

CLIMATE OF THE UPPER COLUMBIA BASIN.

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Climate is an effect. We must judge of it by its causes. Any basin of country held within a series of mountain ranges and drained by a large river like the Columbia, into the ocean, will have a variable temperature. Heated by the sun, like a furnace, the cooler air from the hills and mountains will rush down on all sides and replace its upward currents of warm air. Cool sea winds, laden with vapor, will come in swift currents through all the mountain passes and sweep over all the ridges to restore the equilibrium. These counter-currents will meet, causing rains and snows on the higher plains and mountains. In winter, the whole interior is often colder than the air over the sea, so that these mountain winds not only flow into the interior basin, but they tend down the river and through the mountain passes to the ocean. In later autumn, the upper basin often becomes very cold. Fogs appear over the river and small valleys, condensed from the invisible vapors and filling large regions like a sea, hundreds of feet deep. Above this expanse, the farmers on the upper hills have clear sky. These fogs prevail ten to twenty days in November and December. As the cold increases, they fall as frost, or a kind of fog-snow, on hill and plain, leaving a clear sky, and what is called a crisp, dry air. The night becomes clear. Moon and stars shine. The air is still. As the cold becomes more intense in long nights and shorter days, the warmer southwest ocean winds again find their way into this chilled interior basin. They are hailed as the "Chinook breezes." They bring vast amounts of vapor, which strike the mountains and highlands and become condensed into mists and clouds and rains and snows, making all the highest ridges white. This process repeats itself as the winter months pass and the spring months come. This cooled interior basin acts like a cold room. It invites the warm sea winds that drop snows on the upper crests of the Cascades and its spurs, as the Simcoe range, and upon the Blue Mountains, the Cour d'Alene, Bitter Root, and Rocky mountains. It often rains on the hills and forests and shaded valleys, and finally melts the frosts and snows of the lower hills and plains,

causing vegetation to start early. Grass becomes abundant, especially on the southern slopes. Fall sown wheat-fields checker the plains with their brilliant green. Flocks and herds thrive. The lower plains and valleys become warm in March and April. In May the gardens are well set with early vegetables, and the fruit trees—cherries, peaches, apricots, apples and pears—are in bud, bloom and leaf. Plows are in motion during these months on the hill-sides and plains.

LATER SPRING.

As the days prolong toward summer, the heated basin still invites the contending currents from the cooler ocean and the colder mountain ridges. The play of these forces becomes of intense interest to the observer. The sun rising higher and higher, sends his vertical rays into all the valleys and shady nooks, drawing up the vapors, drying up the swamps, pools and streams. Dust prevails in the highways. Herds of cattle and horses, in long lines, follow their trails down the hills to their watering places. Farmers hasten their plowing and seeding and fencing and road-making. Summer has apparently come to all this region in May, while rain and mud delay the farmers west of the Cascades and near the sea.

THE UPPER AERIAL CURRENTS.

But in the higher regions of the air the cloud banners still spread their wings over this interior basin; now overhanging the valleys in early morning with a dense, black covering; then rolling up in fleecy folds a thousand feet above the highest hills; then, towards nightfall, stretching their dark, ominous mantle over the whole horizon.

Another day dawns with heat, quickly dissipating mist and cloud and revealing a brazen sun. The steady sea breeze comes to refresh the farmer in the field and the traveler on the road. Suddenly out of a clear sky appears a little cloud, a speck only. It is the signal of the colder mountain wind, meeting that from the sea. Soon the heavens are overcast. Denser and darker clouds approach, and lightnings flash. Cloud banners swing before the storm in vast circuits. Their eddying whirls sweep grandly over the higher peaks and burst in waterspouts, bearing down soil and rocks and deluging the valleys. A few hours pass. The sky is again clear. Roads and fields are again dry, but the

low meadows are kept wet and unfit for the plow. The sheltered hills and higher plains prove the safest and surest place for the husbandman.

SUMMER.

The snows are mostly, though not all, gone from the mountains. Even these higher regions share a part of the heat of the valleys, and flocks and herds seek their upland pastures. Sea breezes prevail, bringing comfort to laborers and travelers and to the homes of the people. The invisible vapors pour in from the sea, ascend in the heated air currents, showing hardly more than light, fog-clouds on the hill-sides at dawn, or a fleecy covering on the snow-peaks, with merely a few white wisps in the sky overhead at noon. Men and animals seek the shade. The soil becomes dust in the trails and highways.

WHEAT GROWTH.

Yet the wheat-fields are green. The air, partly saturated with invisible vapor, has entered the pulverized earth, and, on cooling at night, has deposited a portion of its moisture, nourishing the thirsty plants and insuring the harvests. There are no rains in summer except on the hills and wooded valleys, but this supply of invisible vapor to the plowed, spongy soil, does the service of mists, fogs, dews and rain. With the increase of wheat culture and timber culture, mists and showers will doubtless be condensed from this vast aerial sea of invisible vapor.

CHANGES.

The climate will change from the same causes. Every leaf and stock and branch and blade of grain, vegetable and tree, becomes a cooler and condenser of moisture; but none so much as the plowed and finely pulverized tilth of the fields and gardens. An excess of this moisture will escape the rootlets of plants, and find the impervious strata below, and finally trickle out in new or larger springs on the hillsides. Surely enough comes in from the sea, over the mountains, to supply all the wants of vegetable and animal life.

MOIST AIR OF SUMMER.

Although the air seems dry, its power to absorb invisible vapor has increased from 2.13 grains per cubic foot, at 32° Fahrenheit, to 4.39 grains per cubic foot at 52°; and to 8.01 grains per cubic foot at 70° to 19.84 grains at 100 Fahrenheit.

Most of this supply of vapor is from