

TREASURE STATE FARM AND LIVESTOCK

RAINFALL FOR MONTH OF JUNE

HEAVIEST PRECIPITATION DURING MONTH OCCURRED IN POWDER RIVER SECTION

With Carter County Second and the Southern Fergus District Third; Fall at Polson Was Lightest; Adel in Cascade County Led for April, May and June.

Moderate to heavy rains fell in nearly every section of Montana during the month of June, according to the monthly report on precipitation issued by William T. Lathrop, meteorologist in charge of the Montana station of the United States weather bureau.

The heaviest precipitation during the month was at Biddle, in southern Powder River county on the Little Powder river, which station reports 7.54. The next is Ekalaka, county seat of Carter county, with 5.73. The third highest, 5.50, is reported from Pine Grove in Southern Fergus county. Adel in southern Cascade county, which reports the greatest precipitation for April, May and June, had only 4.95 during June.

The smallest precipitation is reported from Polson, which station reports only .12. The Upper Yaak river reports .44, Babb .48, Kallispell .54, and Libby .53.

The complete report follows. The first column indicates precipitation for June and figures in second column indicate precipitation for April, May and June:

West of Divide	
Anaconda	3.03
Belton	.59
Butte	2.36
Columbia Falls	1.09
Dayton	1.19
Deer Lodge	3.07
East Anaconda	3.89
Fortine	.66
Hamilton	3.17
Haugan	.64
Heron	.58
Kallispell	.53
Missoula	1.70
Ovando	.71
Philpburg	2.66
Polson	.12
St. Ignatius	.57
Stevensville	1.66
Upper Yaak River	.44
Victor	1.35
Central Division	
Adel	4.95
Agricultural college	2.86
Augusta	2.01
Babb	.48
Big Sandy	1.12
Big Timber	1.90
Brenner	1.19
Browning	1.51
Busteed	2.69
Cascade	2.38
Chinook	2.25
Choteau	.88
Conrad	.88
Copper	3.00
Cut Bank	.84
Denton	2.89
Dillon	1.90
Dunkirk	.70
Ennis	1.50
Findon	4.25
Flathead Creek	2.10
Fort Shaw	.80
Goldbutte	1.44
Great Falls	1.39
Harlowton	3.06
Havre	.82
Hebgen Dam	1.10
Helena	2.58
Highwood	1.50
Hobson	3.85
Holter	2.91
Kinread	.81
Knobles Ranch	1.40
Lewistown	2.97
Livingston	2.34
Lytle	1.06
Norris	2.02
Renova	1.37
Three Forks	2.06
Utica	3.98
Valler	1.95
Virginia City	1.62
White Sulphur Sp'ngs	3.06
Willow Creek Reserve	1.41
Winifred	2.42
Eastern Division	
Ballantine	3.66
Biddle	7.54
Billings	2.40
Bridger	1.86
Broadus	4.77
Crow Agency	4.10
Culbertson	2.37
Ekalaka	5.73
Flatwillow	3.81
Foster	5.03
Garland	2.87
Glasgow	1.75
Knowlton	3.20
Lustre	2.43
Malta	2.91
Melstone	3.00
Mildred	2.68
Miles City	1.53
Nelson Reservoir	1.81
Outlook	4.17
Pine Grove	5.20
Plevna	4.62
Poplar	4.21
Red Lodge	2.06
Rock Springs	1.54
Roundup	3.75
Roy	3.29
Savage	1.45
Sidney	3.81
Snowbelt	3.31
Springbrook (Circle)	2.95
Valentine	2.56
Vananda	1.72
Wheaton	4.23
White Water	2.69
Wibaux	2.08
Wyola	2.95

Drainage of Arid Lands

By R. A. HART
United States Senior Drainage Engineer for the Montana Irrigation and Drainage Association.

It is pretty generally realized that drainage is necessary to agricultural operations in arid as in humid regions, and it seems reasonable to say that it will eventually be of more general application to irrigated than to non-irrigated soils.

Maximum crop production in the arid sections depends upon the artificial application of the optimum amount of water and it has been found by long experience that under ordinary conditions it is very difficult, if not impossible, to supply just the right quantity, and as a consequence irrigators have erred on the side of applying too much water.

The result of the over-irrigation of arid soils has been the filling up of the ground water reservoir with the excess percolating water until the ground water level has risen from depths ranging from ten to a hundred or more feet to within a very few feet of the surface, causing a waterlogging of the surface soil, and in many instances, an accumulation of alkaline salts, due to the evaporation of water from the surface. Practically every valley in the west has suffered to a greater or less extent from the over-zealousness of the land owners, and in some valleys a considerable percentage of the lands is now unproductive and often abandoned.

The water-logging of the soil is the direct result of seepage from the irrigation of the lands themselves; seepage from lateral ditches, and to a small extent seepage from the supply canals. The concentration of the alkaline salt solution near the surface and the deposition of the alkaline salts on the surface is the indirect action. The remedy for the combined evils is under-drainage which removes the excess moisture from the soil space, directly, while the alkaline salts disappear as a matter of course, the action being just the reverse of that by which they made their appearance.

By lowering the water table, the excess moisture already in the soil is removed; fluctuations of the ground water level are prevented, and the percolation from subsequent irrigation finds a ready means of escape. Vigorous cultivation of the soil followed by copious irrigation permits of the leaching out of the alkaline salts by the downward movement of the water. The removal of the excess moisture from the soil spaces allows the air to enter and the proper balance between air and moisture is maintained, while the soil is made warmer. The greater root space afforded actually increases the amount of available moisture and the available plant food supply. Plowing may be done earlier so the growing season is made both earlier and longer.

While the direct action of under-drains is much the same in arid as in humid regions, the ultimate results desired and the methods of obtaining them are vastly different. In the humid sections drainage systems are designed to remove a given depth of water from a given area in a given period of time. This is usually expressed in terms of a certain fraction of an inch in 24 hours. In the arid section the important thing is to prevent fluctuations of the ground water level within the root zone, which requires that the drainage system shall remove storm water as rapidly as it falls and to care for percolating irrigation water and lateral seepage from higher lying lands. Systems must be designed, therefore, to care for the maximum flow, and there is usually a continuous flow the year round.

The root zone in the arid sections extends to a considerable depth and for ordinary conditions the ground water level should not be permitted to rise higher than five or six feet from the surface. This calls for drains six feet or more in depth, which is greater than that usually given to drains in the humid sections. Where alkaline salts are present, it is especially important that ample depth be given, since these salts, being soluble, are concentrated at the upper limit of saturation, which is often several feet above the free water level, owing to the capillary attraction of the soil.

The greater depth of drains required and the necessity of providing more generous capacity make the unit cost of constructing drains in the arid section higher than in the humid. Labor and material are also higher. Properly designed and carefully constructed drains are effective throughout a greater area, however, in the arid sections so that the cost of drainage is no more and often less than in the humid sections.

The drainage of irrigated lands has been reduced to a science and involves many technical considerations. It is easy to make vital errors in location and design of drainage systems and since the work is comparatively new and has received but little attention, there are but few men capable of handling the situation. The great importance of the work is being realized now, however, and much careful study is being given the subject. The construction of drainage works is often extremely difficult and presents problems that only specialists are competent to handle.

The first experiments to determine whether or not lands injured by seepage water and alkaline salts could be economically reclaimed were made in Utah and many successful demonstrations were carried out. As a result of the success of these experiments a general movement toward reclamation of the 503,000 acres of

formerly productive land, now unproductive through excess of water or alkaline salts, is now in progress. The movement has spread to other states. Hundreds of acres are being reclaimed every year in the Uncompahgre valley of Colorado by the improved methods. Conditions have been studied in the Grand valley where the situation is especially bad, and it is only a matter of time until most of that valley will be drained. Other portions of Colorado are in need of drainage and vast operations are commencing, particularly in the San Luis valley. A considerable amount of work is under way in Wyoming and New Mexico while Idaho is the scene of extensive action. A number of projects are under way in Oregon and Washington, where conditions are especially favorable for co-operative work on a large scale. A great deal has been accomplished in California already but sentiment is crystallizing in favor of more comprehensive efforts. Drainage is undoubtedly destined to take its place as one of the most important factors in the future development of the west.

Crops Gain at Dillon

Dillon—The maximum temperature for the last week was 86 degrees and the minimum 40 degrees. There was .60 of an inch of precipitation. The light showers and cool weather was beneficial to crops. The spring grain in the dry land sections was injured by the dry weather but the moisture and climatic conditions of the week make a big difference in the outlook. Winter wheat is very good and a large yield is almost assured. The south end of the county is not so moist as the north, but the irrigated crops are above the average. Haying is in full swing on many of the larger farms around the county.

Spring Grain Normal

Kallispell—A total of .80 of an inch of rain fell here during the last week, with cool, cloudy weather following. This will insure full development of fall wheat and will bring the average of spring grain nearly to normal.

SPUD CROP WILL SMASH RECORDS

ESTIMATE IS THAT IT WILL REACH A TOTAL OF SIX MILLION BUSHELS

Condition is Rated at 97 Per Cent With 40,000 Acres in; Wool Clip Is Lighter; Livestock in Good Condition With Ranges the Best Ever.

Montana's potato acreage this year is the largest in the history of the state and is estimated at 49,000 acres in the report issued by the Montana co-operative crop reporting service. The report forecasts the crop at 6,600,000 bushels from a condition of 91 per cent.

The potato crop in Montana is estimated at 49,000 acres, or an increase of 11 per cent over last year's crop, which was estimated at 44,000 acres, while the 1920 crop was placed at 40,000 acres and the 1919 crop at 38,000 acres. The condition of the crop is 91 per cent, the same as one year ago, which is 2 per cent above the 10-year average condition for July 1. The crop is late but stands are generally good and growing conditions were very favorable, except in a few sections, which needed rain at the close of June. Irrigated sections were generally good and water was applied to meet the dry, hot conditions, the water supply is the best in years.

Along with the increased acreage is the development of seed growing and large acreage will be grown for seed purposes. The growing of certified seed, which promises to become important, is being developed through the work of the agricultural college extension service and the Montana Seed Growers' association. Montana seed potatoes were much in demand last spring and there is every prospect that the raising of seed stock will become an important part of the potato industry in Montana.

Rating by Counties
The 1921 commercial crop was the largest ever produced in the state and to June 24 the car lot movement from Montana stations amounted to 1,791 cars, compared to 949 cars from the 1920 crop, 352 cars from the 1919 crop and 771 cars from the 1918 crop. The ranking counties in the number of cars moved from the 1921 crop is as follows: Ravalli, first; Flathead, second; Powell, third; Madison, fourth; Carbon,

fifth, and Lewis and Clark, sixth. The statement was based upon the station reports of the first 1,577 cars. The largest shipping stations are as follows: Woodside, first; Kallispell, second; Deer Lodge, third; Helena, fourth; Hamilton, fifth, and Waterloo, sixth.

The 1922 commercial crop indicates an increased acreage in Ravalli, Missoula, Powell, Madison, Jefferson, Gallatin, Carbon, Lewis and Clark, Richland and Cascade counties, with a reduction in the acreage in Lincoln and Flathead counties. New commercial sections that will have a surplus this year will be found in Park, Custer, Fallon, Blaine, Phillips and Valley counties, with other small localities that will produce a surplus.

The hay crop is forecast at 3,762,000 tons compared to the June 1 forecast of 3,716,000 tons, the 1921 crop was estimated at 3,407,000 tons, the 1920 crop 2,601,000 tons, and the 1919 crop 1,339,000 tons. The condition of the crop is 96 per cent, compared to 100 per cent last month, 95 per cent one year ago and the 10-year average of 86 per cent.

The apple crop is forecast at 862,000 bushels against last year's crop of 975,000 bushels and the 1920 crop of 825,000 bushels.

Livestock in Good Shape
Livestock is in better condition than usual and has made rapid gains the past month. Both cattle and sheep should be in prime condition at an early date. Shearing has been a little late but is nearing completion, the wool clip has been good, but is a little lighter than last year, due to the severe winter. The clip is estimated at 8 pounds per fleece, compared to 8.3 last year and the 10-year average of 7.9 pounds.

Ranges are unusually good, the grass and forage has made a remarkable growth and the southern and eastern parts of the state have the best ranges since 1916. High ranges are good to excellent, although late. Grasshoppers have been numerous but little damage has been reported. Montana's crop prospects were generally good on July 1 and the lack of moisture was becoming apparent in the counties of the north central district and on a portion of the Flathead reservation section, with a few other localities reporting the need of rain. Moisture conditions were

good in the western half of the state and the southern and southwestern districts were in fine shape. Grasshoppers have appeared in over 40 counties, but little damage has resulted and active work has been undertaken to fight the pests. Cut-worm damage has been very light, while hail damage has been light and mostly local.

Summer fallow and diversified farming are receiving much attention and the reports coming in indicate an unusual interest in diversified farming and the growing of feed crops. This tendency is also borne out by the increased acreage of corn, oats, barley, potatoes, peas, alfalfa, clover and millet. Seed crops, particularly peas, potatoes and alfalfa, are receiving much attention.

New York—Jack Dempsey, world's heavyweight champion, has agreed to meet Harry Willis, negro heavyweight, time and place of the battle to be determined later.

Montana Shippers

Realize that South Saint Paul is one of the best shipping points in the U. S. today. You'll do better to ship here, especially if you ship to:

Weiler & Weiler Co.

Successors to Carson, Wood & Weiler Livestock Commission
SOUTH ST. PAUL, MINNESOTA
CHICAGO, ILLINOIS
"Ask for our Free Western Weekly Market Letter."

FOUR YEARS THE BEST

MEAT TYPE HAMPSHIRE
The International Live Stock Show is the test of hog producing power. Hampshires have won the Grand Championship in this test four years in succession, 1918-19-20-21 in the hands of the average farmer. No experts needed to make Hampshires win. The Hampshires are the greatest of all forage hogs—making the highest priced pork out of the cheapest feeds on the farm. Active, vigorous and healthy, they raise exceptionally large litters. At the International, they have shown almost without exception, the heaviest spring pigs of any breed, carrying always the heavy high killing lean meat type. For free Hampshire information and for names of breeders in your neighborhood, address
AMERICAN HAMPSHIRE SWINE RECORD ASSOCIATION
E. C. Stone, Sec., Dept. 17, Peoria, Ill.

Charles M. Russell's Genuine Portrayals of the Old West

Subjects:

- WAGON-BOX FIGHT.
- BLACKFEET TRADING PARTY.
- STAGE COACH ATTACKED BY INDIANS.
- La Verendrye's Discovery of the Rocky Mountains.
- Pierre Radisson, Discoverer of the Mississippi River.
- Pawnee Indians See Missouri River Steamer for the First Time.

SIX ARTIST'S PROOFS

Of Pen Sketches by Mr. Russell enclosed in a handsome portfolio with Russell Drawing on the cover

FOR ONE DOLLAR

By Mail, Postage Prepaid, \$1.10

These striking sketches from the pen of the greatest portrayer of the Old West were drawn this year to illustrate the series of historical stories that are being published weekly in many newspapers over the country under the title

BACK-TRAILING ON THE OLD FRONTIERS

The sketches are engraved on the finest quality of heavy Calendar paper and are suitable for framing. The size of the drawings is 15 inches in width by from seven to nine inches in depth. The six sketches and portfolio make a handsome gift. Each drawing is accompanied by a brief synopsis of the story which it illustrates. These descriptive stories are easily removable and do not interfere with framing.

These are new sketches by Russell and are now on the market for the first time.

Order Yours Today

Cheely-Raban Syndicate

Great Falls, Montana

Dealers: Write Us

CHEELY-RABAN SYNDICATE, GREAT FALLS, MONTANA.

Please send me postpaid one set of six sketches by Charles M. Russell in portfolio, for which I enclose \$1.10. (Stamps not accepted.)

NAME _____
ADDRESS _____
POSTOFFICE _____