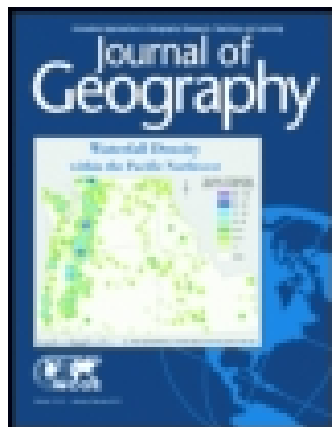


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Montana

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MONTANA

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***B**OUNDARIES and Size.* Montana is the northernmost of the tier of Rocky Mountain states, touching Canada on the north and Wyoming on the south. It lies between North Dakota and a part of South Dakota on the east and the narrow northern arm of Idaho on the west. It is the third largest of the states (area, about 147,000 square miles), ranking next in size after Texas and California. Its shape is that of a parallelogram, irregular in boundary on the southwest, measuring 550 miles from east to west, and 275 miles from north to south. It is larger than all the New England states, together with New York, New Jersey, Delaware, and Maryland. The distance by rail across the state on one of the transcontinental lines is over 750 miles, or about as far as from Chicago to Philadelphia.

Mountains. Although Montana is a mountain state its eastern end extends far out into the Great Plains, so far that the traveler entering the state from the east has hundreds of miles to travel before he sees a mountain. There are a few scattering mountain ranges east of the middle line of the state and more numerous ranges on to the west, while the western third of the state is all mountainous. The main range of the Rockies crosses the greater portion of the state, well to the west; its general trend is northwest-southeast. It passes west of Helena and east of Butte. South of Butte it bends westward to the Idaho line and forms the Montana-Idaho boundary as far as Yellowstone Park. This range, known as the Continental Divide, separates Montana into two parts, the Pacific slope on the west and the Atlantic on the east, the latter being much the larger. A portion of Glacier National Park on the northern boundary drains into Hudson Bay. One high ridge in this Park is known as the "Triple Continental Divide." Montana is the only state in the Union which drains into three oceans.

The mountain ranges are numerous, probably fifty or more. They have in general a trend parallel to the main continental backbone. Among the ranges to the west of the Rockies are the Flathead mountains, the Mission Range—one of the most beau-

tiful in the state—and the Purcell, the Kootenai, the Coeur d'Alene and the Bitterroot ranges. East of the Main Range are, first, the Big Belt, Bridger, Madison and Gallatin ranges; beyond these, the Little Belt, Crazy and Absaroka mountains, and scattering ranges still beyond these. The highest peaks in the state are found in the Beartooth mountains on the southern boundary line, Granite Peak, 13,000 feet high, being the loftiest, and numerous others exceeding 12,000 feet in height. There are no elevated

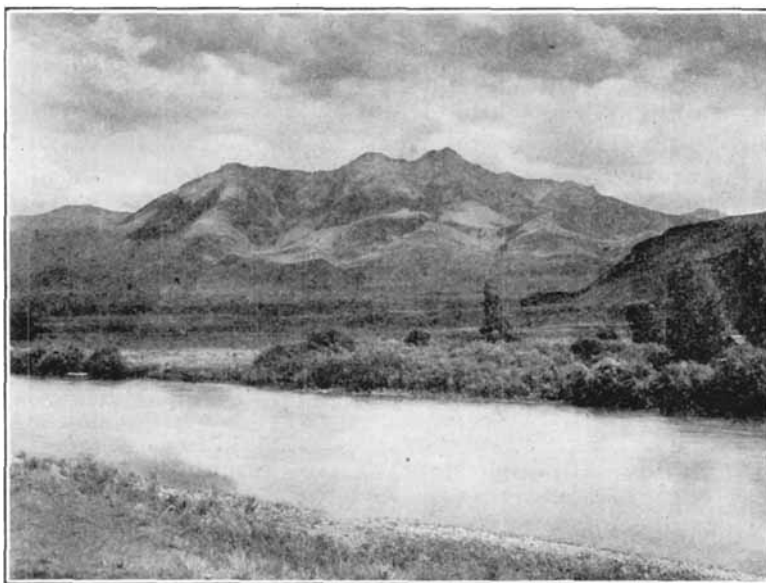


Fig. 1. Emigrant Peak, Absaroka Range, and Yellowstone River.
Courtesy Northern Pacific Railroad.

plateaus of any magnitude and the average elevation of the state is much lower than that of the states to the south (Montana, 3,900 ft.; Colorado, 7,000 ft.) The low points of the eastern and western boundaries are in the neighborhood of 2,000 feet and the railroads cross the continental divide at altitudes of from 5,200 feet to 6,300 feet.

Lakes. Most of the numerous lakes are of the small but beautiful Alpine type, though Flathead Lake, west of the Divide in northern Montana, is an exception, being 32 miles in length, the largest lake in the state. Ponds are numerous in some sections of the plains, particularly in the glaciated portion of northern Montana.

The non-mountainous part of Montana is a great plain which comprises more than one-half the total area. At the north the plains are fairly level where the Keewatin ice sheet smoothed

their surface. In the central and southern portions the plains are more rolling, with high divides, separating the drainage areas, which are sometimes deeply trenched and much dissected. In various parts, principally to the east, there are "bad land" sections whose extremely rugged topography is due to the rapid and uneven erosion of the soft underlying Tertiary and Cretaceous rocks.

Rivers. More than two-thirds of the state is drained by the Missouri and its tributaries. This stream heads at Three Forks, being formed by the union of the Gallatin, the Madison, and the Jefferson, whose fountain heads are in Yellowstone Park and in the mountain lakes and springs of the Continental Divide west of the Park. At Three Forks the Big Muddy is a clear mountain stream. It first flows northward between mountain ranges; north of Helena it passes through the "Gates of the Mountains," a gorge cut through the Big Belt Range, and emerges on the plains. Continuing its northerly course to Great Falls, it then turns sharply to the east and in seven miles drops by a series of falls and cascades a distance of 535 feet, and flows on eastwardly across the state in a deep and narrow valley. Its principal northern tributaries are the Sun, Marias, and Milk rivers. From the south it receives the Smith, Judith, and Musselshell rivers, and the largest of all its Montana tributaries, the Yellowstone. The Yellowstone rises in Yellowstone National Park and flows north and east for hundreds of miles, finally joining the Missouri a few miles over the state line. Important tributaries of the Yellowstone are the Clark's Fork, the Big Horn, and Powder rivers, all from the south.

The principal streams of the Pacific slope are Clark Fork (there are two rivers in the state bearing this name) and the Kootenai. Clark Fork rises above Butte and flows northwest ultimately to join the Columbia. It has numerous local names in its course in Montana—Yankee Doodle Creek, Silver Bow Creek, Deer Lodge, Hell Gate, Missoula and Clark Fork river—so that the decision of the Geographic Board that it be called Clark Fork throughout its length appears to be well founded. Its chief tributaries are the Bitterroot from the south, and the Flathead from the north. The Kootenai flows irregularly across the northwestern corner of Montana. It is a clear, beautiful stream with gravelly banks and a timbered valley. Both the Kootenai and Clark Fork have a greater minimum flow than the Missouri.

Fort Benton is marked on the maps as the head of navigation on the Missouri and in early days it was visited every season by numerous boats from St. Louis. Even the Yellowstone was once deemed a navigable stream. Now the only event in river naviga-

tion in the state is the annual pilgrimage of the Government "snag boat" up the Missouri.

The climate of Montana is characterized by the long winters and short summers due to its latitude (45 to 49 deg.) and its distance from the ocean. Shut off from the moisture-bearing winds of the Pacific by numerous mountain ranges and lying west of the path of the winds from the Gulf of Mexico, its rainfall is light and its percentage of sunshiny days large. It has an average annual rainfall of over 15 inches and an average crop-growing season of about 120 days. The state shows marked regional variations in its climate. Eastern Montana has the extreme of winter cold and summer heat of North Dakota while western Montana has the lower seasonal range of temperature of eastern Washington and northern Idaho. Northwestern Montana has the heaviest rainfall of any section of the state. Local variations in rainfall are very common. The mountain ranges, particularly their western slopes, have a good rainfall and even the benches along the mountain valleys and the high divides of the plains have more rain than the lower lands adjoining. An accurate rainfall map of the state would be as varied as the topography. The marked effect of altitude on climate, both temperature and precipitation, is not readily appreciated by dwellers in the prairies of the central United States.

Forests. About one-third of Montana is forested, the forests being confined to the regions of heaviest rainfall. Sections of northwestern Montana are continuously forested; elsewhere there is much open forest. Many mountain areas (lofty peaks and rocky or south-facing slopes) and many mountain valleys are devoid of forest growth, although lying within the forest regions. The plains are treeless except for fringes of willows and cottonwoods along the streams and dwarfed evergreens on some of the high divides. Coniferous species—pine, spruces, fir, and larch—make up the bulk of the forests.

More than one-half of the forests are included in the United States National Forests. Under control of the Forest Service important watersheds are preserved from denudation. Cutting is permitted only so far as it may be equalled by natural growth and deforested areas are replanted. A patrol system, aided by lookout stations, roads, paths, fire lanes and telephone lines, keeps down the fire waste.

Mines. The exploitation of the state was begun by the notable expedition of Lewis and Clark in 1805-07. It was very effectively continued by the fur traders and trappers who came immediately after Lewis and Clark. The gold seekers who thronged here in

the late fifties and early sixties completed the exploration of the state, and with their great discoveries of gold at Bannack (1862), Alder Gulch (1863), and Helena (Last Chance Gulch, 1864) the settlement and development of the state began. Montana began as a mining state and mining has always been one of its principal industries. Over \$2,000,000,000 has been produced by its mines since they began to yield and the total mining output in 1916 was \$145,000,000.

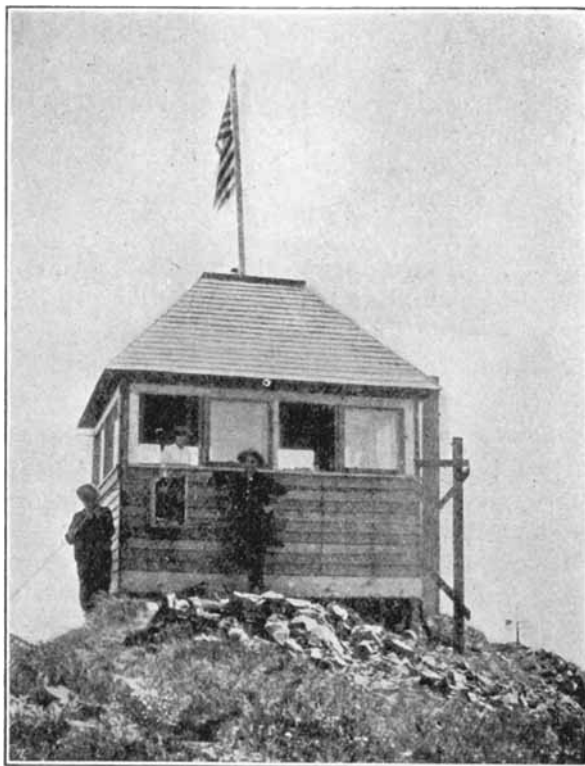


Fig. 2. Fire Lookout Station on Mountain Top, Western Montana. Photo by United States Forest Service.

The first mines were the placer "diggings," with their various systems of washing the loose gold from the gravel bars along the streams. The next step was the development of quartz—or deep-mining and then the production of silver was added to that of gold. The development of copper mining came with the building into the mining districts of the Northern Pacific railroad from the east and the Utah and Northern (now the Oregon Short Line) from the south.

Though the mining output of Madison, Lewis and Clark, and Jefferson counties and of Philipsburg and other mining districts

is important, the production of the Butte mines has for years overshadowed all other mining in the state. Within the environs of Butte is a high hill of eruptive granite, Anaconda Hill, which is known in Montana as the "richest hill on earth." The mineral veins of this hill attain in places a thickness of two or three hundred feet and through "secondary enrichment" a workable thickness of six hundred feet has been reached. Many of the veins have been followed down to a depth of over 3,000 feet without signs of exhaustion. About 15,000 miners find employment in the Butte mines, making Butte a city of over 70,000 people, the first in size in the state. The location of the Washoe smelter on Warm Spring Creek, 29 miles west of Butte, is responsible for the existence of the city of Anaconda, now a place of over 15,000 people. The Butte ores are also shipped to Great Falls, 150 miles away, for smelting, and the industry has had much to do with the growth of that city.

In the past few years the production of zinc has made great advancement, the output for 1916 being valued at \$31,000,000. For years Montana ranked first in the production of copper but recently she has had to yield first place to Arizona. In 1916 she ranked first in the production of silver.

In addition to metal mining the mining of coal is also an industry of much importance. Coal beds are very widely distributed over the plains portion of Montana, their total area being placed by some authorities as high as 30,000 square miles. In the Tertiary formations of eastern and northern Montana there are thousands of square miles of lignite beds, usually lying at the surface or so close to it that the residents of each locality are able to dig their own fuel from the ground. Both semi-bituminous and bituminous coals of high grade are found in the Cretaceous coal beds of central Montana. The principal producing mines are those of the Red Lodge district of southern Montana and of Roundup and Lehigh in central Montana. In 1917 the total coal production was about 4,500,000 tons.

Grazing. Montana has for years held high rank as a grazing state. The native grasses are abundant and highly nutritious. These grasses cure on the ground, so that stock thrive on them the year around. Stock animals in the ordinary winters of light snows and frequent chinook winds are able to "rustle" on the range without feeding, but the percentage of losses is so high in case of severe winter storms that stockmen have generally taken to providing hay for their animals to be fed as needed. Cattle are even fattened for market in winter on hay alone, as in the Big Hole Basin in western Montana for example. While the raising of

horses and cattle is an important industry, it is as a sheep state that Montana takes highest rank. Sheep are better fitted to graze on the rugged lands and regions of scanty vegetation than are cattle, also better able to graze beneath the snow in winter. The favoring climate produces fleeces of good weight and high quality. The total number of sheep in the state is in the neighborhood of 4,000,000, giving Montana, next to Wyoming, first place in this industry.

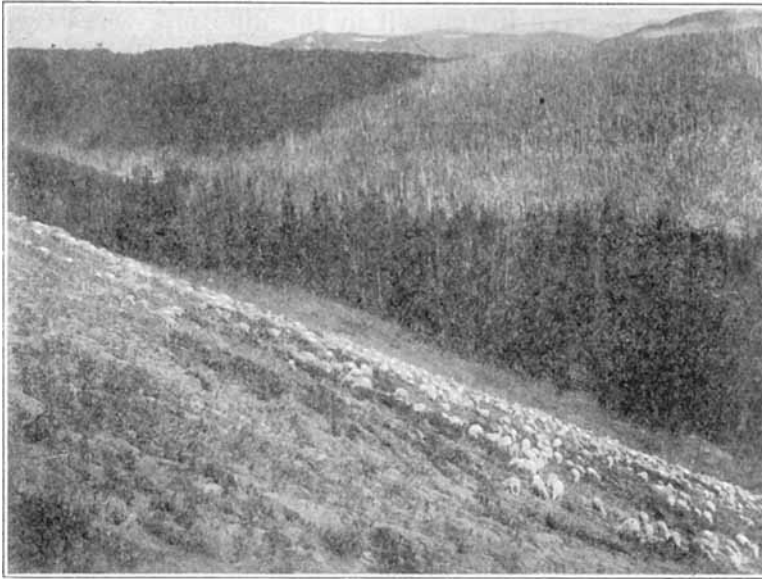


Fig. 3. Sheep Grazing on Forest Reserve. Photo by U. S. Forest Service.

The stockmen have in recent years suffered the loss of much of the open range land whose free use was so advantageous to them. However there yet remain millions of acres of land either too rugged or dry or inaccessible for farming purposes but still valuable for grazing, and in addition the seventeen million acres of Forest Reserves afford excellent summer range.

Agriculture. Farming by irrigation began at an early day in Montana in the mountain valleys near the mining camps with their excellent markets. With the coming of the railroads all the valleys which were susceptible of irrigation were farmed. As wealth increased capital became available for the construction of "high line" ditches to reach the fertile benches above the valleys. State and nation began to assist in projects—Carey Act and Reclamation Service—to bring the water to extensive tracts in cases where the initial expense was too great for private enter-

prise. The result of all these activities is the intensive farming of several million acres of highly productive land.

The total amount of irrigated land is so small (about 3,000,000 acres) that without other farming the industry of agriculture has seemed destined to remain a minor one in the state. In recent years, however, it has been found that crops can be grown without irrigation in many sections, thus greatly increasing the farming area and production. In some localities crops are thus grown every year; in others a crop is grown once in two years, the moisture being conserved in the soil in the alternate years through surface cultivation. Excellent results in this so-called "dry-farming" have been attained in many localities, such as the Judith Basin, Belt Basin, East Gallatin Bench, and Lake Basin in central Montana, Tobacco Plains in northwestern Montana and in the extreme eastern counties. Stimulated by these successes 35 million acres of land, more than one-third the area of the state, have been homesteaded for agricultural purposes during the past ten years, and one of the new counties reports 87 per cent of its surface under the plow. It is not to be expected that all the "dry farmers" will succeed. In sections where the factors of local variations in rainfall and evaporation or the capacity of the soil for retaining moisture are against them, the undertaking is a precarious one unless the homesteaders are possessed of sufficient means to tide over seasons of crop failure. Through the addition of dry farming production to that by irrigation the rank of Montana as an agricultural state has been raised from a place near the foot of the states to a rank above the middle.

The principal crops grown are the grains—wheat, oats, barley, rye and flax; hay—alfalfa, timothy, wild grasses; and potatoes, sugar beets and other vegetables. Corn is not grown to any extent, although a successful beginning in its production has been made in the Lower Yellowstone valley. Such fruits as apples, plums, and berries are successfully grown in the Bitterroot valley, the Flathead country and the Billings district.

The manufacturing industries of Montana are in the undeveloped stage common to the newer states. The sparseness of the population, the great opportunities for the laborer in other industries, the lack of nearby markets and of transportation facilities are some of the hindering causes. However the amount of manufacturing in some lines is by no means negligible. The reduction of ores provides employment for thousands of men at Anaconda, Great Falls, East Helena, and Butte. The manufacture of lumber is an important industry in western Montana, the annual output of the mills being over 400,000,000 feet. Flour mill-

ing has become important since the advent of the dry farmer, mills being in operation at Great Falls, Lewiston, Bozeman, and other points in the grain growing section. There are large beet sugar factories at Billings and Missoula. Manufactures of brick and other clay products are in operation at Great Falls, Lewistown, Helena, and Anaconda, and Portland cement manufactures at Trident and Lewistown.

Water Power. The rapid development of the abundant hydro-electric power is noteworthy. About 300,000 horse power has already been developed and new plants are being added at short intervals. The great centers of this development are at Great Falls and along the course of the Missouri through the Big Belt mountains between Great Falls and Helena. There are also large plants at Thompson Falls on Clark Fork and on the upper Madison river. The electric current is in extensive use throughout most of the state in domestic service and in mining, smelting, and other manufacturing, and in transportation. The main line of the Chicago, Milwaukee and St. Paul is operated electrically from Harlowton in central Montana westward across the state and on into Washington, a distance of about 450 miles.

The People. The population of Montana is a transplanted one which comes from almost all the other states. Only one out of three Montanans is native born. Numerous pioneers are yet living who came with the first gold stampede. About 25 per cent are foreign born. Notwithstanding the newness of the state its people show strongly marked characteristics, bred of their environment and fixed upon the inhabitants during the early days of mining and ranching. Among these distinctive characteristics are generosity and sociability. The penny has not yet come into general circulation and the people pride themselves on their indifference to paying high wages and high prices. The bricklayer gets \$9.00 and the hodcarrier \$5.50 for an eight-hour day. The long distances between ranches and between towns accounts for the sociability. Montanans are progressive, carrying out expensive schemes of improvement in less time than older and more conservative communities would take in considering how to make a beginning. Prosperity is on every hand. The wealth produced in 1916 from the mines, ranches, farms, and forests totalled \$342,000,000, an average of \$454 for each inhabitant of the state. The chief exceptions to the rule of prosperity are to be found among such homesteaders as have entered on their undertakings without means or experience or judgment.

Montanans travel much and are well versed in conditions in other communities and other states. There is much shifting from

the ranch to town and back again and the orders of society are in a fluid condition with democracy everywhere the rule. There are no cities of 100,000, six of over 10,000 and five between 5,000 and 10,000, so that conditions are for the most part rural.

There is little of the "wild and woolly" as depicted in the West of the movies. Gambling went out several years ago, the red-light establishments more recently, and the saloons are to go the first of January, 1919. The former activities of the picturesque cowboy have been greatly limited by barbed wire and plow, and sheepherding has lost much of its former loneliness. The honk of the automobile has supplanted the crack of the freighter's whip and though not so conservative Montana is fast becoming as regular in its habits as the average Eastern state.

Conclusion. The varied character of the resources of Montana is exceptional. Instead of being exclusively a mining state or a stockraising state or a farming state, Montana is prominent in all three and in addition has numerous other valuable resources, such as coal, timber and water power. The rapid growth in population is in keeping with the wealth of resources. Careful estimates place the present population at three quarters of a million, or double the population in 1910. For several years past the homestead entries (15,000-20,000 annually) have exceeded those of all other states combined, yet there are still large tracts unsurveyed. To the student of geography the appreciation of the natural resources of such a state and the observation of their development constitute a most interesting study.

THE HIGHEST RAILROADS IN THE WORLD

It is a remarkable fact that among the railroads of the world constructed in part at very high levels above the sea, the eight which have to their credit the absolutely top figures are all situated in South America.

We append in tabulated form the highest altitude of each, the country in which situated and the name of the railroad.

15,865 ft.	Peru.....	Peruvian Central (Oroya)
15,814 ft.	Bolivia.....	Bolivia R. R. (Potosi)
15,809 ft.	Chile.....	Antofagasta & Bolivia R. R.
14,688 ft.	Peru.....	Peruvian Southern R. R.
14,108 ft.	Bolivia.....	Arica—La Paz R. R.
13,393 ft.	Bolivia.....	Guaqui—La Paz R. R.
12,000 ft.	Argentina.....	Transandine (Arg. Gov.) R. R.
11,841 ft.	Ecuador.....	Guayaquil & Quito R. R.