

MUSSELSHELL WATERSHED.

Castle and Little Belt Mountains.—At the beginning of the month there was as much snow in the mountains as I have seen in 20 years, but the warm March weather has taken most of it off. Unless there is more rain than usual there will likely be a shortage of water for irrigation.

Snowy Mountains.—There was more snow than usual at the beginning of the month, but it melted rapidly during March. In the high mountains the snow is very solid.—*R. O. Lewis.*

Little Belt.—No snow fell during March, but very little has melted and run-off from the higher elevations. The depth is from 2 to 15 feet at 7,000 feet altitude.—*F. R. Servoss.*

YELLOWSTONE WATERSHED.

Absaroka Mountains.—There is about 4.5 feet of snow at 7,500 feet elevation, and it is very solid. The fall was very light in March. The snow is very hard from thawing and freezing at high altitudes, and will furnish a steady flow of water during the spring and summer.—*R. A. Dewart.*

ICE IN RIVERS.

On the Central Montana and Puget Sound Railway, between Lombard and Maudlow, on Sixteen Mile Creek, all bridges were more or less damaged by high water and ice gorges, requiring 3 days to repair sufficient for traffic. The bridge at Callabar, Mont., was washed out, taking 2 days to repair. The bridge at Whitney, Mont., was damaged by high water and ice gorge, requiring 4 or 5 days to repair.—*E. H. Barrett, Assistant General Superintendent, Butte, Mont.*

Burns, Mont.—The damage by the ice gorges and high water at this point in the Yellowstone River was about \$10,000 to private property. The gorge was about 6 miles long.—*N. H. Nelson.*

Butte, Mont.—High water and ice jams did considerable damage in Silver Bow County during the early part of March. Both bridges on Silver Bow Creek went out. Nearly all streams tributary to the Big Hole River, near Melrose and Divide, did much damage to ranches and roads. Bridges, roads, and ranches were damaged along Browns Gulch and Basin Creek.—*J. E. Rheim, County Commissioner.*

Glendive, Mont.—The ice went out of the river with little damage to Reclamation Service Works, only one small lateral being destroyed by the high water resulting from the gorge at Burns Creek, which backed the water up as far as Marco. At times the water was within 2 feet of the main canal bank in a few low places, and much damage would have resulted had it overflowed.

The railroad contractors were the heaviest losers, about 20,000 cubic yards of material being washed so badly as to necessitate replacing.

One farmer near Burns, Mr. David Davies, lost heavily on grain which he had stored on his farm, the water reaching a depth of 10 or more feet at this point.

Mr. E. J. Berry, who has a large ranch just above Glendive, lost heavily, quite a number of cattle and other stock being swept down the stream.—*Robert S. Stockton, Irrigation Manager, United States Reclamation Service.*

North Dakota.—The mean temperature for the State was 41.3°, or 20.3° above the normal.—*Orris W. Roberts.*

South Dakota.—At the close of February it was estimated that 30 to 40 per cent of the corn crop of 1909 was yet in the field. Therefore when the snow melted in March the unusual scene was observed of farmers on adjacent holdings engaged in spring plowing, seeding, and gathering corn at the same time. The early starting of grass was favorable for stock on the ranges which had been on scanty feed during the winter because of the depth of snow covering. Prairie fires caused much damage and loss of property in several northwestern counties. The snow-storm of the 29th and 30th in the western portion of the State delayed railroad traffic to some extent. The State game warden reports the weather very favorable to game birds and animals, and that the flight of wild fowl was earlier than usual. There was an ample supply of water in all streams, but the absence of rain reduced and in some places exhausted the supply of water in cisterns in parts of the eastern portion of the State.—*S. W. Glenn.*

Colorado.—Heavy frost occurred on the morning of the 30th, but it is believed that fruit buds were not sufficiently advanced to have been seriously injured. The high wind of the 29th caused much damage to telephone and telegraph poles. Over extensive areas of the plains the poles were torn out of the ground by the combined action of the snow and wind. Trains were also much delayed by the drifting snow. At Sedgwick a small tornado occurred on the 29th; the path was from 200 to 400 feet in width, and extended from northeast to southwest.

Two persons were injured and the property loss is estimated at \$3,500. The early date of this storm is noteworthy; tornadoes are of rare occurrence in Colorado, although several have been reported from the northeastern portion. The amount of snow in the mountains at the close of March was much less than the normal on all watersheds. There were few storms and the snow-fall was light during March. Bright sunshine and unusual warmth during the greater part of the month melted the snow covering of the higher valleys and unprotected slopes. Melting has not begun, however, at the very high altitudes, and only in a moderate degree in the timber and on the northern slopes.—*F. H. Brandenburg.*

Nebraska.—The average temperature for the State was 51.4°, or 7° above that of 1878, which has been the warmest recorded March in the past.—*G. A. Loveland.*

Iowa.—There was no appreciable amount of precipitation at most of the stations from February 23 to March 28. The farmers were in the field gathering the remainder of last year's corn crop by the 5th or 7th. The indications are favorable for an increased acreage of oats and corn. Good seed corn is scarce, however, owing to the severe freeze on the 12th and 13th of October last. The observer at Washta reports the greatest loss of bees ever known in that vicinity. More than three-fourths of those wintered outside are dead.—*G. M. Chappel.*

Kansas.—Transportation interests had no check and building operations proceeded uninterrupted. The rivers fell slowly and were low at the end of the month.—*T. B. Jennings.*

Missouri.—Owing to extreme dryness forest fires occurred in Webster and adjoining counties; some damage was done to buildings and considerable damage to orchards. The Secretary of the State Board of Agriculture reports that the prospects for peaches is the best that Missouri has had for many years.—*George Reeder.*

Nebraska - Wyoming, North Platte Project.—Violent wind storms during the month have done considerable damage to portions of the canal and lateral systems.—*Reclamation Record.*

Logan, Iowa.—The upper Boyer River drainage district, embracing the Boyer Valley north of Logan for a distance of 18 miles has been established here by the board of supervisors. The project contemplates straightening the Boyer River at an estimated cost of \$130,000.—*The Jackson Sentinel.*

Bozeman, Mont.—A big irrigation scheme, which will provide water for 30,000 acres in the vicinity of Willow Creek and Three Forks, in this county, will be pushed to completion this summer. A canal 3 miles in length will carry water from both North and South Willow Creek to a reservoir with a capacity of some 30,000 acre-feet. This reservoir requires the construction of a dam about 70 feet high. A conduction canal 12 miles in length will carry water from the reservoir to the lands to be irrigated.—*Anaconda Standard.*

THE SHOSHONE RESERVOIR.

By W. S. PALMER, Section Director.

The completion of the Shoshone Dam in Shoshone Canyon which is about 7 miles west of the city of Cody, Wyo., will form a large lake more than 12 miles long and 2 miles wide, extending up both forks of the Shoshone River which divides just above the dam in Shoshone Canyon. The lake will be on the road from Cody to the Yellowstone Park, and the Cody Gateway will be one of the attractions of that most scenic route to Yellowstone Park. The route through the canyon is along the road which had to be literally chiseled out of the solid rock walls of the canyon by the Government engineers before work on the great dam could be commenced. Beyond the canyon the road leads along the north bank of the reservoir which will extend several miles up the North Fork of the Shoshone River, and follows the river to the boundary of the Park which is entered over Sylvan Pass, from which one of the grandest views of the Park can be ob-

tained. Besides serving as an immense reservoir for storing water to reclaim 150,000 acres of desert lands along the lower portion of Shoshone River, the lake will be utilized as a pleasure resort and the ambitious residents of Cody are already planning to make it one of the great pleasure resorts of the West. Summer cottages along the banks of the lake will be erected by many, and hotels, boats, and bath houses will attract summer tourists who may desire a pleasant place to spend all or a portion of their summer. The water of the lake will be stocked with the rainbow trout and the black bass in such numbers as to prove very enticing to anglers in a few years. The lake will be large enough to allow excellent boating.

The river banks below the mouth of the canyon show unmistakable evidence of ancient geyser activity in that section, and here are found the wonderful mineral and sulphur springs, the curative values of which were known to the Indians years ago. They used to gather here to bath in the waters and renew their youth and strength; they called the stream the "Smelling Water," and the early white man of that section gave the name "Stinking Water" to the river which we now know as the Shoshone.

The dam in the canyon has been completed and this, the highest masonry dam in the world, is ready to hold back the flood waters which will come down the stream in the spring. The dam which is 328 feet above bed rock and 246 feet above the bed of the stream is only 200 feet wide on top. The dam could easily be carried much higher, as its top is nowhere near the top of the canyon, but the low banks on the east side of the South Fork of the Shoshone renders a higher dam impracticable.

WATER SUPPLY FOR THE SHOSHONE PROJECT.

By D. W. COLE, Constructing Engineer.

The Shoshone River has its source in the massive Absarokee Range of the Rocky Mountains. The entire watershed is a very rugged country, elevated from 6,000 to 12,000 feet above the sea. Practically the entire run-off of the stream is derived from the heavy snows deposited in the high mountains. The precipitation from September until June is almost wholly in the form of snow. Rain comes in showers, sometimes very heavy during the months of July and August, but these have very little effect upon the flow of the main stream.

The floods in the river occur in June and July as a result of melting of the snow in the deep ravines of the mountains.

The country is very sparsely inhabited, and the few persons living in this district are quartered along the streams in the lower portions of the watershed. Hence, any stations for measurement of precipitation, located at the usual habitations of men, would give little information as to the actual amounts in the high mountains. To get a correct idea of the precipitation from which the greater portion of the stream yield is derived, the gages would need to be located on the higher ridges of the mountains, where only hunters penetrate at infrequent intervals, and which are practically inaccessible in winter. Unusual and special effort would be required, and expensive methods would be necessary to maintain gage stations where they would throw much light on the subject of precipitation in the mountains.

The general subject of collection of precipitation data in the high mountain areas, where snow is a thing to be measured, is one of world-wide interest, which it appears has not been satisfactorily handled heretofore.