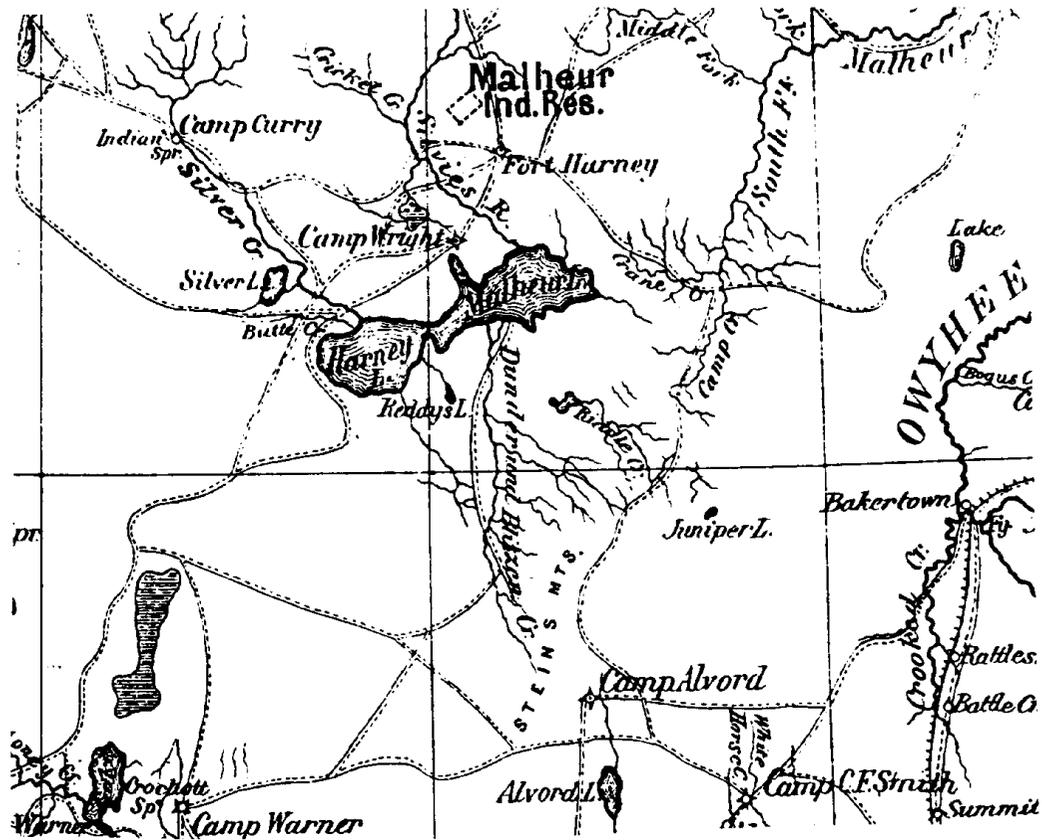


**DONNER UND BLITZEN RIVER, OREGON:
RIVER WIDTHS, VEGETATIVE ENVIRONMENT, AND CONDITIONS
SHAPING ITS CONDITION, MALHEUR LAKE TO HEADWATERS**



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Submitted to

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Preface

The following report was prepared by University scientists through cooperative agreement, project science staff, or contractors as part of the ongoing efforts of the Interior Columbia Basin Ecosystem Management Project, co-managed by the U.S. Forest Service and the Bureau of Land Management. It was prepared for the express purpose of compiling information, reviewing available literature, researching topics related to ecosystems within the Interior Columbia Basin, or exploring relationships among biophysical and economic/social resources.

This report has been reviewed by agency scientists as part of the ongoing ecosystem project. The report may be cited within the primary products produced by the project or it may have served its purposes by furthering our understanding of complex resource issues within the Basin. This report may become the basis for scientific journal articles or technical reports by the USDA Forest Service or USDI Bureau of Land Management. The attached report has not been through all the steps appropriate to final publishing as either a scientific journal article or a technical report.

INTRODUCTION

This study was mounted for the Eastside Ecosystem Project. The assignment was to examine historical documentation about the appearance of and uses of the watershed of the Donner und Blitzen River from its headwaters to its confluence with Malheur Lake in the Harney Basin of southeastern Oregon.

The study area lay remote from major routes of travel and observation by nineteenth century travelers. Nevertheless, a half dozen fur trade brigades entered the Harney Basin in the decade following 1826. In 1843, 1845, and 1853 overland emigrants passed through the region. In the years 1859-65 operations against the Northern Paiute led to extensive military reconnaissance activity and mapping of portions of the area. During a thunder storm on one of these outings the military named this river the Donner und Blitzen.

In the decade of the 1870s stockraisers poured into the rangelands of southeastern Oregon. In a matter of months they claimed primary water sources and thus dominated surrounding summer pasture. Peter French, not the first to arrive, emerged as the dominant force in the Blitzen Valley. In time French's empire faced challenges. An angry homesteader murdered French in 1899. A local coroner's jury ruled that in spite of three bullets in his body, French had died of "natural causes."

In 1908 President Roosevelt created the Malheur Wildlife Refuge. A prolonged drought and the Great Depression made the P and Ranch unattractive to Swift and Company. The eastern firm sold the property in 1935 to the federal government for addition to the refuge. The Civilian Conservation Corps established three camps along the Donner und Blitzen. The hundreds of young men channelized, dammed, and ditch the water courses, creating a mosaic of fields, canals, and holding ponds.

In time the wild animals returned. Federal policy, however, permitted local grazers to continue running their livestock on the reserve. The once great swamps remained in agricultural production. Government employees and contract farmers sowed grasses to feed both birds and cattle. The lower Donner und Blitzen remained a manipulated environment.



ACKNOWLEDGMENTS

I would like to thank Pat Pickens and the staff of the BLM Oregon State Office Public Room for their patient and efficient production of plats of survey and microfiche copies of cadastral field notes. Without that basic data this study would not have been possible.

I also thank Stefan and Ethan Aumack whose wonderful eyes and skills in reading manuscript field notes made possible the development of the typescripts of the earliest records of conditions along the Donner und Blitzen River in the nineteenth century.

I am also appreciative of the resources of the Watzek Library and the Boley Law Library, Lewis & Clark College, the Oregon Historical Society Library, and the Millar Library of Portland State University. From these institutions I drew upon primary and secondary sources to assess the historical and cartographic developments in the project area.

Stephen Dow Beckham
Lake Oswego, Oregon

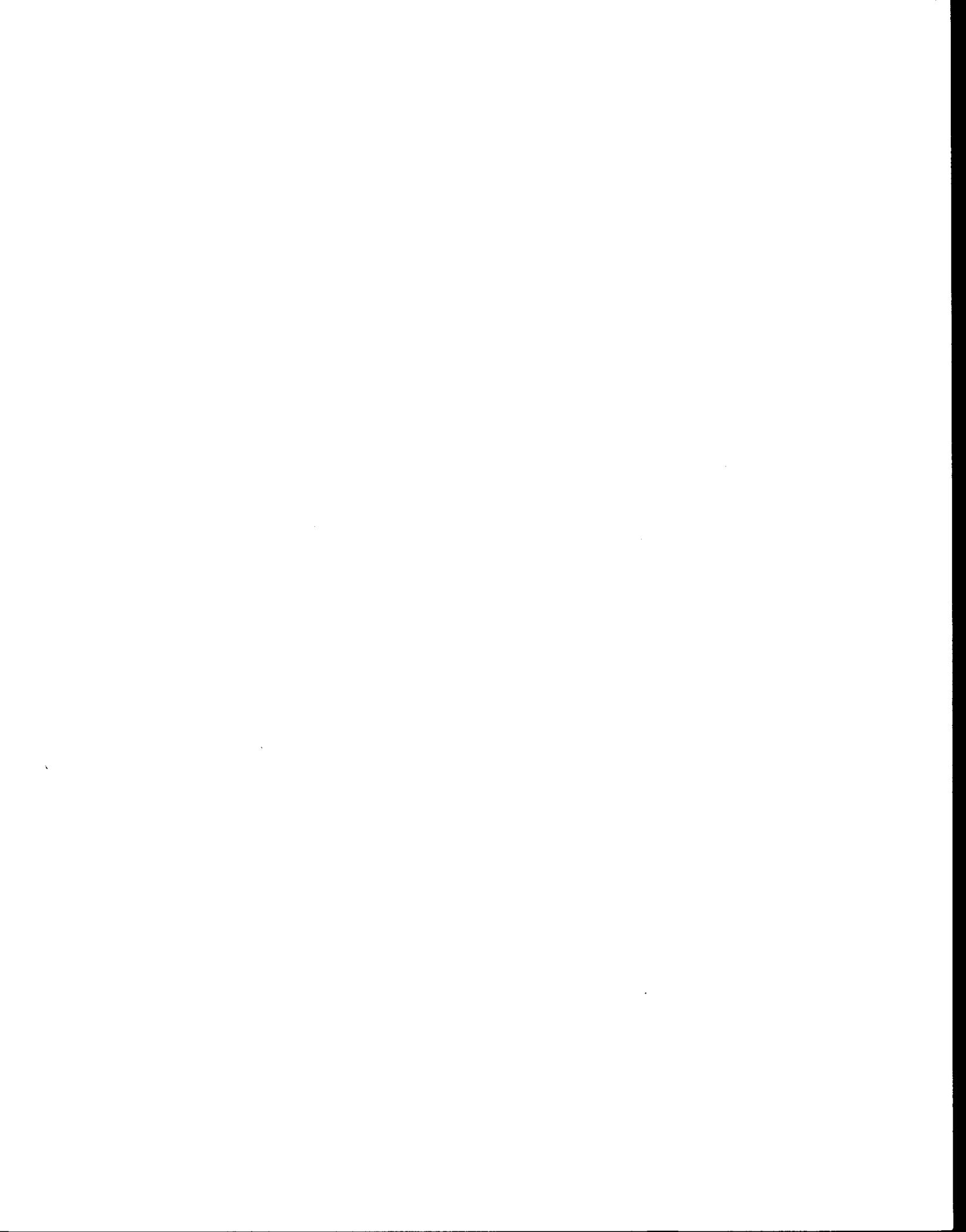


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John W. Meldrum, T32S, R32 1/2 East, W.M., on the Donner und Blitzen River, September, 1880.

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HISTORIC DEVELOPMENTS

Fur Trade, Exploration, and Overland Travelers, 1826-59

The Donner und Blitzen River gained its present name in 1864 during the warfare between the Northern Paiute and Western Shoshoni with the citizens of the United States and the U. S. Cavalry. Oregon Volunteers under Col. George B. Currey crossed the stream during a thunder storm and bestowed on it the German name for thunder and lightning. Locally the stream is often called the Blitzen River (McArthur 1974:228).

This river flows from the western and northern face of Steens Mountain to enter Malheur Lake in the Harney Basin. The region is a vast, interior drainage area of approximately 5,000 square miles. None of its stream courses are connected to the sea. The Blue Mountains define the area to the north; an irregular ridge separates the area from the Malheur drainage to the east; Steens Mountain rises on the south; and a low rise to the west cut the region off from the valleys at Catlow, Abert, Summer, and Silver lakes. The setting is High Desert, a plateau ranging from 4,100 to 5,000 feet. The Harney Basin is approximately 100 miles from north to south and fifty to sixty miles wide. Periodically the waters of Malheur, Mud, and Harney lakes have joined to form the largest, fresh water lake in Oregon. At high water Malheur Lake covers approximately 45,000 acres, while Harney lake submerges about 30,000 acres. The primary streams feed the lakes are the Silvies and the Donner und Blitzen which flow into Malheur Lake and Silver Creek which flows some fifty miles and enters Harney Lake (Clark 1932:102-103).

Euro-Americans first entered the Harney Basin in the 1820s during the fur trade. During that decade Peter Skene Ogden led a series of Snake Country brigades for the Hudson's Bay Company. The corporate policy articulated by George Simpson, governor of field operations, was

to trap out the Snake watershed of all fur-bearing animals. The goal was to create an area so devoid of mammals that Americans, when venturing beyond South Pass, would become so discouraged that they would turn back and not become competitors (Johansen and Gates 1967:124).

Ogden dispatched a party toward the Harney Basin on February 21, 1826. He told Antoine Sylvaile and five others to trap the Malheur and Owyhee rivers. The men ventured farther west and found yet another stream, initially known as Sylvaile's River and subsequently as Silvies River. The party got into trouble with the Indians, lost some of their horses, and departed (Elliott 1910:207-208).

On his third Snake Country brigade Ogden took a party of thirty-five men through the Deschutes, Crooked River, and John Day watersheds. They turned southward from the Blue Mountains and on October 11, 1826, arrived on Silvies River. Ogden reported sighting Malheur, Mud, and Harney lakes and noted a sand ridge separating Mud and Harney lakes:

A small ridge of land about an acre in width divides the fresh water from the Salt Lake, these two Lakes have no intercourse with each other--in the first the water has rather an unpleasant taste--about a mile in width and nine in length in this Lake discharges Sylvills River also two Small Forks but it has no discharge. Salt [Harney] Lake at the south end of it is three miles in width its length at present unknown to us but it appears to be a large body of water of a saltish taste, all hands gave it a trial but none could drink it, it appears to take a West Course. All the Country around us is low and destitute of wood with the exception of worm wood and brush we had difficulty of finding even a sufficiency to cook our supper (Davies and Johnson 1961:19-20).

Taking few beaver and enduring food shortages, Ogden and his party returned to the Deschutes headwaters and then moved south to the Klamath Basin. In June, 1827, Ogden and his party returned to the Harney Basin and in three weeks of trapping took 150 beaver in prime

condition. The men then moved on east to the Malheur and reached the Snake on July 16, 1827 (Davies and Johnson 1961:125-133).

On his fifth Snake Country expedition, Ogden entered the Harney Basin by traveling north from the Humboldt in June, 1829. Ogden faced dissension among his men--some wanting to turn back and retrace their steps rather than pressing on into unknown country. Ogden persevered and wrote on June 18-20:

At sunrise we started, wishing to avoid the heat of the day which is now becoming almost unupportable. On starting we ascended some very high hills, unfortunately for our horses' feet well covered with small stones. We shortly after found a small brook, we then had a hilly country and at 2 p.m. reached a fork of Unfortunate River, and the same in my opinion we were encamped on last fall when I started on my voyage of discovery. Here we encamped [in Malheur Gap]. The sufferings of our dogs was truly great, the heat of the day equally so. Course NW. Distance fifteen miles. Twelve traps in the water.

Our traps gave us two beaver, so much in favour of the new track. At sunrise we again started. Only a few hills this day, the remainder of the tracks level, but stones and worm wood most abundant. At 1 p.m. however I had the satisfaction of seeing and shortly after reaching Sylvailles Lake [Malheur Lake] and encamped.

Writing of Harney Lake, Ogden observed: "This lake is not less than twenty miles in length and at least fifteen width, and Salt Lake [Malheur] which is only separated from it by a few feet is nearly of the same dimensions (Davies and Johnson 1961:159-160).

John Work commanded the Snake River expedition of 1830-31. He took him men to the Humboldt Sink and turned north via Quinn River to Tum Tum Lake and the southern end of Steens Mountain. Payette, who had visited Harney Lake with Ogden in 1826, may have guided this part around the western flank of Steens Mountain and north to Harney Lake, identified by the trappers that year as Sylvailles Lake (Elliott 1913:309).

In June, 1832, Work dispatched a party of eight men under C. Plante to

seek beaver on the Malheur and in the Silvies watershed before returning to Fort Vancouver via the Crooked and Deschutes rivers (Lewis and Phillips 1900:168).

Between 1826 and 1832 at least six fur trapping parties entered the Harney Basin. This repeated labor and documented taking of beaver pelts confirms that the region was sufficiently productive of this mammal as to induce regular visits. The consequences of these journeys, though hidden in manuscript diaries until the early twentieth century, nevertheless appeared in 1833 on the significant "Arrowsmith Map" of North America. This London cartographer showed the Snake River, its southern tributaries--the Malheur and the Owyhee--and an unnamed Silvies River flowing southward into a chain of lakes identified as "Youxpell Lakes" (Clark 1932:107-108).

In 1843 Pierson B. Reading arrived at Fort Boise via the Oregon Trail and discussed at length with Francois Payette, the chief trader, the prospects of cutting southwesterly to California. Warned of grave danger, Reading set out and entered the Harney Basin six days later. He wrote:

After traveling a few hours, came in sight of two lakes lying about four miles distant from each other, one, the smaller, being fresh water which receives Selvaille River; the other being much larger, I should judge about 20 miles in circumference, is salt water. AT the west end of this lake we found a village Indians which we passed through, and camped about 5 o'clock on a creek passing through a marsh. After we had camped, the Indians began to be troublesome and we were forced to drive them away (Brimlow 1951:14).

Overland emigrants passed through the northern Harney Basin in 1845. Following Stephen H. L. Meek over his alleged short-cut to the Willamette Valley, nearly 1,000 travelers with an estimated 250 wagons traveled west through the Malheur and then into the Silvies watershed. They entered the Harney Valley on September 6. Jesse Harritt, a diarist in

the party, referred to the Silvies as Crooked River and wrote:

Continued down this rich valley fourteen miles and encamped on Crooked River, a small murmuring stream running to the south, shaded on its banks by a few willows. As we advanced this morning the beautiful scenery increased; this valley is one of the most sublime places I ever saw; it is from appearances from thirty to fifty miles wide from north to south, the length of which I am not able to determine; the soil is rich and beautifully set with fine grass, intermingled with patches of sage; the mountains to the north in places are thinly set with pine and cedar timber.

The next day Harritt reached Harney Lake and wrote: crossed one small stream and encamped on the margin of a large lake; had an abundance of fine grass; no wood except sage (Harritt 1914:522).

The explorers of the Free Emigrant Route likewise led emigrants via the Harney Basin in 1853. This party, under Elijah Elliott and other residents of the upper Willamette Valley, attempted to open an alternative to the Oregon Trail which would permit travelers to turn west at Fort Boise, cross Oregon, and enter the Willamette via its Middle Fork. The emigrants split on the matter of whether it was better to travel north or south of Malheur and Harney lakes. In September a large number with their wagons set out around the east end of Malheur Lake. On September 16 they arrived at Sod House Spring, the present site of the headquarters of the Malheur Wildlife Refuge. Benjamin Owen referred to the Donner und Blitzen: "Between us, & them [Northern Paiute Indians] there was a deep mirey Stream, that we Supposed Emptied its Waters into the Same Lake that we came around the day before." The emigrants had difficulty finding a suitable ford. Owen continued: "But after going a Short distance up the Creek [Donner and Blitzen], Mr. Clark came to a Place that he thought to Cross, & rode right in, & his Mare mired down." Others also became trapped in the mud and it took hours of rope work to rescue the horses. The emigrants had to travel five miles up the Blitzen before they found Rocky Ford, a safe crossing for their

livestock and wagons. They pressed on to Harney Lake and their efforts to open a new wagon road to the west (Menefee and Tiller 1977:228-229).

Military Operations, 1859-65

Between 1859 and 1865 the U.S. Military and Oregon Volunteers explored the Harney Basin in the pursuit of Northern Paiute and Bannock Indians. Capt. Henry D. Wallen in June, 1859, left Fort Dalles for an important reconnaissance of a potential military route to the Great Salt Lake. The army anticipated hostilities with the Mormons and wanted to find a means to move troops from Pacific Northwest forts to Utah. Wallen led eighty-five dragoons, twenty-seven infantrymen, and eleven others to Silver Lake. Turning east they reached a large, salty lake which Wallen named Lake Harney in honor of the commanding general of the Department of Oregon. He next named Stampede Lake, today Mud Lake, for difficulties with horses. The command then found the traces of the Meek and Elliott emigrant parties and followed them to the Malheur River. Lt. Joseph Dixon, an engineer in the Wallen party, wrote of the "long and gentle reaches into a large saline valley or basin being in many places as level as a house's floor." He noted: "This valley or basin is about 80 miles in length from east to west and about 50 miles in width."

Although the Wallen party did not travel around the southern side of Harney and Malheur Lake nor did it view the Donner und Blitzen River, its members secured a favorable impression of the region. Dixon wrote of the area north of Malheur Lake from the crossing of the Silvies River:

to the base of the mountains, a distance of about 18 miles, the country is a beautiful level valley, covered with a luxuriant growth of bunch grass, wild pea vines, and red clover, interspersed with fields of camas on a rich soil abundantly watered by numerous mountain streams This wide savannah or grassy meadow

section is abundant; antelope, deer, elk, and several species of grouse, prairie chickens, ducks, geese, etc. (Dixon 1860:236-256).

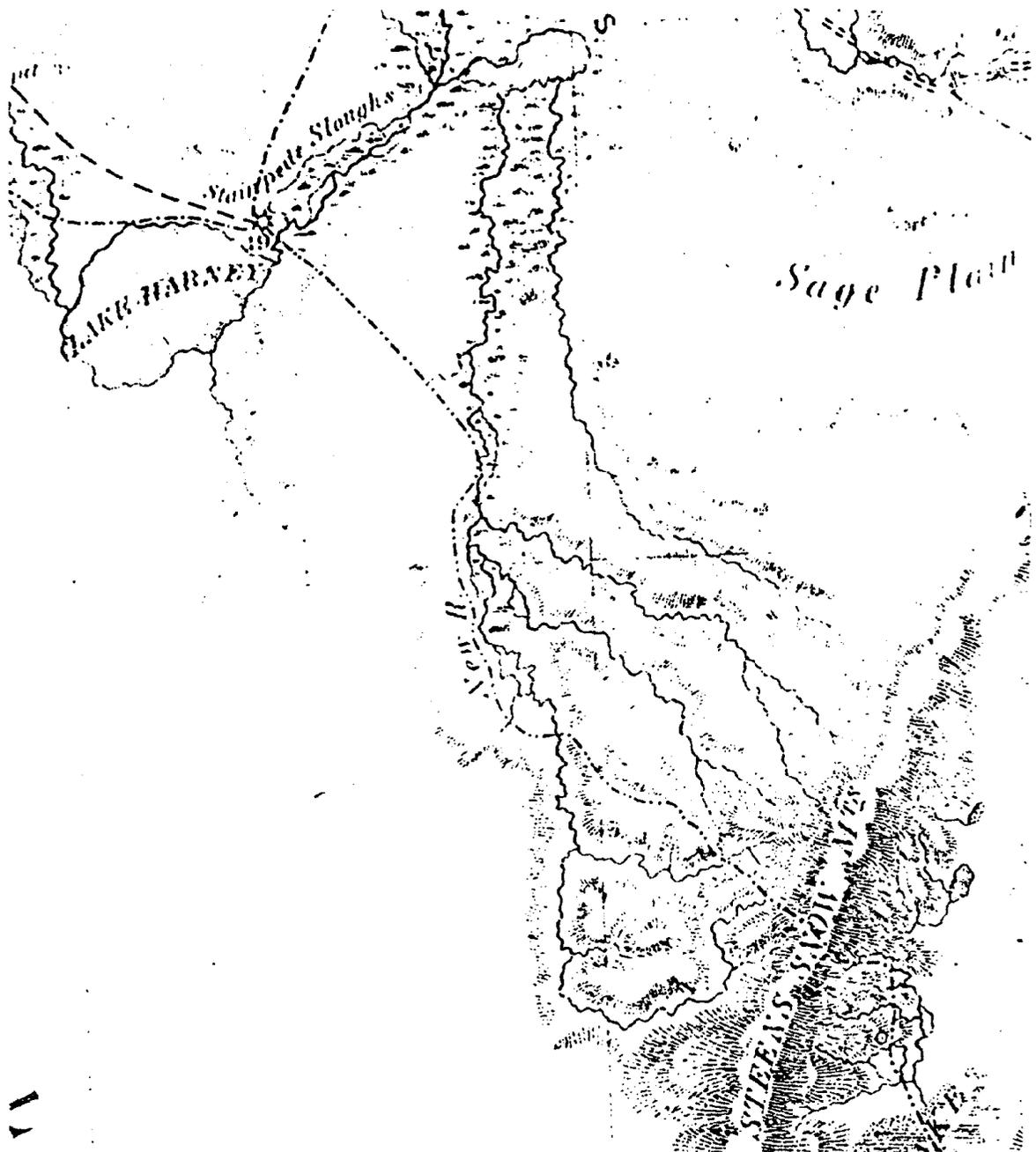


Fig. 1 Earliest map of course of Donner und Blitzen ["New R."] from "Steens Snow Mts" north to Malheur Lake. Note "Stampede Sloughs," "Lake Harney" and route "-...-." of "Scout 2d against Snake Indians" which took soldiers to the Donner und Blitzen (Dixon 1860b).

Dixon, a topographical engineer, recorded cartographic data on his travels in 1859. To this other travelers in 1860 added information. These explorers to the Harney Basin included Capt. Andrew J. Smith and a company of dragoons and Major Enoch Steen and twenty infantrymen. Both parties were charged with road explorations. Lt. Dixon accompanied Steen as the topographical engineer. Learning of Indian hostilities, the two parties joined under Major Steen on July 4 and established Camp Union on Silver Creek north of Harney Lake.

Robert C. Clark, historian of early exploration in the region, wrote:

Road building was abandoned for the remainder of the summer and until September scouting and exploring parties were sent out through Harney basin, north, south and east, until it was thoroughly explored. Silvies River was followed to its source in the Blue Mountains and named Cricket River, because of the great swarms of that insect found along it. On another expedition to the south the Donner und Blitzen River of today was discovered and named New River and Steens Mountain named after the commanding officer (Clark 1932:113).

Within a year of the U.S. Army expeditions throughout the Harney Basin, the Oregon Surveyor-General published a status map on the progression of cadastral surveys in Oregon. This map showed "Lake Harney," a small, unnamed Malheur Lake, and "Snow [Steens] Mountain." The map also showed the traces of the Meek and Elliott wagon trains.

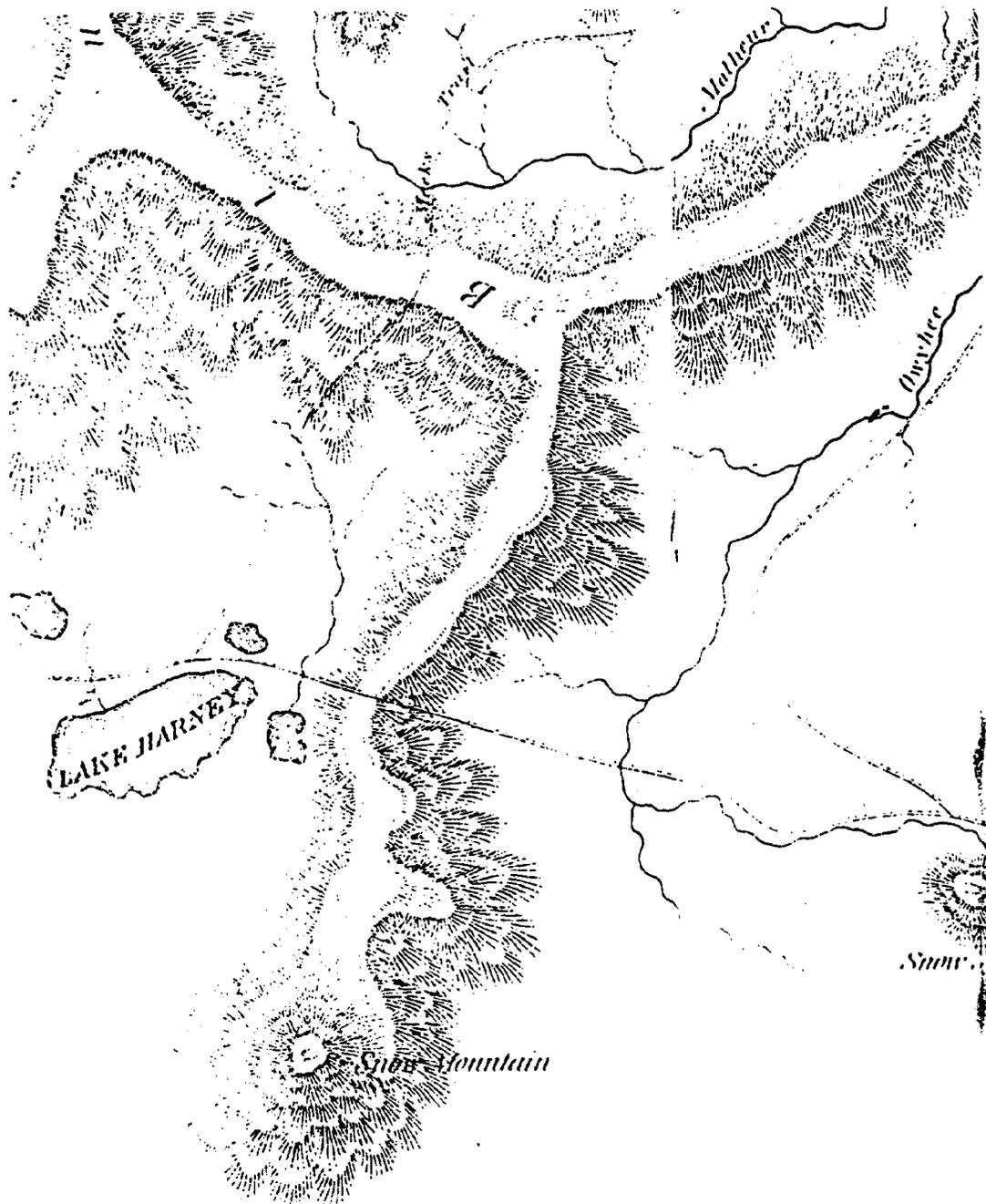


Fig. 2. Map of Harney Basin, 1861, showing lakes and course of Silvies River feeding into Malheur Lake. Snow [Steens] Mountain rose prominently to the south (Pengra 1861).

In the 1860s withdrawal of U.S. Army regulars to fight in the Civil War led Oregon volunteers to enlist and serve at a number of military posts in the region. These included Old Camp Alvord near Andrews on the southeast side of Steens Mountain, Camp Currey on Silver Creek, and Camp Wright. The latter stood at the eastern end of the narrow upthrust near Malheur Lake. Capt. Lorin L. Williams of Roseburg, Oregon, and commander of Company H of the First Oregon Cavalry established this post. Williams had his men construct a floatboat, presumably of whipsawed lumber, joined with wood pegs. Ten men set out from Wright's Point on this craft to explore Malheur Lake. The Northern Paiute burned it in 1866 (Brimlow 1951:33, 35).

John M. Drake of the First Oregon Infantry and the First Oregon Cavalry served in southeastern Oregon in 1864-65. ON June 13, 1864, he arrived in the Harney Basin and wrote: "The Big Meadows at the head of which we are encamped tonight appear to be a valley 40 or 50 miles long and 31 miles wide, almost a dead level with some good land; is a good grass country but of too high an altitude for agricultural purposes, I should think." Drake participated in several exploring details. On June 27, for example, he was at the base of Steens Mountain and wrote: "We encamped tonight in a pretty little valley at the foot of the Snow Mountain, in a southwest direction from our last camp." ON June 29 he wrote:

Marched due north 20 miles over a hilly, barren country to Little Valley and encamped at 2:30 P.M. From the summit of a high hill crossed during the day I had a fine view of Harney Valley, by far the best I have yet obtained. Tule [Malheur] Lake lay at our feet almost, its eastern shore lined with a fringe of white, an alkali bottom I presume. The main body of the lake seemed clear and blue as the ocean. Cricket Creek [Silvies River] with its narrow strip of timber was to be seen extending into the foothills to the northwest. Lake Harney was dimly visible in the distance to the southwest, lying apparently environed by hills. Its surface presented to the eye a clear placid blue and could not be less

than 40 miles distant (Knuth 1964:54, 66).

Stockraisers and Settlers, 1870-ff.

In the late 1860s developers of military wagon roads entered the Harney Basin. Congress on July 5, 1866, granted three sections of land to the State of Oregon for every mile of road built. The legislature had the authority to transfer these generous land grants to road builders. The Willamette Valley and Cascade Mountain Wagon Road Company between 1864 and 1867 laid out a trace from Albany to Boise via the Harney Basin. The route wandered for 448 miles and, in later years, became the subject of bitter criticism and litigation over its receipt of land grants. In anticipation of increased travel the U.S. Army in 1867 established Fort Harney where it assigned regular soldiers to assist the Bureau of Indian Affairs in its dealings with the Northern Paiute (Brimlow 1951:37-39).

The changes which came to the Donner und Blitzen watershed unfolded in 1868 with the discovery by stockmen of the tremendous range potentials of southeastern Oregon. In his essay, "King Grass Beckons Live Stock," George F. Brimlow remarked: "King grass, sustainer of needful beef, sheep and horses, was the ally of the miner, the military, the stageman and settler, who came from beyond the horizon." Following a drought in California in 1864 and a legislative enactment to tax roving bands of livestock, herders found it attractive to seek distant pasturage in Oregon. Completion of the Central Pacific-Union Pacific Railroad in 1869 and the means to ship livestock from a railhead at Winnemucca, Nevada, to market also played in the unfolding range industries of the Harney Basin (Brimlow 1951:42-43).

Anticipating renewed confrontation between settlers and Northern Paiutes, the president withdrew lands on March 14, 1871, to create the

Malheur Indian Reservation. In the 1870s the president added to and reduced the reservation several times. By 1883 the reservation had only 320 acres and was abolished on March 2, 1889, when the president restored the remaining lands to the public domain (Royce 1899:854, 880, 884, 902, 908, 910, 930).

The shifting fortunes of the Malheur Reservation stemmed directly from the pressure of cattlemen on the lands held for Indian use. Through the 1870s stockmen poured into the Harney Basin. "But it was on the Malheur Reservation that stockmen made the most flagrant and persistent encroachments," wrote J. Orin Oliphant. The records of W. V. Rinehart, agent from 1877-82, chronicled the trespass. The problems became worse with the eruption of the Bannock Indian War in 1878. In his report of intruders onto the reservation, Rinehart on April 17, 1882, enumerated the following: Todhunter and Devine, French and Glenn, Overfelt and Sweetser. These men were the largest and most prominent owners of cattle in the region. The conflicts over this range--which included the lower reaches of the Donner und Blitzen--testified to the rapid spread of the range industries into that watershed in the 1870s (Oliphant 1968:296-301).

In June, 1872, Peter French departed from the Sacramento Valley with 1,200 head of cattle, a Chinese cook, and a dozen vaqueros. His course led northeast via the Warner Valley, Beatys Butte, and the Catlow Valley. Camped near the Blitzen Valley, French encountered a discouraged gold seeker named Porter. Over the campfire he bargained with Porter for his small herd, purchasing both his cattle and a branding iron with the letter "P." Giles French later wrote:

Porter's cattle ran between Roaring Springs and the valley of the upper Blitzen. The fact that there was no other brand on that range made the land technically his, under the existing rules of possession. 'First come, first served,' decided the range rights of much of the West in the days of the big spreads. If a man moved

into a territory and used the grass, he was entitled to continue using it and to expand until he came to the border of another cattleman's range. Usage, rather than outright ownership of the land itself, determined the right to control--but grass was all a cattleman wanted anyway (French 1964:43).

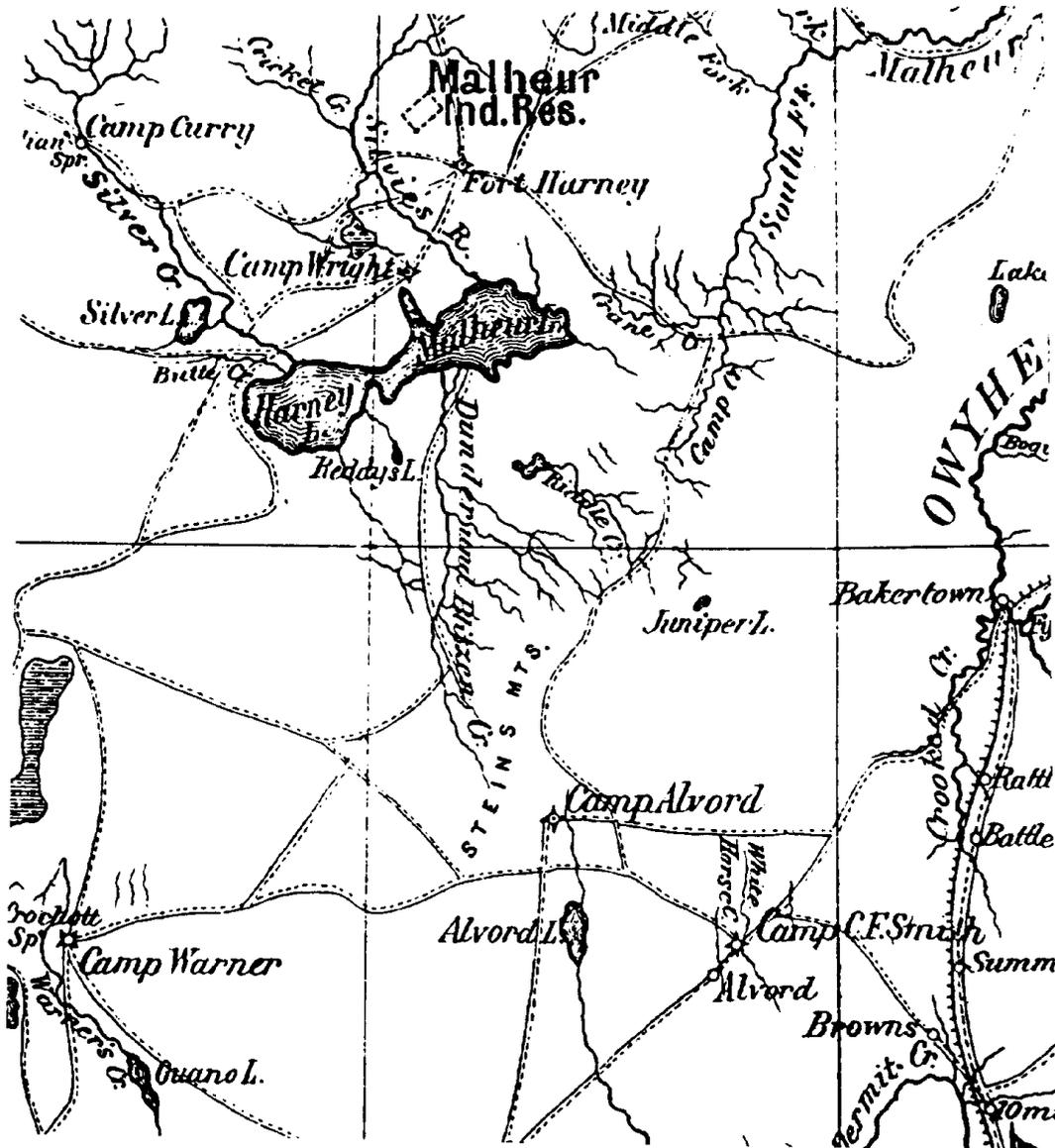


Fig. 3 "Dunder und Blitzen Cr[ee]k," Map of Oregon, ca, 1870 (Knuth 1964).

Fed by fourteen tributaries, the Donner und Blitzen beckoned to Peter French. Giles French continued:

The Blitzen comes into the flat lands from the Southeast, where, beaten white by the rocks, it drops four thousand feet in less than twenty-five miles. Once on the valley floor, the river quietly picks up its tributaries while ambling sedately into shallow Malheur Lake. To hem in this valley, which is thirty miles long and five miles wide, the Jackass Mountains rise on the west, giving some protection from that direction.

"This valley," wrote Giles French, "surrounded by sloping hills on which grass grew as high as a man's stirrups, looked like cattle heaven to Peter French and he thought it could be just that if range and cattle were properly managed" (French 1964:44, 47).

In spite of more than two and a half decades of fur trapping in the Harney Basin, French and others who moved in during the 1870s found a bounty of wildlife. David Shirk, for example, first brought cattle to the Catlow Valley on the west face of Steens Mountain in 1873. Writing about conditions when he filed in the fall of 1876 for land on Home Creek, Shirk said:

It was then, as now, one of the most beautiful valleys in southeastern Oregon, the bunch grass waving over its broad stretches like a grain field. The valley was bordered on the east by the Stein mountain range and on the west by the Batys Butte mountains, and over all, in addition to the bunch grass the white sage stood two feet high, and rendering it a veritable stockman's paradise. It also abounded in game of all sorts, especially the mule deer and antelope, vast herds of the latter covering the plain. Beaver also abounded in Home Creek, a large barn being constructed by me of cottonwood logs which were cut by these industrious little animals (Shirk 1956:128).

Congress in 1860 passed a law which permitted Oregon to select swamplands for state ownership. Oregon did nothing with the measure until 1870 when it began to identify those flooded lands which it could select for state ownership. By 1872 petitioners were pounding on the State Land Board to purchase tracts from the alleged state swamplands.

So ardent were the demands that 323 applicants applied for 5.8 million acres under the Oregon law! In 1878 Oregon limited the tracts to 320 acres per individual and in 1882 began issuing deeds. By 1886 it had processed 90,000 acres (Jackman and Scharff 1968:36-37). French and Glenn, his California partner, built part of their Blitzen Valley empire out of such claims. George Brimlow noted: "In 1877, French and Glenn purchased from Robie the land and cattle of Diamond Ranch on McCoy Creek, about sixteen miles southeast of the main headquarters of "P" Ranch. About the same time, also, they bought the interests of Robie, Frank McBean and others in the thousands of acres of marsh on the Blitzen River and Diamond Swamp" (Brimlow 1951:78; French 1964:63-65). French paid \$43,300 to A. H. Robie for 43,300 acres in the Diamond swamp on September 13, 1877. The state of Oregon accepted payment by French and Glenn for the swamp on July 20, 1885. (French 1964:63-65, 90).

When John W. Meldrum surveyed T29S, R31E, W.M., in November, 1876, he commented in the margin of his plat of survey on conditions along the northern reaches of the Donner und Blitzen:

In the Eastern part of this Township lying on both sides of Dunder und Blitzen River which flows North only through the Township is a large swamp in size about 5,000 Acres. Around the edges of the swamp are some good bottom lands subject to annual overflow in the spring months. The soil on all the bottomlands is of 1st rate quality. All the swamp and overflowed lands in the Township are claimed by a Company Robie and Snyder, who are largely engaged in Cattle raising (Meldrum 1876).

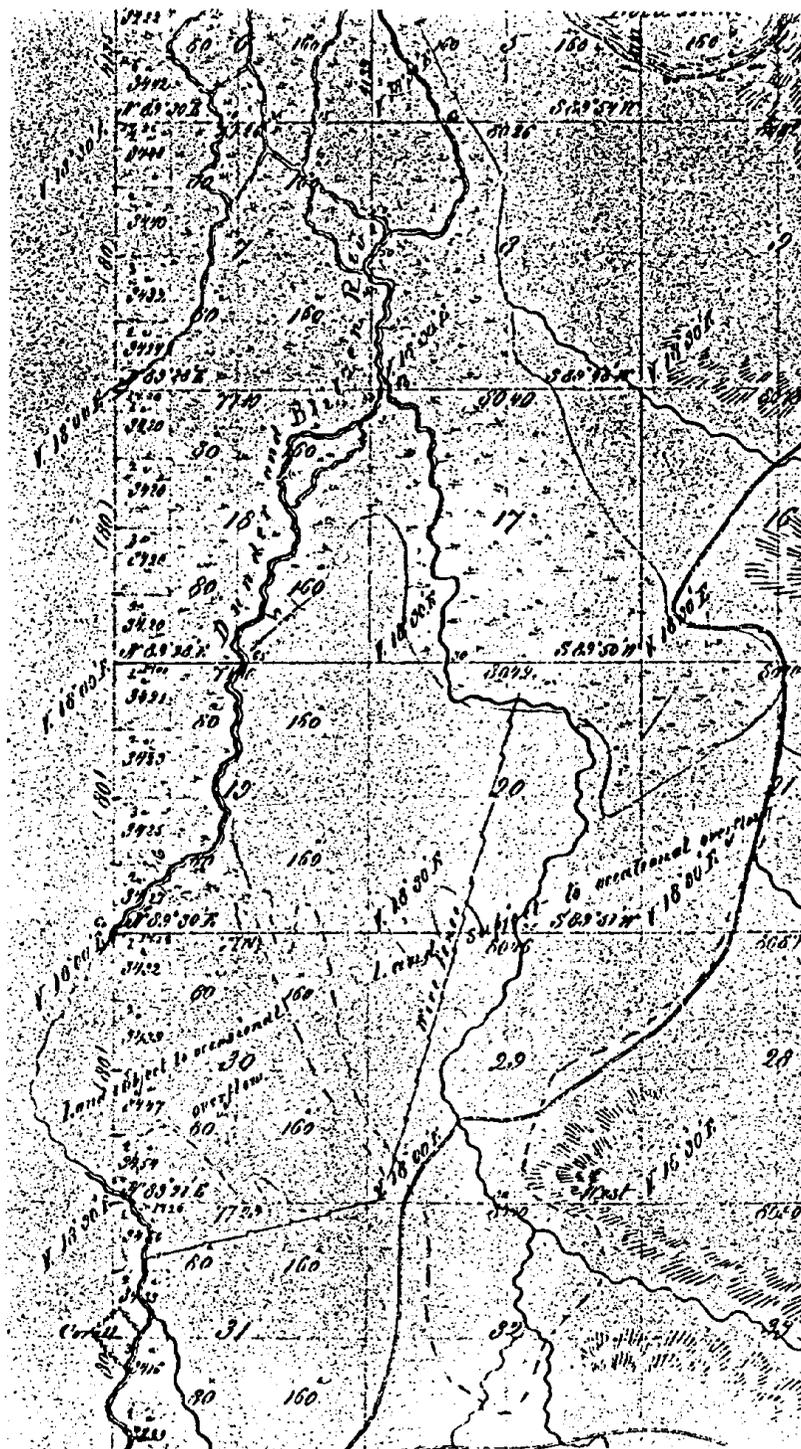


Fig. 4. Donner und Blitzen River with "land subject to occasional overflow," T31S, R32 1/2E, W.M. (Meldrum 1877a).

Meldrum noted, as well, the swampy conditions and annual overflows farther up the Donner und Blitzen River. In 1880 he observed in T31S, R32E, W.M.: "The land at the foot of this mountain in the Eastern part is low and swampy or subject to occasional overflow during the months of May and June at the annual floods in Dunder & Blitzen River" (Meldrum 1880a). In his work at Frenchglen, T32S, R32 1/2E, W.M. during the summer of 1880, Meldrum wrote:

This Township lies upon the West side and forms a part of the Western base of Steins Mountain. The land is mostly rolling or hilly with general decline toward Dunder and Blitzen River. Along the river are some narrow bottoms of 1st rate soil. The uplands for the most part are stony but interspersed throughout the Township are small tracts of good rich land free from rocks and suitable for Agriculture. Good bunchgrass grows in nearly all parts of the Township. There is scattering Juniper timber in the Eastern and Southern parts and Willows and Poplars along the banks of the river and on the Creek which flows North westerly across the South Eastern part of the Township (Meldrum 1880c).

French initiated ambitious irrigation projects along the lower Donner und Blitzen. By diverting water from the river into hand-dug canals and ditches, French and his men flooded the sagebrush, killing it, and induced growth of meadow grass. His biographer, Giles French, noted: "His irrigation projects of themselves held the water of Malheur Lake at a lower level, causing more dry land between the water and the meander line. The meander line is a surveyed line which follows the outline of some given stream, lake, or swamp. Such lines were later to have profound impact on the life of Peter French" (French 1964:138). Indeed, the contest between French and homesteaders who moved onto lands below the meander line led to his murder in 1897.

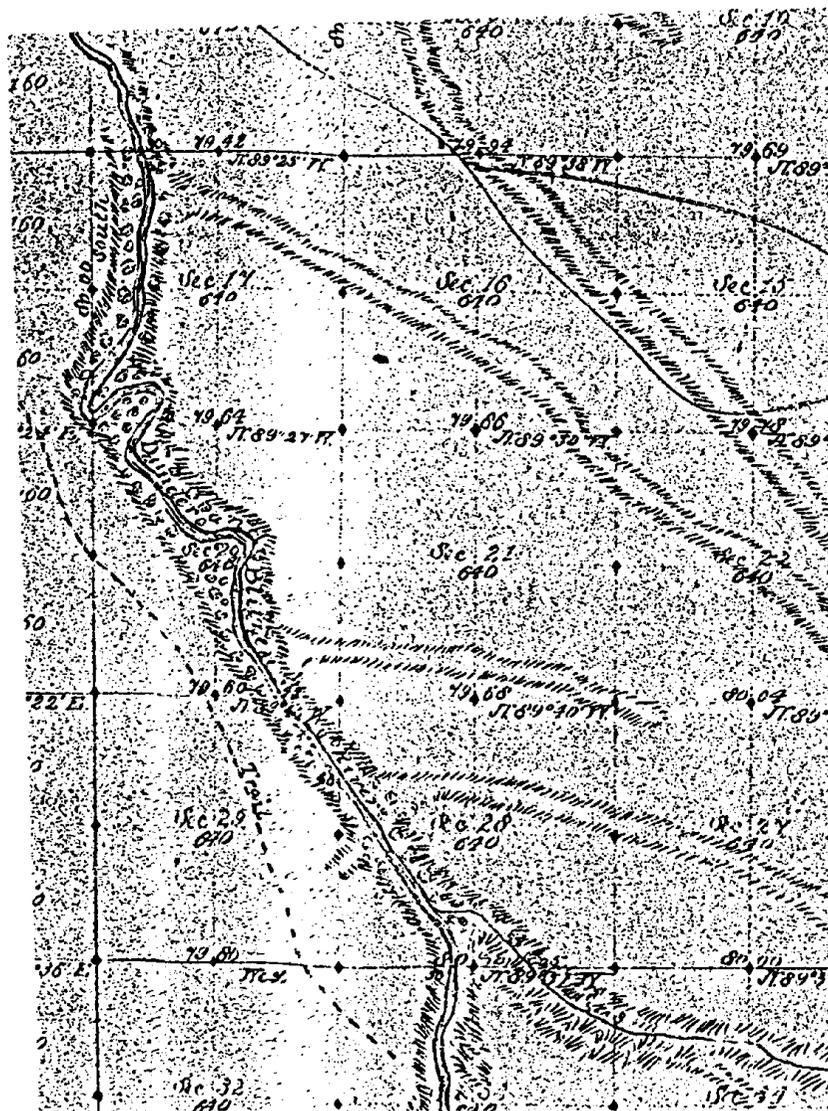


Fig. 5. Donner und Blitzen River in T32S, R32 1/2E, W.M. south of Frenchglen, showing cottonwoods and willows along its course (Meldrum 1880c).

The conflicts which swept through the region in the 1890s were in part the function of the sodbuster versus the cattle baron as well as a contest for the formerly submerged lands of Malheur Lake. James J. Donnegan in 1939 explained the unfolding conflict:

In May, 1895, the Surveyor General called for bids for surveying the lands situated between the meander line of Malheur Lake, as originally surveyed and established, and the then present shore

line of the lake. This created a new meander line. Due to irrigation on the Blitzen and Silvies Rivers and a series of dry years, the waters of the lake receded and a large area became to all purposes agricultural lands. Settlers filed on the lands within the new meander line and as usual a legal fight arose as to the legality of their entries. The French-glen Livestock Company claimed under the theory of riparian ownership all of the lands to the center of the lake, thereby claiming all of the lands that were within the new meander line. This new survey was made by John H. Neal and approved by the Surveyor-General June 25th, 1897 (Brimlow 1951:245).

F. C. Lusk served as executor of French's estate and amalgamated his personal real estate with that of the French-Glenn Livestock Company. The enterprise was described in 1902 as "more than 120,000 acres under fence. Upon its [lands] are many thousand head of cattle, horses and mules, and from its meadows are cut from 8,000 to 10,000 tons of hay per annum." The writer added: "It is an empire within itself-- fine buildings, fish streams, broad meadows, groves of timber, deer and elk and everything that is wild and grand" (Anonymous 1902:738-739). In 1906 Lusk sold the P and Diamond Ranches on the lower Donner und Blitzen to Henry L. Corbett of Portland. The estimated sales price of the P Ranch was \$300,000. Corbett and other investors from Portland held the ranch for a few years and then sold to the Eastern Oregon Livestock Company, a subsidiary of Swift & Company. In 1935 Swift disposed of the property, selling 64,717 acres for \$675,000 to the federal government for inclusion in the Malheur Wildlife Refuge (French 1964:158, 160).

Malheur Wildlife Refuge, 1908-1995

The Malheur Refuge started in 1908 with the executive order of President Theodore Roosevelt. Its primary focus was preservation of habitat for birds. In 1919 Oregon's governor James Withycomb recommended that the Oregon legislature cede the beds of Mud and Malheur lakes to the federal government for inclusion in the refuge. The

bill engendered considerable controversy as local irrigation districts on the Silvies and Blitzen rivers feared the prospects of the legislation. The bill, supported ardently by the Audubon Society and fish and game advocates, was twice defeated in the legislature and a third time in the general election.

The land acquisitions of the Fish and Wildlife Service continued with the purchase of the OO Ranch south of Harney Lake. The government paid \$116,143 for 14,751 acres. The Civilian Conservation Corps constructed headquarters buildings commencing in 1935. Government projects have included manipulation of miles of the Blitzen River. Brimlow wrote in 1951:

Engineering feats accomplished wonders for the sanctuary of migratory waterfowl and the haven of feathered and furry life. A concrete dam spans the Blitzen at the south end of the refuge, its water available to a large area. The Blitzen serves as a canal for twenty-eight miles, there being 100 miles of canal. Water is held at various levels, the impounding of it in a box canyon making Boco Lake. Dikes and other improvements assure proper control and protection (Brimlow 1951:248).

From 1935 to 1931 the three CCC camps on the Malheur Refuge provided the manpower for the massive channelization projects along the Donner und Blitzen. The facilities placed crews at refuge headquarters, Buena Vista, and at the south end of the Blitzen Valley. John Scharff and E. R. Jackman noted: Hundreds of miles of canals, fences, and roads were built. Many water-control structures were built as were recreation improvements (Jackman and Scharff 1968:57-64).

Throughout its operation the Malheur Refuge has actively mounted programs which have changed the course of the Donner und Blitzen, put bottomlands into agricultural production, and manipulated local wildlife. Jackson and Scharff wrote:

Muskrats, like the lemming in the North country, are cyclic and their population explosions result in mass migrations to the

surrounding uplands usually bringing about a die-off down to a small number. In the winter of 1953, in excess of twenty thousand muskrats were removed from Malheur Lake by trappers on a share basis. The muskrat populated areas of the lake were divided into trapping units on the basis of a lodge count and an individual trapper assigned to each unit. The trapper caught, skinned, stretched and dried the pelt. The total catch of each trapper was divided on a 75-25 basis, 75 percent of the catch going to the trapper and 25 percent to the refuge. Usually following a major die-off, the rats do not reach a harvestable number again for several years (Jackman and Scharff 1968:64).

The incongruity of this story emerged in the concluding lines of this essay which noted: "One of the greatest values of our national wildlife refuges is that they preserve nature unspoiled and provide a place where persons can go to repair the damage done by the rattle and clang of civilization. Nature aids us in placing human relations in proper perspective" (Jackman and Scharff 1968:65). Apparently muskrats measured in the "rattle and clang" and were targeted for extermination. They were, after all, "rats."



CADASTRAL SURVEY NOTES, 1876-81

Malheur Marsh South to Frenchglen

TOWNSHIP 27S, RANGE 31E, W.M.

North boundary of section 4

[Not available]

East on random line between sections 4 and 9

40.00 Set temporary 1/4 section corner
80.00 Intersect N and S line at the corner
West on true line
13.40 **[Donner] and Blitzen River 160 links wide runs North**
25.00 Leave Swamp bears N and S
40.00 Drove charred stake and raised mound of earth as per instructions for
1/4 section corner
42.50 **Leave bottom subject to overflow bears NE and SW**
80.00 The corner
Upland gently rolling soil 2nd rate
Bottom level subject to overflow; soil 1st rate. The East 25.00 chains
Lule Swamp

North between sections 9 and 10

Variation 19°45' East

25.00 Enter swamp bears NW and SE
40.00 Drove charred stake and raised mound of earth with pits as per
instructions for 1/4 section corner
65.00 **[Donner] and Blitzen River 180 links wide runs NW**
80.00 Drove charred stake and raised mound of earth with pits as per
instructions for corner to sections 3, 4, 9 and 10
Drove willow stake
Land, S 25.00 chains bottom subject to overflow; soil 1st rate;
Remainder swamp

East on random line between sections 3 and 10

40.00 Set temporary 1/4 section corner
79.80 Intersect N and S line 18 links North of the corner
N89°52'W on true line
37.00 **[Donner] and Blitzen River 300 links wide runs S80°W**

- 41.80 **Leave [Donner] and Blitzen River runs S80°W.** Drove charred stake and raised mound of earth with pits as per instructions for Witness 1/4 section corner 190 links W of true corner point
- 79.80 The corner
Land level. Swamp

North on random line between sections 2 and 3

Variation 18°30' East

- 25.00 South side of deep swamp, bears E and W
Set temporary Witness 1/4 section corner and offset to East 15.00 chains thence North 45.00 chains thence West 15.00 chains to point on line on North side of deep swamp on line between sections 2 and 3, thence North on line
- 80.50 Intersect North boundary of Township 8 links East of the Witness corner to sections 2 and 3 or 17 links West of the true corner point in the slough
S0°7'W in true line
- 10.50 Leave slough comes from SW and runs North. Enter deep swamp bears NW and SE
- 55.50 Leave deep swamp bears E and W. Set juniper post with charred stake in mound of earth with pits as per instructions for witness 1/4 section corner 15.00 chains south of the true corner point
- 80.50 The corner
Land level; swampy
Soil 1st rate

East on random line between sections 2 and 11

- 40.00 Set temporary 1/4 section corner
- 80.18 Intersect N and S line 30 links North of the corner
N89°47'W on true line
- 40.09 Set basalt stone . . . and dug pits as per instructions for 1/4 section corner
- 67.00 Wagon road bears N and S
- 67.70 Enter swamp bears NE and SW
- 72.43 **[Donner] and Blitzen River 75 links wide runs North**
- 80.18 The corner
Upland gently rolling; Soil 2nd rate
Bottom level; swampy; soil 1st rate

North between sections 10 and 11

Variation 19°00' East

6.50 **[Donner] and Blitzen River 125 [in]ks wide runs NE**
34.00 **[Donner] and Blitzen River 125 [in]ks wide runs NW**
40.00 Set juniper post, drove charred stake, and raised mound of earth with pits as per instructions for 1/4 sec[ti]on] corner
43.00 **[Donner] and Blitzen River 150 [in]ks wide runs NE**
80.00 Set aspen post, drove charred stake and raised mound of earth with pits as per instructions for corner to sec[ti]on]s 2, 3, 10 and 11
Land level, bottom subject to overflow on S 3/4. Swampy on N 1/4
Soil 1st rate

East on random line bet[ween] sec[ti]on]s 10 and 15

40.00 Set temporary 1/4 sec[ti]on] cor[ner]
80.02 Intersect N and S line 27 links North of the corner
N89°48'W on true line
0.64 **[Donner] and Blitzen River 100 [in]ks wide runs NW**
40.01 Drove charred stake and raised mound of earth with pits as per instructions for 1/4 sec[ti]on] cor[ner]
80.02 The corner
Land level bottom subject to overflow
Soil 1st rate
Good grass

North between sec[ti]on]s 14 and 15

Va[riation] 20°15'East

35.00 **Enter bottom subject to overflow bears NE and SW**
40.00 Drove charred stake and raised mound of earth with pits as per instructions for 1/4 sec[ti]on] cor[ner]
68.00 **[Donner] and Blitzen River 150 [in]ks wide runs NE**
73.00 **[Donner] and Blitzen River 125 [in]ks wide runs NW**
80.00 Drove charred stake and raised mound of earth with pits as per instructions for corner to sec[ti]on]s 10, 11, 14 and 15
Drove pine stake . . . in SE pit
Land level; Soil 1st rate
The North 45.00 ch[ain]s subject to overflow in the spring months

East on random line bet[ween] sec[ti]on]s 15 and 22

40.00 Set temporary 1/4 sec[ti]on] cor[ner]
80.00 Intersect N and S line at the corner
West on true line
25.00 **Enter bottom subject to overflow bears NE and SW**
40.00 Drove charred stake and raised mound of earth with pits as per

instructions for 1/4 sec[ti]on] cor[ner]
51.50 **[Donner] and Blitzen River 150 l[in]ks wide runs NE**
55.20 **[Donner] and Blitzen River 130 l[in]ks wide runs SE**
64.10 **[Donner] and Blitzen River 142 l[in]ks wide runs NE**
80.00 The corner
Land level; soil 1st rate
Subject to overflow on W 55.00 ch[ain]s

North bet[ween] sec[ti]on]s 21 and 22

Va[riation] 19°30'East

0.60 **[Donner] and Blitzen River 100 l[in]ks wide runs NE**
5.00 **[Donner] and Blitzen River 120 l[in]ks wide runs NW**
40.00 Drove charred stake and raised mound of earth with pits as per
instructions for 1/4 sec[ti]on] cor[ner]
65.00 **[Donner] and Blitzen River 120 l[in]ks wide runs NE**
80.00 Drove charred stake and raised mound of earth with pits as per
instructions for corner to sec[ti]on]s 15, 16, 21 and 22
Drove willow stake . . . in SE pit
Land level; subject to occasional overflow; soil 1st rate

East on random line bet[ween] sec[ti]on]s 21 and 28

40.00 Set temporary 1/4 sec[ti]on] cor[ner]
79.60 Intersect N and S line 33 l[in]ks North of the corner
N89°46'W on true line
1.10 **[Donner] and Blitzen River 100 l[in]ks wide runs NE**
23.10 Slough 150 l[in]ks wide course NW
34.60 **Leave bottom subject to overflow bears NW and SE**
39.80 Drove charred stake and raised mound of earth with pits as per
instructions for 1/4 sec[ti]on] cor[ner]
79.60 The corner
Land level; soil 1st rate; good grass
The E 1/2 subject to occasional overflow

North bet[ween] sec[ti]on]s 27 and 28

Va[riation] 18°45'East

22.00 **[Donner] and Blitzen River 115 l[in]ks wide runs NW**
40.00 Drove charred stake and raised mound of earth with pits as per
instructions for 1/4 sec[ti]on] cor[ner]
49.00 **[Donner] and Blitzen River 140 l[in]ks wide runs NW**
80.00 Drove charred stake and raised mound of earth with pits as per
instructions for corner to sec[ti]on]s 21, 22, 27 and 28

Drove pine stake . . . in SE pit
Land level bottom subject to occasional overflow
Soil 1st rate

East on random line between sections 27 and 34

40.00 Set temporary 1/4 section corner
79.70 Intersect N and S line 30 links South of the corner
S89°47'W on true line
39.85 Drove charred stake and raised mound of earth with pits as per
instructions for 1/4 section corner
76.80 **[Donner] and Blitzen River 150 links wide runs NE**
79.70 The corner
Land level: Soil 1st rate

North between sections 33 and 34

40.00 Drove charred stake and raised mound of earth with pits as per
instructions for 1/4 section corner
43.85 [Donner] and Blitzen River 120 links wide runs East
80.00 Drove charred stake and raised mound of earth with pits as per
instructions for corner to sections 27, 28, 33 and 34
Drove willow stake . . . in SE pit
Land level bottom subject to occasional overflow
Soil 1st rate

South boundary of section 33

[Not available]

General Description

The land in this Township is nearly all low bottom bordering [Donner] and Blitzen River, which runs Northerly, nearly through the middle of the Township.

The soil is 1st rate on all except a small portion of upland in the North Eastern part and the greater part of the Township is well suited to agriculture without irrigation.

There is a swamp comprising about 2000 acres lying in sections 2, 3, 4, 9, 10 and 11 and **some low bottom lands subject to overflow in sections 9, 10, 11, 14, 15, 16, 20, 21 and 22** (Meldrum 1877d).

TOWNSHIP 28S, RANGE 31E, W.M.

North on random line bet[ween] sec[ti]on[s] 3 and 4

Va[riation] 19°30'East

- 40.00 Set temporary 1/4 sec[ti]on] cor[ner]
79.84 Intersect North boundary of Township 39 l[in]ks West of the corner
S0°17'W on true line
15.00 **[Donner] and Blitzen River 75 l[in]ks wide runs NW**
24.00 **[Donner] and Blitzen River 80 l[in]ks wide runs NE**
35.35 **[Donner] and Blitzen River 80 l[in]ks wide runs NW**
39.84 Set willow post with charred stake in mound of earth with pits as per
instructions for 1/4 sec[ti]on] cor[ner]
71.10 **[Donner] and Blitzen River 75 l[in]ks wide runs NE**
79.84 The corner
Land level; subject to overflow in spring months
Soil 1st rate

East on random line bet[ween] sec[ti]on[s] 4 and 9

- 40.00 Set temporary 1/4 sec[ti]on] cor[ner]
80.48 Intersect N and S line 14 l[in]ks South of the corner
S89°54'W on true line
12.50 **[Donner] and Blitzen River 75 l[in]ks wide runs NE**
40.24 Deposit a basalt stone . . . and raised mound of earth with pits as per
instructions for 1/4 sec[ti]on] cor[ner]
80.48 The corner
Land level; soil 1st rate

North bet[ween] sec[ti]on[s] 9 and 10

Var[iation] at Witness cor[ner] 20°00'E

- Begin at the Witness corner to sec[ti]on[s] 9, 10, 15 and 16, 20 l[in]ks
South of the true corner point and at 75 links the Right bank of River
gives counting distance from the corner point
0.55 **Leave [Donner] and Blitzen River 75 l[in]ks wide runs West**
37.65 **[Donner] and Blitzen River 75 l[in]ks runs East**
40.00 Set willow post with charred stake in mound of earth with pits as per
instructions for 1/4 sec[ti]on] cor[ner]
43.20 **[Donner] and Blitzen River 75 l[in]ks wide runs NW**
55.00 **[Donner] and Blitzen River 75 l[in]ks wide runs NE**
57.50 **[Donner] and Blitzen River 75 l[in]ks wide runs NW**
80.00 Set willow post with charred stake in mound of earth with pits as per
instructions for corner to sec[ti]on[s] 3, 4, 9 and 10

Land level, mostly subject to occasional overflow; soil 1st rate

East on random line between sections 9 and 16

- 40.00 Set temporary 1/4 section corner
80.00 Intersect N and S line 25 links South of the corner
S89°49'W on true line
2.00 **Leave [Donner] and Blitzen River comes from East runs SW**
7.25 **[Donner] and Blitzen River 75 links wide runs NW**
40.00 Set willow post with charred stake in mound of earth with pits as per
instructions for 1/4 section corner
47.70 **Branch of [Donner] and Blitzen River 30 links wide runs North**
80.00 The corner
Land level; soil 1st rate

North between sections 15 and 16

Variation 19°45'E

- 0.20 Slough 20 links wide course NE
1.00 Slough 20 links wide course NW
2.25 Slough 20 links wide course NE
25.00 Ascend hill bears E and W. **Rock ford of [Donner] and Blitzen River
about 20.00 chains East of line**
34.00 Top of ridge bears E and W
40.00 Set basalt stone . . . and dug pits as per instructions for 1/4 section
corner. Foot of hill bears E and W
79.80 **[Donner] and Blitzen River 75 links wide runs West.** Set willow post
with charred stake in mound of earth with pits as per instructions for
Witness corner to sections 9, 10, 15 and 16
Land on bottom level soil 2nd rate
Land on upland rolling soil 2nd rate

East on random line between sections 15 and 22

- 40.00 Set temporary 1/4 section corner
79.80 Intersect N and S line 30 links South of the corner
S89°47'W on true line
39.90 Set basalt stone . . . and dug pits as per instructions for 1/4 section
corner
65.30 **[Donner] and Blitzen River 75 links wide runs North**
79.80 The corner
Land gently rolling; soil on W 1/2 1st rate; on E 1/2 2nd rate
Good grass.

North between sections 22 and 23

Variation 20°00' East

- 36.50 **Bend of [Donner] and Blitzen River comes from SE runs NE**
40.35 **Leave bend of River; runs NE**
Set juniper post with charred stake in mound of earth with pits as per instructions for Witness 1/4 section corner
44.50 **[Donner] and Blitzen River 100 [in]ks wide runs NW**
80.00 Set basalt stone and dug pits as per instructions for corner to sections 14, 15, 22 and 23
Land gently rolling
Soil good

East on random line between sections 23 and 26

- 40.00 Set temporary 1/4 section corner
79.71 Intersect N and S line 38 [in]ks North of the corner
N89°44'W on true line
39.85 Set juniper post with charred stake in mound of earth with pits as per instructions for 1/4 section corner
71.65 **[Donner] and Blitzen River 175 [in]ks wide runs North**
79.71 The corner
Land gently rolling; soil good

North between sections 25 and 26

Variation 19°45' East

- 11.00 Leave swamp bears E and W. **Enter bottom subject to overflow**
17.00 Leave low bottom. Enter swamp bears NW and SE
30.00 **Leave swamp enter low bottom subject to overflow bears NE and SW**
40.00 Set juniper post with charred stake in mound of earth with pits as per instructions for 1/4 section corner
54.70 **Branch of [Donner] and Blitzen River 100 [in]ks wide turns NW**
70.00 Leave bottom subject to overflow bears E and W
80.00 Set basalt stone . . . and dug pits as per instructions for corner to sections 23, 24, 25 and 26
Land S 70.00 chains swamp and **bottom subject to overflow in spring months.** Soil 1st rate.
N 10.00 chains level. Soil good 2nd rate

East on random line between sections 26 and 35

- 40.00 Set temporary 1/4 section corner
80.00 Intersect N and S line 20 [in]ks North of the corner

- N89°51'W on true line
- 40.00 Set juniper post with charred stake in mound of earth with pits as per instructions for 1/4 sec[ti]on cor[ner]
- 61.20 **Branch of [Donner] and Blitzen River 50 [in]ks wide runs North**
- 66.00 **Branch of [Donner] and Blitzen River 20 [in]ks wide runs North**
- 78.00 Leave swamp bears NE and SW
- 80.00 The corner
Land level swamp soil good

South boundary of section 35

[Not available]

General Description

Except the upland in the South Western part, and in the Eastern part, the land in this Township is generally level. Soil in all the Western and Southern parts of the Township 1st rate

In the Southern part is the North end of the Middle Swamp, lying in sec[ti]ons 25, 26, 27, 28, 29, 33, 34, 35 and 36 and comprising an area about 2800 acres **around the edges of which are some low bottom lands of 1st rate soil but subject to overflow in the spring and early summer months.**

[Donner] and Blitzen River flows out of the swamp in several channels, the principal one passing out in the NE 1/4 of sec[ti]on 26, one in the SW 1/4 of sec[ti]on 26, two in sec[ti]on 27, two in sec[ti]on 28, and one in sec[ti]on 29 all of which extend further North in the Township. There is a fall of several feet in the River at the lower end of the swamp, making the swamp susceptible of easy draining. All the swamp is claimed by a company, Robie and Snyder, under the State.

The uplands are rolling with 2nd rate soil and are covered with good bunch grass (Meldrum 1876d).

TOWNSHIP 29S, RANGE 31 E, W.M.

North Between Sec[ti]ons 34 & 35

- 1.00 Enter bottom subject to overflow bears NE & SW
14.00 **Donner & Blitzen River 150 l[in]ks wide runs East**
19.00 Leave bottom bears NE & SW N 89°57'W
40.00 Set Basalt Stone 19x9x6 and dug pits as per instructions for 1/4
sec[ti]on cor[ner]
80.00 Set Basalt Stone 14x10x7 and dug pits as per instructions for
Cor[ner] to Sec[ti]ons 26,27,34 & 35

Upland gently rolling
Bottom level
Soil good

East on random line bet[ween] Sec[ti]ons 26 & 35

- 40.00 Set temporary 1/4 Sec[ti]on cor[ner]
80.00 Intersect N & S line 21 l[in]ks North of Cor[ner] on true line
16.00 Descend hill bears NE & SW
24.00 Enter bottom bears NE & SW
27.75 **Donner & Blitzen river 75 l[in]ks wide runs N**
40.00 Set Willow post drove charred stake and dug pits [etc.] as per
instructions for 1/4 Sec[ti]on Cor[ner]
50.00 Leave bottom bears NE & SW
80.00 The Corner
Upland rolling
Soil 2nd rate
Bottom level subject to overflow
Soil 1st rate

East on random line bet[ween] Sec[ti]ons 23 & 26

- 40.00 Set temporary 1/4 Sec[ti]on Cor[ner]
80.12 Intersect N & S line at Cor[ner]
West on true line
26.00 **Donner & Blitzen river 50 l[in]ks wide runs NW**
28.00 Leave swamp bears NW & SE
40.06 Set Basalt Stone 16x14x5 and dug pits as per instructions for 1/4
Sec[ti]on Cor[ner]
45.00 Top of hill bears NW & SE
80.12 The Corner
Upland rolling

Bottom level. Swamp
Soil good
November 10, 1876

East on random line bet[ween] sec[ti]on[s] 14 & 23

40.00 Set temporary 1/4 Sec[ti]on] Cor[ner]
80.00 Intersect N & S line at Cor[ner]
West on true line
40.00 Set Basalt Stone 18x8x6 and dug pits as per instructions for 1/4
Sec[ti]on] Cor[ner]
71.30 **Donner & Blitzen river 50 [in]ks wide runs North**
80.00 The Corner
Land level
Swamp

General Description

In the Eastern part of the Township lying on both sides of Donner and Blitzen River which flows Northerly through the Township is a large Swamp in area, about 5,000 Acres. Around the edges of the swamp are some good bottom lands subject to annual overflow in the Spring months.

The soil on all the bottom lands is of 1st rate quality.

All the swamp and overflowed lands in the Township are claimed by a Company, Rolie & Snyder, who are largely engaged in cattle raising.

The uplands in the Western part are rolling, and hilly, soil 2nd rate, good grass (Meldrum 1876b).

TOWNSHIP 30S, RANGE 31E, W.M.

East on random line bet[ween] sec[tion]s 3 and 10

- 40.00 Set temporary 1/4 sec[tion] cor[ner]
80.00 Intersect N and S line at cor[ner]
On true line
20.75 Enter swamp bears NW and SE
24.00 Slough 150 l[in]ks wide runs NW
28.50 Leave swamp ascend rocky island bears NW and SE
40.00 Set basalt stone . . . and dug pits as per instructions for 1/4 sec[tion]
cor[ner]
50.00 Enter swamp bears N and S
54.40 **[Donner] and Blitzen Rover 100 l[in]ks wide runs North**
63.00 Leave Swamp bears N and S
80.00 The corner
Upland slopes toward swamp
Soil 2nd rate
Bottom level, swamp

East on random line between sec[tion]s 10 and 15

- 40.00 Set temporary 1/4 sec[tion] cor[ner]
80.00 Intersect N and S line at cor[ner]
West on true line
4.70 Krumbo Creek 12 l[in]ks wide runs NW
8.50 Leave swamp bears NW and SE
10.00 **Leave bottom subject to overflow bears NW and SE**
33.50 Enter swamp bears N and S
40.00 Set basalt stone . . . and dug pits as per instructions for 1/4 sec[tion]
cor[ner]
43.00 **[Donner] and Blitzen River 75 l[in]ks wide runs North**
47.00 Leave Swamp bears N and S
80.00 The corner
Upland slopes toward swamp
Bottom level
Soil on upland 2nd rate
Soil on bottom 1st rate

East on random line bet[ween] sec[tion]s 15 and 22

- 40.00 Set temporary 1/4 sec[tion] cor[ner]
80.45 Intersect N and S line 21 l[in]ks North of cor[ner]
N89°51'W on true line

- 12.50 Enter bottom subject to overflow bears N and S
- 26.70 **[Donner] and Blitzen river 100 [in]ks wide runs N**
Enter swamp at river
- 40.22 Set basalt stone . . . and dug pits as per instructions for 1/4 sec[tion]
cor[ner]
- 52.50 Leave swamp bears N and S
- 80.45 The corner
Upland slopes SE
Soil 2nd rate
Bottom level. Soil 1st rate

North between sec[tion]s 22 and 23

Var[iation] 19°E

- 8.00 **[Donner] and Blitzen River 50 [in]ks wide runs NW**
- 23.50 Leave Swamp bears NW and SE
- 40.00 Set basalt stone . . . and dug pits as per instructions for 1/4 sec[tion]
cor[ner]
- 56.00 **Leave bottom subject to overflow bears NW and SE**
- 80.00 Set basalt stone . . . dug pits as per instructions for cor[ner] to
sec[tion]s 14, 15, 22 and 23
Land level
Soil good

East on random line bet[ween] sec[tion]s 23 and 26

- 40.00 Set temporary 1/4 sec[tion] cor[ner]
- 80.00 Intersect N and S line at cor[ner]
West on true line
- 40.00 Set basalt stone . . . and dug pits as per instructions for 1/4 sec[tion]
cor[ner]
- 70.00 **Enter bottom subject to overflow**
- 74.00 Enter swamp bears N and S
- 76.85 **[Donner] and Blitzen River 40 [in]ks wide runs North**
- 80.00 The corner
Land slopes gently West
Soil in upland 2nd rate

North between sec[tion]s 26 and 27

Var[iation] 18°30'E

- 13.50 **Enter bottom subject to overflow**
- 18.00 Enter swamp bears NE and SW
- 40.00 Set basalt stone . . . and dug pits as per instructions for 1/4 sec[tion]

63.00 cor[ner]
80.00 **[Donner] and Blitzen River 50 [in]ks wide runs NE**
Set basalt stone . . . and dug pits as per instructions for cor[ner] to
sec[tion]s 22, 23, 26 and 27
Land level, swamp
Good grass

East on random line bet[ween] sec[tion]s 27 and 34

40.00 Set temporary 1/4 sec[tion] cor[ner]
79.80 Intersect N and S line 20 [in]ks North of cor[ner]
N89°51'W on true line
12.00 Enter swamp bears N and S
25.00 **[Donner] and Blitzen River 50 [in]ks wide runs North**
39.95 Set willow post . . . and dug pits as per instructions for 1/4 sec[tion]
cor[ner]
79.80 The corner
Land level, swamp
Good grass

South boundary of section 34

[Not available]

General Description

The land in this Township is gently rolling in the Eastern, elevated table land in the Western, and **level swamp along the [Donner] and Blitzen River in the central part of the Township.** The soil on the upland is generally of good 2nd rate quality while **the bottom land on Krumbo Creek and around the edge of the swamp near [Donner] and Blitzen River is of 1st rate quality.**
Good grass grows all over the Township (Meldrum 1876f).

TOWNSHIP 31 S, RANGE 32 1/2 E

North on west boundary of Section] 31

Va[riation] 18°30' East

- 14.00 **Bend of Donner & Blitzen river 50 l[in]ks wide, comes from SE, runs N**
- 23.00 Leave bend of river runs NE
- 38.27 Corral fence bears NW & SE
- 40.00 Drove charred stake and raised mound of earth with pits [etc] as per instructions for 1/4 Section] Cor[ner]
- 46.10 Corral fence bears NE & SW
- 80.00 Drove charred stake and raised mound of earth with pits [etc] as per instructions for corner to Section]s 30 & 31. Drove pine stake 2 ft. long 2 in[ches] square in E pit.
Land level bottom subject to occasional overflow.
Soil good

West on random line Bet[ween] Section]s 30 & 31

- 40.00 Set temporary 1/4 Section] Cor[ner]
- 77.29 Intersect West Boundary of Township 91 links North
- 4.54 **Donner & Blitzen River 50 l[in]ks wide runs NW**
- 6.30 Leave bottom subject to overflow bears N & S
- 37.29 Drove charred stake and raised mound of earth with pits [etc] as per instructions for 1/4 Section] Cor[ner]
- 41.30 Enter bottom subject to occasional overflow bears NW & SE
- 47.30 Leave bottom subject to overflow bears NW & SE
- 50.80 Enter bottom subject to overflow bears NW & SE
- 76.32 Wire fence bears N 75° E & S 75° W
- 77.29 The Corner
Land level bottom: Soil 1st rate
Partly subject to overflow

North on west boundary of Section] 30

Va[riation] 18° 30' East

- 2.85 **Donner and Blitzen River 50 l[in]ks wide runs NW**
- 40.00 Drove charred stake and raised mound of earth with pits [etc] as per instructions for 1/4 Section] Cor[ner]
- 80.00 Drove charred stake and raised mound of earth with pits [etc] as per instructions for Corner to Section]s 19 & 30
Drove Juniper stake 2 f[ee]t long 3 in[ches] square in East pit
Land level bottom subject to overflow in the Spring months

Soil 1st rate: good grass

West on random line bet[ween] Sec[ti]on[s] 19 & 30

- 40.00 Set temporary 1/4 Sec[ti]on] Cor[ner]
77.14 Intersect West boundary of Township to 70 l[in]ks North of the
Corner
N 89° 30' E On True Line
36.00 West side of deep marsh. Drove charred stake and raised mound of
earth with pits [etc] as per instructions for Witness 1/4 Sec[ti]on]
Cor[ner] 114 links West of true corner point
44.00 Leave deep marsh bears NW & SE
46.14 Leave bottom subject to overflow bears NE & SW
48.64 Enter bottom subject to overflow bears N & S
54.00 Leave bottom subject to overflow bears NE & SW
63.60 Enter bottom subject to overflow bears NW & SE
77.14 The Corner
Land level bottom mostly subject to overflow and swampy

North on West Boundary of Sec[ti]on] 19

Va[riation] 18°00' East

- 0.50 Enter swamp from NE & SW
1.00 **Donner and Blitzen River 60 l[in]ks wide runs NE**
40.00 Drove charred stake and raised mound of earth with pits [etc.] as per
instructions for 1/4 sec[ti]on] cor[ner]
80.00 Drove charred stake and raised mound of earth with pits [etc.] as per
instructions for corner to Sec[ti]on[s] 18 & 19
Land level: swampy soil 1st rate
Good grass

West on Random Line Bet[ween] Sec[ti]on[s] 18 & 19

- 40.00 Set temporary 1/4 sec[ti]on] cor[ner]
77.10 Intersect West Boundary of Township 74 l[in]ks of the corner.
N 89° 28' E on True Line
34.35 **Donner and Blitzen River 75 l[in]ks wide runs North.** Leave Swamp
bears N & S.
35.70 Low ridge bears N & S
36.35 Enter bottom subject to occasional overflow bears N & S
37.10 Drove charred stake and raised mound of earth dug pits as per
instructions for 1/4 sec[ti]on] cor[ner]
77.10 The Corner
Land level bottom soil good

The E 1/2 subject to occasional overflow the W 1/2 swampy

North Bet[ween] Sec[ti]on[s] 17 & 18

Va[riation] 18°30' East

- 40.00 Drove charred stake and raised mound of earth with pits [etc.] as per instructions for 1/4 sec[ti]on] cor[ner]
- 44.00 Enter Swamp bears SE & SW
- 74.00 **Donner and Blitzen River 40 l[in]ks wide runs NE**
- 80.00 Drove charred stake and raised mound of earth with pits [etc.] as per instructions for corner to Sec[ti]on[s] 7,8,17 & 18

Drove fir stake 2 f[ee]t long 2 in[ches] squared in SE pit.

Land level bottom: Soil good
The South 34.00 ch[ai]ns subject to overflow
The North 36.00 ch[ai]ns swamp

East on Random Line Bet[ween] Sec[ti]on[s] 8 & 17

- 40.00 Set temporary 1/4 sec[ti]on] cor[ner]
- 80.40 Intersect N & S Line 28 l[in]ks South of the corner
S89°48'W On True Line
- 3.40 Dry bed of creek course NW
- 26.50 Enter Bottom subject to occasional overflow bears N70°W & S20°E
- 30.50 Enter Swamp N70°W & S25°E
- 40.20 Drove charred stake and raised mound of earth with pits [etc.] as per instructions for 1/4 sec[ti]on] cor[ner]
- 76.40 Bridge creek 60 l[in]ks wide runs NW
- 78.40 **Donner and Blitzen river 50 l[in]ks wide runs North**
- 80.40 The Corner
Land level bottom. The west 64.00 chains swampy and subject to overflow. Soil 1st rate.

North Bet[ween] Sec[ti]on[s] 7 & 8

Va[riation] 18°30' East

- 4.00 Enter Willow thicket bears NW & SE
- 32.00 **Donner and Blitzen River 50 l[in]ks wide runs NW**
- 34.00 Leave Willow thicket bears NW & SE
- 36.50 Drove charred stake and raised mound of earth with pits [etc.] as per instructions for witness 1/4 sec[ti]on] cor[ner] on south side of deep marsh bears NE & SW
- 36.75 Enter deep marsh bears NE & SW

- 39.00 **Donner and Blitzen River 50 [in]ks wide runs NE**
 52.00 Slough 60 [in]ks wide runs NW
 80.00 Set Pine Post with charred stake in mound of earth with pits [etc.] as
 per instructions for corner to Sec[tion]s 5,6,7 & 8
 Land level, swampy
 Soil good.

East on Random line Bet[ween] Sec[tion]s 5 & 8

- 40.00 Set temporary 1/4 sec[tion] cor[ner]
 80.26 Intersect N & S line 14 [in]ks south of the corner
 S89°54'W On True Line
 40.13 Sand Stone 16x15x5 and dug pits as per instructions for 1/4 sec[tion]
 cor[ner]
 49.75 Enter bottom subject to overflow bears N32 1/2 W and S32 1/2 E
 50.25 Enter swamp bears N32 1/2 W & S 32 1/2 E
 57.16 **Donner and Blitzen River 60 [in]ks wide runs NW**
 80.26 The Corner
 Land East 49.75 chains slopes gently to West Soil good West 30.50
 chains swampy and overflowed.

General Description

In the Eastern part of the Township the land is rolling with general slope toward the North West: the ground is somewhat stony; the soil generally good 2nd rate.

There is an abundance of good bunch grass on all the uplands of the Township.

In the North Western part on Donner and Blitzen River and on Bridge and Mud creeks are some good bottom lands of 1st rate quality of soil the greater part of which in Sec[tion]s 19,20,21,29 & 30 are swampy and subject to occasional overflow in the spring months.

In Sec[tion]s 5,6,7,8,17,18 & 19 is a large swamp bordering on Donner and Blitzen River which runs Northerly through the Western part of the Township (Meldrum 1877b).

TOWNSHIP 31 S, RANGE 32 E

East on random line between sections 25 & 36

- 40.00 Set temporary 1/4 Section Corner
79.69 Intersect East Boundary of Township 44 [in]ks
North of the Corner to Sections 25 & 36, which corner I find to agree
with the description furnished me by the Office
West on true line
39.85 Set Post with charred stake in mound of earth, with pits [etc] as per
instructions for 1/4 Section Corner
44.20 **Leave low bottom subject to occasional overflow, and enter swamp
bears N & S**
79.69 The Corner
Land W, 35.49 chains, Swamp East

East on random line between Sections 24 & 25

- 40.00 Set temporary 1/4 Section Corner
79.90 Intersect N & S line 77 [in]ks North of the Corner, to Sections 24 &
25, which corner I find to agree with the description furnished me by
the Office
West on true line
0.40 **Donner & Blitzen River 60 [in]ks wide, comes from West, runs N, E**
5.20 **Leave Donner & Blitzen River 60 [in]ks wide. Comes from South
runs East**
8.15 **Leave swamp, enter bottom subject to occasional overflow bears N,
20°E, and S, 50°W**
15.15 Leave low bottom subject to occasional overflow, enter swamp bears
N, 50°W and South
39.95 Set Post with charred stake in mound of earth with pits [etc] as per
instructions for 1/4 Section Corner
75.40 **Slough of Donner & Blitzen river 20 [in]ks wide and runs North**
79.90 The Corner
Land swampy and subject to occasional overflow:
Soil 1st rate
Vegetation swamp grass and juniper

General Description

Extending North and South at little East of the middle of this township is a steep and stony hill or bluff, with the ascent toward the East. At the foot of this hill in the Eastern front the land is swampy, the Western front is high and rolling, or hilly. The soil is generally 2nd rate.

There is scattering Juniper timber on most of the uplands (Meldrum 1880b).

Frenchglen South to Headwaters of South Fork

TOWNSHIP 32 S, RANGE 32 1/2 E

North On West Boundary of Section 6

Variation 18°00' East

- 32.60 Wagon road bears NE and SW
- 38.40 Fence bears NE and SW
- 40.00 Drove charred stake and raised mound of earth with pits [etc.] as per instructions for 1/4 section corner from this corner Peter French's house bears N78°E
- 47.20 Fence bears NW and SE
- 48.65 Fence bears NE and SW

53.66 **Slough of [Donner] and Blitzen river 40 [in]ks wide, runs NW**

79.70 Wagon road bears NW and SE

- 80.00 Set a cut sand stone 20x9x6 and dug pits as per instructions for corner to Township 31 & 32 South Ranges 32 & 32 1/2 East
Land level bottom.
Soil 1st rate

November 16, 1877

West on random line between sections 6 & 7

Variation 18°E

- 40.00 Set temporary 1/4 section corner
- 77.10 Intersect west boundary 20 [in]ks N of corner to sections 6 & 7 .
...
N89° 51'E
N89° 52'E On true line
- 00.00 From which N17°30'E above
- 37.10 Set charred stake in mound of earth with pits as per instructions for 1/4 section corner
- 63.21 **Donner & Blitzen River 60 [in]ks wide course N20°W**
- 77.10 Corner to sections 5,6,7 & 8
Land level, soil 1st rate
Sage brush and various kinds of grass

North between sections 7 & 8

Variation 18°30'E

- 33.68 **Donner and Blitzen River 70 [in]ks wide, course NW**
 37.35 **Donner & Blitzen River 100 [in]ks wide, course N 20 °E**
 40.00 Set charred stake in mound of earth with pits as per instructions for
 1/4 sec[ti]on] cor[ner]
 40.47 **Donner and Blitzen River 58 [in]ks wide, course N 75 °W**
 50.47 **Donner and Blitzen River, course N 10 °E for a short distance where
 it bears to the N and finally to the NW which makes it impossible to
 chain the line down the channel. I therefore triangulate to obtain the
 distance and width**
 60.59 Leave the river, course NW
 62.59 **Donner & Blitzen river 60 [in]ks wide course for 1/2 chain N 25 °E
 which bears abruptly to NW**
 Here I am again forced to triangulate to obtain the distance and width
 63.69 **Leave the river. 75 [in]ks wide course NW**
 80.00 Made mound of earth with pits, set charred stake and drove post in
 pit as per instructions for cor[ner] to sec[ti]on]s 5,6,7 & 8.
 Land level soil 1st rate
**Excellent grass and along the river many growth of willow and rose
 bushes.**

East On Random Line Bet[ween] Sec[ti]on]s 8 & 17

- 40.00 Set temporary 1/4 sec[ti]on] cor[ner]
 79.42 Intersect N & S line 82 [in]ks North of the corner
 N89 °25'W On True Line
 39.71 Set Sandstone 26x20x18 in mound of stone for 1/4 sec[ti]on] cor[ner]
 55.90 Descend steep stony hill bears NW & SE
 57.42 Foot of hill bears NW & SE
 77.34 The Corner
 Land mountainous soil 2nd rate
 Good Bunch grass.

On Random Line Bet[ween] Sec[ti]on]s 17 & 18

Va[riation] 17 °30'East

- 40.00 Set temporary 1/4 sec[ti]on] cor[ner]
 80.00 Intersect E & W line at the corner to sec[ti]on]s 7,8,17 & 18 which I
 find to agree with the descriptions furnished me by the office; Made a
 mound of earth with pits as per instructions. Post in SE pit.
 On True Line
 Ascend gently sloping hill from cor[ner] bears NW & SE
 5.00 Top of hill bears NW & SE
 40.00 Set Basalt Stone 13x12x12 in mound of stone for 1/4 sec[ti]on]
 cor[ner]

- 42.50 Descend hill bears NE & SW
- 74.50 Enter Bottom bears NE & SW
- 77.50 **Bend of Donner and Blitzen River 35 l[in]ks distant to East; comes from East, runs North**
- 78.25 Leave Bottom bears NW & SE
- 80.00 The Corner
Land S 1/2 steep, stony hilside sloping to East; N 1/2 rolling; stony:
Soil 2nd rate.

East On Random Line Bet[ween] Sec[tion]s 17 & 20

- 40.00 Set temporary 1/4 sec[tion] cor[ner]
- 79.64 Intersect N & S line 78 links North of the corner.
N89°27'W On True Line
- 12.64 Descend hill bears NW & SE
- 39.82 Set Sand Stone 18x10x9 in mound of stone for 1/4 sec[tion] cor[ner]
- 55.64 Descend steep stony hill bears NW & SE
- 61.94 **Donner and Blitzen River 50 l[in]ks wide runs NE**
- 65.35 Leave Bottom; Ascend hill bears N & S
- 79.64 The Corner.
Land rolling; Soil 2nd rate
Good Bunch grass
Scattering Juniper timber

East On Random Line Bet[ween] Sec[tion]s 20 & 29

- 40.00 Set temporary 1/4 sec[tion] cor[ner]
- 79.60 Intersect N & S line 35 links North of the corner
N89°45'W On True Line
- 4.00 Descend hill bears NW & SE
- 11.50 Enter Willow thicket bears NW & SE, foot of hill bears NW & SE
- 13.95 **Donner and Blitzen River 45 l[in]ks wide runs NW**
- 22.10 Top of steep stony hill bears NW & SE
- 39.80 Set Granite Stone 18x12x8 in mound of stone for 1/4 sec[tion] cor[ner]
- 43.85 Trail bears NW & SE
- 79.60 The Corner
Land rolling; soil 2nd rate

North Bet[ween] Sec[tion]s 28 & 29

- Va[riation]18°00'East
- 22.50 Descend Sloping hill from cor[ner] bears NW & SE
Descend steep stony hill bears E & W

32.00 Ravine, course NE
 40.00 Set Sand Stone 20x3x9 in mound of stone for 1/4 sec[ti]on cor[n]er
 50.00 Point of stony hill projects East
 59.75 **Donner and Blitzen River 60 l[in]ks wide runs NW**
 74.50 Top of hill bears NW & SE
 80.00 Set Sand Stone 36x9x8 in mound of stone for corner to sec[ti]ons
 20,21,28 & 29
 Land Broken and hilly
 Soil 2nd rate
 Good grass

East On Random Line Bet[ween] Sec[ti]ons 28 & 33

40.00 Set temporary 1/4 sec[ti]on cor[n]er
 80.00 Intersect N & S line 21 l[in]ks North of the cor[n]er
 N89°51'W On True Line
 7.85 Descend steep stony hill bears NW & SE
 20.40 Creek 25 l[in]ks wide runs NW
 31.50 Top of point projects to NW
 40.00 Set Basalt stone 14x12x4 in mound of stone for 1/4 sec[ti]on cor[n]er
 42.00 Foot of hill: Enter bottom bears North & South
 43.70 **Donner and Blitzen River 50 l[in]ks wide runs North**
 44.30 Ascend hill bears N & S
 50.00 Top of steep stony hill bears N & S
 79.23 Spring branch 2 l[in]ks wide runs N
 80.00 The Corner
 Land Broken and hilly
 Soil 2nd rate: Good grass
 A few scattering juniper trees

General Description

This Township lies upon the West side and forms a part of the Western Base of the Stein's Mountain. The land is mostly rolling or hill with general decline toward Donner and Blitzen River, which, crossing the South Boundary of Sec[ti]on 33, flows North Westerly and passes out of the Township on North Boundary of Sec[ti]on 6. Along this River, in Sec[ti]ons 8,17,20,28,29 & 33 are some narrow bottoms which are of 1st rate soil. The Uplands, for the most part are stony, but interspersed throughout the Township are small tracts of good rich land, free from rocks, and suitable to agriculture.

Good Bunch grass grows in nearly all parts of the Township.

There is scattering Juniper timber in the Eastern and Southern parts, and **Willows and Poplar along the banks of Donner and Blitzen River, and on the creek which flows North Westerly across the South Eastern part of the**

Township (Meldrum 1880d).

TOWNSHIP 33S, RANGE 32 1/2 E, WM

N89°54'E on a random line bet[ween] sec[tion]s 4 & 9

- 40.00 Set temp[orary] 1/4 sec[tion] cor[ner]
79.76 Intersect the N and S line, 14 l[in]ks north of the corner of sec[tion]s
3,4,9 & 10
Thence I run
West on a true line bet[ween] sec[tion]s 4 and 9 over rolling land
through scattering undergrowth
25.75 Descend steep precipitous west slope into canyon
33.65 **[Donner] & Blitzen River, 60 l[in]ks wide, 4 f[ee]t deep, course
northwest; ascend steep rocky, east slope**
39.88 Set an iron post . . . pits impractical
40.75 Top of steep ascent; ascend along rocky SW slope
49.85 Drywash, course southeast; ascend rocky NE slope
69.00 Top of ascent; bears NW and SE, over rolling land thru scattering
timber
75.00 Descend west slope
79.76 The corner of sec[tion]s 4,5,8, and 9
Land, M[oun]t[ain]ous and rolling
Soil, rocky and worthless, 4th rate
Timber, juniper
Undergrowth, juniper and sagebrush, **with willow and alder along river**

N 0°02'W bet[ween] sec[tion]s 9 and 10

- 23.00 Ascend gradually along rough east slope thru scattering undergrowth
Ravine, water in hole along bottom; course northwest along rocky
west slope
28.00 **[Donner] and Blitzen River, 70 l[in]ks wide, 2 1/3 f[ee]t deep, course
west; ascend steep south slope**
36.00 Top of steep ascent; bears E and W; over rolling land
40.00 Set an iron post . . . pits impractical
58.70 Dry wash, course west
80.00 Set an iron post . . . pits impractical
Land, rolling and m[oun]t[ain]ous
Soil, sandy and rocky, 4th rate
Undergrowth, sagebrush, with willow and alder along river
No timber

N 89°51'E on a random line bet[ween] sec[tion]s 10 & 15

- 40.00 Set temp[orary] 1/4 sec[tion] cor[ner]

- 29.40 Descend precipitous slope into box canyon
- 33.90 Bottom of canyon, dry wash, course NE; ascend precipitous slope
- 40.00 Set an iron post . . . pits impracticable
- 40.50 Along steep, rocky east slope
- 71.90 Wire fence, bears NE and SW; descend steep NE slope
- 74.40 **[Donner] & Blitzen river, 50 [in]ks wide, course NW; ascend steep slope**
- 80.00 Set an iron post . . . pits impracticable
 Land, M[oun]t[ai]n[ou]s
 Soil, rocky and worthless, 4th rate
 Timber, juniper
 Undergrowth, sagebrush

General Description

This township is high rolling table land, covered for the most part with lava, and interspersed with rocky canyons from 200 to 1000 feet deep and very difficult to survey. The general altitude is from 5000 to 7000 feet.

The [Donner] and Blitzen River flows through the township entering near the southwest corner of section 36; thence in a general northwesterly direction, leaving the township about 5 chains west of the 1/4 section corner on the north line of section 4; it flows in a deep, rocky, canyon, with precipitous walls.

There is very little water in this township except in the [Donner] and Blitzen River, although there are several small springs in the spring of the year, but in the late summer and fall there is little or no water in them.

There is considerable scrubby juniper timber scattered over the township, which is used for fence posts and fuel.

The soil is sandy and rocky and not fit for cultivation.

There are no settlers or improvements in the township (Morrill and Wilkes 1911b).

- 40.90 Dry wash, course, east
Ascend steep, rocky slope
- 45.00 Top of sharp ridge, bears E & W; descend rocky, rough slope
- 52.00 **[Donner] & Blitzen river, 65 l[in]ks wide, 2 f[ee]t deep, course NW**
Ascend along rocky southwest slope
- 65.50 Top of ascent bears NW & SE; over rolling land
- 72.40 Dry wash, course SW
- 74.50 Rimrock, 10 f[ee]t high bears E & W
- 80.00 Set and iron post
A juniper 8 in[che]s diam[eter] bears N88°30'W, 308 l[in]ks dist[ant]. .
. pits impracticable
No other bearing trees available
Land M[oun]t[ai]n[ou]s and rolling
Soil, rocky and worthless, 4th rate
Timber, scattering juniper
Undergrowth, sagebrush, with willow and alder along river

East on a random line bet[ween] sec[tion]s 26 and 35

- 40.00 Set temp[orary] 1/4 sec[tion] cor[ner]
- 80.12 Intersect the N & S line 30 l[in]ks north of the corner of sec[tion]s
25,26,35 and 36
Thence l run
N89°47'W on a true line bet[ween] sec[tion]s 26 and 35
Thru scattering timber & undergrowth
- 23.60 Descend steep, rocky, southwest slope
- 38.20 **[Donner] & Blitzen River, 60 l[in]ks, course NW, 2 f[ee]t deep**
- 40.06 Set an iron post . . . pits impracticable
Ascend steep, rocky east slope
- 65.60 Top of ascent bears NW and SE; over rolling land
- 80.12 The corner of sec[tion]s 26,27,34 and 35
Land M[oun]t[ai]n[ou]s and rolling
Soil, rocky and worthless, 4th rate
Timber, scattering juniper
Undergrowth, sagebrush; willows and alder along river
July 26, 1911

N0°01'W bet[ween] sec[tion]s 35 and 36

- Over rolling land thru scattering timber and undergrowth
- 2.90 Descend precipitous slope into box canyon
- 10.60 Bottom of box canyon 500 f[ee]t deep; wash, course east
Water in holes along wash; ascend precipitous slope
- 16.90 Top of ascent; over rolling land

TOWNSHIP 34S, RANGE 32 3/4E, WM

N89°52'W on a random line between] sections 7 and 18

- 40.00 Set temporary 1/4 section corner
75.29 Intersect W body of the Township, 14 links N of the corner of sections 7,12,13 and 18
Thence I run
S89°58'E on a true line between] sections 7 and 18
Descend
6.00 Dry run, course NE; gradual ascent
24.07 Dry run, course N; steep ascent
35.00 Top of ridge, bears N and S
35.29 Set an iron post
44.00 Descend over rim into canyon, along face of a hill, sloping N
59.15 **South Fork of Blitzen River, 30 links wide, course N60°W**
Ascend steep slope
67.00 Top of ridge, bears NW and SE; descend gradually
75.29 The corner of sections 7,8,17 and 18
Land, mountainous and rocky
Soil, very poor
Timber, scattering juniper
Undergrowth, sagebrush

October 14, 1911

N0°4'W between] sections 17 and 18

- Over rolling mountainous land, through scattering timber
23.30 Dry run, course NE
30.00 Descend over NW slope
40.00 Set an iron post
A juniper, 10 inches diameter, bears S19°E, 316 links distant] . .
.
A juniper, 12 inches diameter, bears N88°45'W, 107 links distant]
.
41.60 Dry run, course NE
47.50 Dry run, course NE
50.00 Descend abruptly over steep, rocky NE slope into Blitzen Canyon 300 feet
60.50 **South Fork of Blitzen River, 30 links wide, course W; ascend**
70.00 Top of ridge bears E and W
Thence over rolling land
80.00 Set and iron post

TOWNSHIP 34S, RANGE 32 1/2E, WM

S89°55'E on a random line bet[ween] sec[tion]s 1 and 12

- 40.00 Set temp[orary] 1/4 sec[tion] cor[ner]
79.76 Intersect the E b[od]y of the township 39 l[in]ks S of the corner of
sec[tion]s 1,6,7 and 12
Thence I run
S89°48'W on a true line bet[ween] sec[tion]s 1 and 12
25.00 Along edge of canyon, south of line
39.88 Set an iron post . . . pits impracticable.
43.60 Descend over rimrocks into canyon
47.75 **[Donner] and Blitzen river, 50 l[in]ks wide, course NW;** ascend over
rimrocks
54.00 Top of rimrocks; over rolling land
79.76 The corner of sec[tion]s 1,2,11 and 12
Land, rolling and M[oun]t[ai]n[ou]s
Soil, rocky and worthless; 4th rate
Undergrowth, sagebrush;
No timber

General Description

This township lies on the Western approach of Stein's Mountains at an altitude of from 5,000 to 6,000 feet, is badly cut up with canyons 400 to 800 feet deep. **[Donner] and Blitzen river runs thru the northeastern part of the township, entering the township in sec[tion] 12 and flows in a general northwesterly direction, and leaves the township near the northwest corner of sec[tion] 6, and flows in a deep and very rocky canyon, with steep walls.** Except this river, there is no water in the township other than a few small springs which are nearly all dry in the late summer.

The township is for the most part covered with lava; so thick are these rocks together that walking is very difficult and slow. There are a few scattering juniper trees in the central part, which are very scrubby and useless for anything except fence post and fuel. There are no settlers in the township nor settlers improvements (Morrill and Wilkes 1911d).

80.00 Set an iron post
 A juniper, 8 in[che]s diam[eter], bears N80°E, 247 l[in]ks dist[ant] . . .
 .
 A juniper, 7 in[che]s diam[eter], bears S80°30'E, 335 l[in]ks dist[ant] .
 . . .
 A juniper, 7 in[che]s diam[eter], bears S8°30'W, 396 l[in]ks dist[ant] .
 . . .
 A juniper, 10 in[che]s diam[eter], bears N36°30'W, 363 l[in]ks dist[ant]

 Land, mountainous
 Soil, sandy and rocky; 3rd rate
 Timber, juniper
 Undergrowth, juniper and sagebrush

N0°2'W bet[ween] sec[tion]s 21 and 22

Descend
 6.00 **South Fork of Blitzen River, 20 l[in]ks wide, course N70°W**
 Ascend steep slope
 28.00 Top of steep ascent; thence over level table land
 40.00 Set an iron post
 56.00 Descend gently N slope
 70.00 Dry ravine, course E
 77.00 Top of ridge, bears E and W; descend
 80.00 Set an iron post
 A juniper, 10 in[che]s diam[eter], bears S17°E, 191 l[in]ks dist[ant] . .
 . .
 A juniper, 16 in[che]s diam[eter], bears S70°45'W, 295 l[in]ks dist[ant]

 No other suitable bearing trees available
 Land, rolling and mountainous
 Soil, sandy and rocky; 4th rate
 Timber, scattering juniper
 Undergrowth, sagebrush

S89°42'E on a random line bet[ween] sec[tion]s 22 and 27

40.00 Set temp[orary] 1/4 sec[tion] cor[ner]
 80.15 Intersect N and S line, 34 l[in]ks S of the cor[ner] of sec[tion]s
 22,23,26 and 27
 Thence l run
 N89°57'W on a true line bet[ween] sec[tion]s 22 and 27
 Descend
 20.85 Small creek, 3 l[in]ks wide, course SW

Land mountainous;
 Soil, sandy and rocky; 3rd and 4th rate
 Timber, juniper
Undergrowth, sagebrush with willows along river

S89°49'E on a random line between sections 17 and 20

40.00 Set temporary 1/4 section corner
 79.68 Intersect the N and S line, 2 1/2 miles S of the corner of sections
 16,17,20 and 21
 Thence I run
 N89°50'W on a true line between sections 17 and 20
 Over rolling mountainous land, through scattering timber
 19.20 Descend into Blitzen Canyon, which bears N and S, 350 feet deep
 28.35 **South Fork of Blitzen River, 40 miles wide, course N**
 Ascend
 36.70 Top of ridge, bears N and S
 39.84 Set an iron post
 A juniper, 14 inches diameter, bears N61°30'E, 276 miles distant

 A juniper, 10 inches diameter, bears S78°30'W, 105 miles distant

 56.60 Dry run, course NE; ascend gently
 79.68 The corner of sections 17,18,19 and 20
 Land, mountainous
 Soil, sandy and rocky; 3rd and 4th rate
 Timber, juniper
 Undergrowth, small juniper and sagebrush

October 14, 1911

N0°03'W between sections 20 and 21

Descend
 8.00 Dry ravine, course N15°W
 13.75 **South Fork of Blitzen River, 20 miles wide, course N70°W**
 Ascend steep S slope
 20.00 Enter heavy timber, bears E and W
 30.00 Top of steep ascent, bears E and W; descend
 40.00 Set an iron post
 A juniper, 8 inches diameter, bears N59°30'E, 265 miles distant .

 A juniper 24 inches diameter, bears S58°W, 140 miles distant . .
 . .

- 26.00 Top of steep ascent, bears N80°E and S80°W; through scattering timber, over rolling mountainous land
- 39.98 Set an iron post
 A juniper, 12 in[che]s diam[eter], bears S14°E, 198 l[in]ks dist[ant] . .
 . .
 A juniper, 16 in[che]s diam[eter], bears N11°W, 282 l[in]ks dist[ant] . .
 . .
- 50.00 Enter heavy timber, bears N and S
- 79.96 The cor[ner] of sec[tion]s 28,29,32 and 33
 Land, mountainous
 Soil, sandy and rocky; 3rd rate
 Timber, juniper
Undergrowth, juniper and sagebrush with willow along river
- October 12, 1911

General Description

This township is rolling mountainous and very badly broken and interspersed with ridges and rocky canyons, the NE corner being near the top of Stein's Mountain and some 2,000 f[ee]t above the general level of the township.

It is well watered by Blitzen River, Big and Little Indian Creeks, also Mud and Ankle Creeks besides numerous small streams throughout the township.

The timber consists of juniper, mahogany and quaking asp[en]; the undergrowth is the same, which is very dense and difficult to get through.

Two settlers are in the township; Jess Marshall in Sec[tion] 9, whose improvements consist of about 40 acres of land fenced, 3 of which are cultivated and upon which is a small cabin, valuation about \$200.00, while W[illia]m H. Huffman's house is just across the line in T 34S, R 33E, a large part of his improvements are in this township, which consist of 40 acres of land fenced, about 15 acres of which is cultivated, valuation about \$100.00 (Morrill and Wilkes 1911f).

- 30.50 Same creek, course NW; ascend
- 34.15 Top of low point, slopes N
- 37.85 Left bank of Mud Creek, 10 l[in]ks wide, course SW
- 40.07 1/2 Set an iron post
Ascend
- 48.15 Top of ridge; descend steep, rocky hill
- 51.55 **South Fork of Blitzen River, 20 l[in]ks wide, course N25 °W**
Ascend steep hill over several rims
- 67.15 Top of spur, slopes N; descend .
- 73.15 Head of ravine, course N
- 80.15 The cor[ner] of sec[ti]on[s] 21,22,27 and 28
Land, mountainous
Very little soil; 4th rate
Timber, juniper
Undergrowth, sagebrush

October 5, 1911

N0 °02'W bet[ween] sec[ti]on[s] 27 and 28

- Descend into canyon
- 19.50 **South Fork of Blitzen River, 20 l[in]ks wide, course NE; ascend**
- 40.00 Set an iron post . . . pits impracticable. Ascend
- 64.00 Top of ridge, bears E and W; descend
- 80.00 Set an iron post
A juniper, 16 in[che]s diam[eter], bears N26 °E, 12 l[in]ks dist[ant] . . .
.
No other bearing trees available
This cor[ner] stands on steep N slope
Land, mountainous
Soil, sand and volcanic ash; 2nd rate
Timber, scattering juniper
Undergrowth, sagebrush

S89 °47'E on a random line bet[ween] sec[ti]on[s] 28 and 33

- 40.00 Set temp[orary] 1/4 sec[ti]on cor[ner]
- 79.96 Intersect the N and S line, 9 l[in]ks S of the cor[ner] of sec[ti]on[s] 27,28,33 and 34
Thence I run
N89 °51'W on a true line bet[ween] sec[ti]on[s] 28 and 33
Descend over NW slope
- 10.30 **South Fork of Blitzen River, 25 l[in]ks wide, course N60 °E**
Ascend

Undergrowth, sagebrush

N0°04'W bet[ween] sec[tion]s 7 and 8

Ascend gradually through scattering timber
34.00 Top of ascent, bears E and W; descent
38.80 Spring branch, 5 l[in]ks wide, course W; ascend
40.00 Set an iron post . . . pits impracticable
47.50 Top of ascent; across flat
Top of ridge, bears E and W
55.00 Descend over steep, broken NW slope
66.50 **S[outh] Fork of Blitzen River, 30 l[in]ks wide, course NE; ascend**
80.00 Set an iron post . . . pits impracticable
Land, mountainous
Soil, sandy and rocky; 3rd and 4th rate
Undergrowth, sagebrush
Timber, scattering junipers

N89°59'W on a random line bet[ween] sec[tion]s 7 and 18

40.00 Set temp[orary] 1/4 sec[tion] cor[ner]
77.70 Intersect W b[od]y of T[ownshi]p, 14 l[in]ks N of the cor[ner] of
sec[tion]s 7,12,13 and 18
Thence I run
N89°55'E on a true line bet[ween] sec[tion]s 7 and 18
Descend over rocky ground, through scattering undergrowth
31.50 Creek, 10 l[in]ks wide, course NE
37.70 Set an iron post . . . pits impracticable
69.90 Small creek, 8 l[in]ks wide, course NW
77.70 The cor[ner] of sec[tion]s 7,8,17 and 18
Land, rolling, mountainous and rocky
Soil, sand and lava, 4th rate
Timber, scattering juniper
Undergrowth, sagebrush

N0°04'W bet[ween] sec[tion]s 17 and 18

Descending over steep, N slope, through scattering undergrowth
9.70 Creek, 10 l[in]ks wide, course W; ascend
19.00 Top of ascent, bears E and W
Over rolling land
40.00 Set an iron post . . . pits impracticable
42.00 Descend NE slope
50.00 Foot of descent, bears NW and SE

TOWNSHIP 35S, RANGE 32 3/4E, WM

N0°03'W on a random line between] sections 4 and 5

- 40.00 Set temp[orary] 1/4 sec[ti]on cor[ner]
80.01 Intersect N b[od]y of T[ownshi]p, 14 l[in]ks E of the cor[ner] of
sec[ti]ons 4,5,32 and 33
Thence I run
S0°09'E on a true line bet[ween] sec[ti]ons 4 and 5
Descend steep slope, through scattering timber and undergrowth
5.21 **South Fork of Blitzen River, 18 l[in]ks wide, course NE**
16.51 Top of ascent; steep [slope]
Leave canyon; ascend gentle W slope
40.01 Set an iron post . . . pits impracticable
48.00 Descend over rim into canyon
53.61 **South Fork of Blitzen River, 10 l[in]ks wide, course NW; ascend steep
slope**
60.91 Top of rim; leave canyon; ascend gentle slope
80.01 The cor[ner] of sec[ti]ons 4,5,8 and 9
Land, mountainous
Soil, sandy and stony; 4th rate
Timber, scattering juniper and mahogany
Undergrowth, sagebrush and juniper

September 12, 1911

S89°50'E on a random line between] sections 5 and 8

- 40.00 Set temp[orary] 1/4 sec[ti]on cor[ner]
80.06 Intersect N and S line, 2 l[in]ks N of the cor[ner] of sec[ti]ons 4,5,8
and 9
Thence I run
N89°49'W on a true line bet[ween] sec[ti]ons 5 and 8
Descend over rocky ridge, through scattering undergrowth
32.07 Dry ravine, course NW; ascend
40.03 Set an iron post . . . pits impracticable
45.07 Top of rocky ridge, bears N and S
Descend
66.87 **South Fork of Blitzen River, 12 l[in]ks wide, in deep canyon, course
NE; ascend steep slope**
80.06 The cor[ner] of sec[ti]ons 5,6,7 and 8
Land, mountainous
Soil, sandy and stony; 4th rate
Timber, scattering juniper

No timber
Undergrowth, willow

General Description (Morrill and Wilkes 1911h)

[Not available]

Over rolling land
 65.00 Dry ravine, course NW
 74.00 A spring branch 5 l[in]ks wide, course W
 Enter dense undergrowth of willows and aspen, bears E and W
 77.00 Spring branch, 2 l[in]ks wide, course W
 78.00 Leave dense undergrowth, bears E and W
 Ascend gently, over S slope
 80.00 Set an iron post
 A juniper, 16 in[che]s diam[eter], bears N24 1/4 °E, 346 l[in]ks
 dist[ant]
 An aspen, 10 in[che]s in diam[eter], bears S7 1/2 °E, 306 l[in]ks
 dist[ant]
 A juniper, 10 in[che]s diam[eter], bears N59 °30'E, 265 l[in]ks dist[ant]

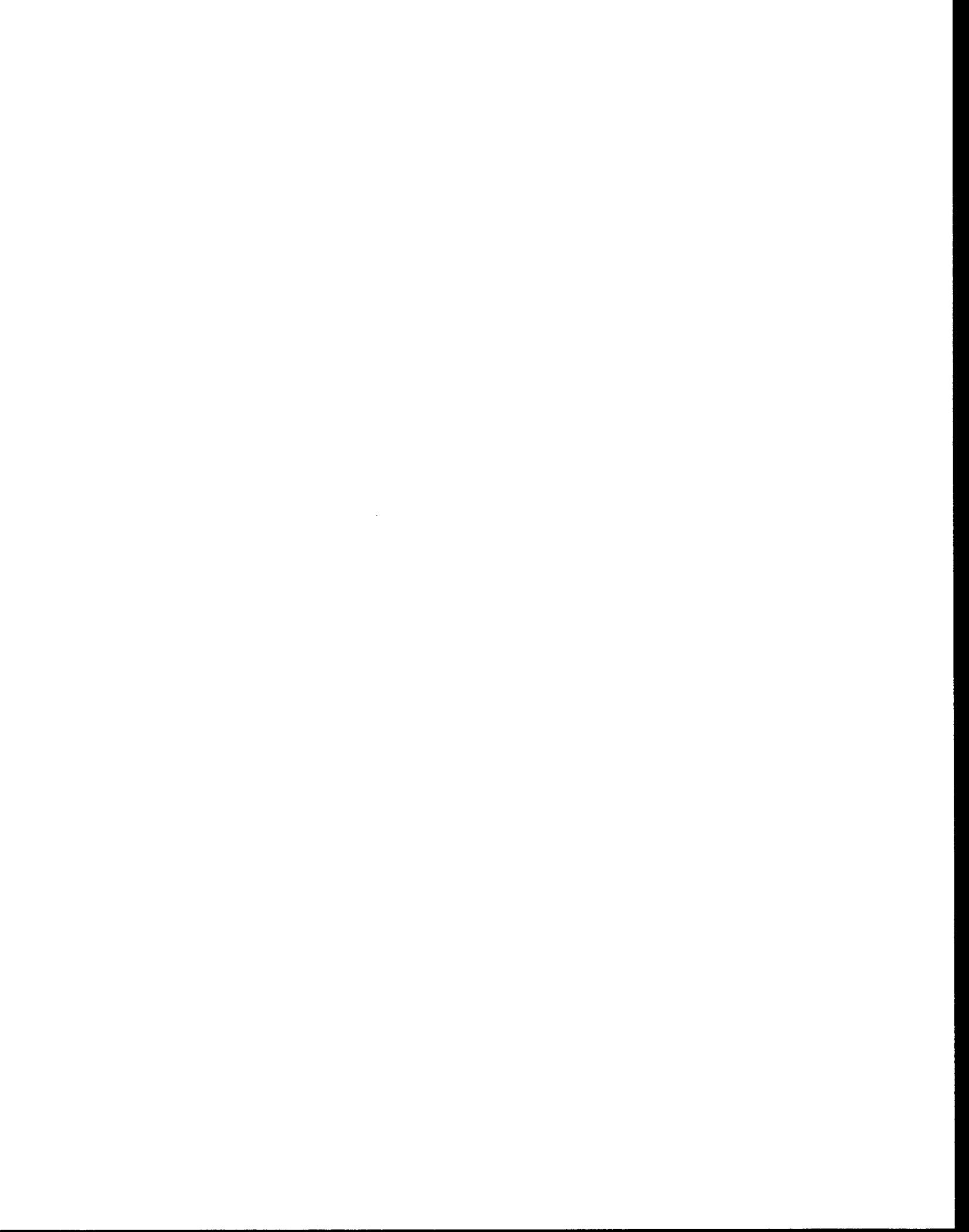
 A juniper, 10 in[che]s diam[eter], bears S15 °W, 22 l[in]ks dist[ant] . . .
 .
 A juniper, 18 in[che]s diam[eter], bears N58 1/4 °W, 32 l[in]ks dist[ant]

 Land, mountainous
 Soil, sandy and rock; 3rd rate
 No timber
 Undergrowth, willow, aspen and sagebrush

September 13, 1911

S89°51'E on a random line bet[ween] sec[tion]s 17 and 20

40.00 Set temp[orary] 1/4 sec[tion] cor[ner]
 80.08 Intersect N and S line, 3 l[in]ks N of the cor[ner] of sec[tion]s 16,17,20
 and 21
 Thence I run
 N89°50'W on a true line bet[ween] sec[tion]s 17 and 20
 Over rolling mountainous land, through scattering undergrowth
 15.00 Descend along steep NW slope
 38.00 Foot of descent
 A spring of cold, clear water 10 f[ee]t in diam[eter]; follow down
 stream, 5 l[in]ks wide, crossing same several times, through dense
 undergrowth of willows
 40.04 Set an iron post . . . pits impracticable
 58.15 Dry ravine, enters from SE
 64.00 Leave spring branch, course NW; ascend steep NE slope
 80.08 The cor[ner] of sec[tion]s 17,18,19 and 20
 Land, mountainous
 Soil, sandy loam and rocky; 3rd and 2nd rate



CONCLUSIONS

The Donner und Blitzen River drains the western face of Steens Mountain and flows in a northerly course toward a terminus in Malheur Lake. The river is fed by several important tributaries from the east. These include Indian Creek, Little Blitzen River, Fish Creek, Mud and Bridge creeks, Krumbo Creek, and Kiger, Cucamonga, and McCoy creeks. The high desert country through which this river flows is a setting of open terrain with scatterings of juniper, sagebrush, and bunch grass. The river corridor, however, is another matter. It is a special environment which has characteristics setting it apart from the surrounding countryside.

The lower Donner und Blitzen--the long stretch from Frenchglen north thirty miles to Malheur Lake--was in the nineteenth century a vast swamp. The cadastral surveyors noted the meandering course of the river, its swampy conditions, and the comment "subject to occasional overflow in spring months" in their examinations of these townships. The presence of "swamp grass" and junipers were both observed but were respectively found in upland and river bottom environments. In his summary of T27S, R31E, W.M., John W. Meldrum concluded in 1877: "The soil 1st rate on all except a small portion of Upland in the Northeastern part and the greatr of the Township is suited to Agriculture without irrigation. There is a swamp of about 2000 Acres lying in secs. 2, 3, 4, 9, 10 & 11 and some low bottom lands subject to overflow in secs. 9, 10, 11, 14, 15, 16, 20, 21, & 22" (Meldrum 1877d).

The upper Donner und Blitzen--the nearly twenty miles flowing via the South Fork through the canyon to French Glen--lay in a different setting. The river's course here traversed the rising elevation of the west face of Steens Mountain. In T32S, R32 1/2E, W.M. the surveyor noted, for

example: "Willows and Poplar along the banks of Donner and Blitzen River, and on the creek which flows North Westerly across the South Eastern part of the Township" (Meldrum 1880d). The Donner und Blitzen was an oasis in its canyon stretches, a setting of river fringed by willow, aspen, and cottonwoods. This was confirmed in T34S, R32 3/4E, W.M., when the surveyor noted: "It is well watered by Blitzen River, Big and Little Indian Creeks, also Mud and Ankle Creeks besides numerous small streams throughout the township. The timber consists of juniper, mahogany and quaking asp[en]; the undergrowth is the same, which is very dense and difficult to get through (Morrill and Wilkes 1911f).

Commencing in the 1820s the fur trade brought trappers to this region. Diaries confirm that the Hudson's Bay Company brigades worked in the Harney Basin and on the western slopes of Steens Mountain. In spite of the exploitation of mammals, early cattle drovers such as David Shirk yet found beaver in the region at the time of settlement in the 1870s. Commencing in that decade, however, cattle drovers brought in increasing numbers of livestock. Horses and cattle both used the watershed of the Donner und Blitzen extensively. Peter French, one of the great cattle barons of the last two decades of the nineteenth century, gained ownership and control of most of the river's watershed. By this control he also had access to tens of thousands of surrounding acres for summer pasture for his herds. French also introduced irrigation projects to divert the river, kill sagebrush, and open new lands for production of hay.

The creation of the Malheur Wildlife Refuge reversed the trend of the expansion of private ownership. In time the refuge grew dramatically with its acquisition of the P Ranch and then the OO Ranch. The management approach of refuge personnel, however, was to continue channelization, placing of dams on the Blitzen, and maintaining leases to livestock raisers. The refuge personnel also filled large areas of

former swamp, planted crops, and harvested hay. The lower thirty miles of the river continued as a manipulated environment, while the upper twenty miles of the river remained a setting of active range uses during the summers.

While the human presence has remained relatively small or light during the past 170 years, the imprint of historic era activities has nevertheless marked the Donner und Blitzen. The stream below Frenchglen flows through miles of straight canal, no longer naturally overflows the bottoms, nor does it handle the volumes of water it once received prior to irrigation projects. The upper reaches show the impact of livestock which have cropped off the countryside and reduced the distribution of shrubs and trees along the streambanks. In these several respects the Donner und Blitzen carries the imprints of historic era development.

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APPENDIX

River Mile Widths Based on Survey Notes

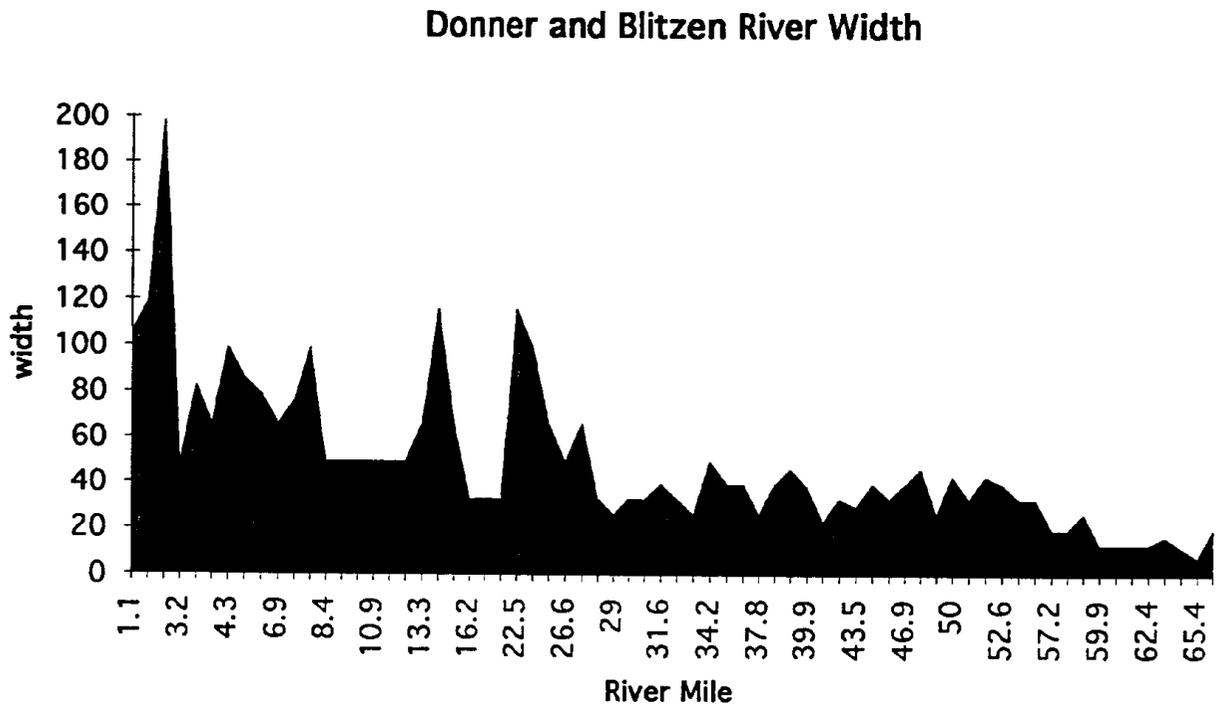


Fig. 6. Widths by River Mile of the Donner and Blitzen River calculated from cadastral survey field notes.

Township	Sections	River Mile	Width (lks)	Width (feet)
				1 lk = 0.66 ft.
T 27 S, R 31 E	4,33	0		
	4,9	1.1	160	105.6
	9,10	1.5	180	118.8
	3,10	2.1	300	198
	2,11	3.2	75	49.5
	10,11	3.7	125	82.5
	10,15	4.2	100	66
	14,15	4.3	150	99
	15,22	5.5	130	85.8
	21,22	5.6	120	79.2
	21,28	6.9	100	66
	27,28	7	115	75.9
	27,34	8.2	150	99
T 28 S, R 31 E	3,4	8.4	75	49.5
	4,9	9.7	75	49.5
	9,10	10	75	49.5
	9,16	10.9	75	49.5
	15,16	11	75	49.5
	15,22	12.2	75	49.5
	22,23	13.3	100	66
	23,26	14	175	115.5
	25,26	15.1	100	66
	26,35	16.2	50	33
	14,23	21.2	50	33
	23,26	21.5	50	33
T 29S, R 31 E	26,35	22.5	175	115.5
	34,35	23.7	150	99
T 30 S, R 31 E	3,10	25.5	100	66
	10,15	26.6	75	49.5
	15,22	27.7	100	66
	22,23	28.8	50	33
	23,26	29	40	26.4
	26,27	29.2	50	33
	27,34	30.3	50	33
T 31S, R 32.5E	5,8	31.6	60	40
	8,17	32.9	50	33
	17,18	33	40	26
	18,19	34.2	75	50
	E 24	35.5	60	40
	24,25	35.6	60	40
T 31S, R 32 E	N 6	37.8	40	26
	6,7	39.1	60	40
T 32S, R 32.5 E	7,8	39.7	70	46
	7,8	39.9	58	38

