, showing how little clothing is necessary in such a hot climate.



FIG. 523.—Laplanders dressed in furs. Contrast with Fig. 522.



FIG. 524.—Eskimo women at Cape York, Greenland. Behind them is the summer tupic, or skin tent.

and care for them. Simple spades and hoes, at first made of stone or wood, aided greatly in this work.

By domesticating plants (p. 348) and animals (p. 365) a great addition was made to man's resources. Domestication is the basis of civilization, for it gave man the habit of working, of storing up for a season of need, and of trading; upon it also depends the idea of property and of the home.

To-day all the world depends for food on the farmer and herder. Wherever conditions favor, the land is cleared for farming, and the majority of mankind are engaged in the production of food for themselves or for those with a different occupation. The plow, the reaper, and the threshing machine have taken the place of the primitive spade and hoe. Thousands of railway cars and vessels are constantly engaged in moving products of the farms to places where men are engaged in other pursuits, or where the population is too dense to permit the production of all the food needed. Agriculture is by far the most important of industries.

Summary. — *The devising of simple implements for securing plant and animal food is the basis of modern invention. The domestication of plants and animals for food is the basis of our civilization. All the world depends for food on the farmer and herder, and agriculture has become the most important of industries.*

246. Clothing. — In a hot climate man has little need for clothing (Fig. 522); but in a cool or cold climate some protection is necessary. Without it man could not occupy the cold temperate zone. Various natural products, including skins (Fig. 523), wool, and plant fibers, have been used to protect the body. Early Germans and Britons were clothed in skins, as the Eskimos are to-day (Figs. 524, 525).

In cold climates one of the objects of hunting has always been to secure materials for clothing; and one of the objects of herding is the production of wool and leather, and of farming, the production of fibers for cloth. The principal vegetable fibers used for making cloth, rope, etc., are cotton, flax, hemp, and jute.

Wool, silk, furs, and leather are animal products, at present widely used by civilized people for clothing.

The production and manufacture of materials for clothing now rank among the great industries of the world. The fact that the most civilized races live in the cool temperate zones makes the production of materials for clothing far more important than if their homes were in the tropical zone.

Summary. — *Clothing is needed by all dwellers in cool climates, and for it, various animal and plant products are used. Since the most civilized races live in the cool temperate zones, the production and manufacture of clothing are among the most important of industries.*

247. Shelter. — Man has adopted many devices for securing shelter from the elements. The summer home of the Eskimo

is a skin tupic (Fig. 524); his winter home a hut, or igloo, of snow or ice (Fig. 525). Indian wigwams were made of skins. The nomad of the deserts uses skins and blankets (Fig. 526) made of the wool of his domestic animals. Sod houses are still



FIG. 525. — Eskimo winter home, or igloo. Entrance is by way of a small ice tunnel, through which wind does not easily enter.

built in many regions. Grass huts, and branches woven into a simple shelter (Fig. 529), are common in the tropical zone; and some savages live there with hardly any shelter. In parts of Europe and southwestern America, caves and overhanging ledges furnished shelter to primitive man.

Long before the historical period, clay and wood were used, at first very crudely, as materials for building perma-



FIG. 526. — A tent of blankets used for shelter by nomads on the desert of Sahara.



FIG. 527. — Thatched house in the Philippine Islands, needed for protection from sun and rain, not cold. It is raised above the ground to avoid dampness and to prevent the entrance of animal pests, which are very troublesome.



FIG. 528. — Swiss house near the timber line in the Alps. The abundance of wood leads to the building of wooden houses; the strong winds make it necessary to weight down the roofs with large stones. Rough-hewn boards are used in these houses. In parts of Europe where wood is scarce, as in Italy, wooden houses are very rare.

ment homes. The use of wood began in forest regions (Fig. 528), at first doubtless by the use of boughs, branches, and logs; then of rough-hewn boards. Simple log cabins, some of which still remain, were built by pioneers in America.

Stone houses were probably first made by merely piling stones together, as is done to-day by the Cape York Eskimos. Then mud was used to fill the cracks, and later, mortar was employed. The first use of clay was in making sun-dried bricks, or adobe, still employed in arid countries, as the Holy Land, Spain, and New Mexico. These are too easily affected by dampness for use in moist climates; but the discovery of how to bake bricks by fire has made the use of clay possible there. In arid regions, where trees are scarce or absent, stone and sun-dried bricks are very widely used.



FIG. 529. — A negro village, the huts being made of woven branches, a very simple form of shelter.

Our fine wood, brick, and stone houses have been developed, by a series of improvements, from these simple beginnings.

The cold of winter calls for further protection than that furnished by clothing and houses. Fire supplies this, and it is safe to class the use of fire among the greatest of human discoveries. It has become of value not merely for heating, lighting, and cooking, but as the basis for much of our modern manufacturing. It has led to mining of coal, production of oil and gas, mining and manufacturing of iron, and many other industries. As a result

of its use, modern man has come to count as necessities hundreds of articles about which primitive man knew nothing.

Summary. — *Many primitive means have been employed for securing shelter; for example, skins, snow, blankets, grass, branches, and caves. The use of wood, stone, and clay doubtless started in a very primitive way: wood from the use of boughs and logs; stone from mere piles; and clay in the form of sun-dried brick. The discovery of fire has been of great importance, making possible manufacturing and thus opening to man's use many otherwise useless materials.*

248. Selection of Homes. — Doubtless early man had no fixed home, but wandered about in search of food, as many primitive peoples do to-day. When for any reason a home became desirable, two considerations led to the selection of a location: (1) nearness of food supply; (2) protection from enemies. Homes are still located by large numbers of people with the first idea in mind: for example, farmers, fishermen (Fig. 533), and hunters; but, fortunately, civilized men are no longer obliged to take account of the second.



FIG. 530. — Native houses in trees, New Guinea.

There are many illustrations of the location of houses on sites that give protection from enemies. Some savages build houses in trees (Fig. 530), and some on piles in water (Fig. 534), as the ancient lake dwellers of Switzerland did. The Pueblo Indians



FIG. 531. — An Indian pueblo in Arizona, on the top of a mesa, and overlooking the surrounding country. The steep face is difficult of access.

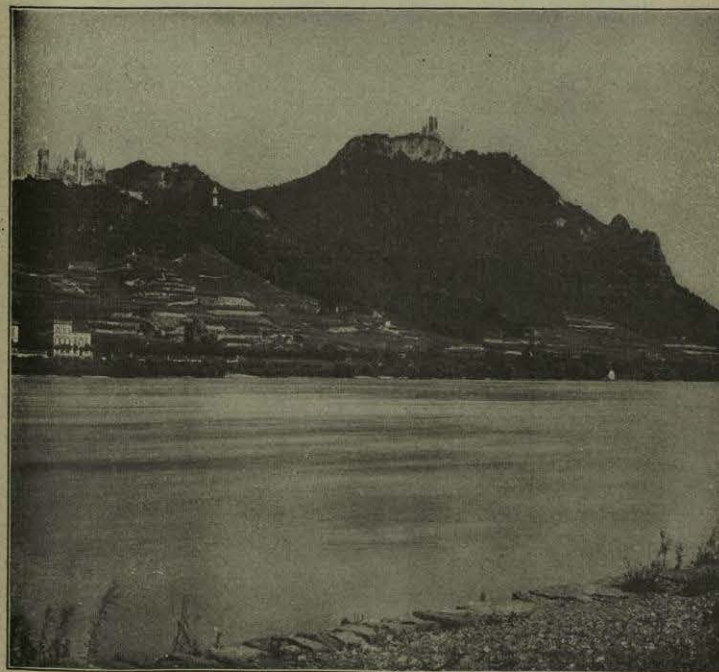


FIG. 532. — Ruin (on the right) of a castle on the Rhine, built in a position fairly safe from attack.



FIG. 533.—Houses built on a steep hillside in a mountainous peninsula south of Naples, Italy. A few spots on the slope are cultivated, but most of the land is unfit for cultivation. The houses are, however, near the water, and fishing is possible.

lived on top of steep-sided buttes and mesas (Fig. 531); others lived in caves and under overhanging ledges on cliff sides (p. 85). Castles in Europe were often built on hills, and other places difficult of access (Fig. 532); and, for further protection, strong walls were built around them.

Summary. — *The homes of primitive man have been selected with reference to nearness of food and possibility*

of protection from enemies. For the sake of protection, homes have been located in trees, in the water, on cliff sides, and on hills.



FIG. 534. — New Guinea village, built, for protection, on piles in the water.

249. Location and Growth of Cities. — When scattered it is easier for men to secure sufficient food than when many live in a single place; but it is less easy to ward off the attacks of enemies. Largely for this reason, the custom has grown for men, even savages (Figs. 529, 530, 534), to gather into communities. From their villages, these primitive people go out to the neighboring fields, forests, and waters for farming, hunting, or fishing, and yet, being near together, are ready to resist attack. They are also ready for an expedition to attack a neighbor for revenge or profit.

The leader in attack or defense easily became chief of the village; if powerful enough, he might become ruler of several villages. Even at present nations grow in power and territory by conquering weaker peoples. Government has become very complex, and differs greatly among nations; but, like all our wonderful modern life, it had its beginnings in the simple practices of our early, uncivilized ancestors.

Many European towns grew up because of the need of defense. One man, more powerful than the rest, built a strong stone castle, perhaps on a hill, and protected the region about it by a wall. Farmers, soldiers, and others, under the protection of the castle owner, worked for him, lived in houses within the walls, and helped defend them when attacked. In Europe, hundreds of places like this are still to be seen, although no longer used for defense. Around some, with favorable situations, large cities have developed.

In locating cities, at present, there is no need of considering defense. The great cities of the civilized world are the capitals of large nations, and the busy manufacturing and commercial centers. London, Paris, Berlin, Vienna, Brussels, St. Petersburg, Madrid, Rome, Constantinople, and other large European cities are capitals. The first five are also manufacturing centers; and London, Paris, St. Petersburg, and Constantinople are able to carry on commerce by sea. Each of these cities has a location favorable to growth.

All flourishing cities in the world, whether great or small, owe their prosperity, in large part, to their favorable situation. Some, like Milan in Italy, and Vienna in Austria, are situated where routes of travel converge or cross. They had their beginning long before the days of railways; but the railway, making them centers of modern traffic, has greatly increased their prosperity. Many cities, like Cincinnati, St. Louis, Vienna, and Paris, are on rivers; and others, like Buffalo and Chicago, are on large lakes. Still others, like Genoa, Liverpool, San Francisco, and New York, are seaports. Such seaports as London, New York, Philadelphia, Baltimore, and New Orleans, which are at the mouths of rivers that open pathways into the interior, have exceptionally favorable situations.

Many cities, like Lowell, Lawrence, and Rochester, owe their growth to water power, which has encouraged manufacturing. Others, like Scranton, Wilkes Barre, Pittsburg, and Denver, owe

their development mainly to near-by mines. Can you mention other instances of cities whose growth depends on their favorable location? What has helped determine the growth of your own city?

Summary. — *The tendency of people to congregate in centers had its origin in the need of defense, and from it has arisen government. Some large European towns grew around fortified castles; but the largest have prospered either because they are capitals of great nations or are manufacturing and commercial centers. Flourishing modern cities are mainly located on one of the following sites: at the crossing of trade routes; on rivers, especially at their mouths; on harbors; on lake shores; near water power; near mines.*

250. Development of Commerce. — Even primitive men desire articles which they cannot produce. For example, remote Eskimo tribes will gladly exchange skins for pieces of wood; and central African negroes will trade ivory for simple trinkets. Two ways of obtaining desired objects are open: one to seize them, the other to give articles in exchange for them; and both methods are resorted to. From exchange, commerce has developed.

Objects of trade were early carried overland, at first on foot, later by the aid of animals, even across deserts and mountains. The first commerce by sea was carried on in small, open boats, propelled by oars; later, sails were used. Even before Bible times, and before Europeans became civilized, caravans crossed the deserts of Asia Minor, bringing treasures from Asia. The inclosed Mediterranean offered opportunity for the extension of this commerce by sea and for the introduction of Asiatic civilization along its shores.

A powerful nation developed on the Grecian peninsula, and its irregular coast bred a race of sailors. Even to-day the Greeks are the sailors of the Mediterranean. The ancient Greeks carried their commerce to all parts of the Mediterranean, establishing colonies which later developed into powerful independent nations. As the boats were made larger, the commerce which developed among Mediterranean

nations was gradually extended into the open ocean, and even up the European coast to the British Isles. The Mediterranean may be called the cradle of early navigation.

When the Mohammedans interfered with trade between Europe and Asia, a sea route to India was sought. The



FIG. 535.—The Suez Canal. The neck of land which separates the Mediterranean and Red seas forced those who sought a water route to India, four or five centuries ago, to undertake the explorations which led to such important discoveries. The demands of modern commerce for a shorter water route between Europe and Asia led to the construction of the Suez Canal.

Portuguese found one around Africa, and Columbus, in searching for one toward the west, discovered America. For the development of these new lands, and the valuable commerce with them, ships were made still larger and stronger. Then came the use of steam; and now huge steel ships

carry the increasing commerce of the world over all oceans.

Commerce was once carried on by actual exchange of goods, and in some cases this is still done. But a far better way is to have some medium of exchange. Such a medium is money. The use of money is far simpler than direct exchange. For example, a man who needs shoes might find it difficult to get them if he had only his labor to offer; but if he receives money for his labor, he can get what he needs. Any substance that has a recognized and fairly uniform value could be used as money. Gold is generally used, because it is not too common, is not easily destroyed, and is valued by all peoples for ornament.

Commerce has aided greatly in the spread of civilization, for it has brought people into closer communication and sympathy with

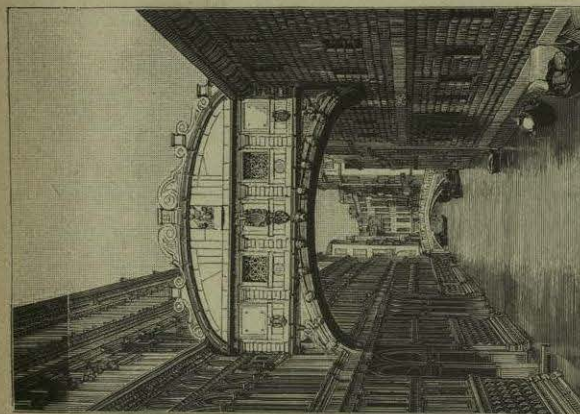


FIG. 536.—A canal in Venice, a European city that was located on salt marshes, off the mainland, to secure protection from invaders. It developed into a very important commercial center, but has now given way to cities with better locations.

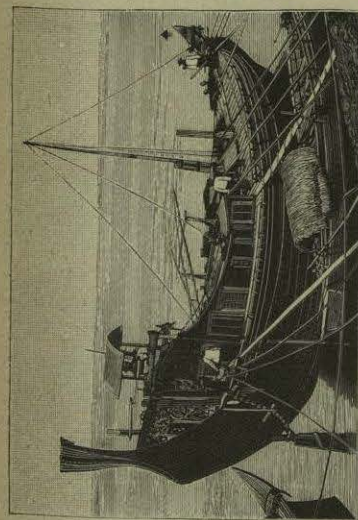


FIG. 537.—Burmese boat of very primitive type.



FIG. 538.—Message sticks used in West Australia to transmit messages.

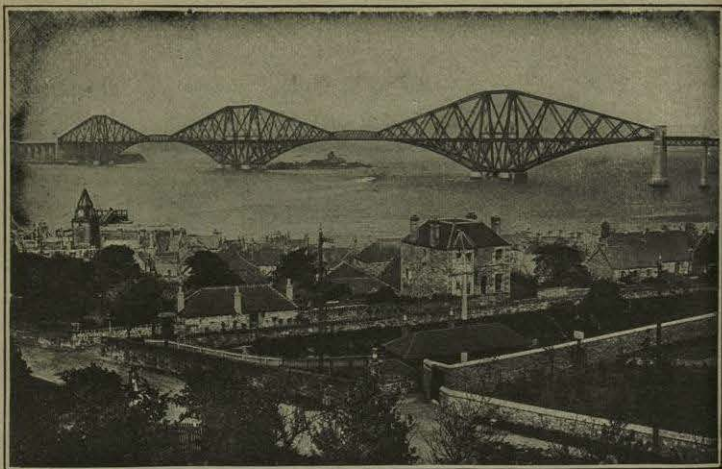


FIG. 539. — Bridge across the Firth of Forth, near Edinburgh, Scotland. This bridge, like many others, was built to accommodate the increasing modern commerce.



FIG. 540. — Shipping in New York harbor. Brooklyn Bridge behind the masts.

one another, and has made people in one section learn from those in another. As a means of communication, writing has developed, and, like other features of our civilization, this has been evolved from simple beginnings. For example, picture writing, or recording events by symbols carved on wood or stone, has been used by many primitive peoples (Fig. 538). From this the alphabet developed, then printing, which has proved so important an aid in spreading knowledge. The telegraph, ocean cable, and telephone, made possible by the use of electricity, have now brought all parts of the civilized world in close touch with one another. Wireless telegraphy is the last great advance in communication. It is part of the progress of the human race toward higher and higher civilization, in which commerce has had so great an influence.

Summary. — *Commerce has developed from simple exchange carried on among primitive people, at first overland, either on foot or by the aid of animals, and on the sea by the use of boats propelled by oars. Early commerce between Asia and Europe, overland across Asia Minor, and thence in the inclosed waters of the Mediterranean, made the Mediterranean the cradle of navigation. The discovery of a water route to Asia, and of the New World, resulting from the closing of routes to Asia by the Mohammedans, have led to the development of larger ships and to the great advances of modern commerce. The use of money, the extension of civilization, the development of writing and printing, and communication by electricity are among the important outcomes of the development of commerce.*

251. Influence of Man on Nature. — In his progress, man has in many ways profoundly influenced his surroundings. He has modified, extended, and destroyed plants (pp. 348, 349) and animals (pp. 364, 365). By removing the forest he has made it possible for water to run off more rapidly (p. 50), washing soil into the streams and causing great variations in river volume. As a result, some streams formerly useful for water power are now too variable; and some areas, as parts of Italy, France, and Mississippi, have had their soil stripped off, leaving either bare rock or a surface too badly gullied for farming (p. 51).

On densely settled floodplains and deltas, the river courses have been controlled and annual floods prevented. Stream courses