ELEVENTH BIENNIAL REPORT

OF THE

State Board of Irrigation Highways and Drainage

NEBRASKA

1915-1916

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TO THE

GOVERNOR OF NEBRASKA

1915-1916

GEO. E. JOHNSON, State Engineer

1916
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Lincoln, Nebr.

OFFICE OF THE STATE BOARD OF IRRIGATION, HIGHWAYS AND DRAINAGE.

To John H. Morehead, Governor of Nebraska:

Sir:—I have the honor to submit herewith the following report of the work of this office during the past two years.

Yours very respectfully,

GEO. E. JOHNSON,
State Engineer.

Lincoln, Nebraska, October 31, 1916.

LIST OF OFFICERS OF STATE BOARD OF IRRIGATION, HIGHWAYS AND DRAINAGE, STATE OF NEBRASKA.

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JOHN H. MOREHEAD	Governor, President
WILLIS E. REED	Attorney General
FRED BECKMANN	Commissioner of Public Lands and Buildings

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Geo. E. Johnson	State Engineer
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Geo. K. Leonard	Chief Draftsman
D. P. Weeks	State Hydrographer
R. L. Cochran	Bridge Inspector
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B. Luise Schultz	Chief Clerk
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J. R. Barton	Clerk

Water Superintendents.

R. H. Willis	Water Division No. 1, Bridgeport, Nebraska
Page T. Francis	Water Division No. 2, Crawford, Nebraska

Water Commissioners.

C. A. Liljenstolpe	Scottsbluff, Nebraska
P. C. Wade	Bridgeport, Nebraska
J. C. McCoy	Lewellen, Nebraska
Robt. Osborne	Harrisburg, Nebraska
G. F. Palmer	Hershey, Nebraska
C. J. McNamara	North Platte, Nebraska
Jas. Ferrier	Culbertson, Nebraska
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C. S. Radcliffe	Sidney, Nebraska
John Cook	Agate, Nebraska
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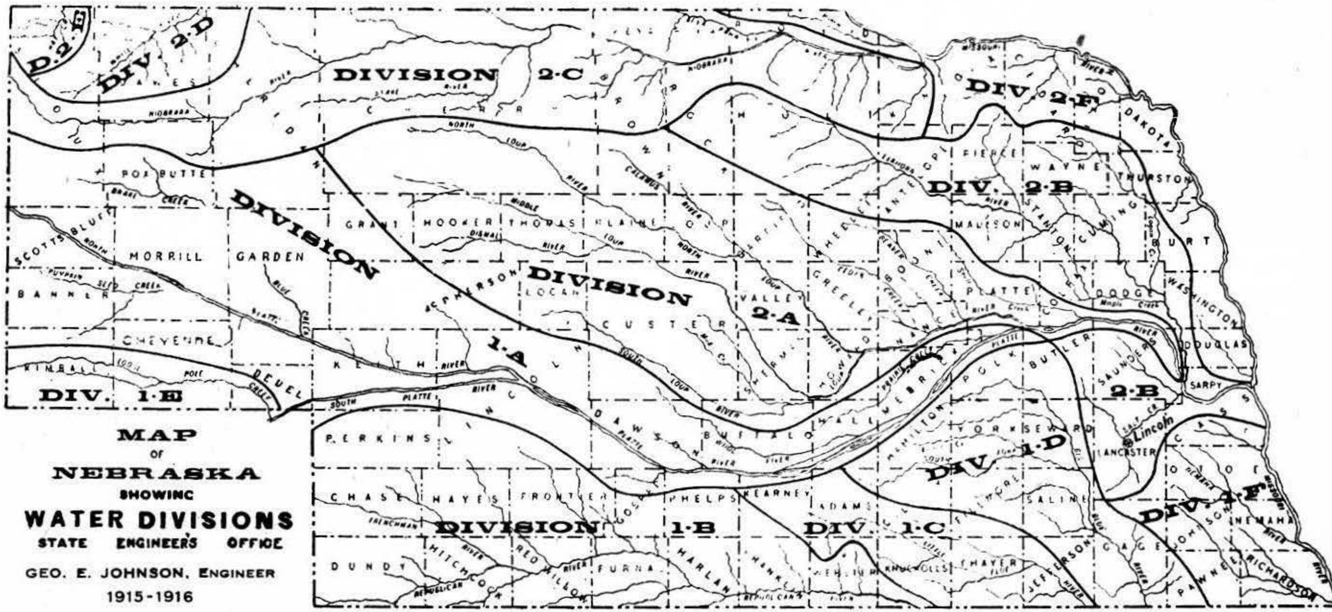
Jas. Spearman	Crawford, Nebraska
M. J. Gayhart	Montrose, Nebraska



MAP
OF
NEBRASKA
SHOWING
WATER DIVISIONS
STATE ENGINEER'S OFFICE

GEO. E. JOHNSON, ENGINEER

1915-1916

WATER DIVISIONS AND WATER DISTRICTS.

Section 6780 of Cobbey's Annotated Statutes: Irrigation and Water Power—Water Divisions:

"The State of Nebraska is hereby divided into two water divisions. denominated Water Division No. 1 and Water Division No. 2, respectively."

Section 6781—Boundaries of Division One:

"Water Division No. 1 shall consist of all the lands of the state drained by the Platte River; and also all other lands lying south of the Platte and South Platte rivers, that may be watered from other superficial or subterranean streams not tributary to said Platte River."

Section 6782—Boundaries of Division Two:

"Water Division No. 2 shall consist of all lands that may be watered from the Loup, White, Niobrara and Elkhorn Rivers, and their tributaries and all other lands of the state not included in any other water division."

For convenience in the adjudication of claims and in the distribution of water, these divisions have been subdivided into twelve water divisions denominated 1-A, 1-B, 1-C, 1-D, 1-E, 1-F; 2-A, 2-B, 2-C, 2-D, 2-E, 2-F, as shown on the accompanying map.

REPORT OF SUPERINTENDENT OF WATER DIVISION NO. 1.

To The Honorable State Board of Irrigation, Highways and Drainage:

Gentlemen:—I am submitting herewith my report with the view of acquainting the water users of Water Division number (1) one with the work performed and conditions met by me during the last two years as Water Superintendent.

During the season of 1915 gaugings were made by some of the water commissioners and some of the gaugings by the State Hydrographer and myself on the North Platte river at the State line (Henry), Bridgeport, North Platte and Elmcreek and North Platte on the South Platte river. The gaugings made by others than myself were reported to me at Bridgeport as soon as they were made. Observers were employed to read the gauge rod at these stations and reported daily by postal card to my office. Reports of the amount of water flowing in the river at Whalen, Wyo., were also received daily from the United States Reclamation Service, together with tri-weekly reports from the Pathfinder Reservoir.

This information was used in making a division of the water to the water users. Canal managers were requested to have their ditch riders or headgate keepers read the canal gauge rods and report the gauge height on the postal card furnished by the State, to the water superintendent daily.

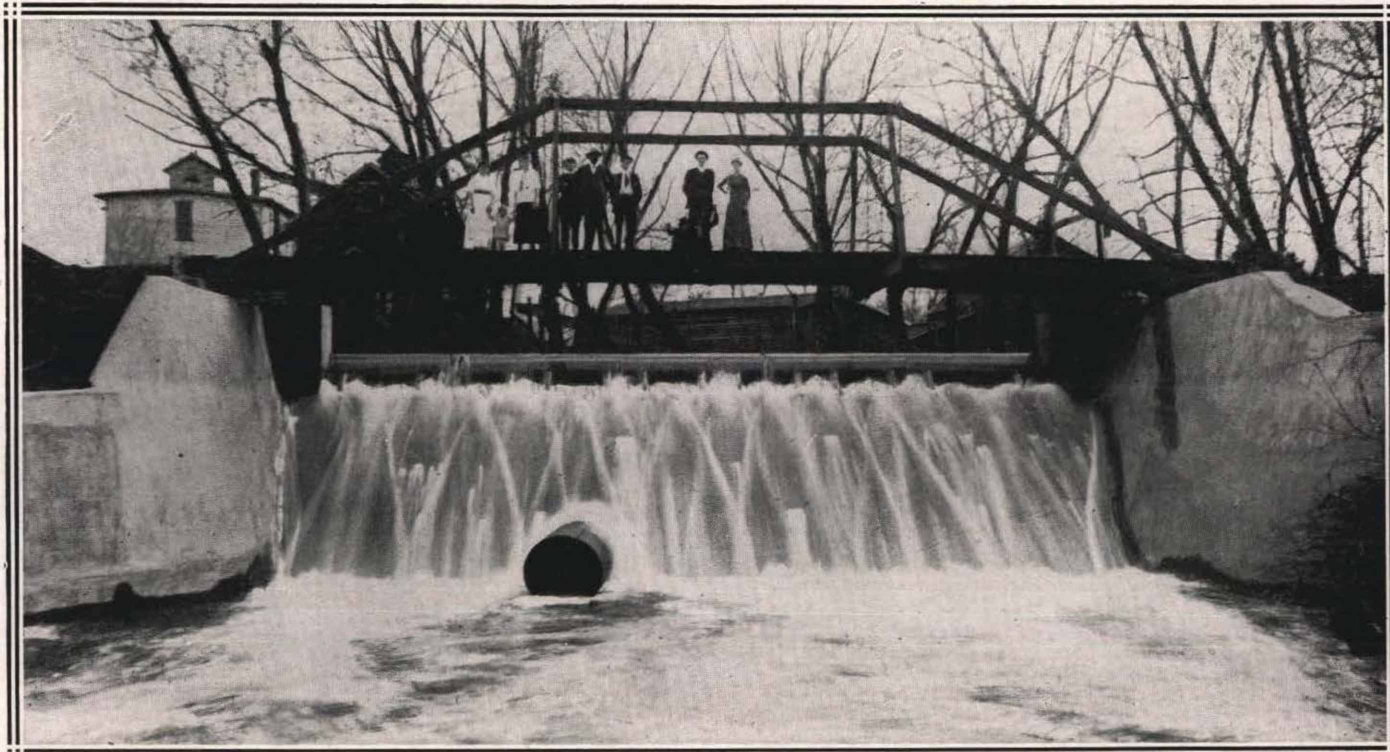
It is considered a great advantage to an irrigation project to supply the superintendent with prompt information relative to the status of the canal flow.

Sufficient current meter measurements were made in each canal at their rating flume by the State Hydrographer that upon receipt of gauge height cards from the ditch riders, the amount of water flowing in the canal is immediately ascertained.

This system, although somewhat crude, was the means by which the status of the streams was known each day during the irrigation season.

In the management, or distribution of the water of the streams, only such irrigation projects having filed their acreage reports were considered, primarily. The acreage reports on file were used as the basis in the distribution of water during the irrigation season. These reports contain mainly, a list of all lands which an irrigation project proposes to irrigate during the current season.

Some protests have been made by a few of the larger projects against making out a list of lands, claiming that the work was too laborious with no real benefit to anyone.



SHELL CREEK VALLEY MILL DAM, COLUMBUS, NEBRASKA

The advantage to the water users as well as the officers of the State Board of Irrigation, Highways and Drainage, to have this list each season is considerable, especially during a time of scarcity of water. When there is an insufficient amount of water to satisfy all the appropriators, it becomes necessary to close the junior appropriators. The question confronts the water superintendent: How much water should the senior appropriators have when the junior appropriators are burning up? Should the senior appropriator have the full amount of his grant or just enough to supply the lands actually being irrigated? If the latter amount, then the acreage report furnishes the data needed.

The following is the delivery schedule used for the sason of 1916:

WATER DELIVERY SCHEDULE.

Division No. 1-A.

For the season of 1916, based upon corrected acreage reports filed prior to June 1, 1916.

This schedule will govern the distribution of the natural flow of the Platte, North and South Platte Rivers and tributaries during periods of scarcity, by the water commissioners.

Natural flow includes all water flowing in this water shed except storage water, under control and released for use under contracts filed in the office of the State Board of Irrigation, Highways and Drainage.

NAME OF DITCH	No.	STREAM	From Bridgeport			
			River East	River West	Trib. East	Trib. West
King's Canal	A 1440	Lawrence Fork				
Dobson Lat.	A 1436	Red Willow		.6		
French Ditch	A 1433	North Platte		3.0		
Dobson Ditch	A 1432	North Platte & Red Willow		3.1		
Sheep Creek Lat.	A 1403	Sheep Creek Draw				
M. H. Stone Canal	A 1401	North Platte	1.0			
Sheep Creek Lat. Canal	A 1398	Sheep Creek				
McConnel South Side	A 1382	South Platte	32.6			
Plum Creek Ditch	A 1344	Plum Creek				
Bratt Ditch	A 1316	White Horse			5.6	
Schramek	A 1295	Little Spring Creek			147.8	
	A 1310	Spring Creek				
Nelson	A 1290	Seepage from Lake				
Roberts Ditch	A 1241	Spotted Tail				1.1
Peterson Ditch	A 1240	Otter Creek			1.3	
Hagerty Ditch	A 1238	Dugout			0.9	
Coon Creek Ditch	A 1225	Coon Creek			1.4	
Catch Ditch	A 1220	Spring Creek				0.9
Dobson Ext.	A 1181	North Platte	1.9			
Sheep Creek Lat.	A 1176	Sheep Creek				4.9
Liebhardt Lat.	A 1165	North Platte			2.9	

NAME OF DITCH	No.	STREAM	From Bridgeport			
			River East	River West	Trib. East	Trib. West
Hillside Irr. Canal	A 1164	Nine Mile Canyon				5.1
Kilpatrick Res. No. 2	A 1159	Snake Creek				.4
French Ditch	A 1149	North Platte	11.0			
Marsh-Braziel Ext. A	A 1126	Horse Creek		7.0		
Clear Creek Ext.	A 1111	Clear Creek				1.2
Randall Bros. Ditch	A 1100	Lawrence Fork				
Brown Ditch	A 1072	Spotted Tail				2.3
Seeley Irr. Ditch	A 1052	Pumpkinseed	1.0			
Keystone Canal	A 1003	White Tail				
Spring Creek No. 1	A 1002	Spring Creek			1.1	
West Keystone	A 1001	White Tail				
Jackson Ext.	A 1000	Horse Creek				1.1
Lisco Ditch	A 991	North Platte		3.0		
Gilmore Ditch	A 983	Horse Creek				3.7
Huffmans Ditch	A 937	Seepage				1.7
Mulloy Ditch	A 863	S. W. Lower Dugout				
Meglemre Ext.	A 853	Greenwood				
Keystone Ditch	A 848	White Tail			4.3	
Keystone Canal	A 662b	White Tail			45.5	
Little Spring Ditch	A 659	Little Spring Creek			.6	
Niehus Ditch	A 550	Lawrence Fork				
Paisley Ditch	A 515	Blue Creek	12.3			
Crigler Ext.	A 486	Lawrence Fork				
Schermerhorn Canal	A 418	North Platte		29.7		
Brogan Bros. Ditch	A 410	Spring Branch			.6	
West. Irr. Dist.	A 393	South Platte			180.0	
Gering Canal	A 365	North Platte		208.6		
Steamboat Ditch	A 350	North Platte		9.2		
Meyers Canal	A 283	South Platte			1.0	
N. River Irr. Canal	A 243	North Platte	119.0			
Coon Creek Ditch	A 69	Coon Creek				
Finch Ditch	D 964	Clear Creek			1.4	
Holcomb Ditch	A 1	North Platte			11.8	
Reed Ditch	A 751	White Tail			0.57	
Matthews Canal	D 750	Matthews Creek				
Miller Ditch	D 740	Skunk Creek	2.3			
Alfalfa Irr. Dist.	D 738	North Platte	56.5			
Signal Bluff	D 807	North Platte	20.5			
Miller & Warren	D 805	South Platte	26.0			
Gyger Ditch	D 806	North Platte				
Rush Creek Irr. Canal	D 802	North Platte	9.6			
Spohn Ditch	D 801	North Platte	12.2			
Foster Keystone	D 730	White Tail			6.3	
Cold Water	D 796	Cold Water Creek			4.3	
Beerline Canal	D 887	North Platte	30.0			
Gothenburg Canal	D 645b	Platte	240.0			
Overland Irr. Canal	D 791	North Platte	12.4			
Doran Canal	D 850	Lawrence Fork				
Scott & Williams	D 747	Clear Creek			1.0	
Suburban Irr. Dist.	D 662	North Platte	110.0			
Meeker Ditch	D 788	Blue Creek			32.3	
Iowa Irr. & Imp. Canal	D 786	Blue Creek			1.0	
Paxton & Hershey	D 653	North Platte	112.0			
S. & P. L. & T. C.	D 722	North Platte	90.0			

NAME OF DITCH	No.	STREAM	From Bridgeport River East	River s	Trib. East	Trib. West
Blue Creek Canal	D 785	Blue Creek			42.4	
Blue Creek Ditch	D 781	Blue Creek			12.8	
Lisco Ditch	D 856	North Platte	21.5			
Haney Ditch	D 719	Lonergan	1.1			
Halloway & Phelps	D 717	White Tail			2.5	
Clear Creek Canal	D 754	Clear Creek			9.3	
Meredith & Ammer	D 876	Pumpkinseed				
Cooper Ditch	D 872	Dugout				
Holcomb Ditch	D 636	Pawnee Creek				
Soehl Canal	D 697b	Lonergan			.9	
Scheutz Canal	D 881	Scheutz Springs			.9	
Ramshorn	D 945	North Platte		30.5		
Kah Ditch	D 944	North Platte		4.6		
Empire Canal	D 858	North Platte		28.6		
E. S. Crigler Ditch	D 861	Lawrence Fork				
Patrick Ditch	D 725	Sand Creek			2.5	
Cascade Ditch	D 1032	Otter Creek			3.4	
Mutual Ditch	D 843	Pumpkinseed			2.5	
Sheridan & Wilson	D 710	North Platte	4.0			
Gothenburg P & I.	D 645a	Platte		30.0		
Central	D 926	North Platte		36.0		
Spring Creek Ditch	D 704	Spring Creek				
Finn Bros. Ditch	D 836	Springs				
Union I. & P. C.	D 763	Blue Creek				14.0
Radcliffe No. 3	D 1034c	Cedar Creek				.8
Holcomb & Smith	D 698	Sand Creek				
Belmont Canal	D 828	North Platte		176.5		
East Lonergan	D 699	Lonergan				9.4
Court House Rock	D 840	Pumpkinseed		16.5		
Soehl Canal	D 697a	Lonergan				2.0
Enterprise	D 920	North Platte		173.71		
Clear Creek Canal	D 748	Clear Creek				2.3
Farmers Canal	D 918	North Platte			915.0	
Heards Ditch No. 1 & 2	D 916	Pumpkinseed		.7		
Radcliffe No. 2	D 1034b	Cedar Creek				1.2
North Platte Canal	D 635	North Platte		177.0		
Kearney Canal	D 1023	Platte		162.0		
Nelson & Radcliffe	D 1034a	Cedar Creek				4.7

When the supply of water begins to fall below the total amount required by this schedule, canals will be closed by water commissioners beginning with the top of this list.

The following is the delivery schedule of Storage Water under Contracts with the United States Government.

NAME	July	August	September	Date
Interstate	....	....	....	....
Farmers Irr. Dist.	713	713/500	500/300	Ends Oct. 1
Gering	151	151/110	110/65 15th	Ends Sept. 15
Central	18	18/12	00	Ends Sept. 1
Chimney Rock	47	47/33	33/27 15th	Ends Sept. 15
Belmont	169	169/81	00	Ends Sept. 1
Browns	85	85/70	70/50	Ends Oct. 1
Beerline	14	14/8	00	Ends Sept. 1
Lexington	40	40	00	Ends Aug. 9

The system of procuring the data necessary to manage or distribute intelligently, the water of the streams in Water Division No. 1 was somewhat improved over the season of 1915. This was due mainly to the placing of Mr. D. P. Weeks, Jr., by the State Engineer, as hydrographer on the streams of my division. His whole time was devoted to the measurement of streams and canals. This feature was very gratifying and should be continued. Mr. Weeks gauged the North Platte river from Henry to Elm Creek on the Platte river. Establishing stations at nearly every wagon bridge on the river and employed observers to read the gauge at each station and report to my office on postal cards furnished by the State, daily. By this arrangement much better service was rendered the water users. In connection with the above plan of frequent stream measurements on the river it was possible to prepare and mail a bulletin three times a week to all water commissioners, secretaries of irrigation projects and commercial clubs and others who were interested, during the season of 1916, covering the status of the river flow, including the outflow and inflow of the Pathfinder Reservoir and the amount of water passing Whalen, Wyo., together with rainfall reports whenever it was possible to get them.

From July 8th to the 15th, it was necessary to close all canals whose priorities dated later than January 1, 1894.

This was the only period during the seasons of 1915 and 1916 it was necessary to close any canals.

I wish to make a few suggestions, which, in my opinion, will tend to make the office of Water Superintendent much more useful to the water users than it has in the past.

First:—Two hydrographers are needed to make the measurements that are so desirable in the management of the distribution of the waters of this water division. The two hydrographers, I believe, will cover the entire territory from Elm Creek to Henry, measuring every week, the river flow at all suitable wagon bridges, all seep streams, tributaries to the rivers and all ditches.

Second:—Employ observers with a salary sufficient to stimulate the necessary interest required for good reliable results.

Third:—Install automatic water stage recorders on the North Platte river near the Wyoming-Nebraska line, Bridgeport, North Platte and Elm Creek or Lexington.

Fourth:—Formulate a plan whereby the ditch managements will be more inclined to co-operate with the water superintendent, water commissioners and hydrographers in keeping records of canal flows.

Fifth:—Canals without rating flumes should be required to place one at some convenient point in canal near the point of diversion. Nearly all canals now have rating flumes and good headgates. There are a few without rating flumes and several without headgates.

Respectfully submitted,

ROBT. H. WILLIS,

Superintendent Water Division No. 1.

DRAINAGE

The Legislature of 1913 passed the following law, relative to drainage:

"All plans for proposed drainage districts shall be approved by the State Board before any contract is let or begun. The State Board, or its representative, shall have authority to order any changes they may see fit in said plans, and require the drainage district to conform thereto; and shall at all times, during the construction, have the right to inspect said work, and make recommendations pertaining to the same. Upon request of any interested party or parties of the proposed drainage district, the State Board may prepare for them, plans and specifications for any proposed drainage work at actual cost of doing same."

Plans for Drainage Districts approved:

Otoe and Johnson Counties Drainage District No. 1.
Frontier County Drainage District No. 1.
Merrick County Drainage District No. 1.
Richardson County Drainage D.strict No. 4.
Nemaha County Drainage District No. 3.
Horse Shoe Lake Drainage District.

Horseshoe Lake Drainage District.—This district lies in typical sand hills of Cherry County, Nebraska. The area is approximately township 34, ranges 39 and 40. The drainage consists in cleaning out the natural water course from lake to lake for about 15 miles, involving about 17 lakes.

The district was organized June 17, 1916, under the laws of Nebraska, as provided for in Article 5, Chapter 19, section 149-204, inclusive, Section 1899 of Revised Statutes of Nebraska, 1913, as amended by Article 1, Chapter 28, of the Session laws of 1915, of the State of Nebraska.

The purpose of the drainage is to reclaim hay land. About 3,500 acres are expected to be drained at an estimated cost of $10.00 per acre. This land will yield two to two and one-half tons of wild hay to the acre valued at $2.00 per ton uncut. Experience under similar conditions shows that this land may, the third year after drainage, be made to grow three tons of red clover and timothy per acre, and in exceptionally favorable years, two cuttings may be made.

The proposed work involves about 150,000 cubic yards of excavation in sand and muck at an estimated cost of 18 cents per cubic yard; 17 timber bridges of 14 to 16 foot spans, at an estimated cost of $160.00 each; engineering work including preliminaries and all work previously done, about $3,000.00. Contract for the excavation was let at 17½ cents to Fred M. Crane Co., of Omaha, Nebraska, August 15, 1916. Work commences October 1, 1916, to be completed January 1, 1918.

All the work will be paid for by cash paid into the district treasury by the individual land owners with the exception of perhaps $5,000.00, for which bonds will be sold to care for the small land owners not able to remit promptly for their proportion of the improvements.

Burt and Washington Counties.—The largest drainage district that has been constructed in the State is in Burt and Washington Counties. This work, when completed, will cost approximately $450,000.00. One of the principal features of this district is the twenty settling basins, which are designed to remove the silt, drift and debris from the flood waters before allowing them to enter the drainage ditches. These basins are of considerable interest, and they have already proved to be a great benefit in protecting the drainage ditches, and in building up the low land where they are located.

IRRIGATION

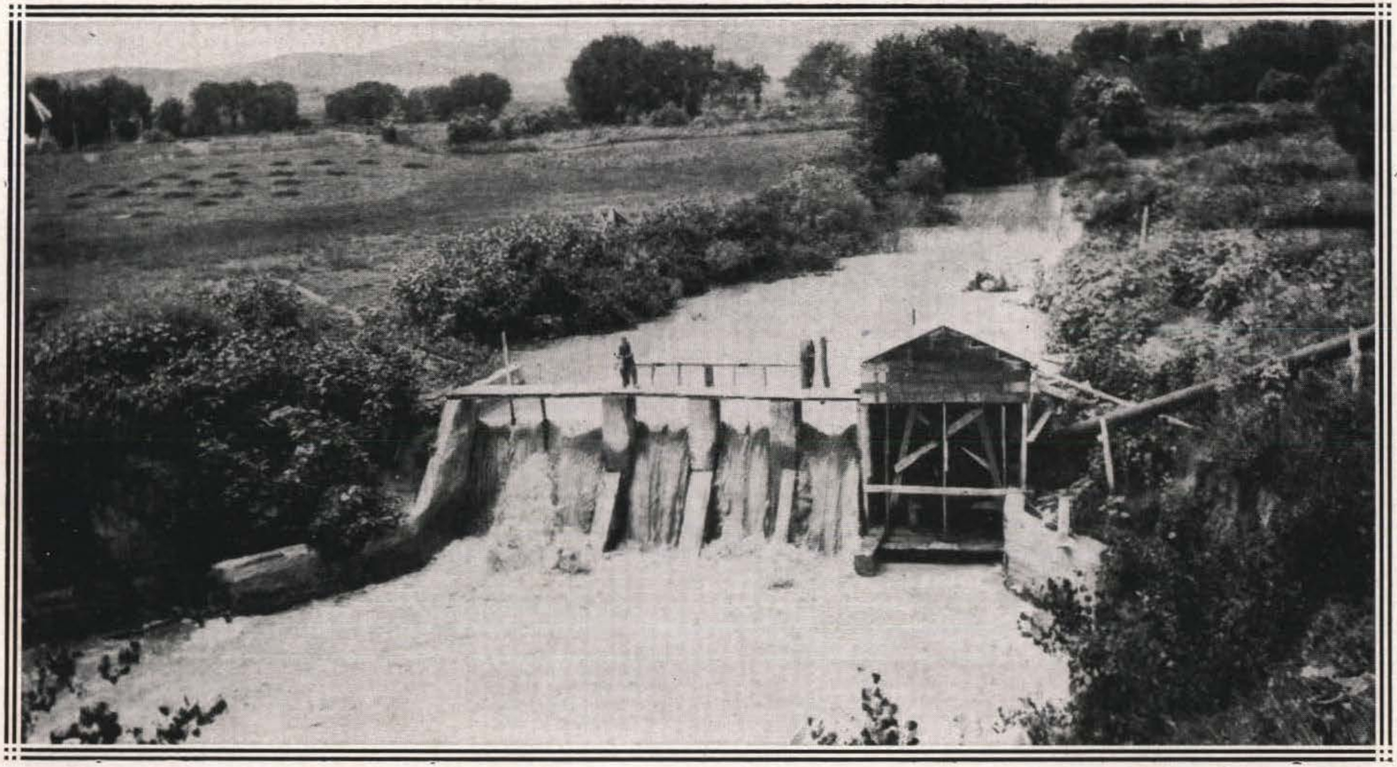
There was very little water used for irrigation during the year 1915, owing to the excessive rain fall; however, this condition was reversed in 1916, and all of the land under ditches used a considerable amount of water. There was enough water for all of the ditches at all times, excepting seven days in July.

IRRIGATION LEGISLATION.

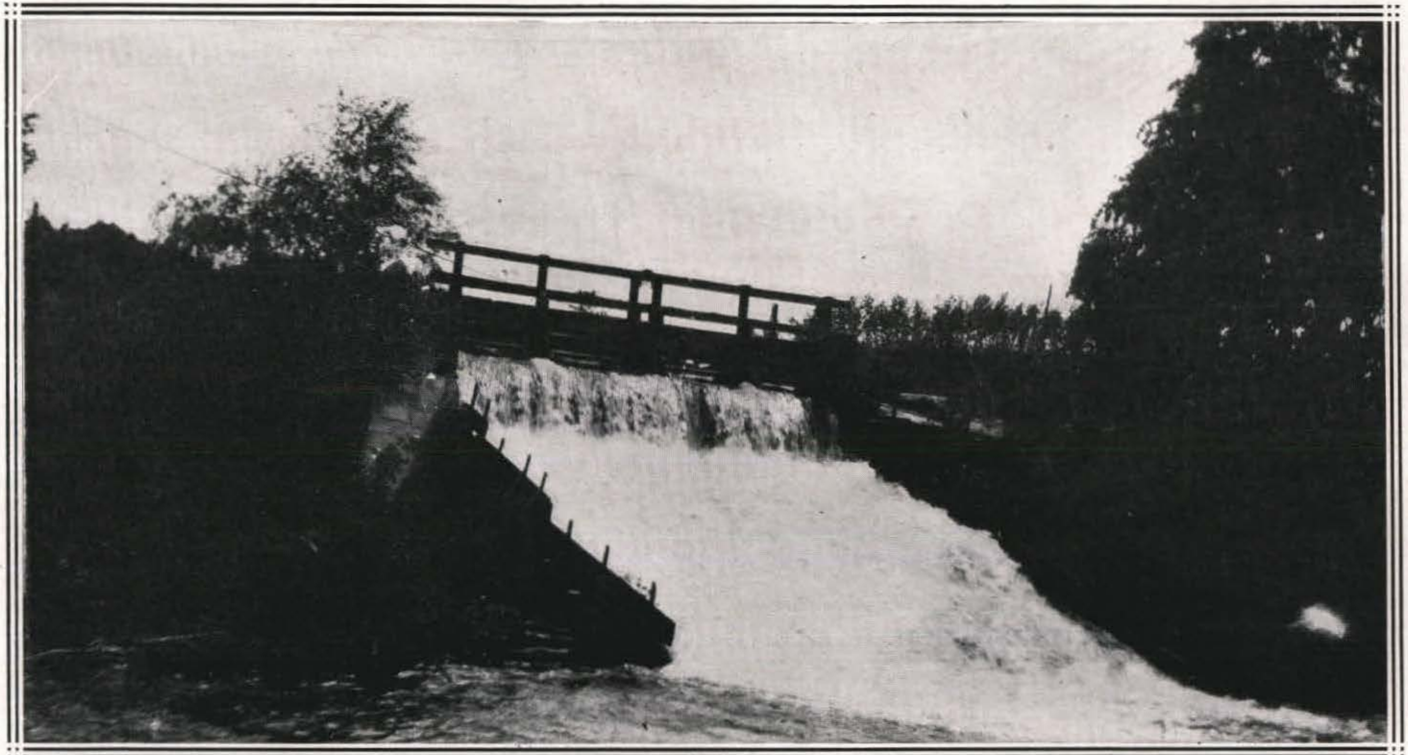
The first law relative to irrigation was passed by the Legislature of the State in 1877. This law enabled corporations formed to construct and operate canals for irrigation and other purposes to acquire rights of way; and declared such works internal improvements.

The Saint Raynor law, the first general irrigation law, was passed in 1889. It provided for the appropriation of running waters for useful or beneficial purposes by posting a notice at the point of diversion, a copy of the notice to be filed with the county clerk of the county in which the diversion was located, and construction to be begun within 60 days and prosecuted diligently and uninterruptedly to completion. The law provided that irrigation works should be exempt from taxation; that the same land should not be covered by more than one ditch or lateral without the owner's consent; that irrigation works were internal improvements; that water from one stream should not be turned into another stream; that rights of way could be condemned for irrigation purposes; that excessive amounts of water should not be used; and that the waters appropriated should be distributed in certain ways. Under this law there was no way of knowing the value of a right except by going into court, and a right was always open to attack.

The people of the western portion of the State wished to have some state control over water rights, and in 1891, an irrigation convention was held at Lincoln, and drafted a bill. This bill was introduced in the Legislature that winter but was defeated. Another bill almost identical with the first was introduced in the Legislature in 1893, but was defeated after a spirited fight, and the friends of irrigation had to be contented with an amendment to the Saint Raynor law allowing water rights to be filed on streams 20 feet or over in width, and permitting water, under certain conditions, to be turned from one stream into another. The members of the Legislature from the eastern portion of the state feared that the passage of an irrigation code would be looked upon as an advertisement to the outside world that the rainfall in the state was not sufficient to produce crops, and that this would have a tendency to check settlement. The complete failure of all crops because of the drought in 1894, caused the question of adopting an irrigation code to be made a campaign issue that fall. The Legislature in 1895 passed an irrigation



OLIVER BROS., WAUNETA, NEBRASKA. POWER USED TO IRRIGATE 150 ACRES OF LAND



LONG PINE DEVELOPMENT, LONG PINE, NEBRASKA code modeled after the Wyoming code, and also an irrigation-district law modeled after the Wright Irrigation district law of California. The irrigation code created a state board of irrigation, consisting of the governor, the attorney general and the commissioner of public lands, the governor being ex-officio president of the board, and divided the state into two water districts.

The law provided that at the first meeting of the state board it should elect a secretary, who should be a hydraulic engineer of theoretical knowledge and practical skill and experience, and an under secretary for each of the water divisions, and that it could employ an assistant secretary and such other assistants as might be necessary. The board either directly or through its secretary or under secretaries, was charged with the measurement of all streams in the state; the determination of priorities and amounts of all claims initiated prior to the passage of the law, and the issuance of certificates of appropriation for claims found valid, the distribution of all waters appropriated; the receiving, recording and considering of all future applications for permits to appropriate water; the granting of permits, if there was any unappropriated water in the streams, and the appropriation asked for would not in any other way be detrimental to the public welfare; and the issuance of certificates of appropriation when satisfied that the applications had been perfected according to law.

This law, besides granting the board certain police powers and fixing penalties, defined standards of measurement; dedicated the water of the state to public use; fixed the date of priority of applications and the order of preference in using water for different purposes; granted the right of eminent domain for irrigation works; exempted irrigation works from taxation; and provided for mutual irrigation companies.

In 1895 to 1911 a number of minor changes were made in the irrigation code, most of which were for the purpose of assisting the state board in its administrative work. At the sessions of the legislature in 1911 and 1913, practically the entire code was revised and re-enacted, with amendments. Among some of the more important changes made were the following:

The "State Board of Irrigation" was changed to the "State Board of Irrigation, Highways and Drainage;" the board was charged with the duty of examining into the condition of all water appropriations and of holding hearings and cancelling rights where the water had not been used for beneficial purposes for more than three years; the maximum amount of water that a tract could receive was limited to 3 acre-feet per acre per year; irrigation works were declared common carriers and the rates for water were to be determined by the state railway commission; and the list of all lands to be irrigated were required to be filed with the superintendent of each water division April 1 of each year.

The irrigation district law has been amended from time to time since its passage in 1895. The main provisions at present are as follows:

A majority of the electors, who also own or hold by leasehold a majority of the lands in the district susceptible of irrigation from a common system of works, may petition the County Commissioners of the County in which the land, or the greater portion of it lies, asking that an irrigation district be created including all the land. A copy of the plans, etc., submitted to the county commissioners must be filed with the state engineer, who must examine them and submit a report to the board of county commissioners at the meeting set for the hearing of the petition. If the petition, either in its original form or in the amended form, is approved by the board of county commissioners, the board divides the proposed district into three divisions, and calls an election to vote upon the organization of an irrigation district, and to elect a director for each division, if the vote is favorable to organization. If upon canvassing the vote the county commissioners find a majority favorable to organization, the district is declared organized, and the directors elected meet and organize. The board of directors has control of the affairs of the district in a general way and is authorized to make surveys, acquire rights of way, and to secure lands, water or other property by purchase or condemnation. All surveys, maps, plans and estimates must be made under the direction of a competent engineer and sent to the state engineer, who shall file a report upon them with the board of directors. Having determined the amount of money required, the board of directors calls a special election to vote on the question of issuing bonds, and if a majority of the votes are in favor of issuing bonds, a special proceeding is begun in the district court to have the bonds examined, approved and confirmed. If the bonds are confirmed they are sent, together with a history of the district, to the auditor of public accounts for registration if he finds the law has been conformed with in all respects. When registered, the bonds may be sold at 95 per cent of their face value, or if not sold, can be used to pay for property or for construction at their par value. The bonds and interest are paid from the revenues derived from an annual assessment upon the real estate in the district. They bear interest at 6 per cent, and unless otherwise provided by a majority vote at the time of issuance, a certain per cent is payable each year, beginning with the expiration of the eleventh year. This per cent cannot be less than 5 at the end of the eleventh year. After the eleventh year the minimum increases 1 per cent a year through the eighteenth year, and is 15 per cent in the nineteenth year. All the bonds must be paid upon the expiration of the twentieth year. The secretary of the board of directors certifies to the county clerk the amount of money needed each year for the payment of interest, bonds and for operation and maintenance, and the taxes are collected by the county treasurer at the same time that other county taxes are collected.

The administration of the irrigation laws of the state is in the hands of the state board of irrigation, highways and drainage, the executive member of which is the state engineer. The state is divided into two districts, each in charge of a water superintendent, and each district is divided into divisions in charge of water commissioners, who report to the superintendent.

Information concerning water rights can be obtained by inspecting the records of the state board and by consulting the state engineer. The irrigation laws have been published in pamphlet form, and copies may be obtained by addressing the state engineer.

IRRIGATION ENTERPRISES.

There is no Carey Act project within the state, and with the exception of the Interstate Canal, built and operated by the U. S. Reclamation Service, all the canals in the state are operated under the following organizations:

1. **Individual or partnership ownership.**

2. **Mutual irrigation companies.** These are corporations or associations organized under the laws of the state for irrigation purposes, and deriving no revenue from the operation of such works.

3. **Stock companies.** These are corporations, and in some cases the stock is owned entirely by non-landowners; in others, chiefly by non-residents, of which only a few own land under the canal; and in other cases, by only a part of the landowners under the canal.

4. **Irrigation districts.** Along small streams where only a small amount of water can be diverted nearly all the canals fall under the first class. On the larger streams, canals operated under each of the different types of organization are to be found. Each type of organization has been attended with success and with failures. The results in each case usually can be traced to the circumstances and conditions encountered, and the methods employed in surmounting them.

Owing to the great number of enterprises that have been undertaken, it is not practicable to undertake to describe them all. In the following pages the more important ones within the different drainage basins will be discussed, pointing out the early history, location, principal features of the system, and the success or failure, if of such a nature as to be out of the ordinary. The order of the priority of canals is not discussed, but the docket and application numbers are given in the tables.

CANALS ALONG BIRDWOOD CREEK.

Birdwood Irrigation District (D646). The Equitable Farm and Stock Improvement Company posted a notice of appropriation on October 21, 1893, for the diversion of 100 second-feet, and during the next two years constructed twenty miles of canal at a cost of $17,804.00. The Company sold some water rights but the enterprise was not a financial success as the lower eight miles of the canal were hard to maintain and the delivery of water to the lands under the end of the canal was very uncertain.

On November 1, 1905, a petition signed by twenty landowners was presented to the board of county commissioners of Lincoln county, praying for the organization of an irrigation district to include the land under the upper twelve miles of the canal. On December 26, 1905, the commissioners approved the petition and called an election to be held January 27, 1906. On February 5, the commissioners met as a canvassing board, and finding 15 votes "yes" and one "no," declared the district duly organized. Bonds in the sum of $18,000 were then voted and paid to the company, who cancelled all water rights under the lower end of the canal. The land within the district, for district purposes, is assessed on a valuation of $10 per acre.

Total area in district-1916-5147.63 acres, the greater part of which was irrigated to some extent this season. The crops watered being corn, oats, wheat, alfalfa, orchards, potatoes and other garden truck, and wild hay.

The financial condition of the district is good; assessed valuation being $51,476.30, bonded indebtedness $19,400.00. A levy of twenty mills on the dollar valuation was made this year to pay off bonds, 1/5th of which becomes due in 1917. Also a levy of twenty-two mills to pay interest on bonds. The canal is in good shape, carries ample water for all consumers; considerable work in concrete was done on the headgate this season.

CANALS ALONG THE FRENCHMAN RIVER.

Champion Water Power and Irrigation Ditch (D-47). This ditch was formerly seven miles long and was constructed in 1891, with $4,500 donated by Champion precinct of Chase County. The ditch was found to have too small a capacity, and was enlarged by an individual at a cost of $3000. Later it was sold and the Ditch extended three miles. Kilpatrick Brothers Company of Beatrice are the present owners of the ditch, and with the exception of water used on one quarter section of land, outside their own holdings, the water from this ditch is used entirely on their own land.

In addition to the ditch, Kilpatrick Bros. have constructed in connection with their irrigation system, a reservoir which covers approximately 120 acres. About 4000 acres are susceptible to irrigation, under this ditch, and about 2000 acres are irrigated from year to year, the water being used for irrigating wheat, oats, barley, emmer, alfalfa, corn and potatoes.

The ditch and reservoir cost approximately $25000.

Inman Ditch (D-791-A-436). The Inman Ditch & Irrigation Company is a co-partnership, or joint stock company, composed of riparian owners along the Frenchman River. The Company owns seven miles of main ditch, only, the laterals being owned by the individual members; two and one-half miles of the ditch were built as a private ditch in 1895, and four and one-half miles in 1896. The amount of land irrigated each year for the past seventeen years is 450 acres. The total cost of operation is $200.00 per year, on the average.

Crops raised consist principally of alfalfa and forage crops, with some grain and vegetables.

Maranville Ditch (D70-71). This ditch is 4½ miles long and was built in 1895, at a cost of $5000 by three partners. The canal heads about 9 or 10 miles west of Champion.

The financial condition of the Maranville Ditch Co. is first class, does not have any indebtedness whatever. They value the plant at $6000. The yearly cost of operation is not to exceed $100.00 in keeping up ditches and dam.

This ditch irrigates about 500 acres, when they get all the water they need; the principal crops raised being alfalfa, some oats and spelts, and garden, but mostly alfalfa.

Frenchman Valley Irrigation District (D24, 25 29 and 30). The canal formerly known as the Culbertson Water Power and Irrigation Canal has been owned and operated by the Frenchman Valley Irrigation District since March, 1913.

The waters of the Frenchman River are diverted into the canal by an earth dam located about one and one-half miles northwest of Palisade. The river flows through the canal half a mile and then intersects the channel of the Stinking Water Creek. The next half mile the canal is partly in the enlarged channel of the creek and the remainder in an excavated channel. At the point where the canal leaves the bed of the Stinking Water Creek, the difference in grade between the river bed and the bottom of the canal is about five feet. At this point the headgates or controlling works are located. They constitute a reinforced concrete structure with a thirty-two foot opening for the river channel. During the irrigation season, vertical posts, equipped with trips for the purpose of instantaneous waste of flood water down the river, are set across this opening and flash-boards are dropped in between them to a height of about eight feet, thus diverting the water into the remainder of the canal. This location of the controlling works provides a settling basin the width of the river channel and tapering from five feet deep at the flash-boards to the original grade of the river one mile up the canal. The sediment is scoured back into the river during the winter and enough never accumulates during the irrigation season to cause trouble.

The main canal is twenty-six miles long and at the end the water is diverted into three main distributing laterals with a combined length of almost eleven miles. The water delivered to seventy-five per cent of the lands must be carried about twenty miles along the side of the river valley where the cross drainage is very heavy and at times causes damage, both in wash-outs and the deposit of sediment.

Since acquiring possession of the canal, the District has improved it by the construction of two riveted steel and reinforced concrete inverted siphons, reinforced concrete headgates and controlling works, one open steel flume, ninety-one concrete and tile water gates for farmers' turn-outs, seventeen public bridges, four reinforced concrete spillways for flood protection and also regulation of the canal, twenty concrete drops and checks, and strengthened the embankments at required places for the entire length of the canal. Provision was made in the bond issue voted at the time of the formation of the District for the bulk of the improvements; but the public bridges, about seventy-five per cent of the farmers' water gates, the spillways, and about twenty-five per cent of the grading for strengthening the embankments have been done under the regular maintenance and operation tax levy.

The bonded indebtedness of the District is $150,000.00 or approximately $15.00 per acre. The taxes have been paid up or sold each year as levied. At present the registered warrants are selling readily at par.

The levy on the assessed valuation of the year 1916 is ninety mills for the general fund and seventy mills for interest on bonds. The levy of ninety mills covers the cost of operation for the season of 1916, and also a deficit occasioned by the excessive damages caused by the torrential rains of 1915, which were not completely covered by the levy of that year.

The District organization includes 9,368 acres, approximately ninety-five per cent of which is irrigated at some time during each season. The most important crops grown are small grain, sugar beets, alfalfa, corn and potatoes.

Riverside Canal (D-18).—The farmers under this canal attempted to form a company—the Riverside Canal and Irrigation Company, but the organization was never perfected, and they have operated the canal under a mutual agreement whereby each acre constitutes a share. Six and one-half miles of canal were built in 1894, and an extension of one mile in 1897, the entire cost of construction being $3,000.00. The canal was built somewhat upon the plans followed in the construction of the Culbertson canal. The entire flow of the river is diverted by a dam about three miles east of Beverly, and conducted through a new channel for about three-fourths of a mile at which point the headgates and waste gates are located. The excess water is here wasted back into the old channel of the river. This canal covers 1,200 acres lying in the valley of which 694 acres are irrigated. All operation charges are assessed upon the land represented in the agreement. The cost of maintenance for this season was $870.00.

Principal crops raised consists of beets, alfalfa, wheat and corn.

CANALS ALONG LODGE POLE CREEK.

Hurley, Lilly and Polly Ditch (D-354). This is a partnership ditch The original ditch was about 4½ miles long and about 300 acres could be irrigated from it. At present only 2½ miles of the ditch are in opertion and about 188 acres irrigated. The partners use the rotation method, each getting the entire flow of the ditch for a period in proportion to the amount of land they own. By following this method they usually irrigate the entire acreage lying below the ditch each season. Crops raised—alfalfa, wild hay, mixed with timothy, oats, potatoes, sugar beets and corn, all crops good this season.

Cost of maintenance is about $25.00 per year.

Kimball Irrigation District (A-897). The Kimball Irrigation District was organized by local parties who filed an appropriation for a storage project April 15, 1908. On July 22, 1909, a petition signed by twenty-four landowners was presented to the board of County Commissioners of Kimball County, praying for the organization of an irrigation district, and on October 9, the board approved the petition and called an election for November 6. On November 15, the commissioners met as a canvassing board, and finding an unanimous vote in favor of the district, declared it duly organized. On April 9, 1910, bonds in the sum of $250,000.00 were voted for the construction of the project. These were issued under date of July 1, 1911. They were sold during 1911, the purchasers being mostly local men. The project is comprised of two storage reservoirs. The lower one located seven miles west of Kimball has been formed by building an earthen dam, 4900 feet long, with a maximum height of 45 feet, across the bed of the creek. The dam contains 221,000 cubic yards of material, the capacity is 7200 acre feet, but the plan has been to partially refill the reservoir each season, and so increase the supply to 9000 acre feet. To prevent wave action, the dam has been protected with reinforced concrete face laid in section. The water is diverted from the reservoir through one outlet on the north side of the creek. About one-half mile below the dam the canal branches and the south canal crosses the stream in a steel flume. This branch is twenty miles long, while the north branch is fourteen miles long. The system covers 7200 acres of irrigable land, and during the season of 1914 over 80 per cent of the land was actually irrigated. In the construction of the system, fourteen steel flumes were used. These cost $35,500 in place. The largest flume is 1100 feet long and has a maximum height of 56 feet.

The second reservoir is located seven miles farther up the stream, the north ditch extending eight miles thus supplying water to an additional 5000 acres.

The financial condi'ion is A-1. There are no unpaid interest coupons, all semi-annual interest on bonds have been promptly paid since issued. Very few registered warrants on general fund, said warrants taken at par by the Banks. Cost of maintenance for 1914—60c per acre; for 1915—60c per acre, and for 1916—75c per acre. Part of this year's maintenance went into construction of new steel flume, therefore this cost has not increased. Each annual levy for interest on bonds is $2.25 per acre making the total levy for 1916—$3.00 per acre.

Ninety-five per cent of all the lands in the district are in cultivation and in crops th's year, and all this land is irrigated. The crops consist of sugar beets, potatoes, cabbage, alfalfa, native hay, wheat, oa's, barley, spelts and corn.

This season has been very dry, water delivery best since organization; it is contemplated all lands will be in cultivation in year 1917. First run water for year 1916 from May 11 to July 31. Two additional deliveries were made to finish potatoes and beets.

CANALS ALONG THE NORTH PLATTE RIVER.

Castle Rock Irrigation District (D-921). The Castle Rock Irrigation and Water Power Company was incorporated with a capital stock of $20,000 in April, 1889, and during that month a notice of appropriation was posted on the south bank of the river in Section 4, township 21 north, range 54 west. Construction was started the same summer and continued until the summer of 1896, by which time 17 miles of main canal and three miles of low-line lateral had been completed at a cost of about $20,000.

On May 3, 1898, a petition signed by nine landowners was presented to the county commissioners of Scottsbluff County, praying for the organization of an irrigation district, and on May 5, the commissioners approved the pet:tion and called an election to be held on June 4. On June 13, the commissioners met as a canvassing board and finding 19 votes "yes," and 18 votes "no" declared the district duly organized. The district did not obtain possession of the canal until 1912. On September 14, 1912, a bond election was held at which bonds in the sum of $30,000 were voted. These bonds were issued under date of October 1, 1912, and $20,500 worth were used to purchase the canal from the old company, $6,801.96 to retire water rights of the old canal and repair and build lateral headgates, and $2,698.04 to pay for the construction of a headgate. The only indebtedness of the district is the bonded indebtedness of $30,000, the district meeting payment on all warrants regularly. The cost of operating canal is about $4000.

There are about 6000 acres of land under irrigation; principal crops are hay, sugar beets, small grain, and potatoes.

THE CORNELL DAM, VALENTINE, NEBRASKA

Enterprise Irrigation District (D920). A preliminary meeting was held on January 19, 1889, at which time the landowners, residing within the territory now comprising the district were invited to subscribe for stock in the Farmers' Canal Company. This proposition was accepted at this meeting, but on February 9, 1889, the decision was reconsidered and the organization of the Enterprise Ditch Company was decided upon. Stock was subscribed for and the Company organized on March 7, 1889, as a mutual stock company, with an authorized capital stock of 500 shares, with a par value of $100 each. Surveys were made and a notice of appropriation posted on the north bank of the river in Section 28, township 23 north, range 57 west, prior to the latter part of March, 1889, a copy of the notice being filed with the County Clerk of Scottsbluff County, on March 30. Construction on the ditch was started at once, but as the projected ditch was quite long, and there were not many stockholders, it was not completed until 1895, by which time the ditch had been built for a distance of 24 miles at a cost of $31,306.00. Water was first diverted from the river and used along the upper portion of the canal during the latter part of the season of 1890.

On May 2, 1898, twelve of the landowners under the canal presented a petition to the county commissioners of Scotts Bluff County praying for the formation of an irrigation district and on May 23, the commissioners approved the petition and called an election to be held June 18. On July 27, the commissioners met as a canvassing board, and finding 18 votes "yes" and 8 votes "no," declared the district duly organized. On August 15, the district voted bonds in the sum of $45,000 for the purchase of the stock of the old company. The bonds were issued under date of October 5, 1898, and the transfer to the district was made March 17, 1900. On August 7, 1910, a second issue of bonds was voted in the sum of $15,000 for the construction of a permanent headgate. These bonds were issued under date of September 1, 1910. Of the first issue of bonds, $22,800.00 have been paid to date. All bonds which are due are paid except one bond for $150.00 which has not been presented for payment. Funds are on hand to pay this bond and all interest coupons as they become due. The last series of this issue will fall due January 1, 1918. A levy will be made each year sufficient to pay off the bonds as they become due. The second issue of bonds will not fall due until September 1, 1921, the last series of which will fall due September 1, 1930. Total bonded debt is $5.00 per acre.

For the purpose of levying assessments to meet maintenance and operation charges, bond issues and interest on bonds, the land is classified into four grades, which are assessed on valuations of 25c, $10.00, $15.00 and $20.00 per acre respectively. The levy for maintenance and operation for 1916 was 45 mills and that for bonds and interest was 60 mills. The charges therefore for water per acre for 1916 were as follows:

Land Valuation	Operation and Maintenance	Bonds and Interest	Total
$10.00	$0.45	$0.60	$1.05
15.00	0.67½	0.90	1.57½
20.00	0.90	1.20	2.10

This District has an irrigable area of 7,275 acres, of which about 6000 acres were irrigated during the season of 1916. Diversified and intensive farming is practiced on nearly all the farms under this canal. The principal crops are beets, alfalfa and potatoes. Other crops do well, but are not as profitable as the crops mentioned.

The canal is in good shape, all wooden structures including bridges, are being replaced with concrete. The cost of maintenance should grow less from year to year on account of the structures being constructed in a permanent manner.

Farmers Irrigation District (D918-A660). The Farmers Irrigation District, or Tri-State Project as it is called, is second in size and importance in the state, and by far the largest enterprise constructed by private capital.

On August 31, 1887, some settlers, who formerly had lived in the irrigated sections of Colorado, organized the Farmers' Canal Company, and on September 16 posted notices of appropriation on the north bank of the river in Section 10, township 23 north, range 58 west; copies of the notices were filed in the office of the county clerk of Cheyenne County, which at that time included the territory now in Scotts Bluff County. This was the first instrument making claim for irrigation purposes to be filed within the State.

Construction was begun in 1888 and continued until 1890, at which time the canal had been completed for a distance of 10 miles, at a cost of about $7,800. The work was done by the stockholders, each being assigned a certain stretch of work which was estimated to represent the amount of the stock subscribed by him. In 1891, these farmers, finding that they were not financially able to complete the work, sold the canal, reserving perpetual water rights to themselves, to a company which was promoting a much larger project, and wished to use the line of the canal as its right of way.

This succeeding company authorized a bond issue of $250,000 and proceeded to enlarge and extend the canal by opening up detached stretches through a distance of 25 miles. It was forced to cease construction in 1893 on account of the inability to float more bonds. The actual cost of construction undertaken amounted to about $86,000, which together with the accrued interest, brought the total to approximately $100,000. Not being able to meet the accrued interest or the bonds falling due, foreclosure proceedings were brought in 1898, and the canal sold by an order of the court in 1901.

On March 4, 1897, twenty-eight landowners under the canal filed a petition with the county commissioners of Scotts Bluff County, praying for the organization of an irrigation district, and on March 17 the commissioners approved the petition and called an election to be held on April 10. On April 19, the commissioners met as a canvassing board and finding 29 votes "yes" and 1 vote "no," declared the district duly organized, but this organization did not obtain control of the canal at this time.

The Tri-State Land Company, with an authorized capital stock of 160,000 shares of the par value of $100 each, was organized in 1904 and purchased the rights of the Farmers Canal Company. In 1905, they began to enlarge and extend the canal. To supplement the appropriation from the river this company in 1912 purchased at a cost of $500,000 a perpetual right to 180,000 acre-feet of stored water annually from the Pathfinder Reservoir.

On October 14, 1912, the landowners within the irrigation district as organized in 1897, held an election and voted bonds in the sum of $2,550,000.00 with which to purchase the canal system, and water rights of the Tri-State Company. At this election, additional bonds in the sum of $153,000 were voted to be used in making some improvements and meeting the accrued interest at the end of the first year. These bonds were issued under date of January 1, 1913.

The present outstanding bonded indebtedness of the Farmers Irrigation District amounts to $2,203,000.00—$500,000.00 of the bonds of the district having been cancelled and cremated by the terms of a certain contract between the District, The United States and the Tri-State Land Company, through which contract the District saved $25,000 in cash which had been paid to the United States by the Tri-State Land Company, and 6% interest on $500,000.00 of its bonds amounting to $30,000.00 per year or $600,000.00 during the 20 years in which the bonds were to run, in exchange for which the District assumed an indebtedness to the United States of $475,000.00 payable in installments as follows: Without interest, $9,500.00 on September 1, 1915, $9,500.00 each July 15, 1916, 1917, 1918; $19,500.00 each July 15, 1919 and 1920; $28,500.00 each July 15, 1921 to 1934. The United States having the right to carry 250 second feet of water through the District's Canal from its headgate to Red Willow Creek.

For the purpose of providing funds with which to pay maintenance and operation expenses and to provide interest on outstanding bonds the lands within the District are assessed each year, against which assessment a certain mill levy per dollar of assessed valuation is made. In the year 1915 a levy of 40 mills on the dollar was made for maintenance and operation and 50 mills on the dollar to provide interest on bonds. Lands were assessed at $40.00 and $50.00 per acre, therefore the lands which were assessed at $40.00 per acre were obliged to pay $1.60 per acre for maintenance and operation and $2.00 per acre for bond interest making a total tax per acre of $3.60. Gravel and seepage lands were assessed at $4.00 an acre, making a tax of 36c per acre. A few tracts were assessed at $10.00, $20.00 and $30.00. The average cost per acre for maintenance and operation was $1.05. The average cost per acre for bond interest was $2.04.

In the year 1916 the land assessments were the same as in 1915, though the mill levy was slightly increased being 40 mills for maintenance and operation and 55 mills for bond interest, making the cost per acre on $40.00 lands $1.60 for maintenance and operation and $2.20 for bond interest, a total per acre of $3.80; and on $50.00 lands $2.00 for maintenance and operation and $2.75 for bond interest or a total of $4.75 per acre.

Included within the boundaries of the District are 64,000 acres of land of which between four and five thousand acres are gravel and seep lands.

The principal crops are sugar beets, potatoes, small grain of all kinds, corn and alfalfa.

Lisco Canal (D-856, A-991), and North River Irrigation Canal and Water Power Company (A-243). These two enterprises are so closely related that it will be best to consider them together. In July, 1893, Reuben Lisco posted a notice of appropriation for 32.86 second feet of water on the north bank of the river in Section 14, township 18 north, range 47 west, and built the Lisco canal, which was five miles long, for the purpose of irrigating his own lands. In 1896, the North River Irrigation Canal and Water Power Company was organized and made an application for a water right for 168.29 second feet of water. This Company proposed to irrigate a stretch of territory east of that watered from the Lisco ditch and desired to use the same right of way. A contract was entered into whereby the company enlarged the Lisco canal, and in return agreed to carry free of charge the water to which Lisco was entitled. The company was composed entirely of farmers, who worked out the stock subscribed for upon the following basis: The entire yardage to be removed was estimated, from which the number of yards to be moved for each 40-acre tract was determined; The farmers built 33 miles of canal, in addition to enlarging the five miles of the Lisco ditch during the years 1896-1898. According to the yardage estimates made, it would have cost $33,000 to build the canal by contract.

The Lisco canal formerly covered 1500 acres, and the completed canal brought an additional 12,000 acres under the ditch. Water was used by the farmers in this larger area for several years, then dissensions over the use of the water arose and the ditch was allowed to deteriorate. It was not used after 1900, when a large break occurred in the Sand draw that was never repaired. When the company failed to keep the canal in repair, in accordance with the contract, Lisco was forced to keep the upper end in running order to supply water to his lands. He immediately brought an action, and obtained a decree giving him his water right and the five miles of the canal on his former right of way. He then attached the canal of the company for the costs of the suit and took possession of the upper seven miles, thus making the Lisco canal twelve miles long instead of five miles. In 1910 Lisco made an application for three second-feet additional, in order to cover all the lands below the canal. He then listed his own lands for sale, attaching a water right to each tract sold.

A mutual stock company with a capital stock of $20,000 has been organized and has taken over the management of the canal. There are about 2800 acres under the ditch, and during the season 1916 about 2800 acres were under irrigation. The maintenance and operation charges have been very low, being only 25c per acre.

Midland Canal (D-789) and Overland Canal (D-791). These two canals were built during 1894 and 1895 by individuals. Each cost about $2,000. The Midland has a length of about 4½ miles, and the Overland a length of 5 miles. The Overland heads below the Midland, but being built on a lighter grade it crosses over the Midland two miles below the headgates of that canal. Since 1905, the portion of the ditch lying below the Midland canal has been practically abandoned, the water being brought from the river through the upper portion of the Midland Canal. This practically combines the two ditches.

The Midland Canal is owned by C. E. Roberts, and is free from all indebtedness. About 320 acres are under irrigation, crops being mostly alfalfa and corn.

The Overland Canal is owned by the Western Land & Cattle Company, has under irrigation about 1040 acres of alfalfa, corn and native hay, in addition to small garden patches and some fruit; is free from all indebtedness, and during the past year the operation and up-keep of this canal was about $300.00.

The Suburban Irrigation District (D-662). A notice of appropriation was posted on the south bank of the river in Section 12, township 14 north, range 33 west, on May 22, 1894, and on May 24, 1894, the Farmers and Merchants Irrigation and Land Company was organized with a capital stock of $50,000. On July 20, 1894, the articles of incorporation were amended, changing the capital stock to $25,000. This company proposed to build a canal to cover all the lands lying in the delta around and below the town of North Platte, and during the years 1894 and 1895, 18 miles of canal were built at a cost of $25,000.

On January 28, 1896, a petition was filed with the county commissioners of Lincoln County, praying for the organization of an irrigation district, and on March 16, the commissioners approved the petition, and called an election for April 10. On April 20, the commissioners met as a canvassing board, and finding ten votes "yes" and one "no," declared the district duly organized. The district voted bonds in the sum of $26,000 for the purchase of the canal. The area of the district is about 8500 acres, and practically all of the same has been irrigated more or less during the existence of the district.

The last of the $26,000.00 bonded indebtedness was paid in July of 1916, and the district is now entirely free of indebtedness, and has paid all of the costs of maintenance for the past three years upon a cash basis. The assessment for 1915 amounted to a total of $1.00 per acre, being 36c per acre for maintenance, 4c per acre for interest on bonds, and 60c per acre to pay the balance of the principal of the bonds. For this year, that is 1916, the only levy is 40c per acre for maintenance. For twenty years of the existence of the district, the average tax has been 55c per acre, and the highest being the $1.00 per acre in 1915 when the last of the bonded indebtedness was paid, and the lowest 15c.

The Board of Directors have replaced several old wooden drops and checks with reinforced concrete, and have also erected two large concrete and steel flumes, and two concrete and steel bridges. It is expected that the tax of 40c an acre will be sufficient for maintenance and to replace all wooden structures in the near future.

The principal crops raised are alfalfa, wild hay, small grain, corn and beets.

Winters Creek Canal (D-952). The Winters Creek Irrigation Company was incorporated October 1, 1888, with a capital stock of $10,000, represented by 100 shares of the par value of $100 each. Sixteen persons subscribed for 80 shares, each share representing 40 acres of land. Surveys of the canal were completed during November, 1888, and construction was undertaken the same month. No contract was let for the construction, each shareholder being allowed to work out 90 per cent of the par value of the stock subscribed; the other 10 per cent was paid in cash. During the winter the number of stockholders increased to thirty, and by May 1, 1889, about ten miles of the canal had been built. Water was diverted and was run the entire length of the canal that season. In the winter of 1889-1890, the authorized capital stock was increased to $10,700 by issuing seven more shares. The canal was enlarged and extended to its present length of 12 miles.

On January 1, 1911, the Company was re-incorporated with a capital stock of $96,000, represented by 960 shares of the par value of $100 each. A large portion of this stock is now held by the Imperial Land Company, a subsidiary of the Scotts Bluff Sugar Company.

The Company acts merely as a common carrier, and makes an annual charge of $3.00 per acre upon all contracts executed prior to May 15th, of each year and $4.00 per acre upon all contracts executed after the 15th of May, for the service of delivering the water to the headgate of the lateral. The laterals were built almost entirely by the farmers.

The headgates are located in Section 17, township 22 north, range 55 west, on a bend in the north bank of the river, and during the past, drifting sand has entered the headgates and settled in the upper portions of the canal interfering greatly with the operation.

There are 5840 acres of irrigable land lying below the canal and during the season of 1916, water was supplied to approximately 5,000 acres. The principal crops grown are alfalfa and sugar beets, the latter predominating, as the greater portion of the land lies close to the beet-sugar factory at Scottsbluff.

CANALS ALONG PUMPKIN SEED CREEK.

Meredith and Ammer Ditch (D876). The Meredith and Ammer Ditch was built in 1893. The system consists of two ditches, one on either side of the creek, diverting water at the same dam. The ditch on the west side is two miles long, and the one on the east side is 2½ miles long. At present the ditch is owned by a co-partnership, consisting of four equal interests. There is no bond mortgage or other indebtedness against the ditch. The cost of maintenance is nominal, probably not to exceed one hundred dollars. Up to date a concrete dam has been constructed at a cost of about four thousand dollars.

About 900 acres are under irrigation. Crops irrigated are wheat, oats, corn, spelts, potatoes and alfalfa, also a considerable acreage irrigated for wild hay.

Mutual Ditch (D843). The Mutual Ditch Company was incorporated with a capital stock of $10,000, each share representing a water right to forty acres, and having a par value of $100. Four miles of ditch were built during 1891 at a cost of $2,140.00. New headgates were built in 1912 at a cost of $250.00. One hundred and sixty acres were irrigated in 1914, and about 200 acres in 1915 and 1916. The assessments are made for the current year's expenses on the number of shares held; the expense of operation and maintenance is about 30c per acre.

Crops irrigated are mostly alfalfa and wild hay.

CANALS ALONG THE REPUBLICAN RIVER.

Dundy County Ditch (D118). The Dundy County Irrigation Company was organized in 1890, and 21 shares, with a par value of $500, were subscribed by the water users, each share representing the right to one second-foot of water. However at the present time, all the old users of water have dropped out with the exception of Wm. Hickley—five shares, and L. Morse—ten shares. The Company posted a notice of appropriation on November 22, 1890, at a point on the north bank of the stream in Section 24, township 1 north, range 39 west. Construction was begun immediately and during 1891 eleven miles of canal were built, the work being done almost entirely by the stockholders. The cost of the canal was $4500 of which $1500 was spent in the construction of headgates and three flumes. The Company extended the canal 2¼ miles in 1894 at a cost of $700. During the first five years of operation the cost of maintenance almost equalled the first cost of the canal, and the two lower flumes were allowed to become dilapidated. At the present time only six miles of canal, including the upper flume, are in operation. On account of the shifting sands of the river bed the Company does not attempt to maintain a dam across the river, but when the flow becomes low they construct a temporary dam of brush and straw. The acreage cost of maintenance is about $300 per year.

The Meeker Canal (D-4-7-8-9), now operating as The McCook Ditch Company, heads on the south bank of the Republican River in Section 15, township 3 N, Range 31 West, 4½ miles east of Culbertson, Nebraska. Nineteen miles of this canal were built during the years 1891-1892. Two precincts of Red Willow county voted and issued $10,000 in bonds to aid in the construction. The balance of the money for construction was raised by the builders on personal notes.

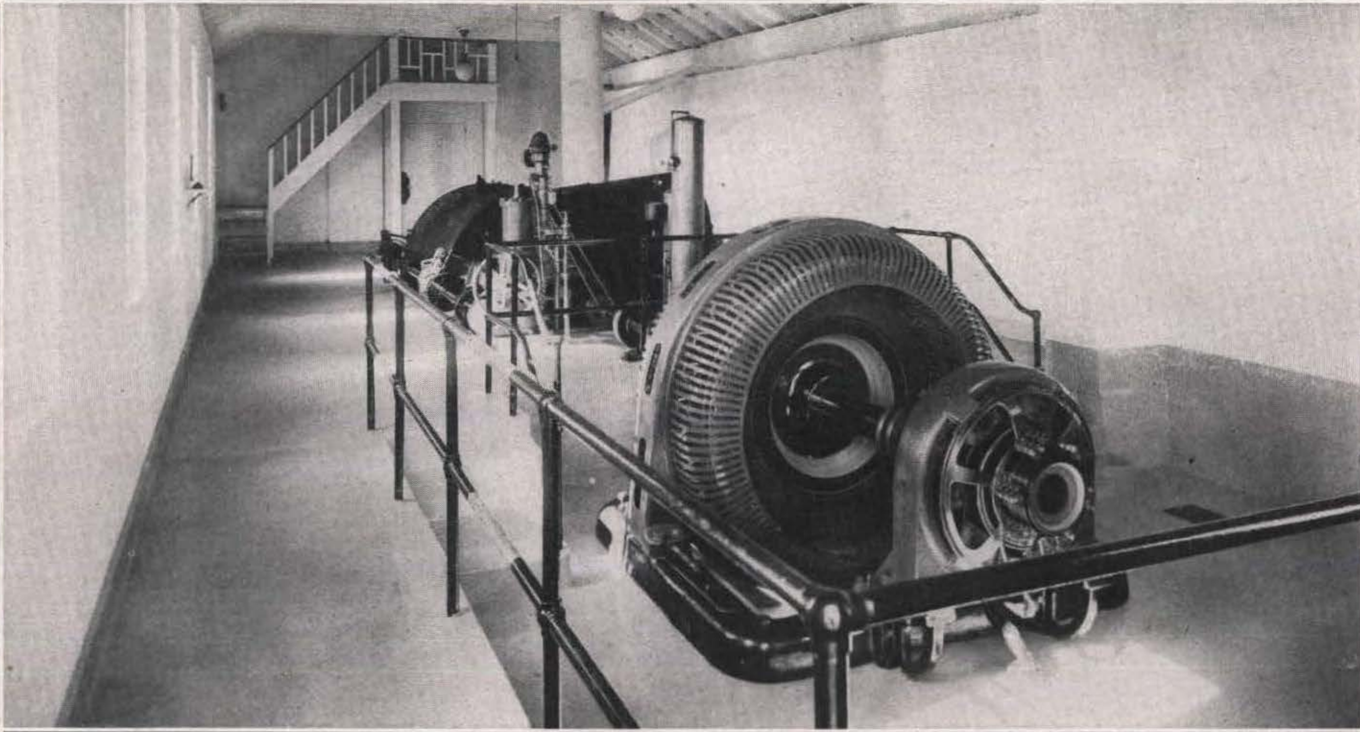
In 1893, the McCook Irrigation and Water Power Company was organized with a capital stock of $50,000 and took over the canal. The Company then extended the canal 3½ miles, but this portion was later abandoned, on account of the excessive cost of maintenance. The company purchased the Carson ditches, Nos. 1 and 2, holding prior rights and abandoned them, transferring the water rights to the Meeker Canal. The cost of construction of the system was $50,000.

Water rights for 160 acres were formerly sold for $2,000, but the price has been advanced to $35 an acre. Up to the season of 1915, there was an additional maintenance charge of $1.00 per acre. This amount, however, was found to be inadequate to meet the operating expenses of the Canal, and this maintenance charge was raised to $2.00 per acre in 1915 by the State Railway Commissioners. There are paid-up water rights for 2400 acres under the canal; water is also leased to non-holders of water rights, the rental price being $3.50 per acre. There are 10,000 acres lying below this Canal, 3,950 acres were irrigated in 1911, 4200 acres in 1912, and 2561 acres during the season 1914. This Canal was not operated extensively during the season of 1915, due to excessive rainfall, which eliminated any direct need of water for irrigation purposes. This excessive rainfall caused considerable damage at various points along the canal in the way of washouts and flooding dirt into the channel.

In November, 1915, a petition for Receivership was filed, and on November 20, 1915, the McCook Irrigation and Water Power Company passed into Receiver's hands. At the Receiver's sale, held in March, 1916, the McCook Irrigation and Water Power Company was purchased by Mr. W. H. Ferguson of Lincoln Nebraska, and has since been operated under the name of McCook Ditch Company.

Beginning in April, 1916, extensive repairs and improvements have been made at various points along the Canal, mostly in the line of Spillways, widening and cleaning and increasing the carrying capacity of the Canal. These extensive repairs incurred a cost of $10,000 to the present operators.

Under ordinary conditions the maintenance charge of $2.00 per acre should be sufficient to meet the operating expenses for the season. Corn,



WATER WHEEL ROOM, 1000 K. W. GENERATING 1350 H. P. WATER WHEEL, KEARNEY POWER PLANT sugar beets, alfalfa, wheat and potatoes are the principal crops under this canal.

Rupert Ditch (A-1192). This ditch was constructed by the Rupert Ditch Company in 1912-1913. All the stock is owned by some of the landowners under the ditch. The ditch is nine miles long, and has three siphon flumes, all of concrete. The ditch has been damaged considerable by the floods of 1915, and since then they have had plenty of rain so the ditch has not been used.

CANALS ALONG THE SOUTH PLATTE RIVER.

Miller and Warren Ditch (D-805). A notice of appropriation was posted January 5, 1895, and construction of ditch begun. In all about six and one-half miles of canal have been built at a cost of about $4500.

A mutual company, called the "Miller and Kimball Canal Co.," was organized in 1903, and now own and control the canal. There are about 3760 acres under the canal, each share of stock covers a water right for forty acres; forty-five shares of stock have been issued. No indebtedness. The ditch is maintained by stockholders, and no assessments made for repairs as yet. The affairs of the Company are conducted by three directors, elected annually by the stockholders.

Prairie hay and alfalfa are the principal crops raised.

CANALS ALONG WHITE TAIL CREEK.

Keystone Canal (A-662B, 843, 1003)—West Keystone Canal (A1001) —Foster Keystone Canal (D730). The Keystone Irrigation Company was incorporated in 1909 with a capital stock of $100,000.00, all of the stockholders being owners of land under the Company's ditches. The Corporation has no bonded or other indebtedness. The organization includes practically all of the old canals and water rights in the North Platte Valley in the vicinity of Keystone, including the irrigation interest of the W. A. Paxton estate. Five thousand acres of land are covered by the different ditches of the company and the water is used extensively. The water supply comes from White tail and other creeks which keep up their flow during all kinds of seasons.

The cost of maintenance has been only nominal so far, being only 10 to 15c per acre per year.

The crops irrigated are alfalfa and wild hay, to furnish feed for the large herds of cattle; also sugar beets, corn and other general farm crops.

CLAIMS AND APPLICATIONS GRANTED AND PENDING.

The following tables give a complete list of all claims and applications for water, which have been granted by the State Board of Irrigation, Highways and Drainage, and which have never been cancelled; also all applications and claims now pending.

In these tables, the claims and applications have been arranged in each water division by streams in alphabetical order, and the appropriations on each stream are arranged in order of their priority on that stream.

Those having docket numbers are claims made covering rights acquired under the law prior to April 4, 1895, and those having application numbers are applications for permits to appropriate water made under the law of 1895.

(In the following tables Docket and Appropriation Nos. are marked with an asterisk (*) where claims are pending before the Department.)

CLAIMS AND APPLICATIONS BY STREAMS IN DIVISION 1-A

Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate				Date of Priority			Docket No.	App. No.
						S	T	R	County	Month	D	Yr.		
Ash Creek	Vance, Roscoe	Lewellen	Vance Ditch	Irrig.	1.14	27	16	42	Deuel	June	14	1890	765	......
Ash Creek	Gillard, George	Lewellen	Gillard Ditch	Irrig.	1.43	3	16	42	Deuel	Dec.	31	1890	812	......
Ash Creek	McCormick, C.	Lewellen	McCormick	Irrig.	......	16	16	42	Deuel				1011*	......
Beaver Lake	Baldridge, A. F.	Alliance	Beaver	Irrig.	170.00	16	20	44	Garden	Aug.	6	1910	......	1018
Birdwood Creek	Eq. Farm & S. Imp. Co.	North Platte	Birdwood Ditch	Irrig.	100.00	35	15	33	Lincoln	Oct.	21	1893	646	......
Birdwood Creek	Eq. Farm & S. Imp. Co.	North Platte	W. Side Birdw'd Ditch	Irrig.	8.57	22	15	33	Lincoln	Jan.	16	1894	652	......
Birdwood Creek	Beauchamp, W. K	Sutherland	Beauchamp Ditch	Irrig.	3.00	15	15	33	Lincoln	Sept.	19	1894	677	......
Birdw'd Ck. E. B	McCabe, N.	North Platte	McCabe Ditch	Irrig.	5.00	3	16	33	Lincoln	Mar.	1	1901	......	602
Blue Creek	Union Irr. & W. P. Co.	Lewellen	Union Irr. & W. P. Canal	Irrig.	24.64	18	16	42	Deuel	May	16	1890	763	......
Blue Creek	Iowa Irr. & Imp. Co.	Lewellen	Blue Creek Ditch	Irrig.	12.86	6	16	42	Deuel	Sept.	7	1893	781	......
Blue Creek	Blue Creek Irr. Dist.	Lewellen	Blue Creek Canal	Irrig.	107.29	33	17	42	Deuel	Dec.	27	1893	785	......
Blue Creek	Iowa Irr. & Imp. Co.	Lewellen	Ia. Irr. & Imp. Co. D.	Irrig.	12.00	7	16	42	Deuel	Feb.	24	1894	786	......
Blue Creek	Graf, Robt. E.	Lewellen	Graf Ditch	Irrig.	61.42	19	16	42	Deuel	April	2	1894	788	......
Blue Creek	Winterer, Jacob H.	Lewellen	High Line Ditch	Irrig.	20.00	21	17	42	Deuel	Sept.	27	1894	795	......
Blue Creek	Paisley Irr. District	Lewellen	West Side Ditch	Irrig.	21.00	28	17	42	Deuel	Nov.	20	1894	800	......
Blue Creek	Paisley Irr. District	Lewellen	Paisley Irrig. Ditch	Irrig.	4.00	33	17	42	Deuel	July	14	1899	......	515
Blue Creek	Slesser, David	Oshkosh	Fair View	Power	62.60	4	18	43	Garden	July	18	1910	......	1009
Blue Creek	Eggers, J. E.	Lewellen	The Eggers Extension	Irrig.	.42	33	17	42	Garden	Jan.	4	1912	......	1154
Brown's Creek	Haxby, Geo. H.	Bridgeport	Hackberry Ditch	Irrig.	.43	19	20	48	Cheyenne	July	17	1903	......	717
Buckhorn Spgs.	Maddox, P. P.	Keystone	......	Irrig.	2.28	8	14	36	Keith	Oct.	3	1908	......	918

CLAIMS AND APPLICATIONS BY STREAMS IN DIVISION 1-A—(Continued)

Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate				Date of Priority			Docket No.	App. No.
						S	T	R	County	Month	D	Yr.		
Buffalo Ck. W.	Henry, Absalom	Cozad	Henry Canal	Irrig.	.07	23	11	23	Dawson	July	2	1900		570
Camp Creek	Wehn, J. W.	Alliance	Camp Creek Ditch	Irrig.	1.43	13	18	49	Cheyenne	March	16	1892	866	
Cedar Creek	Radcliffe, Mack	Sidney	Nelson & Radcliffe D.	Irrig.	2.77	28	18	48	Cheyenne	June	1	1882	1034a	
Cedar Creek	Radcliffe, Mack	Sidney	Radcliffe Ditch No. 2	Irrig.	1.23	34	18	48	Cheyenne	July	1	1885	1034b	
Cedar Creek	Radcliffe, Mack	Sidney	Radcliffe Ditch No. 3	Irrig.	.76	27	18	48	Cheyenne	Feb.	14	1890	1034c	
Cedar Creek	Banderet, Frank	Paxton	Cedar Creek Ditch	Irrig.	1.57	17	14	35	Keith	Jan.	3	1911		1051
Cedar Creek	Belmont Irr. C. & W. P. Co.	Bridgeport	Cedar Creek Feeder	Irrig.	5.00	23	18	48	Morrill	Jan.	7	1915		1397
Clear Creek	Hooper, D. C.	Lewellen	Clear Creek Ditch	Irrig.	2.86	32	16	41	Keith	July	1	1888	748	
Clear Creek	Barber, F. H., Marsh, W. F.	Lewellen	Clear Creek Canal	Irrig.	14.57	29	16	41	Keith	May	30	1893	754	
Clear Creek	Green, Nelson A.	Lewellen	Clear Creek Ditch	Irrig.	1.14	32	16	41	Keith	May	30	1893	756	
Clear Creek	Green, Nelson A.	Lewellen	Green Ditch	Irrig.	1.14	29	16	41	Keith	June	1	1893	745	
Clear Creek	Scott, G. T., Williams, E. C.	Lewellen	Scott & Williams Ditch	Irrig.	1.00	28	16	41	Keith	May	18	1894	747	
Clear Creek	Frank H. Barber	North Platte	Finch Ditch	Irrig.	1.43	4	15	41	Keith	June	30	1895	964	
Clear Creek	Barber, F. H. et al	Lewellen	Clear Creek Extension	Irrig.	1.14	31	16	41	Garden	July	5	1911		1111
Cold Water Ck.	Lisco Irr. Co.	Lisco	Cold Water Ditch	Irrig.	4.29	26	18	46	Deuel	Sept.	28	1894	796	
Coon Creek	Winterer, Wm. H.	Keystone	Coon Creek Ditch	Irrig.	.71	34	15	37	Keith	July	3	1895		69
Coon Creek	Winterer, Wm. H.	Keystone	Coon Creek Ditch	Irrig.	1.42	34	15	37	Keith	Sept.	16	1912		1225
Dougout Creek, S. W. Lower	Hagerty, Michael H.	Broadwater	Cooper Ditch	Irrig.	.86	4	19	48	Cheyenne	Aug.	15	1892	872	
S. W. Lower	Mulloy, Coote C.	Irving	Mulloy Ditch	Irrig.	1.00	27	27	48	Cheyenne	July	18	1907		865
S. W. Lower	Hubbard, Henry	Broadwater	Hubbard Ditch	Irrig.	.29	4	19	48	Morrill	June	23	1910		1005

CLAIMS AND APPLICATIONS BY STREAMS IN DIVISION 1-A—(Continued)

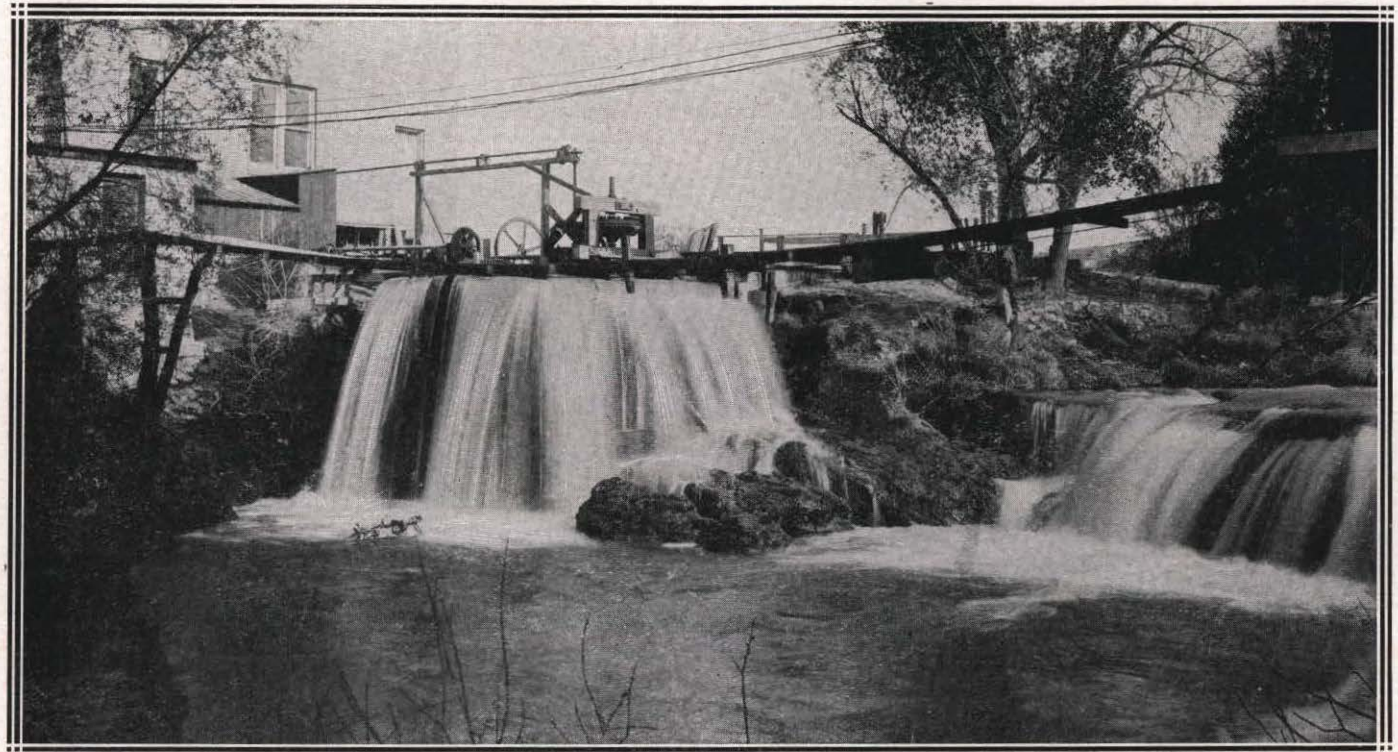
Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate				Date of Priority			Docket No.	App. No.
						S	T	R	County	Month	D	Yr.		
Dougout Creek	Hagerty, M. H.	Broadwater	Hagerty Ditch	Irrig.	1.00	4	19	48	Morrill	Oct.	26	1912		1238
Fremont Creek	Eq. Farm & S. Imp. Co.	North Platte	Fremont Creek Ditch	Irrig.	9.29	15	13	30	Lincoln	Jan.	31	1894	686	
Golden Creek	Thies, Perry J.	Ogallala	Theis Ditch	Irrig.	2.71	25	15	39	Keith	Sept.	17	1895		160
Greenw'd Creek	Coulter, D. M. and H. M.	Lovel'd Col.	Coulter Ditch	Irrig.	4.00	15	18	50	Cheyenne	Feb.	3	1890	830	
Greenw'd Creek	Trinnier, J. E.	Redington	Trinnier Canal	Irrig.	6.29	28	18	50	Cheyenne	April	6	1891	849	
Greenw'd Creek	Nelson, C. C. and Trinnier, J. E.	Redington	Nelson Canal	Irrig.	3.00	33	18	50	Cheyenne	April	1	1892	845	
Greenw'd Creek	Capron, A. M., Lamb, J.	Redington	Capron & Lamb Ditch	Irrig.	2.00	15	18	50	Cheyenne	Jan.	1	1893	890	
Greenw'd Creek	North & Robinson Co.	Bridgeport	Meglemre Ditch	Irrig.	.59	10	18	50	Cheyenne	May	6	1896		294
Greenw'd Creek	Dean, H. T.	Bridgeport	Dean Ditch	Irrig.	8.86	10	18	50	Cheyenne	Dec.	5	1906		844
Greenw'd Creek	Meglemre, Sarah A.	Longm't Col.	Meglemre Extension	Irrig.	1.50	10	18	50	Cheyenne	March	11	1907		853
Greenw'd Creek	North, Robinson, Dean Co.	Bridgeport		Irrig.		10	18	50	Morrill	Dec.	14	1910		1045*
Horse Creek	Mihan, John	Caldwell	State Line Ditch	Irrig.	3.07	33	23	58	Scotts Bluff	Sept.	10	1897		407
Horse Creek	Brazel, P., Marsh, G.	Caldwell	Marsh & Braziel Ditch	Irrig.	7.19	4	22	60	Wyoming	Nov.	24	1908		921
Horse Creek	Gilmore, F. D.	Caldwell	Gilmore Ditch	Irrig.	9.00	33	23	58	Scotts Bluff	Feb.	21	1910		983
Horse Creek	Mihan, John	Caldwell	State Line Ditch	Irrig.	2.00	33	23	58	Scotts Bluff	April	21	1910		994
Horse Creek	Jackson, Joel	Henry	Jackson Extension	Irrig.	1.00	27	23	58	Scotts Bluff	May	19	1910		1000
Horse Creek	Marsh-Braziel	Caldwell	Marsh-Braziel Ext.	Irrig.	13.	4	22	60	Wyoming	Sept.	18	1911		1126
Horse & Owl Cks	Pizer, H. J.	Mitchell	Horse Creek Ditch	Irrig.	0.86	34	23	58	Scotts Bluff	Feb.	29	1904		742

Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate				Date of Priority			Docket No.	App. No.
						S	T	R	County	Month	D	Yr.		
Huntington Spg.	Cord, Fred	Hull	Cord Ditch	Irrig.	1.43	9	20	58	Scotts Bluff	Dec.	23	1904		778
Indian Creek	Brown, K. G.	Angora	Indian Creek Canal	Irrig.		16	21	50	Morrill	June	13	1916		1456*
Kiowa Creek	Currie, Edwin A.	Mitchell	Currie Ditch	Irrig.	9.14	13	21	57	Scotts Bluff	March	23	1892	938	
Kiowa Creek	Kellums, J. H.	Caldwell	Kellums Ditch	Irrig.	2.43	11	22	58	Scotts Bluff	Oct.	18	1901		641
Kiowa Creek	Lowry, Ellis	Mitchell	Lowry Canal	Irrig.	0.52	31	22	57	Scotts Bluff	March	25	1904		746
Kiowa Creek	Kellums, J. H.	Caldwell	Kellums Ditch No. 2	Irrig.	0.57	1	22	58	Scotts Bluff	Nov.	29	1907		880
Lawrence Fork	Lindburg, Fred R.	Bridgeport		Irrig.	0.50	28	18	52	Cheyenne	Dec.	31	1886	825	
Lawrence Fork	Gilman, Byron, Crigler, E. S.	Redington	Redington Ditch	Irrig.	0.57	36	19	52	Cheyenne	Oct.	9	1889	820	
Lawrence Fork	Lindberg, Fred R.	Bridgeport	E. S. Crigler Ditch	Irrig.	0.57	1	18	52	Cheyenne	Sept.	11	1891	861	
Lawrence Fork	Niehus, J. W.	Redington	Spring Branch Ditch	Irrig.	1.00	11	18	52	Cheyenne	Oct.	23	1891	862	
Lawrence Fork	Redington, H. V.	Redington	Redington Ditch	Irrig.	0.50	11	18	52	Cheyenne	May	1	1893	893	
Lawrence Fork	King, W. O.	Kearney	Doran Canal	Irrig.	1.14	15	18	52	Cheyenne	June	1	1894	850	
Lawrence Fork	Harper, John W., Niehus, J. W.	Redington, Sidney	Spring Branch Ext.	Irrig.	0.57	1	18	52	Cheyenne	Oct.	13	1898		476
Lawrence Fork	Lindberg, Fred	Bridgeport	Crigler Extension	Irrig.	1.43	1	18	52	Cheyenne	Nov.	25	1898		486
Lawrence Fork	Niehus, Henry	Redington	Niehus Ditch	Irrig.	0.86	11	18	52	Cheyenne	March	23	1900		550
Lawrence Fork	Niehus, J. W.	Redington	Harper Ditch	Irrig.	1.43	11	18	52	Cheyenne	May	27	1902		669
Lawrence Fork	Harper, John W.	Sidney	Bicket Ditch	Irrig.	0.57	11	18	52	Cheyenne	May	27	1902		670
Lawrence Fork	Randall Bros.	Redington	Randall Bros. Ditch	Irrig.	2.57	21	18	52	Cheyenne	May	15	1911		1100
Lawrence Fork	King, Wm. O.	Kearney	King's Canal	Irrig.	4.00	15	18	52	Buffalo	Dec.	8	1915		1440
Lonergan Creek	Soehl, Herman A.	Lemoyne	Soehl Canal	Irrig.	2.00	17	15	39	Keith	May	10	1889	697a	
Lonergan Creek	Jacobs, Lee	Ogalalla	E. Lonergan Ditch	Irrig.	9.14	17	15	39	Keith	May	25	1889	699	

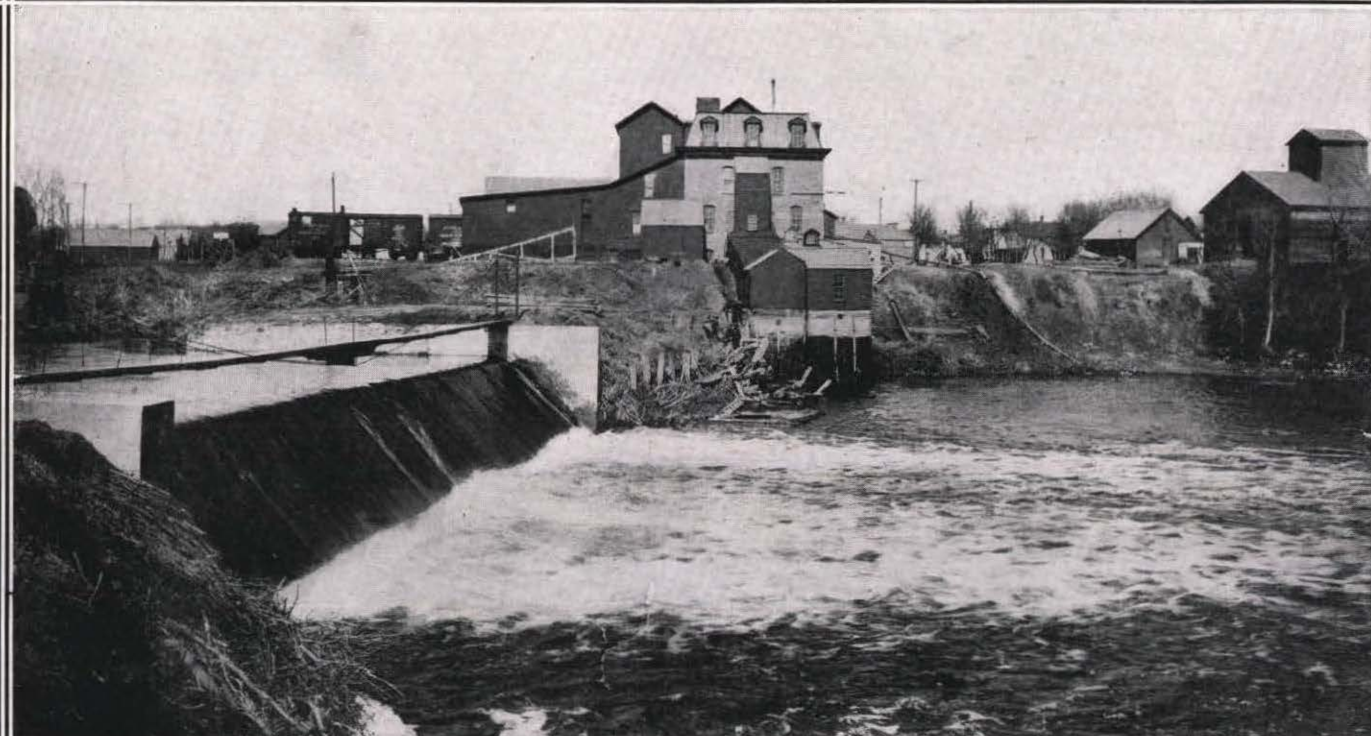
Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate				Date of Priority			Docket No.	App. No.
						S	T	R	County	Month	D	Yr.		
Lonergan Creek	Soehl, Herman A.	Lemoyne	Soehl Canal	Irrig.	0.86	17	15	39	Keith	April	27	1893	697b	......
Lonergan Creek	Stansberry, Elvina	Lemoyne	Haney Ditch	Irrig.	1.14	17	15	39	Keith	July	1	1893	719	......
Matthews Creek	Mathews, Benj. G.	Keystone	Mathews Canal	Irrig.	1.14	28	15	37	Keith	April	1	1895	750	......
Nine Mile Can.	Nine Mile Irr. District	Bayard	Nine Mile Seep. Canal	Irrig.	0.79	10	21	53	Morrill	Aug.	19	1915	......	1431
North Platte R.	Platte Valley Irr. Co.	North Platte	North Platte Canal	Irrig.	300.00	13	14	34	Lincoln	May	31	1884	635	......
North Platte R.	Farmers Irr. District	Scottsbluff	Farmers' Canal	Irrig.	1142.86	3	23	58	Scotts Bluff	Sept.	16	1887	918	......
North Platte R.	Minatare Mut. C. & I. Co.	Minatare	Minatare Ditch	Irrig.	249.43	32	22	54	Scotts Bluff	Jan.	14	1888	919	......
North Platte R.	Winters Creek Irr. Co.	Gering	Winter Creek Canal	Irrig	124.29	17	22	55	Scotts Bluff	Oct.	18	1888	952	......
North Platte R.	Enterprise Ditch Co.	Scottsbluff	Enterprise Ditch	Irrig.	173.71	27	23	57	Scotts Bluff	March	28	1889	920	......
North Platte R.	Castle Rock Irr. C. & W. P. Co.	McGrew	Castle Rock Irr. Canal	Irrig.	82.57	4	21	54	Scotts Bluff	April	18	1889	921	......
North Platte R.	Logan, Chas. E.	Bridgeport	....	Irrig.	5.71	19	20	50	Cheyenne	Oct.	17	1889	821	......
North Platte R.	Bridgeport Irr. Dist.	Bridgeport	Belmont Canal	Irrig.	270.00	18	20	51	Cheyenne	Dec.	19	1889	828	......
North Platte R.	Central I. C. & W. P. Co.	Gering	Central I. C. & W. P. Canal	Irrig.	36.00	27	22	55	Scotts Bluff	June	23	1890	926	......
North Platte R.	Myers, T. A. etal	Ogalalla	Myers & Phelps Canal	Irrig.	7.14	34	15	39	Keith	Sept.	11	1890	709	......
North Platte R.	Sheridan, J. Wake Est. of	Paxton	Sheridan & Wilson D.	Irrig.	10.00	20	14	35	Keith	Oct.	9	1890	710	......
North Platte R.	Chimney Rock Irr. Canal & Water Power Co.	Chimney Rock	Chimney Rock Canal	Irrig.	60.00	1	20	53	Cheyenne	Dec.	3	1890	844	......
North Platte R.	Chimney Rock C. & W. P. Co.	Chimney Rock	Chimney Rock Canal	Irrig.	0.00	1	20	53	Morrill	Dec.	3	1890	1031	......

CLAIMS AND APPLICATIONS BY STREAMS IN DIVISION 1-A—(Continued)

Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate				Date of Priority			Docket No.	App. No.
						S	T	R	County	Month	D	Yr.		
North Platte R...	Empire Canal Co.........	Bridgeport	Empire Canal..................	Irrig.	28.57	18	20	51	Cheyenne	June	25	1891	858	....
North Platte R...	Jurgens, Otto, Adm. Est. D. Kah...............	Minatare	Kah Ditch........................	Irrig.	4.57	11	21	54	Scotts Bluff....	Nov.	1	1891	944	....
North Platte R...	Brown's Cr. I. C. Co.....	Bridgeport	Brown's Creek Canal....	Irrig.	188.71	29	20	50	Cheyenne	Jan.	20	1892	857	....
North Platte R...	Brown's Cr. I. C. Co.....	Bridgeport	Brown's Ck. Irr. Canal	Irrig.	0.0	20	20	50	Morrill	Jan.	20	1892	1033	....
North Platte R...	Hale, Will A..................	Gering	Homestead Ditch..........	Irrig.	11.43	21	22	55	Scotts Bluff..	June	29	1892	941	....
North Platte R...	Alliance I. C. & W. P. Co.	Bridgeport	Alliance Canal.................	Irrig.	100.00	5	20	52	Cheyenne	Dec.	26	1892	874	....
North Platte R...	Clark, Henry T............	Bridgeport	H. T. Clarke Canal........	Irrig.	9.43	22	20	51	Cheyenne	Feb.	2	1893	875	....
North Platte R...	Ramshorn Ditch Co.......	Morrill	Ramshorn Ditch...........	Irrig.	45.71	13	23	58	Scotts Bluff....	March	20	1893	945	....
North Platte R...	Short Line Irr. Co.........	Bayard	Short Line Canal...........	Irrig.	65.57	25	21	53	Scotts Bluff....	May	1	1893	946	....
North Platte R...	Lisco, Reuben..............	Lisco	Lisco Ditch......................	Irrig.	32.86	14	18	47	Cheyenne	July	1	1893	856	....
North Platte R...	Nine Mile C. & Res. Co.	Bayard	Nine Mile Canal.............	Irrig.	200.00	18	21	53	Scotts Bluff....	Dec.	6	1893	925	....
North Platte R...	Cody & Dillon I. C. Co.	North Platte	Cody & Dillon Irr. Canal	Irrig.	127.00	9	14	31	Lincoln	Dec.	29	1893	649	....
North Platte R...	Keith & Lincoln Co. Irr. Dist........................	Sutherland	S. & P. L. & I. Canal....	Irrig.	186.00	18	14	36	Keith	Feb.	2	1894	722	....
North Platte R...	Paxton & Hershey Water Co......................	Hershey	Paxton & Hershey Can.	Irrig.	130.00	18	14	33	Lincoln	Feb.	12	1894	653	......
North Platte R...	Lisco Irrigation Co.......	Lisco	Bower Ditch	Irrig.	21.37	6	17	45	Deuel	March	27	1894	787	....
North Platte R...	Suburban Irr. District	North Platte	Farmers & Merchants Canal	Irrig.	183.00	12	14	33	Lincoln	May	22	1894	662	....
North Platte R...	South Side I. & L. Co.	North Platte	South Side I. & L. Can.	Irrig.	270.00	14	14	34	Lincoln	June	6	1894	667	....
North Platte R...	Roberts, C. F................	Oshkosh	Midland Canal................	Irrig.	12.00	2	16	44	Deuel	June	9	1894	789	....
North Platte R...	Keith, Morrill C..........	North Platte	Keith Canal......................	Irrig.	71.00	36	14	30	Lincoln	July	7	1894	657	....
North Platte R...	Maycock, Joseph...........	Morrill	Rooster Ditch.................	Irrig.	5.71	10	23	58	Scotts Bluff..	July	29	1894	950	....



WAUNETA MILLS, WAUNETA, NEBRASKA



NELIGH MILLS, NELIGH, NEBRASKA

CLAIMS AND APPLICATIONS BY STREAMS IN DIVISION 1-A—(Continued)

Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate				Date of Priority			Docket No.	App. No.
						S	T	R	County	Month	D	Yr.		
North Platte R...	Smith, Augustus	North Platte	Smith Canal	Irrig.	20.00	36	14	30	Lincoln	Aug.	9	1894	676	......
North Platte R...	Western Land & Cattle Co.	Omaha	Overland I. Canal	Irrig.	20.00	1	16	44	Deuel	Aug.	14	1894	791	......
North Platte R...	Hannah Irr. Canal Co.	Lisco	Hannah Irr. Canal	Irrig.	5.71	24	18	47	Cheyenne	Sept.	24	1894	886	......
North Platte R...	Gumaer, H. G. et al	Oshkosh	Oshkosh Canal	Irrig.	40.00	33	17	44	Deuel	Oct.	5	1894	797	......
North Platte R...	Smith, A. H. et al	Broadwater	Beerline Canal	Irrig.	30.00	24	19	49	Cheyenne	Oct.	13	1894	887	......
North Platte R...	Spohn, Wm.	Oshkosh	Spohn Ditch	Irrig.	13.14	13	17	45	Deuel	Dec.	6	1894	801	......
North Platte R...	Rush Creek Irr. Canal Co.	Lisco	Rush Creek Irr. Canal	Irrig.	9.64	2	17	46	Deuel	Dec.	11	1894	802	......
North Platte R...	Lyons I. C. & W. P. Co.	Oshkosh	Lyons Irr. Canal	Irrig.	42.14	30	17	44	Deuel	Dec.	22	1894	803	......
North Platte R...	Orr, Geo. B. et al	Lewellen	Orr & Vance Canal	Irrig.	2.93	29	16	42	Deuel	Dec.	24	1894	811	......
North Platte R...	Williams, E. C. et al	Lewellen	Robbins & Williams Canal	Irrig.	26.57	35	16	42	Deuel	Jan.	4	1895	804	......
North Platte R...	Gyger, J. C.	Oshkosh	Gyger Ditch	Irrig.	10.86	10	16	44	Deuel	Jan.	5	1895	806	......
North Platte R...	Dikeman, S. F.	North Platte	Dikeman Canal	Irrig.	30.00	9	14	32	Lincoln	Jan.	14	1895	684	......
North Platte R...	Western Land & Cattle Co. & W. R. Taylor	Omaha	Signal Bluff Ditch	Irrig.	30.13	16	16	43	Deuel	Jan.	16	1895	807	......
North Platte R...	Jacobs, Lee	Ogalalla	Hay Land Canal	Irrig.	5.71	29	15	39	Keith	Jan.	19	1895	732	......
North Platte R...	Hubartt, E.	North Platte	Hubbart & Hall Ditch	Irrig.	65.70	20	14	30	Lincoln	March	3	1895	691	......
North Platte R...	Theis, Perry J.	Ogallala	Fernstrom & Nissen	Irrig.	4.00	25	15	39	Keith	March	23	1895	737	......
North Platte R...	Alfalfa Irr. Dist.	Ogallala	Alfalfa Irr. Dis. Canal	Irrig.	100.00	1	15	42	Keith	March	25	1895	738	......
North Platte R...	Bushnell, H. J. and E. N.	Oshkosh	Bushhnell Bros. Ditch	Irrig.	7.14	12	16	44	Deuel	March	27	1895	809	......
North Platte R...	Johnson, E. A.	Brady	Johnson Ditch	Irrig.	......	10	12	27	Lincoln		...	......	654*	......
North Platte R...	Alliance Irr. C. & W. P. Co.	Bayard	Alliance Irr. C. & W. P.	Irrig.	......	5	20	52	Morrill		...	......	1035*	......

CLAIMS AND APPLICATIONS BY STREAMS IN DIVISION 1-A—(Continued)

Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate S	T	R	County	Date of Priority Month	D	Yr.	Docket No.	App. No.
North Platte R...	Peterson, E. J.	Lemoyne	Holcomb Ditch	Irrig.	15.49	16	15	40	Keith	June	4	1895		1
North Platte R...	Steamboat Ditch Co.	Gering	Steamboat Ditch	Irrig.	15.00	4	21	54	Scotts Bluff	Oct.	22	1895		186
North Platte R...	Lisco Irr. Co.	Lisco	North River Irr. Canal	Irrig.	168.29	14	18	47	Cheyenne	Feb.	24	1896		243
North Platte R...	Bush Ck. L. & L. Stk. Co.	Lisco	LaMore Ditch	Irrig.	20.00	34	19	48	Cheyenne	July	18	1896		327
North Platte R...	Steamboat Ditch Co.	Gering	Steamboat Ditch	Irrig.		4	21	54	Scotts Bluff	July	22	1896		350
North Platte R...	Tetreault, Amedee	Bridgeport	Tetreault Ditch No. 2	Irrig.	3.43	1	19	50	Cheyenne	Aug.	15	1896		353
North Platte R...	The Gering Irr. Dist.	Gering	Gering Canal	Irrig.	208.62	4	23	58	Scotts Bluff	March	15	1897		365
North Platte R...	Schermerhorn, A. D.	Omaha	Schermerhorn Canal	Irrig.	29.71	16	20	51	Cheyenne	Oct.	25	1897		418
North Platte R...	Frank, Wm.	Grand Island	Columbia Canal	Irrig.	600.00	3	23	58	Scotts Bluff	April	14	1902		660
North Platte R...	Secretary of Interior, U. S. A.	Washington, D. C.	Pathfinder	Irrig.		19	29	83	State of Wyoming	Sept.	19	1904		768
North Platte R...	Belmont I. C. & W. P. Co.	Bridgeport	Belmont Canal	Irrig.	115.71	18	20	51	Cheyenne	March	28	1907		902
North Platte R...	White, D. W.	Bridgeport	Empire Extension	Irrig.	1.00	18	20	51	Cheyenne	July	20	1907		866
North Platte R...	Lisco, Reuben	Lisco	Lisco Ditch	Irrig.	3.00	14	18	47	Garden	April	6	1910		991
North Platte R...	Halligan, J. J.	North Platte	Round House Rock C.	Irrig.		4	21	54	Scotts Bluff	April	13	1910		992
North Platte R...	French, John E.	Henry	French Ditch	Irrig.	11.00	9	23	60	Wyoming	Dec.	21	1911		1149
North Platte R...	Liebhart Bros.	Denver, Col.	Liebhardt Lateral	Irrig.	2.86	4	21	54	Morrill	Feb.	1	1912		1165
North Platte R...	Dobson, W. A.	Davenp't, Ia.	Dobson's Lateral	Irrig.	3.14	5	20	52	Morrill	Feb.	28	1912		1181
North Platte R...	Stone, Myron K.	Lisco	Stone Irrig. Canal	Irrig.	1.00	28	18	46	Morrill	Jan.	19	1915		1401
North Platte R...	French, John E.	Henry	French Ditch	Irrig.	3.00	9	23	60	Wyoming	Sept.	11	1915		1433
North Platte R...	Liebhart Bros.	Denver, Col.	Liebhardt Lateral	Irrig.	2.90	6	20	52	Morrill	March	1	1916		1448
North Platte R...	Atkins, A. W.	Bridgeport	Atkins	Irrig.	5.00	15	19	49	Morrill	March	27	1916		1449
North Platte R...	Atkins, A. W.	Bridgeport	Atkins	Irrig.	5.00	15	19	49	Morrill	March	27	1916		1450
North Platte R...	Intermountain Railway Light & Power Co.	Colo. Sprgs.	Gering-Hydro Elec. Pl.	Power	250.00	28	22	55	Scotts Bluff	April	5	1916		1452

CLAIMS AND APPLICATIONS BY STREAMS IN DIVISION 1-A—(Continued)

Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate				Date of Priority			Docket No.	App. No.
						S	T	R	County	Month	D	Yr.		
North Platte R.	Mann, John H.	Bridgeport	Wastewater Ditch	Irrig.	2.30	30	21	50	Morrill	June	2	1916		1455
Spring Ck., trib. to N. Platte	Union Pacific Ry.	Omaha	Frazier Lake	Ice	4.00	35	14	30	Lincoln	Sept.	6	1907		868
Spring Ck., trib. to N. Platte	Keystone Irr. Co.	Keystone	Spring Creek No. 1	Irrig.	1.13	19	15	37	Keith	May	27	1910		1002
Spring Ck., trib. to N. Platte	Gatch, Chas. E.	Melbeta	Gatch Ditch	Irrig.	0.93	25	21	54	Scotts Bluff	Aug.	21	1912		1220
Borrow Pit, trib. to N. Platte	Taylor, A. O.	Minatare	Borrow Pit Ditch	Irrig.	0.29	19	21	52	Scotts Bluff	April	23	1904		751
Otter Creek	Fairchild, Louis F.	Lemoyne	Cascade Ditch	Irrig.	3.30	4	15	40	Keith	April	1	1891	1032	
Otter Creek	Nissen, Pete & Co.	Belmar	Otter Canal	Irrig.	11.00	5	15	40	Keith	May	24	1912		1198
Otter Creek	Peterson, E. J.	Lemoyne	Peterson Ditch	Irrig.	1.32	5	15	40	Keith	Nov.	6	1912		1240
Owl Creek	Kellums, John H.	Caldwell	Sunflower Ditch	Irrig.	0.79	12	22	58	Scotts Bluff	Sept.	17	1897		411
Owl Creek	Kellums, John H.	Caldwell	Sunflower Ditch	Irrig.	1.14	12	22	58	Scotts Bluff	Oct.	10	1904		770
Owl Creek	Kellums, John H.	Caldwell	Sunflower Ditch No. 2	Irrig.	1.14	12	22	58	Scotts Bluff	Nov.	29	1907		879
Owl Creek	Kellums, John H.	Caldwell	Sunflower Ditch Extension No. 1	Irrig.	0.57	12	22	58	Scotts Bluff	Nov.	29	1907		881
Pawnee Creek	Kent & Burke Co.	Omaha	Holcombe's Ditch	Irrig.	8.00	13	13	28	Lincoln	Oct.	18	1890	636	
Pawnee Creek	Murphy, E. D.	Brady Island	Murphy's Ditch	Irrig.	8.57	29	13	27	Lincoln	June	9	1894	669	
Pawnee Creek	Plumer, Wm. H.	Maxwell	Plumer Ditch	Irrig.	10.00	19	13	27	Lincoln	June	15	1894	672	
Platte River	Kearney Water & Electric Power Co.	Kearney	Kearney Water & Electric Power Plant	I. & P.	140.00 22.00	3	8	16	Buffalo	Sept.	10	1882	1023	
Platte River	Gothenburg L. & P. Co.	Gothenburg	Gothenburg P. & L. C.	I. & P	200.00	29	12	26	Lincoln	July	5	1890	645a	

CLAIMS AND APPLICATIONS BY STREAMS IN DIVISION 1-A—(Continued)

Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate				Date of Priority			Docket No.	App. No.
						S	T	R	County	Month	D	Yr.		
Platte River........	Farmers D. & C. Co.....	Brady Island	Farm. D. & C. Co. D.	Irrig.	280.00	17	13	29	Lincoln	June	2	1894	666	....
Platte River........	Farmers Irr. Co............	Lexington	Farmers Irr. Co.'s D.....	Irrig.	114.00	25	10	25	Dawson	June	14	1894	621	....
Platte River........	Dawson County Irrigation Co..................	Lexington	Farmers & Merchants Canal	Irrig.	1142.86	18	10	23	Dawson	June	26	1894	622	....
Platte River........	Fowles, Russell H........	Maxwell	Maxwell Canal...............	Irrig.	27.14	29	13	28	Lincoln	July	5	1894	673	....
Platte River........	Appleford, Henry M.....	Maxwell	Appleford Canal.............	Irrig.	10.00	15	13	29	Lincoln	July	7	1894	674	....
Platte River........	Sides, LeRoy..................	Lowell	LeRoy Sides Ditch........	Irrig.	20.00	13	8	14	Kearney	July	23	1894	629	....
Platte River........	Platte River Irr. Co.....	Lexington	Platte River Irr. Canal	Irrig.	400.00	13	9	22	Dawson	Sept.	15	1894	624	....
Platte River........	Gothenburg Light & Power Co......................	Gothenburg ..	Gothenburg P. & I. C.	Irrig.	240.00	29	12	26	Lincoln	Sept.	22	1894	645b	....
Platte River........	Farmers Mut. Irr. Co.	Kearney	Farmers Canal...............	Irrig.	180.00	12	8	16	Buffalo	Sept.	24	1894	234 235 628	....
Platte River........	McCullough, John..........	Maxwell	McCullough Ditch..........	Irrig.	30.00	35	13	28	Lincoln	Oct.	20	1894	679	....
Platte River........	Six Mile Ditch Co.........	Gothenburg ..	Six Mile Ditch...............	Irrig.	40.00	11	11	26	Lincoln	Oct.	22	1894	680	....
Platte River........	Gothenburg South Side Irr. Co.........................	Gothenburg ..	Gothenburg South Side Irr. Canal.....................	Irrig.	357.14	30	12	26	Lincoln	Oct.	26	1894	681	....
Platte River........	Booker, H. C..................	Gothenburg ..	Booker Canal................	Irrig.	100.00	16	11	25	Dawson	Nov.	9	1894	625	....
Platte River........	Cozad Irr. Co.................	Cozad	Cozad Irr. Canal...........	Irrig.	614.29	15	11	25	Dawson	Dec.	28	1894	626	....
Platte River........	South Side Irr. Co.........	Cozad	Orchard & Alfalfa Irr. Ditch	Irrig.	300.00	9	10	24	Dawson	Jan.	23	1895	627	....
Platte River........	Lincoln and Dawson County Irrig. Dist.....	Gothenburg ..	Lincoln & Dawson I. D. Canal	Irrig.	642.86	9	13	29	Lincoln	Feb.	22	1895	687	....
Platte River........	Appleford, Henry M.....	Maxwell	Appleford Canal.............	Irrig	2.86	15	13	29	Lincoln	March	28	1895	690	....
Platte River........	Lexington South Side Irr. Co...........................	Lexington	Lexington South Side Ditch	Irrig.	58.00	8	9	22	Dawson...........	Sept.	28	1900	....	576

CLAIMS AND APPLICATIONS BY STREAMS IN DIVISION 1-A—(Continued)

Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate				Date of Priority			Docket No.	App. No.
						S	T	R	County	Month	D	Yr.		
Platte River & Red Willow Ck.	Dobson, W. A.	Davenp't, Ia.	Dobson Lateral	Irrig.	0.57	12	20	51	Morrill	Nov.	3	1915	......	1436
Plum Creek	Eggers, Thos.	Lewellen	Plum Creek Ditch & Res.	Irrig.	1.14	23	16	42	Garden	Jan.	12	1914	......	1344
Pumpkin Seed Creek	Wright, John S.	Harrisburg	Wright Ditch No. 1	Irrig.	2.00	5	19	54	Banner	Dec.	31	1882	904	......
Pumpkin Seed	Kelley, Wm. J.	Harrisburg	Kelley Ditch	Irrig.	1.43	5	19	54	Banner	May	10	1886	915	......
Pumpkin Seed	Zingg Henry N.	Platte Center	Heard's Ditches No. 1 & 2	Irrig.	1.29	14	19	54	Banner	June	1	1887	916	......
Pumpkin Seed	Wright, John S.	Harrisburg	Wright Ditch No. 2	Irrig.	2.86	5	19	54	Banner	Dec.	31	1887	905	......
Pumpkin Seed	Logan, John E.	Gering	Logan Ditch	Irrig.	4.00	7	19	55	Banner	July	16	1890	902	......
Pumpkin Seed	Court House, Rock I. Co.	Bridgeport	Court House Irr. Canal	Irrig.	30.50	30	19	50	Cheyenne	Oct.	6	1890	840	......
Pumpkin Seed	Smith, Eliza C., Wheeler, Chas. G.	Sidney	Smith & Wheeler South Ditch	Irrig.	1.57	26	19	51	Cheyenne	Oct.	16	1890	842	......
Pumpkin Seed	Mutual Ditch Co.	Redington	Mutual Ditch	Irrig.	8.57	33	19	52	Cheyenne	Nov.	1	1890	843	......
Pumpkin Seed	Waitman, P. P.	Redington	Waitman's Ditch	Irrig.	2.86	25	19	53	Banner	March	12	1891	847	......
Pumpkin Seed	Endered, Chas. O. et al	Freeport	Endered Ditch	Irrig.	1.00	21	19	53	Banner	May	27	1891	903	......
Pumpkin Seed	Guthrie, W. E., Sweet, C. A.	Bridgeport	Meredith & Ammer D.	Irrig.	18.86	23	19	50	Cheyenne	Feb.	20	1893	876	......
Pumpkin Seed	Hampton, R. R. and Wm. D.	Harrisburg	Hampton Ditch	Irrig.	1.29	25	20	57	Banner	April	5	1893	906	......
Pumpkin Seed	Finn, J. L., Dean, H. T.	Bridgeport	Last Chance	Irrig.	8.00	27	19	50	Cheyenne	April	12	1894	883	......
Pumpkin Seed	Munn, Lee	Redington	Round House Rock D.	Irrig.	3.00	28	19	51	Cheyenne	May	29	1894	884	......

CLAIMS AND APPLICATIONS BY STREAMS IN DIVISION 1-A—(Continued)

Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate S	T	R	County	Date of Priority Month	D	Yr.	Docket No.	App. No.
Pumpkin Seed	Maxwell, Jos. J.	Redington	Maxwell Irr. Ditch	Irrig.	0.50	23	19	52	Cheyenne	June	30	1894	885	
Pumpkin Seed	Dunlap, J. P.	Dwight	Dunlap Ditch	Irrig.	0.36	24	19	51	Cheyenne	March	1	1895	889	
Pumpkin Seed	Willard, Wm. M.	Redington	Wm. M. Willard Ditch	Irrig.	1.43	25	19	51	Cheyenne	March	27	1895	888	
Pumpkin Seed	Thompson, R. S. et al	Redington	Birdcage Ditch	Irrig.	1.00	19	19	51	Cheyenne	June	1	1895	892	
Pumpkin Seed	Smith, E. and Wheeler, Chas. G.	Sidney	Smith & Wheeler North Ditch	Irrig.	0.71	26	19	51	Cheyenne	June	1	1896	842	
Pumpkin Seed	Cluck, Millard	Harrisburg	Peters Ditch	Irrig.	2.57	34	20	56	Banner	July	1	1902	913	
Pumpkin Seed	Wisner, S. R. et al	Freeport	Abbott & Wisner Ditch	Irrig.		23	19	53	Banner				917*	
Pumpkin Seed	Court House, Rock I. Co.	Bridgeport	Court House Rock I. Canal	Irrig.		30	19	50	Morrill				1028*	
Pumpkin Seed	Airedale Ranch & Cattle Co.	Scottsbluff	Airedale Canal No. 1	Irrig.	5.52	2	19	55	Banner	Jan.	24	1903		698
Pumpkin Seed	Airedale Ranch & Cattle Co.	Scottsbluff	Airedale Canal No. 2	Irrig.	3.22	1	19	55	Banner	Jan.	24	1903		699
Pumpkin Seed	Simon, Lincoln G.	Sidney	Reservoirs Nos. 1, 2 & 3	Irrig.	1.31	7	19	55	Banner	June	24	1903		711
Pumpkin Seed	Johnson, Theo.	Freeport		Irrig.	2.29	2	19	55	Banner	April	20	1906		819
Pumpkin Seed	Beatty, D. E.	Harrisburg	Beatty Ditch	Irrig.	0.84	8	19	55	Banner	Sept.	1	1906		836
Pumpkin Seed	Swanger, R.	Bridgeport	Swanger	Irrig.	0.43	29	19	50	Cheyenne	Feb.	28	1907		851
Pumpkin Seed	Elter & Betebenner	Bridgeport	Pumpkin Creek Mills	Power	25.00	23	19	50	Cheyenne	March	26	1907		855
Pumpkin Seed	Pierson, A. H.	Harrisburg	Clearfield Canal	Irrig.	1.71	31	20	56	Banner	Jan.	23	1908		888
Pumpkin Seed	Beatty, Daisy E.	Harrisburg	Beatty Canal	Irrig.	0.19	5	19	55	Banner	June	2	1910		1004
Pumpkin Seed	Seeley, W. J.	Milford	Seeley Irr. Ditch	Irrig.	0.57	28	19	52	Morrill	Jan.	19	1911		1052
Pumpkin Seed	Airedale Ranch & Cattle Co.	Scottsbluff	Airedale Canal No. 2	Irrig.	1.57	1	19	55	Dawes	Oct.	26	1911		1133
Pumpkin Seed	Airedale Ranch & Cattle Co.	Scottsbluff	Airedale Canal No. 1	Irrig.	0.51	2	19	55	Banner	Sept.	4	1914		1380

CLAIMS AND APPLICATIONS BY STREAMS IN DIVISION 1-A—(Continued)

Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate				Date of Priority			Docket No.	App. No.
						S	T	R	County	Month	D	Yr.		
Pumpkin Seed	Airedale Ranch & Cattle Co.	Scottsbluff	Airedale Canal No. 1	Irrig.	10.00	3	19	55	Scotts Bluff	June	23	1916		1458
Red Willow (Seepage)	Dobson, W. A.	Davenp't, Ia.	Dobson Ditch	Irrig.	2.00	12	20	51	Morrill	Sept.	10	1915		1432
Red Willow (Seepage)	Alliance Irr. Dist.	Bridgeport	Alliance Irrig. Canal	Irrig.	60.00	6	20	51	Morrill	Aug.	5	1915		1429
Sand Creek	Holcomb, G. J. et al.	Bremen, Ga.	Holcomb & Smith	Irrig.	7.00	10	15	40	Keith	May	20	1889	698	
Sand Creek	Dudley, W. H.	Churdan, Ia.	Patrick Ditch	Irrig.	2.43	3	15	40	Keith	May	31	1891	725	
Sand Creek	Nissen, Peter	Ogallala	Nissen Ditch	Irrig.	3.07	10	15	40	Keith	March	18	1901		606
Sand Creek	Maddox, P. P., Sillasen, S. J.	Keystone	Sand Creek Ditch	Irrig.	15.70	9	14	36	Keith	Jan.	3	1910		974
Seepage f'm lake	Huffman, M. J.	Gering	Huffman's Ditch	Irrig.	6.43	26	21	54	Scotts Bluff	March	19	1909		937
Seepage f'm lake	Enterprise Irr. Dist.	Scottsbluff	Nelson Dr. Seep. Ditch	Irrig.	10.00	13	23	57	Scotts Bluff	May	21	1913		1290
Schuetz Springs	Schuetz, Louis	Bridgeport	Schuetz Spring Canal	Irrig.	0.21	28	18	50	Cheyenne	May	10	1892	881	
Sheep Creek	Nichols, Yorick	Henry	Little Moon	Irrig.	1.00	10	24	58	Sioux	March	23	1904		745
Sheep Creek	Covert, Pitt	Cheyenne, Wyo.	Nebraska Reservoir	Irrig.	3.57	36	27	58	Sioux	May	18	1907		859
Sheep Creek	West Fork Ditch Co.	Empire	West Fork Ditch	Irrig.	5.14	1	26	58	Sioux	Sept.	21	1907		871
Sheep Creek	Cunningham, H. B.	Empire	Lower Canal	Irrig.	0.37	11	25	58	Sioux	Nov.	2	1907		875
Sheep Creek	Speese, R. L.	Empire	Home Ranch Ditch	Irrig.	1.79	25	26	58	Sioux	Nov.	2	1907		876
Sheep Creek	Speese, R. L.	Empire	Horse Pasture Res.	Irrig.	1.29	25	26	58	Sioux	Nov.	2	1907		877
Sheep Creek	Speese, R. L.	Empire	Horse Camp Reservoir	Irrig.	2.86	36	27	58	Sioux	Jan.	20	1908		885
Sheep Creek	Cunningham, H. B.	Empire	No. Two	Irrig.	2.50	2	25	58	Sioux	Feb.	24	1908		890
Sheep Creek	Sheep Creek Lateral Co.	Morrill	Sheep Creek Lateral	Irrig.	5.00	8	23	57	Scotts Bluff	Feb.	26	1912		1176

CLAIMS AND APPLICATIONS BY STREAMS IN DIVISION 1-A—(Continued)

Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate				Date of Priority			Docket No.	App. No.
						S	T	R	County	Month	D	Yr.		
Sheep Ck. (Seepage)	Ramshorn Ditch Co.	Morrill		Irrig.	45.57	19	23	57	Scotts Bluff	Sept.	12	1916		1465
Sheep Ck. (Seepage)	Sheep Creek Lateral Co.	Morrill	Sheep Creek Lateral Co. Canal	Irrig.	0.92	8	23	57	Scotts Bluff	Jan.	12	1915		1398
Draw, trib. to Sheep Creek	Hovey, Ethel L.	Empire	Favorable	Irrig.	0.27	19	26	57	Sioux	Oct.	25	1907		873
Draw, trib. to Sheep Creek	Woodman, H. J.	Morrill	Gen. Utility Light & Power Plant	Power	70.00	17	23	57	Scotts Bluff	Aug.	17	1912		1217
Draw, trib. to Sheep Creek	Sheep Creek Lateral Co.	Morrill	Sheep Creek Lateral Co.	Irrig.	0.28	8	23	57	Scotts Bluff	Feb.	20	1915		1403
Skunk Creek	Knight, H. H.	Keystone	Miller Ditch	Irrig.	2.29	1	14	37	Keith	April	1	1895	740	
Skunk Creek	Maddox, P. P.	Keystone	Skunk Creek Ditch	Irrig.	5.00	6	14	36	Keith	Nov.	5	1909		968
Snake Creek	Kilpatrick Bros	Beatrice	Oasis Ditch	Irrig.	54.86	6	24	51	Box Butte	June	6	1894	567	
Snake Creek	Kilpatrick Bros	Beatrice	Elmore Canal	Irrig.	5.71	30	25	51	Box Butte	June	22	1895		41
Snake Creek	Kilpatrick Bros	Beatrice	Kilpatrick Res. No. 1.	Irrig.	200.00	1	24	52	Box Butte	June	7	1911		1104
Snake Creek	Kilpatrick Bros	Beatrice	Kilpatrick Res. No. 2	Irrig.	200.00	6	24	51	Box Butte	Jan.	25	1912		1159
South Platte R.	Eaton, John J.	Brule	Eaton & McGrath D.	Irrig.	20.00	25	13	41	Keith	April	3	1894	755	
South Platte R.	Hollingsworth, A.	Ogallala	Hollingsworth Ditch	Irrig.	30.00	12	13	39	Keith	June	5	1894	723	
South Platte R.	Stebbens, Lucien	North Platte	Stebbins Canal	Irrig.	30.00	32	14	32	Lincoln	Dec.	17	1894	683	
South Platte R.	Searle, E. M.	Ogallala	Riverside Ditch	Irrig.	2.86	17	13	39	Keith	Dec.	22	1894	744	
South Platte R.	Miller, F. L.	Big Springs	Miller & Warren	Irrig.	53.86	7	12	42	Deuel	Jan.	5	1895	805	
South Platte R.	Ryan, J. T.	Brule	Home Irr. Ditch	Irrig.	3.14	30	13	40	Keith	March	2	1895	736	
South Platte R.	Shireman, W. H.	Ogallala	So. Side Plano Ditch	Irrig.	1.43	17	13	39	Keith	April	27	1895	733	
South Platte R.	Kimball, W. et al.	Big Springs	Big Springs Canal	Irrig.	8.93	35	13	42	Deuel	April	27	1895	810	

POWER HOUSE AND WASTE WEIR OF THE KEARNEY CANAL. FALL IS 60 FEET. WEIR IS 120 FEET WIDE

CLAIMS AND APPLICATIONS BY STREAMS IN DIVISION 1-A—(Continued)

Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate				Date of Priority			Docket No.	App. No.
						S	T	R	County	Month	D	Yr.		
South Platte R...	Stafford, David	Paxton	Paxton Southern Ditch	Irrig.	1.43	2	13	36	Keith	Oct.	17	1895		184
South Platte R...	Lute & Sheridan	Ogallala	Lute & Sheridan Ditch	Irrig.	13.43	9	13	37	Keith	Feb.	17	1896		231
South Platte R...	Meyer, Henry	Brule	Meyer Canal	Irrig.	1.46	22	13	40	Keith	April	14	1896		283
South Platte R...	Carnahan, H.	Ogallala	Cereal Irr. Ditch	Irrig.	4.86	16	13	39	Keith	July	10	1896		357
South Platte R...	Allen, Wm. F.	Omaha	Allen Ditch	Irrig.	6.58	24	13	40	Keith	Dec.	15	1896		370
South Platte R...	Western Irr. Dist.	Big Springs..	Western Irr. Dist.	Irrig.	180.00	29	13	41	Deuel	June	14	1897		393
South Platte R...	Kimball, Walter	Big Springs..	Kimball's Underflow	Irrig.	3.57	4	12	42	Deuel	Nov.	8	1898		482
South Platte R...	McConnell, Edw. B.	Hershey	McConnell So. Side D...	Irrig.	37.8	34	14	33	Lincoln	Sept.	25	1914		1382
Spotted Tail Ck.	Stewart, H. G.	Mitchell		Irrig.	1.00	10	23	56	Scotts Bluff	May	2	1898		449
Spotted Tail Ck.	Clarke, Jr., H. S.	Omaha	Stewart Reservoir	Irrig.	1.43	2	23	56	Scotts Bluff	March	2	1904		743
Spotted Tail Ck.	Clarke, Jr., H. S.	Omaha	Brown Ditch	Irrig.	2.28	2	23	56	Scotts Bluff	March	17	1911		1072
Spotted Tail Ck.	Tri-State Land Co.	Scottsbluff	Tri-State Land Co. Canal No. 2	Irrig.		10	23	56	Scotts Bluff	Aug.	21	1911		1123*
Spotted Tail Ck.	Whitehead, Jas. T.	Mitchell	Whitehead Power Pl't.	Power	10.00	26	24	56	Sioux	Aug.	10	1912		1215
Spotted Tail Ck.	Roberts, Samuel L.	Mitchell	Roberts Ditch	Irrig.	2.00	16	23	56	Scotts Bluff	Nov.	6	1912		1241
Spring Branch	Brogan Bros.	Paxton	Brogan Bros. Ditch	Irrig.	0.57	35	15	37	Keith	Sept.	24	1897		410
Spring Br., trib. to Lawr. Fork	Harper, J. W. and Niehus, J. W.	Redington } Sidney }	Harper Ditch No. 2	Irrig.	2.00	1	18	52	Cheyenne	June	16	1902		674
Spring Creek	Peterson, E. J.	Lemoyne	Spring Creek Ditch	Irrig.	0.57	12	15	40	Keith	June	18	1894	724	
Spring Creek	Freiday, Florian F.	Lexington	Freiday Canal	Irrig.	1.00	20	9	20	Dawson	Nov.	25	1910		1040
Sprink Ck., trib. to White Tail..	Keystone Irr. Co.	Keystone	Spring Creek Ditch	Irrig.	1.57	19	15	37	Keith	June	21	1890	704	
Spring Ck. Lit...	Keystone Irr. Co.	Keystone	Little Spring Ditch	Irrig.	0.57	29	15	37	Keith	April	1	1902		659
Spring Ck. Lit...	Shramek, Marie	Havelock	Shramek Canal	Irrig.	1.50	22	22	55	Scotts Bluff	June	9	1913		1295

CLAIMS AND APPLICATIONS BY STREAMS IN DIVISION 1-A—(Continued)

Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate				Date of Priority			Docket No.	App. No.
						S	T	R	County	Month	D	Yr.		
Spring Ck. Lit.	Gilchrist, M. B.	Scottsbluff		Irrig.	0.14	22	22	55	Scotts Bluff	July	29	1913		1310
Springs, trib. to Middle Creek	Bartling, Henry	Redington	Bartling Ditch	Irrig.	0.29	28	18	51	Cheyenne	July	31	1891	870	
Springs, trib. to Middle Creek	Bartling, Henry	Redington	Bartling Ditch No. 2	Irrig.	0.29	28	18	51	Cheyenne	June	1	1894	891	
Sprs. on Sec. 28-18-49	Finn Bros.	Dalton	Finn Bros.' Ditch	Irrig.	0.50	28	18	49	Cheyenne	July	1	1890	836	
Sprgs. & Slough	Cundall, Harry	Stratton	Cundall Ditch	Irrig.	.71	19	20	51	Morrill	Dec.	15	1911		1148
Strm. (no name)	Newberry, H.	North Platte	Newberry Ditch	Irrig.	1.14	22	14	32	Lincoln	Feb.	25	1895	688	
Willow Creek	Everett, R. L.	Harrisburg	Willow Springs Ditch No. 1	Irrig.	0.57	16	19	56	Banner	Jan.	21	1902		650
Willow Creek	Everett, R. L.	Harrisburg	Willow Springs Ditch No. 2	Irrig.	0.86	16	19	56	Banner	Jan.	21	1902		651
White Horse Ck.	Lamplough, Isaac	North Platte	Lamplough's Lakes	Irrig.	2.86	8	14	30	Lincoln	Dec.	31	1883	658	
White Horse Ck.	Bratt, Jno.	North Platte	Jno. Bratt Ditch	Irrig.	6.00	9	14	30	Lincoln	Aug.	25	1913		1316
White Tail Creek	McCarthy, John M.	Keystone	McCarthy Ditch	Irrig.	1.00	36	15	38	Keith	July	15	1890	749	
White Tail Creek	Keystone Irr. Co.	Keystone	Halloway & Phelps D.	Irrig.	4.00	36	15	38	Keith	June	1	1893	717	
White Tail Creek	Leonard Bros.	Keystone	Little Dandy	Irrig.	2.00	22	15	38	Keith	Oct.	12	1894	727	
White Tail Creek	Keystone Irr. Co.	Keystone	Foster Keystone Canal	Irrig.	13.86	36	15	38	Keith	Oct.	30	1894	730	
White Tail Creek	Martin, Charlie O.	Keystone	Reed Ditch	Irrig.	0.57	15	15	38	Keith	May	15	1895	751	
White Tail Creek	McGinley, Geo.	Keystone		Irrig.	1.42	36	15	38	Keith	Oct.	29	1897		420
White Tail Creek	Keystone Irr. Co.	Keystone	Keystone Canal	Irrig.	51.71	26	15	38	Keith	April	26	1902		662b

Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate				Date of Priority			Docket No.	App. No.
						S	T	R	County	Month	D	Yr.		
White Tail Creek	Keystone Irr. Co.	Keystone	Keystone Ditch	Irrig.	4.30	26	15	38	Keith	Nov.	30	1906		843
White Tail Creek	Keystone Irr. Co.	Keystone	West Keystone	Irrig.	1.75	26	15	38	Keith	May	27	1910		1001
White Tail Creek	Keystone Irr. Co.	Keystone	Keystone	Irrig.	9.86	27	15	38	Keith	May	27	1910		1003
Wind Springs	Lancomer, Geo. and Chas.	Gering	Wind Springs Canal	Irrig.	1.43	12	24	55	Sioux	March	1	1892	954	
Wind Springs	Smith, Jas. S.	Mitchell	Smith's Ditch	Irrig.	2.86	12	24	55	Sioux	March	14	1910		986
Winters Creek	Bouton, Chas. A.	Gering	Bouton's Ditch	Irrig.	1.00	3	22	54	Scotts Bluff	Aug.	17	1889	923	
Winters Creek	Shumway, G. L.	Scottsbluff		Power		8	22	54	Scotts Bluff	Jan.	3	1911		1050*
Winters Creek, Draw	Winters Creek Canal Co.	Scottsbluff	Winters Creek Canal	Irrig.	70.00	19	22	54	Scotts Bluff	Feb.	2	1916		1446
Wood River	Ashburn, J. N.	Gibbon		Power	40.00	13	9	14	Buffalo	Nov.	1	1873	993	
Wood River	Shelton Mill. & G. Co.	Shelton		Power	40.00	1	9	13	Buffalo	Oct.	16	1873	994	
Wood River	Bears, S.	Kearney		Power	25.40	13	9	16	Buffalo	May	1	1881	995	
Wood River	Klein, J. J.	Kearney	White Bridge Park	Irrig.	0.03	8	9	15	Buffalo	March	14	1900		545a
Wood River	Klein, J. J.	Kearney	White Bridge Park	Power	10.00	8	9	15	Buffalo	March	14	1900		545b
Wood River	Jacobson, C. A.	Riverdale	C. A. Jacobson Canal	Irrig.	0.50	31	10	16	Buffalo	Nov.	10	1910		1038
Wood River	Kimbrough, Cora	Shelton	Kimbrough Canal	Irrig.	4.0	36	10	13	Buffalo	Sept.	21	1912		1227
Wood River	Quail, T. J.	Miller	Wood River	Irrig.	2.29	14	11	18	Buffalo	May	1	1913		1286

CLAIMS AND APPLICATIONS BY STREAMS IN DIVISION 1-B

Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate				Date of Priority			Docket No.	App. No.
						S	T	R	County	Month	D	Yr.		
Arickaree River	Jenkins, Chas. T.	Haigler	Haigler Res. & Irr. Co.	Irrig.	171.	15	1	42	State of Colo.	Jan.	21	1910		979
Big Cottonwood	Hansberry, J. T.	Bloomington	Blomington Ditch	Irrig.	.50	25	2	16	Franklin	Dec.	31	1881	185	
Big Cottonwood	Siegel, Lewis A.	Bloomington	Bloomington Mill R.	Power	6.	25	2	16	Franklin	Nov.	23	1898		483
Big Cottonwood	Siegel, Lewis A.	Bloomington		Irrig.	1.57	25	2	16	Franklin	Nov.	23	1898		483
Buffalo Creek	Allen, Frank B. et al.	Haigler	Allen & Larned Ditch	Irrig.	6.	18	1	40	Dundy	Oct.	16	1890	117	
Buffalo Creek	Porter, J. R. & Sons	Haigler	Porter & Sons Ditch	Irrig.	2.86	1	1	41	Dundy	Nov.	26	1890	171	
Buffalo Creek	Jenkins, Chas. T.	Haigler	Jenkins L. & L. S. Co's Ditch No. 1	Irrig.	4.29	18	1	40	Dundy	Dec.	12	1908		924
Buffalo Creek	Porter, L. & Inv. Co.	Haigler	J. R. Porter	Irrig.	3.32	1	1	41	Dundy	June	23	1913		1298
Brush Creek	Lofton, Frank S.	McCook	Brush Creek Reservoir	Stor.	3.50	3	2	29	Red Willow	June	1	1912		1201
Center Creek	Gregory, A. B. and P. C.	Franklin	Gregory Ditch	Irrig.	4.	1	1	15	Franklin	Aug.	11	1894	182	
Center Creek	Rose, C. H.	Franklin	Rose Ditch	Irrig.	.29	36	2	15	Franklin	Jan.	10	1902		648
Coates Creek	Burton, R. D.	Franklin		Irrig.	.37	33	2	14	Franklin	March	6	1899		501
Cook Creek	Sharpnac, W. A.	Alma	Sharpnac Ditch	Irrig.	1.	4	1	18	Harlan	Feb.	21	1896		251
Crooked Creek	Kaley, C. H.	Red Cloud	Fish Pond	Fish	1.	1	1	11	Webster	May	7	1902		665
Crooked Creek	Slawson, E. R.	Red Cloud	Slawson Ice Pond	Stor.	.75	1	1	11	Webster	Aug.	8	1912		1213
Driftwood Creek	Schmitz, J. A.	McCook	Schmitz Irr. Works	Irrig.	1.50	12	2	30	Red Willow	May	3	1913		1287
Driftwood Creek	Hesterworth, Jno H.	McCook	Hesterwerth Irr. Wks.	Irrig.	1.	14	2	30	Red Willow	Nov.	17	1913		1332

CLAIMS AND APPLICATIONS BY STREAMS IN DIVISION 1-B—(Continued)

Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate S	T	R	County	Date of Priority Month	D	Yr.	Docket No.	App. No.
Driftwood Creek	Wasson, I. H. & Sons	McCook	Sylvan Dell	Irrig.	2.8	1	2	30	Red Willow	Dec.	6	1913	....	1340
Elk Creek	Murray, Esther	Arapahoe	Murray Irr. Works	Irrig.	2.85	11	4	23	Furnas	Aug.	13	1913	....	1315
Frenchman Riv.	Athey, H. E.	Wauneta	Wauneta Mills	Power	35.	11	5	36	Chase	July	31	1886	178	....
Frenchman Riv.	Daschosifsky, G.	Lamar	Lamar Rolling Mill	Power	30.	18	6	40	Chase	Dec.	30	1887	1013	....
Frenchman Riv.	Estate of M. H. Yaw	Champion	Champion Mills	Power	28.3	21	6	39	Chase	Dec.	31	1887	179	....
Frenchman Riv.	McGillen, W. J.	Imperial	Aberdeen Ditch	Irrig.	2.	3	5	38	Chase	July	1	1888	50a	....
Frenchman Riv.	McGillen, W. J.	Imperial	Harlem Ditch	Irrig.	2.	1	5	38	Chase	July	1	1888	56	....
Frenchm'n River and Stinking Water Creek	Frenchman Valley Irr. Dist.	Culbertson	Culbertson I. & W. P. Canal	Irrig.	215.	31	5	3	Hayes	May	16	1890	24, 25, 29, 30	....
Frenchman Riv.	Kilpatrick Bros.	Beatrice	Champion W., P. & I. Ditch	Irrig.	48.46	23	6	40	Chase	Dec.	23	1890	47	....
Frenchman Riv.	McGillen, W. J.	Imperial	Aberdeen Ditch	Irrig.	.50	3	5	38	Chase	Feb.	2	1891	50b	....
Frenchman Riv.	Farmers Canal Co.	Culbertson	Farmers' Canal	Irrig.	10.	11	3	32	Hitchcock	Dec.	19	1893	10	....
Frenchman Riv.	Fuller, C. D.	Imperial	Fuller Ditch	Irrig.	25.	4	5	36	Chase	June	12	1894	62	....
Frenchman Riv.	Riverside Canal & Irr. Co.	Culbertson	Riverside Canal	Irrig.	12.	33	4	32	Hitchcock	July	28	1894	18	....
Frenchman Riv.	Dissmore, Geo. A.	Des Moines, Ia.	Frenchman Val. Canal	Irrig.	10.	32	5	33	Hayes	Aug.	23	1894	38	....
Frenchman Riv.	Gould, Wilson S.	Omaha	Gould Ditch	Irrig.	2.	1	5	38	Chase	Oct.	9	1894	67	....
Frenchman Riv.	Grant, Allen	Imperial	Grant or Aberdeen D.	Irrig.	2.	3	5	38	Chase	Oct.	16	1894	68	....
Frenchman Riv.	Maranville, E et al.	Lamar	Maranville Ditch	Irrig.	6.	12	6	41	Chase	Dec.	8	1894	70, 71	....
Frenchman Riv.	Wise, J. S.	Palisade	Wise Ditch	Irrig.	2.	15	5	35	Hayes	Dec.	28	1894	42	....

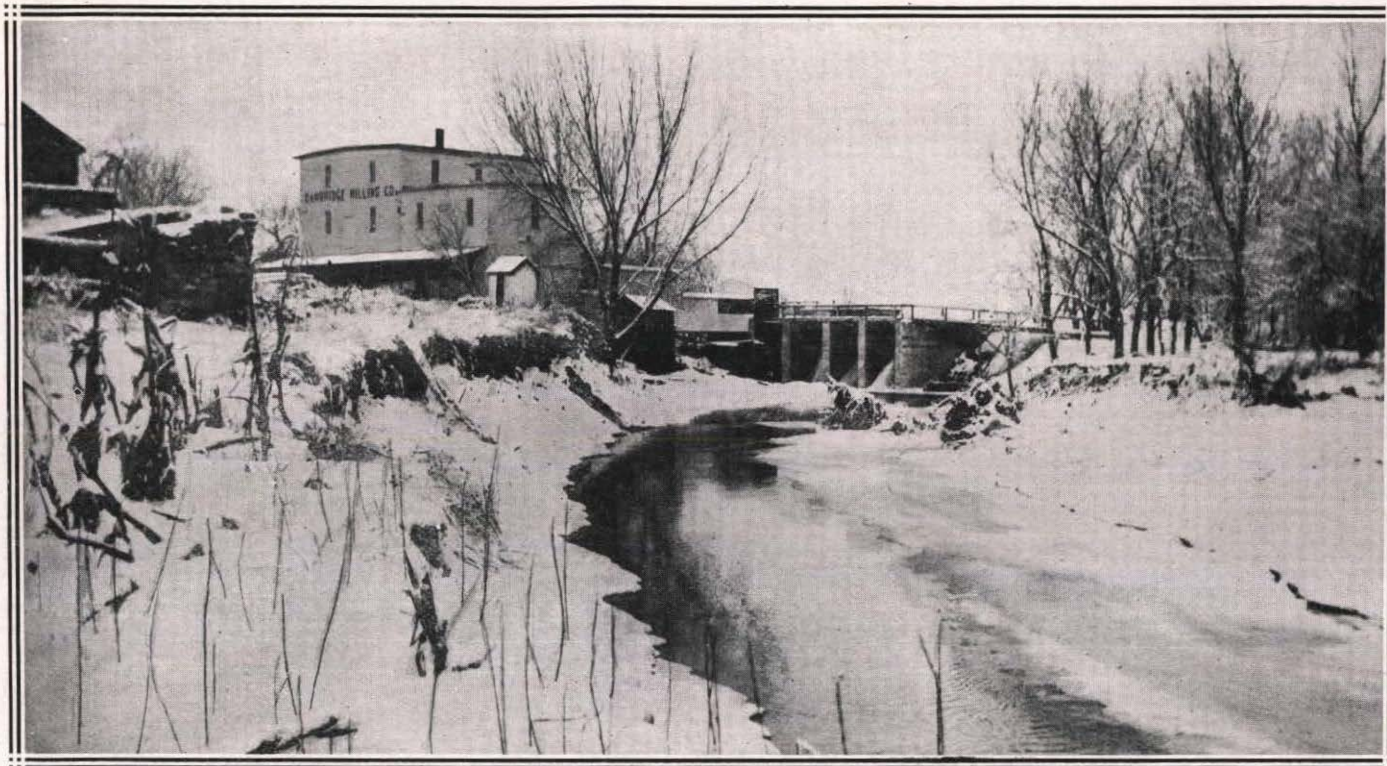
CLAIMS AND APPLICATIONS BY STREAMS IN DIVISION 1-B—(Continued)

Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate S	T	R	County	Date of Priority Month	D	Yr.	Docket No.	App. No.
Frenchman Riv...	Woods, John and Francis	Wauneta	N. Side Gurnsey Ditch	Irrig.	5.	3	5	37	Chase	Jan.	14	1895	74	....
Frenchman Riv...	Woods, John and Francis	Wauneta	S. Side Gurnsey Ditch	Irrig.	24.	10	5	37	Chase	Jan.	14	1895	75	....
Frenchman Riv...	Inman, Norton	Champion	Inman Ditch	Irrig	1.50	17	6	40	Chase	Feb.	28	1895	79	....
Frenchman Riv...	Kilpatrick Bros. Co.	Beatrice	North Side Irr. Ditch	Irrig.	.79	21	6	39	Chase	Feb.	25	1896	....	246
Frenchman Riv...	Shallenberger, P. H.	Imperial	Shallenberger Canal	Irrig.	1.77	25	6	39	Chase	Dec.	21	1897	....	423
Frenchman Riv...	Inman Ditch & Irr. Co.	Imperial	Inman Ditch	Irrig.	6.43	17	6	40	Chase	Feb.	10	1898	....	436
Frenchman Riv...	Hoke, J A.	Champion	Creamery Ditch	Power	34.40	21	6	39	Chase	Dec.	12	1900	....	591
Frenchman Riv...	Follett & Krotter	Palisade	Follett & Krotter Ditch	Irrig.	4.29	35	5	34	Hayes	Apr.	30	1903	....	705
Frenchman Riv...	Follett & Krotter	Palisade	Krotter Power Plant	Power	19.	35	5	34	Hayes	May	12	1903	....	708
Frenchman Riv...	Dissmore, Geo. A.	Des Moines, Ia.	Goker Ditch Extension	Irrig.	20.	8	4	33	Hitchcock	July	6	1903	....	714
Frenchman Riv...	Follett & Krotter	Palisade	Follett & Krotter	Irrig.	2.57	35	5	34	Hayes	Aug.	11	1903	....	720
Frenchman Riv...	Follett & Krotter	Palisade	Krotter Power Plant	Power	12.	35	5	34	Hayes	Apr.	5	1904	....	748
Frenchman Riv...	Hagerman, Wm.	Hamlet		Irrig.	.86	19	5	34	Hayes	Mar.	11	1909	....	935
Frenchman Riv...	Krotter, F. C.	Palisade	Follett & Krotter Ditch	Irrig.	10.46	35	5	34	Hitchcock	Jan.	15	1910	....	975
Frenchman Riv...	Krotter, F. C.	Palisade	Krotter Power Plant	Power	55.	35	5	34	Hitchcock	Aug.	17	1910	....	1021
Frenchman Riv...	Krotter, F C.	Palisade	Krotter Power Plant No. 3	Irrig.	2.42	35	5	34	Hayes	Dec.	15	1910	....	1047
Frenchman Riv...	Krotter, F. C.	Palisade	Krotter Power Plant No. 2	Irrig.	3.	35	5	34	Hayes	Dec.	15	1910	....	1046
Frenchman Riv...	Hoke, J. A.	Champion	Hoke's Power & Pump Plant	Irrig.	2.28	21	6	39	Chase	May	1	1911	....	1094
Frenchman Riv...	Kilpatrick Bros.	Beatrice	Kilpatrick Res. No. 1	Stor.	60.	23	6	40	Chase	June	22	1911	....	1108
Frenchman Riv...	Sheridan, R. B.	McCook	Ex. Aberdeen Canal	Irrig.	1.57	2	5	38	Chase	July	29	1911	....	1117

CLAIMS AND APPLICATIONS BY STREAMS IN DIVISION 1-B—(Continued)

Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate				Date of Priority			Docket No.	App. No.
						S	T	R	County	Month	D	Yr.		
Frenchman Riv.	Theobald & Athey	Wauneta	Wauneta M. & Elec. P. Plant	Power	75.	11	5	36	Chase	Nov.	16	1911		1136
Frenchman Riv.	Arteburn, E. E.	Lincoln	Arteburn Stor. Res.	S. & I.	160.	11	6	41	Chase	Nov.	28	1911		1142
Frenchman Riv.	Bishop, Stephen S.	Lincoln	Inman Storage Res.	Stor.	125.	17	6	40	Chase	Dec.	8	1911		1145
Frenchman Riv.	Oliver Bros.	Wauneta	Oliver Bros. Power Plt.	Power	50.	7	5	35	Hayes	Apr.	28	1913		1284
Frenchman Riv.	Oliver Bros.	Wauneta	Oliver Bros. Canal	Irrig.	3.20	7	5	35	Hayes	Apr.	28	1913		1285
Frenchman Riv.	Frenchman Valley Irr. Dist.	Culbertson	Harvey Res.	Stor.	300.	3	5	38	Chase	July	10	1913		1304
Frenchman Riv.	Krotter, F. C.	Palisade	Krotter Power Plant	Power	65.	35	5	34	Hayes	Dec.	2	1913		1339
Frenchman Riv.	Athey, G. G.	Wauneta	Wauneta Elec. L. Plt.	Power	70.	11	5	36	Chase	Apr.	1	1915		1408
Horse Creek	Nesbit, J. M. et al	Parks	Horse Creek Ditch	Irrig.	1.86	23	1	39	Dundy	Aug.	31	1885	159, 173	
Spring, trib. to Horse Creek	Pringle, Esther L.	Parks	Pringle Ditch	Irrig.	.57	11	1	39	Dundy	Jan.	12	1897		364
Spring, trib. to Horse Creek	Pringle, Geo. N.	Benkelman	Pringle Ditch	Irrig.	1.57	14	1	39	Dundy	May	11	1906		824
Indian Creek	Chamberlain, J. C.	Mt. Sterling, Ill.	Chamberlain Ditch	Irrig.	.06	18	2	36	Dundy	Oct.	4	1895		240
Indian Creek	Thompson & Van Sickel	Benkelman	Thompson & Van Sickle	Irrig.	.93	8	2	37	Dundy	June	20	1895		237
Indian Creek	Kinsey, J. W., C. C.	Benkelman	Kinsey Ditch	Irrig.	.31	10	2	37	Dundy	June	20	1895		261
Indian Creek	Foster, Chas.	Max	Wilson Ditch	Irrig.	1.42	23	2	36	Dundy	June	22	1895		268
Indian Creek	Stoneberg, Sanford	Max	Stoneberg Ditch	Irrig.	1.	2	2	37	Dundy	Mar.	13	1911		1070
Indian Creek	Stoneberg, Sanford	Max	Stoneberg Ditch, No. 2	Irrig.	1.	11	2	37	Dundy	June	23	1913		1299
Kilpatrick, Res. No. 1	Kilpatrick, Bros. Co.	Beatrice	Kilpatrick Res. Ditch	Irrig.	17.	30	6	39	Chase	Jan.	25	1912		1160

Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate S	T	R	County	Date of Priority Month	D	Yr.	Docket No.	App. No.
Medicine Creek	Cambridge Milling Co.	Cambridge	....	Power	68.	29	4	25	Furnas	Dec.	31	1878	92, 93	....
Medicine Creek	Sanders, John L.	Stockville	Sanders Irr. Plant	Irrig.	1.43	27	7	27	Frontier	Feb.	8	1895	83	....
Medicine Creek	Crete Mills	Crete	Curtis Lake	Power	....	32	8	28	Frontier				364*	....
Medicine Creek	Maywood Milling Co.	Maywood	Maywood Milling Co.	Power	11.88	16	8	29	Frontier	May	4	1907	....	858
Mauer Springs	C. B. & Q. R. R.	Lincoln	Burlington Pipe Line	Irrig.	1.48	23	2	11	Chase	Nov.	28	1911	....	1143
Red Willow Ck.	Moore, Wm. H.	Indianola	Red Willow Mill	Power	....	16	3	28	Red Willow	Jan.	1	1886	181	....
Red Willow Ck.	Holland, L. J.	Indianola	L. J. Holland Ditch	Irrig.	35.	16	3	28	Red Willow	Jan	23	1891	95	....
Red Willow Ck.	Helm, John F.	McCook	....	Irrig.	2.	17	3	28	Red Willow	Feb.	18	1895	111	....
Red Willow Ck.	Clark, A. R.	Indianola	Red Willow Val. Mound	Irrig.	14.29	31	4	28	Red Willow	Feb.	27	1905	....	781
Red Willow Ck.	Helm, John F.	McCook	Helm Ditch	Irrig.	10.	8	3	28	Red Willow	Dec.	5	1910	....	1042
Red Willow Ck.	Masters, Chas.	Indianola	Master's Ditch	Irrig.	1.14	6	3	28	Red Willow	July	29	1912	....	1212
Red Willow Lake	Cooper, Jas.	Wallace	Red Willow	Irrig.	2.	36	9	33	Lincoln	Dec.	20	1893	647	....
Republican Riv.	Gearhart & Benson	Arapahoe	Arapahoe Star Mill	Power	196.	27	4	23	Furnas	July	24	1879	1029	....
Republican Riv.	Carson, A.	McCook	Carson Ditch No. 1	Irrig.	1.43	27	3	30	Red Willow	July	1	1888	103	....
Republican Riv.	Pioneer Irr. Co.	Haigler	Haigler L. & C. Co. D.	Irrig.	77.	2	1	43	Dundy	Apr.	4	1890	1025	....
Republican Riv.	Brown, W. A.	Haigler	Sand Point Ditch Co.	Irrig.	11.	11	1	42	Dundy	Sept.	25	1890	115	....
Republican Riv.	Dundy County Irr. Co.	Benkelman	Dundy Co. Ditch	Irrig.	45.	24	1	39	Dundy	Nov.	22	1890	118	....
Republican Riv.	Trites, W. H. et al.	Culbertson	Trites-Davenport Can.	Irrig.	7.	20	3	31	Hitchcock	Dec.	18	1890	3	....
Republican Riv.	McCook I. & W. P. Co.	McCook	Meeker Canal	Irrig.	143.	15	3	31	Hitchcock	Dec.	22	1890	4, 9, 8, 7	....
Republican Riv.	Trenton Farmers Irr. Ass'n.	Trenton	Trenton Farmers I. D.	Irrig.	32.	10	2	34	Hitchcock	Dec.	24	1890	5	....
Republican Riv.	Carson, A.	McCook	Carson Ditch No. 2	Irrig.	18.	27	3	30	Red Willow	May	5	1891	102	....



CAMBRIDGE MILLING COMPANY, CAMBRIDGE, NEBRASKA

RAVENNA MILLS, RAVENNA, NEBRASKA (FLOOD TIME)

CLAIMS AND APPLICATIONS BY STREAMS IN DIVISION 1-B—(Continued)

Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate				Date of Priority			Docket No.	App. No.
						S	T	R	County	Month	D	Yr.		
Republican Riv...	Neighbors, E. G.	Benkelman	Neighbors Ditch	Irrig.	2.86	24	1	39	Dundy	Mar.	18	1891	133	......
Republican Riv...	Cambridge & Arapahoe Irr. & Imp. Co.	Arapahoe	C. & A. I. & I. Co. D.	Irrig.	170.	28	4	25	Furnas	Aug.	26	1891	89	......
Republican Riv...	Republican River Irr. Co.	Benkelman	Republican River I. Co.	Irrig.	30.	29	1	38	Dundy	May	2	1892	147, 148	......
Republican Riv...	Larned, W. H. et al.	Haigler	White & Larned Ditch	Irrig	3.	22	1	40	Dundy	Apr.	29	1893	150	......
Republican Riv...	Marr, Lorenzo	Culbertson	Marr Ditch	Irrig.	4.29	16	3	31	Hitchcock	Jan.	22	1894	11	......
Republican Riv...	Anderson, Anders	Benkelman	Anders Anderson Ditch	Irrig.	2.	1	1	37	Dundy	Jan.	26	1894	151	......
Republican Riv...	Groesbeck & Cannon	Max	Groesbeck Ditch	Irrig.	10.	10	1	37	Dundy	Mar.	27	1894	153	......
Republican Riv...	Thomas, A. J.	Haigler	Thomas Ditch	Irrig.	2.	24	1	40	Dundy	June	5	1894	154	......
Republican Riv...	Ballard, Henry L.	Oxford	Ballard Ditch	Irrig.	8.	8	3	21	Furnas	June	9	1894	91	......
Republican Riv...	Wilcox, F. S.	McCook	Wilcox Ditch	Irrig	4.50	32	3	29	Red Willow	Oct.	4	1894	109	......
Republican Riv...	Delaware - Hickman Ditch Co.	Benkelman	Delaware-Hickman D.	Irrig	20.	17	1	37	Dundy	Jan.	7	1895	157	......
Republican Riv...	Allen, E. M. et al.	Arapahoe	Allen Irr. Ditch	Irrig.	14.	2	3	26	Red Willow	Jan.	26	1895	110	......
Republican Riv...	Spooner, J. A.	Parks	Private Ditch	Irrig.	1.	25	1	40	Dundy	Oct.	7	1897	......	413
Republican Riv...	Walsh, Patrick	McCook	Walsh Canal	Irrig	11.	35	3	30	Red Willow	Jan.	31	1900	......	537
Republican Riv...	Lee, J. L.	McCook	Harmon Ditch	Ice	10.	32	3	29	Red Willow	Jan.	22	1900	......	535
Republican Riv...	Republican River Irr. Co.	Benkelman	Rep. Riv. Irr. Canal	Irrig.	20.	29	1	38	Dundy	Aug.	22	1900	......	577
Republican Riv...	Dickson, W. H.; Holmes, H. R.	Denver, Col.	Haigler Res. No. 2	Irrig.	24.	27	1	41	Dundy	Apr.	29	1910	......	997
Republican Riv...	Campbell Ditch Co.	Stratton	Campbell Irrig.	Irrig.	9.14	9	2	34	Hitchcock	July	13	1906	......	828
Republican Riv...	Rogers, W. N.	McCook	Shadeland Park Ditch	Irrig.	38.	26	3	29	Red Willow	Jan.	3	1911	......	1049
Republican Riv...	McConnell Bros.	Trenton	McConnell Bros Irr. Canal	Irrig.	180.	10	2	34	Hitchcock	Jan.	23	1911	......	1055
Republican Riv...	Hurst, J. C. et al.	Trenton	H. D. Irr. Canal	Irrig.	7.	28	2	35	Hitchcock	Mar.	2	1911	......	1068

CLAIMS AND APPLICATIONS BY STREAMS IN DIVISION 1-B—(Continued)

Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate				Date of Priority			Docket No.	App. No.
						S	T	R	County	Month	D	Yr.		
Republican Riv.	Cappel, Geo.	McCook	Geo. Cappell Ditch	Irrig	1.57	19	3	30	Red Willow	May	1	1911		1093
Republican Riv.	Rogers, W. M.	McCook	Shadeland Park Ditch	Irrig.	7.	25	3	29	Red Willow	Sept.	28	1911		1129
Republican Riv.	Anderson, C. et al	Benkelman	Cottonwood Ditch	Irrig.	3.35	6	1	36	Dundy	Feb.	19	1912		1172
Republican Riv.	Rupert Ditch Co.	Culbertson	Rupert Ditch	Irrig.	20.	32	3	32	Red Willow	Apr.	19	1912		1192
Republican Riv.	Pringle, Geo. N.	Parks	Parks Ditch	Irrig.	17.	20	1	39	Dundy	June	18	1912		1202
Republican Riv.	Republican Riv. Power Co.	Omaha		Power	300.	15	1	9	Webster	Aug.	26	1912		1221
Repub. R. S. Fk.	Guthrie & Co.	Superior	Guthrie & Co.	Power	400.	34	1	7	Nuckolls	Sept.	1	1877	1036	
Republican Riv.	Kirtland, E. S.	Orleans	Orleans Milling & Elevator Co.	Power		27	2	19	Harlan				1043*	
Repub. R. S. Fk.	Karr, J. W.	Benkelman	Karr's Ditch	Irrig.	2.	20	1	37	Dundy	July	28	1894	155	
Repub. R. S. Fk.	Riverside Ditch Co.	Benkelman	Riverside Ditch	Irrig.	13.	29	1	37	Dundy	Aug.	5	1894	156	
Repub. R. S. Fk.	McDonald, J. A.	Benkelman	McDonald Ditch	Irrig.	.79	36	1	38	Dundy	Nov.	13	1901		644
Repub. R. S. Fk.	Bailey, W. J.	Oxford	W. J. Bailey	Irrig.	64.	6	3	21	Furnas	Sept.	8	1913		1321
Republican Riv.	Bartlett, Wm. C.	Alma	Lake Disappointment	Stor.	5.	32	2	18	Harlan	Dec.	18	1915		1442
Republican Riv.	Everson, P. M. and Mitchell, J. C.	Alma	The Everson Canal	Irrig.	1.07	13	2	18	Harlan	Dec.	18	1915		1443
Republican Riv.	Crews, Lewis E.	Haigler	Haigler Canal	Irrig.		21	1	41	Dundy	Sept.	30	1916		1466*
Repub. R. N. Fk.	Pringle, Geo. N.	Parks	The Parks Ditch	Irrig.	2.	20	1	39	Dundy	Dec.	31	1915		1444
Rock Creek	Phelan, J. R. et al	Parks	Phelan Ditch	Irrig.	4.29	17	1	39	Dundy	Dec.	31	1883	138	
Rock Creek	Owens, J. S. et al	Parks	Owen's Ditch	Irrig.	36.	31	2	39	Dundy	June	20	1895		265
Rock Creek	Campbell, R. R.	Parks	Rock Creek Ditch Co.	Irrig.	33.	13	2	40	Dundy	Dec.	18	1899		526
Rock Creek	Benkelman Light Assn.	Benkelman	Benkelman Light Ass'n	Power	20.	8	1	39	Dundy	Nov.	30	1912		1245
Sappa Creek	Zulauf, Geo. W.	Stamford	Stamford Mills	Power		21	2	20	Harlan				997*	

CLAIMS AND APPLICATIONS BY STREAMS IN DIVISION 1-B—(Concluded)

Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate				Date of Priority			Docket No.	App. No.
						S	T	R	County	Month	D	Yr.		
Spring Creek	Carlon, J. C.	Benkelman	Benkelman Ditch	Irrig.	1.29	19	1	37	Dundy	Dec.	31	1896		373
Stinking Water Creek	Kilpatrick Bros.	Beatrice	Chase Co. L. & L. S. Ditch No. 4	Irrig.	.91	14	7	38	Chase	June	27	1895		56
Stinking Water Creek	Kilpatrick Bros.	Beatrice	Chase Co. L. & L. Canal	Irrig.	2.86	10	7	38	Chase	Mar.	10	1894	57	
Stinking Water Creek	McLain, Frank	Imperial	McLain Ditch	Irrig.	2.50	28	7	37	Chase	Sept.	24	1894	65	
Stinking Water Creek	Troutman, A. C.	Palisade	E. L. Light & P'wer Co.	Power	30.	30	5	33	Hayes	June	30	1908		907
Stinking Water Creek	Kilpatrick Bros.	Beatrice	Chase Co. L. & L. S. Ditch No. 3	Irrig.	1.71	14	7	38	Chase	Jan.	29	1895	78	
Stinking Water Creek	Kilpatrick Bros.	Beatrice	Chase Co. L. & L. S. Ditch No. 5	Irrig.	1.50	14	7	38	Chase	Jan.	29	1895	77	
Stinking Water Creek	Kilpatrick Bros.	Beatrice	Chase Co. L. & L. S. Ditch No. 6	Irrig.	2.	13	7	38	Chase	Jan.	28	1895	76	
Stinking Water Creek	Kilpatrick Bros.	Beatrice	Chase Co. L. & L. S. Ditch No. 7	Irrig.	4.57	36	7	37	Chase	Dec.	21	1894	72 175	
Stinking Water Creek	Kilpatrick Bros.	Beatrice	Chase Co. L. & L. S. Ditch No. 1	Irrig.	.70	4	7	38	Chase	June	27	1895		57
Turkey Creek	Wilt & Polly	Naponee		Power		4	1	16	Franklin	Dec.	31	1874	183	

CLAIMS AND APPLICATIONS BY STREAMS IN DIVISION 1-C

Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate				Date of Priority			Docket No.	App. No.
						S	T	R	County	Month	D	Yr.		
Little Blue River	Myers & Sidenburg	Oak	Oak Mill Race	Irrig. Power		16	3	5	Nuckolls				991*	
Little Blue River	Larkin, M. E.	Hastings	Crystal Lake	Stor.	1.5	27	6	10	Adams	Aug.	17	1912		1219
Little Blue River	Lyon, Geo. Jr.	Nelson	Lyons Little Blue Elec. Co.	Power	150.	29	4	6	Nuckolls	Apr.	26	1915		1410
Little Blue River	Lyon, Geo. Jr.	Nelson		Irrig.	4.	18	4	6	Nuckolls	Apr.	26	1915		1411
Little Blue River	Myer Hydro Electric Power Co.	Oak	Meyer Hydro Elec. & Power Co.	Power	150.	16	3	5	Nuckolls	July	7	1916		1467
Little Blue River	Lyon, Geo. Jr.	Nelson	Lyons Little Blue Elec. Co.	Power		29	4	6	Nuckolls	Aug.	10	1916		1462*

CLAIMS AND APPLICATIONS BY STREAMS IN DIVISION 1-D

Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate				Date of Priority			Docket No.	App. No.
						S	T	R	County	Month	D	Yr.		
Bear Creek	Wolfe, J. V.	Lincoln	Wat. Wks. Institution for Feeble Minded	Irrig.	1.	36	4	6e	Gage	May	20	1898		455
Beaver Creek	Wright, G. D.	York		Power	40.	7	10	2w	York	Nov.	1	1878	963	
Blue River, Big	Holmesville, M. & P. Co.	Holmesville	Holmesville M. & P. Co.	Power	500.	29	3	7	Gage	Apr.		1882	1021	
Blue River, Big	Boyes, Burdette	Seward		Power	200.	19	9	4e	Seward	July	8	1910		1006
Blue River Big	Holmesville M. & P.	Holmesville	Holmesville M. & P. Co.	Power	500.	29	3	7e	Gage	May	3	1911		1095
Blue River, Big	Jacobs, E.	Staplehurst	Jacob's Elec. Light Plt.	Power	41.	26	12	2e	Seward	Nov.	13	1911		1135
Blue River, Big	Blue River Power Co.	Seward	Big Blue Power Plant No. 2	Power	100.00	32	9	3e	Seward	Jan.	3	1912		1153
Blue River, Big	Steinmeyer, Geo.	Holmesville	Hoag Power Plant	Power		12	4	5	Gage	Feb.	18	1913		1261*
Blue River, Big	Steinmeyer, Geo.	Holmesville	Barneston Power Plant	Power	500.	13	1	7	Gage	Feb.	18	1913		1262
Blue River, Big	Boyes, Burdette	Seward	Blue River Power Plt. No. 3	Power	100.	5	8	4	Saline	Mar.	13	1913		1265
Blue River, Big	Mares, Frank	Wilber	Mares Irr. Canal	Irrig.	2.28	2	6	4	Saline	Aug.	12	1913		1314
Blue River, Big	C. B. & Q. R. R. Co.	Lincoln	C. B. & Q. Pipe Line	Irrig.	0.50	2	9	3	Seward	Apr.	30	1914		1366
Blue River, Big	C. B. & Q. R. R. Co.	Lincoln	Pipe Line at Wymore	Irrig.	0.50	21	2	7	Gage	Dec.	24	1914		1394
Blue River, Big	C. B. & Q. R. R. Co.	Lincoln	Pipe Line at Seward	Irrig.	0.50	21	11	3	Seward	Dec.	24	1914		1395
Blue River, Big	Johnson, Jas. F.	Lincoln	Power Station No. 4	Power	125.00	19	4	6e	Gage	June	7	1915		1416
Blue River, Big	Johnson, Jas. F.	Lincoln	Power Station No. 2	Power	100.	1	5	4e	Gage	June	7	1915		1417
Blue River, Big	Johnson, Jas. F.	Lincoln	Power Station No. 1	Power	120.	35	7	4	Saline	July	7	1915		1421
Blue River, Big	Johnson, Jas. F.	Lincoln	Power Station No. 3	Power	175.	3	4	5e	Gage	July	7	1915		1422
Blue River, Big	Johnson, Jas. F.	Lincoln	Power Station No. 6	Power		13	1	7	Gage	Aug.	2	1915		1423*
Blue River, Big	Garbe, A. F.	Grafton	Park Plant, B. R. Amusement	Power		1	8	4	Fillmore	Aug.	17	1915		1430*
Blue River, Big	Blue River Power Co.	Seward	Electric Power Plant	Power		32	9	4	Seward	Aug.	14	1916		1463*

CLAIMS AND APPLICATIONS BY STREAMS IN DIVISION 1-D—(Concluded)

Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate				Date of Priority			Docket No.	App. No.
						S	T	R	County	Month	D	Yr.		
Turkey Creek	Lane, J. K.	Pleasant Hill		Power		4	7	3	Saline				990*	
Turkey Creek	Lane, J. K.	Pleasant Hill	Lane's Model Ditch	Irrig.	0.09	4	7	3	Saline	July	16	1895		81
Turkey Creek	Lane, J. K.	Pleasant Hill	Lane's Model Ditch	Irrig.					Saline	July	18	1895		84*

CLAIMS AND APPLICATIONS BY STREAMS IN DIVISION 1-E

Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate S	T	R	County	Date of Priority Month	D	Yr.	Docket No.	App. No.
Lodge Pole	Haase, Chas.	Kimball												
	Clarke, H. A.	Columbus	Bay State Ditch	Irrig.	1.50	29	15	55	Kimball	Dec.	31	1876	347	
Lodge Pole	Johnson, Chas. W.	Potter	Adams & Tobin Ditch	Irrig.	1.14	35	14	50	Cheyenne	Oct.	1	1878	368	
Lodge Pole	Gunderson, A.	Potter	Gunderson Ditch	Irrig.	1.43	1	14	52	Cheyenne	June	1	1879	305	
Lodge Pole	Callahan, Chas.	Sidney	Runge Ditch No. 1	Irrig.	1.71	20	14	50	Cheyenne	Apr.	15	1880	339	
Lodge Pole	Callahan, Chas.	Sidney	Runge Ditch No. 2	Irrig.	0.50	20	14	50	Cheyenne	Apr.	15	1882	338	
Lodge Pole	Anderson, John	Sidney	Anderson Ditch No. 1	Irrig.	2.50	8	14	51	Cheyenne	June	30	1882	373	
Lodge Pole	Bay State Live Stock Co.	Kimball	Circle Arrow Ditch	Irrig.	3.71	29	15	55	Kimball	July	1	1882	346	
Lodge Pole	Pomeroy, E. V. S.	Sidney	Urbach Ditch	Irrig.	0.86	15	14	51	Cheyenne	Sept.	1	1882	308	
Lodge Pole	DeGraw, Geo.	Sidney	Hale Ditch No. 3	Irrig.	0.57	36	14	49	Cheyenne	Apr.	30	1883	320	
Lodge Pole	DeGraw, Geo.	Sidney	Hale Ditch No. 4	Irrig.	0.71	36	14	49	Cheyenne	Apr.	30	1883	321	
Lodge Pole	DeGraw, Geo.	Sidney	Hale Ditch No. 5	Irrig.	0.57	36	14	49	Cheyenne	Apr.	30	1883	322	
Lodge Pole	Whitney, W. T.	Seattle, Wash.	Lower Whitney Ditch	Irrig.	0.29	31	14	48	Cheyenne	May	1	1883	317	
Lodge Pole	Booth, Firth, Estate of	Sunol	Booth's Canal	Irrig.	4.29	29	14	47	Cheyenne	May	31	1883	309 310	
Lodge Pole	McAuliffe, F.	Chappel	McAuliffe Ditch	Irrig	2.29	21	13	45	Deuel	Dec.	31	1884	814	
Lodge Pole	McKinney, J. J.	Kimball	Kinney Ditch No. 2	Irrig.	2.71	33	15	56	Kimball	Dec.	31	1884	348	
Lodge Pole	Libby, H. H.	Lodge Pole	Libby Ditch	Irrig.	2.00	36	14	47	Cheyenne	Dec.	31	1884	312	
Lodge Pole	Dickinson, F.	Lodge Pole		Irrig.	1.14	26	14	47	Cheyenne	Jan.	1	1885	969	
Lodge Pole	Howard, A. T.	Sunol	Howard Ditch	Irrig.	0.86	31	14	47	Cheyenne	Apr.	10	1885	336	
Lodge Pole	Kreuger, Richard and F. W.	Sidney	Krueger Ditch No. 3	Irrig.	1.14	32	14	48	Cheyenne	May	1	1885	323	
Lodge Pole	Wolf, H. D.	Chappel	Wolf Ditch	Irrig.	1.00	18	13	45	Deuel	Dec.	31	1885	813	
Lodge Pole	McIntosh, J.	Kimball	McIntosh Ditch	Irrig.	3.31	29	15	55	Kimball	Apr.	16	1886	351	

CLAIMS AND APPLICATIONS BY STREAMS IN DIVISION 1-E—(Continued)

Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate S	T	R	County	Date of Priority Month	D	Yr.	Docket No.	App. No.
Lodge Pole	Kreuger, Richard and F. W.	Sidney	Krueger Ditch No. 2	Irrig.	2.29	32	14	48	Cheyenne	Oct.	10	1886	324	
Lodge Pole	Borgquist, C. E.	Sidney	Borgquist Ditch	Irrig.	1.29	34	14	49	Cheyenne	Apr.	30	1887	301	
Lodge Pole	Borgquist, C. E.	Sidney	Borgquist Ditch	Irrig.	0.71	34	14	49	Cheyenne	Apr.	30	1887	300	
Lodge Pole	Whitney, W. T.	Seattle, Wash.	Upper Whitney Ditch	Irrig.	2.29	36	14	49	Cheyenne	May	1	1887	316	
Lodge Pole	McLaughlin, M.	Sidney	McLaughlin Ditch	Irrig.	1.00	25	14	48	Cheyenne	May	1	1887	966	
Lodge Pole	DeGraw, Geo.	Sidney	Hale Ditch No. 1	Irrig.	1.14	36	14	49	Cheyenne	July	1	1887	318	
Lodge Pole	Mitchell, J.	Sidney		Irrig.	0.86	8	14	51	Cheyenne	Sept.	1	1887	304	
Lodge Pole	Craig, John	Sidney	Tobin Ditch	Irrig.	2.29	28	14	47	Cheyenne	July	31	1888	330	
Lodge Pole	Charlton, Jessie	Toledo, Ia.	Bordwell Ditch	Irrig.	1.43	35	14	49	Cheyenne	Aug.	1	1888	303	
Lodge Pole	Kinney, L. C.	Pine Bluffs, Wyo.	Premier Ditch	Irrig.	2.43	3	14	58	Kimball	Apr.	11	1889	340	
Lodge Pole	Kinney, S. A.	Pine Bluffs, Wyo.	Smeed Ditch	Irrig.	1.43	8	14	58	Kimball	Apr.	12	1889	341	
Lodge Pole	Charlton, Jessie	Toledo, Ia.	Bordwell Ditch	Irrig.	0.86	35	14	49	Cheyenne	Apr.	27	1889	302	
Lodge Pole	Eubank, John	Kimball	Polly Ditch	Irrig.	0.79	30	15	55	Kimball	May	6	1889	342	
Lodge Pole	Cook, Chas.	Pine Bluffs, Wyo.	Independent Ditch	Irrig.	3.14	7	14	58	Kimball	May	6	1889	343	
Lodge Pole	Howe, H. H.	Kimball		Irrig.	0.43	30	15	55	Kimball	May	6	1889	344	
Lodge Pole	Kinney, J. J.	Kimball	Kinney Ditch	Irrig.	2.	31	15	56	Kimball	May	14	1889	345	
Lodge Pole	Young, W. T.	Kimball	Young Ditch	Irrig.	0.50	33	15	57	Kimball	May	28	1889	349	
Lodge Pole	Yoder, B. F.	Kimball	Ruttner Ditch	Irrig.	1.14	36	15	57	Kimball	June	4	1889	350	
Lodge Pole	Oberfelder, R. S.	Sidney	Oberfelder Ditch	Irrig.	0.43	31	14	46	Cheyenne	June	10	1889	333	
Lodge Pole	DeGraw, Geo.	Sidney	Hale Ditch No. 2	Irrig.	0.43	36	14	49	Cheyenne	June	26	1889	319	
Lodge Pole	Bullock, W. C.	Lodge Pole		Irrig.	9.14	3	13	46	Deuel	June	25	1889	296	
Lodge Pole	Persinger, A. B.	Lodge Pole	Persinger Ditch	Irrig.	4.57	33	14	46	Deuel	June	25	1889	297	

HOLMESVILLE MILL & POWER COMPANY, HOLMESVILLE, NEBRASKA

CLAIMS AND APPLICATIONS BY STREAMS IN DIVISION 1-E—(Continued)

Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate S	T	R	County	Date of Priority Month	D	Yr.	Docket No.	App. No.
Lodge Pole	Kreuger, Richard and F. W.	Sidney	Krueger Ditch No. 1	Irrig.	3.00	29	14	48	Cheyenne	June	26	1889	325	
Lodge Pole	Brady, J. V.	Dix	Brady Ditch	Irrig.	0.71	29	15	55	Kimball	Aug.	16	1889	352	
Lodge Pole	Gross, Chas. Estate of	Pine Bluffs, Wyo.	Hoover Ditch	Irrig.	1.43	12	14	59	Kimball	Sept.	4	1889	353	
Lodge Pole	Bentley, B. M.	Potter	Ickes Ditch	Irrig.	2.50	28	14	50	Cheyenne	Mar.	25	1891	329	
Lodge Pole	Johnson, Chas. W.	Potter	Adams Ditch	Irrig.	1.43	3	14	52	Cheyenne	July	1	1891	371	
Lodge Pole	Girrard, F. G. and R. B.	Kimball	Hurley, Lilly & Polly Ditch	Irrig.	2.57	26	15	56	Kimball	Oct.	1	1891	354	
Lodge Pole	Thornstensen, Nels	Sidney	Christensen Ditch	Irrig.	0.57	7	14	51	Cheyenne	Apr.	15	1893	366	
Lodge Pole	Thornstensen, Nels	Sidney	Christensen Ditch No. 1	Irrig.	0.43	7	14	51	Cheyenne	Apr.	15	1893	367	
Lodge Pole	Trognitz, Chas.	Sidney	Trognitz Canal	Irrig.	1.	36	14	50	Cheyenne	June	1	1893	365	
Lodge Pole	Oberfelder, R. S.	Sidney	Oberfelder Ditch	Irrig	2.	31	14	46	Cheyenne	Dec.	30	1893	306	
Lodge Pole	Krueger, Richard	Sidney	Richard Krueger Ditch	Irrig.	1.	29	14	48	Cheyenne	May	1	1894	968	
Lodge Pole	Anderson, J.	Sidney	Anderson Ditch No. 2	Irrig	0.57	10	14	51	Cheyenne	June	1	1894	372	
Lodge Pole	Johnson, Chas. W.	Potter	Adams Ditch	Irrig.	1.43	10	14	52	Cheyenne	Sept.	1	1894	370	
Lodge Pole	Lyngholm, N. P.	Sidney	Lyngholm Ditch	Irrig.	0.36	14	14	51	Cheyenne	Nov.	1	1894	337	
Lodge Pole	Johnson, Chas. W.	Potter	Adams Ditch	Irrig.	0,50	10	14	52	Cheyenne	Aug.	1	1895	369	
Lodge Pole	Dickinson, F.	Lodge Pole		Irrig.	2.29	33	14	47	Cheyenne	May	10	1896	967	
Lodge Pole	Burg, C. C.	Dix		Irrig	0.14	30	15	53	Kimball	Mar.	3	1897		381
Lodge Pole	Persinger, A. B.	Lodge Pole	Bullock Canal	Irrig.	0.57	4	13	46	Deuel	Feb.	16	1898		437
Lodge Pole	Forsling, Alf	Kimball	Maltese Cross	Irrig.	0.21	36	15	57	Kimball	May	16	1898		454
Lodge Pole	Kinney, L. C.	Bushnell	Bushnell Ditch	Irrig.	3.	2	14	58	Kimball	Apr.	15	1899		504
Lodge Pole	Wiegand, Henry G.	Chappell	Wiegand Canal	Irrig.	2.	17	13	45	Deuel	May	31	1900		563
Lodge Pole	Neuman, A. G.	Chappell	Neuman Canal No. 1 & 2	Irrig.	1.89	36	13	45	Deuel	June	12	1900		565
Lodge Pole	McHatton, Jas. W.	Chappell	Wertz Bros. Ditch	Irrig.	2.86	12	13	46	Deuel	Feb.	14	1901		600

CLAIMS AND APPLICATIONS BY STREAMS IN DIVISION 1-E—(Continued)

Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate S	T	R	County	Date of Priority Month	D	Yr.	Docket No.	App. No.
Lodge Pole	Neuman, G. R.	Chappell	Neuman Ditch	Irrig.	1.29	26	13	45	Deuel	Apr.	17	1901		611
Lodge Pole	Johnson, J. C.	Chappell	Johnson Ditch	Irrig.	2 14	23	13	45	Deuel	Apr.	17	1901		612
Lodge Pole	Bennett L. Stock Co.	Cheyenne, Wyo.	Bennett L. S. Reservoir	Irrig.	22.29	29	15	55	Kimball	Mar.	13	1902		657
Lodge Pole	Nasland, J. A.	Chappell	Nasland Ditch	Irrig.	0.90	1	12	45	Deuel	Apr.	16	1902		661
Lodge Pole	Clausen, John	Dix	Clausen So. Side Ditch	Irrig.	0.57	27	15	54	Kimball	July	25	1902		683
Lodge Pole	Clausen, John	Dix	Clausen No. Side Ditch	Irrig.	0.57	26	15	54	Kimball	July	25	1902		684
Lodge Pole	Bennett L. Stock Co.	Cheyenne, Wyo.	Bennett L. S. Co's D.	Irrig.	1.87	29	15	55	Kimball	Oct.	2	1902		691
Lodge Pole	Forsling, Alf	Kimball	Forsling Ditch	Irrig.	1.50	34	15	57	Kimball	Apr.	24	1903		703
Lodge Pole	Forsling, C. A.	Kimball		Irrig.	1.83	33	15	56	Kimball	July	25	1903		718
Lodge Pole	Clarke, H. A.	Columbus	Bickel Ditch	Irrig.	0.93	30	15	55	Kimball	Aug.	3	1903		719
Lodge Pole	Pomerory, E. V. S.	Sidney	Pomerory Ditch No. 1	Irrig.	0.57	15	14	51	Cheyenne	Aug.	20	1903		723
Lodge Pole	Faden, Elmer L.	Kimball		Irrig.	0.14	30	15	55	Kimball	Sept.	9	1903		724
Lodge Pole	Geddes, F. W.	Kimball	Owasco Ditch	Irrig.	22.28	29	15	55	Kimball	Sept.	12	1903		725
Lodge Pole	Bennett L. Stock Co.	Cheyenne, Wyo.	Owasco Ditch	Irrig	1.75	29	15	55	Kimball	Dec.	15	1903		734
Lodge Pole	Forsling, Alfred	Kimball	Forsling Ditch	Irrig.	0.86	34	15	57	Kimball	Dec.	6	1905		806
Lodge Pole	Soderquist, Peter	Chappell	Smith	Irrig.	3.57	12	12	45	Deuel	Aug.	18	1906		850
Lodge Pole	Soderquist, Peter	Chappell	Ralton Irrig. System	Irrig.	19.14	36	13	45	Deuel	Jan.	4	1907		847
Lodge Pole	Forsling, Clarence	Kimball	Yoder Extension	Irrig.	2.71	36	15	57	Kimball	Apr.	9	1907		857
Lodge Pole	Walker, I. S.	Kimball	Walker Ditch	Irrig.	1.71	31	15	56	Kimball	Sept.	16	1907		869
Lodge Pole	Wilkinson, Mrs. John	Pine Bluffs, Wyo.	Tracy Ditch	Irrig.	0.50	12	14	59	Kimball	Sept.	21	1907		870
Lodge Pole	Soderquist, Peter	Chappell	Ralton	Irrig.	12.4	36	13	45	Deuel	Dec.	4	1907		882
Lodge Pole	Kimball Irr. Dist.	Kimball	Kimball Storage	Irrig.	20,000 acre ft.	36	15	57	Kimball	Apr.	15	1908		897

CLAIMS AND APPLICATIONS BY STREAMS IN DIVISION 1-E—(Concluded)

Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate				Date of Priority			Docket No.	App. No.
						S	T	R	County	Month	D	Yr.		
Lodge Pole	Pyle, W. E.	Kimball	New Ruttner	Irrig.	.51	36	15	57	Kimball	Sept.	16	1903		727
Lodge Pole	Wilds, Turner	Chappell	Wilds Ditch	Irrig.	1.71	11	13	46	Deuel	June	2	1908		904
Lodge Pole	Ruttner, Carl	Sidney	Ruttner Canal	Irrig.	0.50	30	14	47	Cheyenne	June	25	1908		906
Lodge Pole	Bennett L. Stock Co.	Kimball	Bennett Ditch No. 5	Irrig.	1.	29	15	54	Kimball	Feb.	17	1909		934
Lodge Pole	Maginnis, P.	Kimball	Magnnis Ice Pond	Stor.	3.	26	15	56	Kimball	Sept.	19	1911		1127
Lodge Pole	Soderquist, Peter	Chappell	Soderquist Ditch	Irrig.	2.	36	12	45	Deuel	Oct.	22	1912		1237
Lodge Pole	Wiegand, H. G.	Chappell	Wiegand Ditch No. 3	Irrig.	1.28	16	13	45	Deuel	Sept.	10	1913		1322
Lodge Pole	Wiegand, H. G.	Chappell	Wiegand Ditch No. 2	Irrig.	0.42	16	13	45	Deuel	Sept.	10	1913		1323
Lodge Pole	Neuman, A. G.	Chappell	A. G. Neuman Ditch	Irrig.	6.	26	13	45	Deuel	Jan.	5	1916		1445
Lodge Pole	Soderquist, Peter	Chappell	Soderquist Ditch	Irrig.	2.33	36	13	45	Deuel	June	29	1915		1420
Spg. Crk., trib. to Lodge Pole	Oberfelder, R. S.	Sidney	Oberfelder Ditch	Irrig.	2.29	31	14	46	Cheyenne	May	29	1889	307	
Spg. Crk., trib. to Lodge Pole	Chambers, Chas. P.	Sidney	Private Ditch	Irrig.	0.04	14	13	51	Cheyenne	Mar.	19	1895	335	
S. Br., trib. L. P.	Libby, H. H.	Lodge Pole	Spring Branch Ditch	Irrig.	0.29	36	14	47	Cheyenne	July	1	1901		623
Flood Water f'm hill	Fifield, C. M.	Kimball	Fifield Ditch	Irrig.	0.57	22	15	56	Kimball	Apr.	27	1911		1091

CLAIMS AND APPLICATIONS BY STREAMS IN DIVISION 1-F

Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate				Date of Priority			Docket No.	App. No.
						S	T	R	County	Month	D	Yr.		
Weeping Water	Gilmore, Chas. R.	Weeping Water	Gilmore Ditch	Ice	8.	2	10	11	Cass	Aug.	5	1909		955

Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate S	T	R	County	Date of Priority Month	D	Yr.	Docket No.	App. No.
Beaver River	Quackenbush, J. W.	Albion	Pioneer Ditch	Irrig.	3.57	22	20	6	Boone	Dec.	8	1894	287	
Beaver River	Long, Wm. M.	Genoa	Windmill Irr.	Irrig.	.14	14	17	4	Nance	Mar.	31	1896		277
Beaver River	Albion Electric L. & Power Co.	Albion	Albion E. L. & P.	Power	67.	26	20	6	Boone	Oct.	3	1901		639
Beaver River	St. Edward Electric Co.	St. Edward	St. Edward Elec. Co.	Power	134.	27	19	5	Boone	Feb.	11	1911		1058
Beaver Creek	Willard, D. A.	Genoa		Power	125.	14	17	3	Nance	June	19	1915		1418
Beaver Creek	The Ravenna Mills	Ravenna	The Ravenna Mills	Power		8	12	14	Buffalo				1037*	
Cedar River	Nebr. Irr. & Power Co.	Ord	Cedar River Canal	Irrig	175.	22	21	12	Wheeler	Sept.	14	1894	221	
Cedar River	Fullerton E. L. & P. Co.	Fullerton	Fullerton Elec. & P'wer	Power	200.	12	16	6	Nance	Sept.	9	1901		636
Cedar River	Erickson Lake Co.	Lincoln	Erickson Lake Co.	Power	175.	25	21	12	Wheeler	May	24	1915		1415
Cow Creek	McNall, W A.	Brownlee	Homestead Ditch	Irrig.	2.29	7	26	27	Cherry	July	14	1894	194	
Dry Creek, trib. to Calamus	Fisher, Conrad	Burwell	Fisher Canal	Irrig.	4.29	24	23	17	Garfield	Dec.	27	1905		807
Dane Creek	Koupal, Frank	Ord		Irrig.	.14	20	19	14	Valley	July	5	1912		1207
Goose Creek	Erickson, P. C. and J. M.	Brewster	Erickson Ditch	Irrig.	8.	18	25	24	Brown	Apr.	3	1895	209	
Goose Creek	Giles, R. P. et al	Elsmere	Giles Ditch	Irrig.	10.	2	25	25	Cherry	June	1	1895	187	
Goose Creek	Crook, F.	Giles	Crook Ditch	Irrig.	8.	33	25	24	Brown	June	2	1896		345
Gracie Creek	Shoemaker, A. E.	Burwell	Gracie High Line	Irrig.	.29	29	23	17	Loup	July	9	1897		397

CLAIMS AND APPLICATIONS BY STREAMS IN DIVISION 2-A—(Continued)

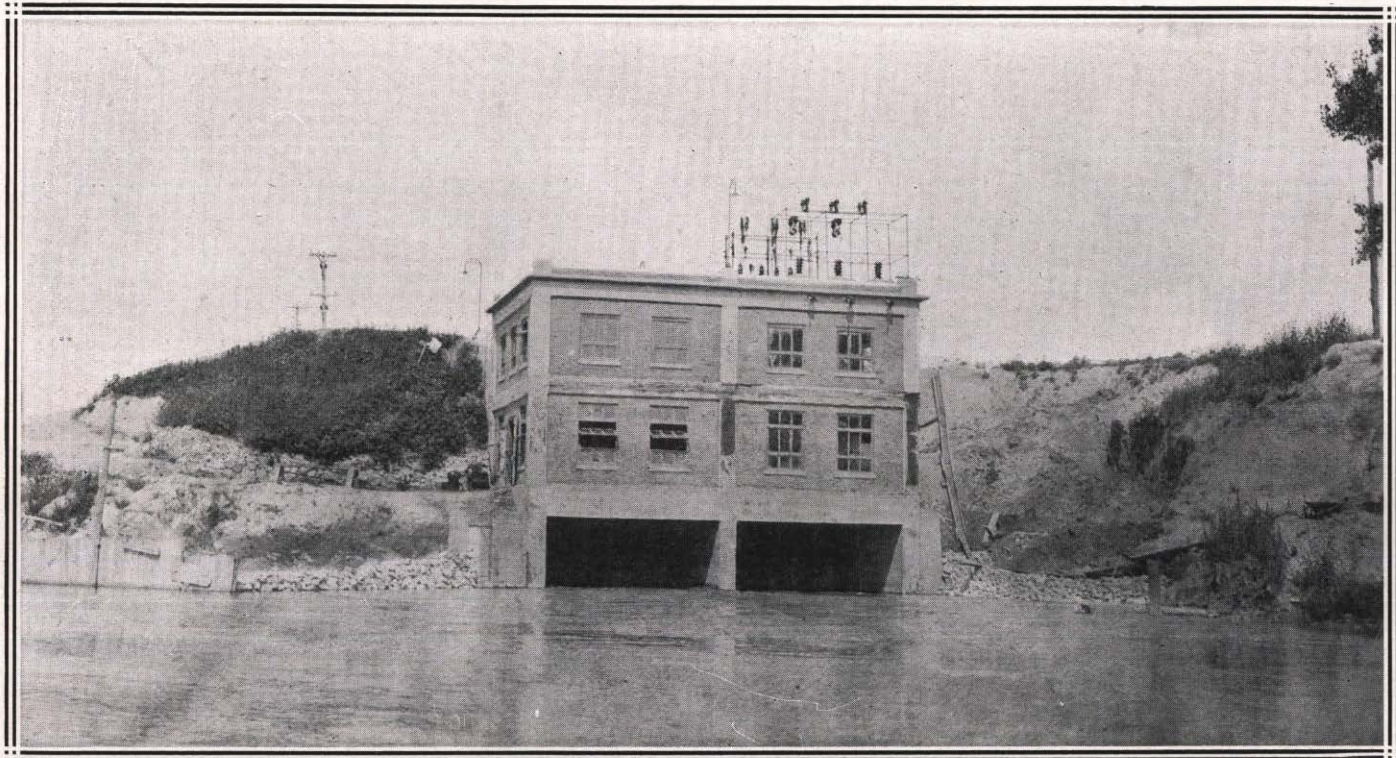
Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate S	T	R	County	Date of Priority Month	D	Yr.	Docket No.	App. No.
Lillian Creek	Lundy, Jas. W.	Doris	Lillian Cr. Canal	Irrig.	5.	1	19	20	Custer	Oct.	14	1912		1233
Looking Glass Creek	Girrard, E. A. and F. H.	Monroe	Monroe Irr. Ditch	Irrig.	2.86	1	17	3	Platte	June	12	1894	289	
Loup River	Nebr. Cen. Irr. Co.	Columbus	Columbus Development	P. & I.	2700.	27	17	4	Nance	June	10	1903		709
Loup River	Boggs, Chas. T.	Lincoln	Schuyler Development	Power	2000.	28	17	1	Platte	Mar.	23	1912		1187
Loup River	C. B. & Q. R. R. Co.	Lincoln	Pipe Line at Ravenna	Irrig.	.50	9	12	14	Buffalo	Dec.	24	1914		1393
Loup R., N. Br.	N. Loup Irr. & Imp. Co.	North Loup	North Loup Ditch	Irrig.	143.	27	19	14	Valley	Sept.	30	1893	227, 228, 232	
Loup R., N. Br.	Lee, J. R.	Brownlee	Lee Ditch	Irrig.	40.	25	27	29	Cherry	Aug.	7	1894	188, 189, 356	
Loup R., N. Br.	Burwell Irr. Co.	Burwell	Burwell Irr. Ditch	Irrig.	110.	27	21	17	Loup	Sept.	7	1894	224	
Loup R., N. Br.	Newton Irr. Dist.	Moulton	Newton Irr. Canal	Irrig.	115.14	35	23	21	Blaine	Feb.	5	1895	205	
Loup R., N. Br.	Erickson, P. C.	Brewster	Homestake Irr. Canal	Irrig.	51.43	27	23	22	Blaine	Sept.	10	1895		152*
Loup R., N. Br.	Tzschuck Canal Co.	Taylor	Tzschuck Canal	Irrig.	242.86	30	22	19	Loup	June	5	1896		301
Loup R., M. Br.	Sherman C. Irr. Water Power & Imp. Co.	Loup City	Sherman County Canal	Power	125.	26	17	16	Valley	Fall of		1888	229a	
Loup R., M. Br.	Middle Loup Val. Irr. Canal Co.	Sargent	Middle Loup Val. I. C.	Irrig.	560.29	15	21	22	Blaine	June	6	1894	202	
Loup R., M. Br.	Douglas Grove Irrigation Dist.	Comstock	Wescott Irr. Ditch	Irrig.	88.57	15	19	18	Custer	Aug.	8	1894	214	
Loup R., M. Br.	Sherman County Irr. Water P. & Imp. Co.	Loup City	Sherman County Canal	Irrig.	244.	26	17	16	Valley	Aug.	13	1894	229b	

CLAIMS AND APPLICATIONS BY STREAMS IN DIVISION 2-A—(Continued)

Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate S	T	R	County	Date of Priority Month	D	Yr.	Docket No.	App. No.
Loup R., M. Br.	Thedford Irr. & P. Co.	Thedford	Thedford Ditch	Irrig.	43.	4	23	29	Thomas	Aug.	25	1894	198	......
Loup R., M. Br.	Purdum, J. W.	Thedford	Norway Irr. Ditch	Irrig.	2.86	31	24	29	Thomas	Sept.	8	1894	199	......
Loup R., M. Br.	Lillian P. D. & P. Co.	Gates	Lillian Prec. Ditch	Irrig.	140.	30	21	21	Blaine	Oct.	19	1894	204 216	....
Loup R., M. Br.	Lundy, Jas. W.	Sargent	Lundy Mill & Power Plant	Power	......	9	19	19	Custer				1024*	......
Loup R., M. Br.	Freeman, Dr. A. B.	Chicago, Ill.	Jewett Ditch	Irrig.	4.29	30	22	24	Blaine	Aug.	12	1895	......	113
Loup R., M. Br.	Harris, L. H.	Dunning	Harris Canal	Irrig.	5.71	16	22	25	Blaine	Feb.	21	1896	......	248
Loup R., M. Br.	Patton, J. A.	Ord	Arcadia Canal	Irrig.	20.	16	17	16	Valley	Mar.	6	1896	......	262
Loup R., M. Br.	Webster Irr. & Canal Co.	Comstock	Webster Canal	Irrig.	1.71	20	19	17	Custer	Mar.	5	1898	......	442
Loup R., M. Br.	Longwood Irr. Canal Co.	Comstock	Longwood Irr. Canal	Irrig.	12.93	20	19	17	Custer	Feb.	21	1912	......	1175
Loup R., M. Br.	Muhlback, Fred	Mullen	Mullen Grist & L. Plant	Power	124.	6	24	32	Hooker	Mar.	12	1912	......	1185
Loup R., M. Br.	St. Paul Electric Light Works	St. Paul	St. Paul Elec. L. Wks.	Power	2000.	3	14	10	Howard	Aug.	12	1912	......	1216
Loup R., M. Br.	Lundy, Jas. W.	Sargent	Lundy M. & Pow. Plt.	Power	400.	9	19	19	Custer	Sept.	16	1912	......	1224
Loup R., M. Br.	U. S. of America	Halsey	Nursey Ditch	Irrig.	1.	3	22	26	Thomas	Sept.	16	1912	......	1226
Loup R., M. Br.	Lundy, Jas. W.	Doris	Mid. Loup Power Plt.	Power	500.	36	20	21	Custer	Oct.	15	1912	......	1234
Loup R., M. Br.	Holmes, Eddy	Nemo	Loup Val. Irr. Canal	Irrig.	.85	36	20	21	Custer	May	31	1913	......	1294
Loup R., M. Br.	Lundy, Jas. W.	Sargent	Lundy's Lake Canal	Irrig.	28.31	4	19	19	Custer	June	27	1913	......	1300
Loup R., M. Br.	Lundy, Jas. W.	Sargent	Lundy's Lake	Stor.	8.	2	19	19	Custer	July	19	1913	......	1306
Loup R., M. Br.	Lundy, Jas. W.	Sargent	Lundy's Lake	Irrig.	6.34	4	19	19	Custer	July	19	1913	......	1307
Loup R., M. Br.	Lundy, Jas. W.	Sargent	Bill's Lake Canal	Irrig.	118.	36	20	21	Custer	July	19	1913	......	1308
Loup R., M. Br.	Austin Irr. Ditch Co.	Loup City	Austin Irr. Ditch	Irrig.	50.	32	13	14	Sherman	Nov.	6	1913	......	1330
Loup R., M. Br.	Central Power Co.	Grand Island	Central Power Co.	Power	1000.	30	13	12	Hall	July	14	1914	......	1373
Loup R., M. Br.	C. B. & Q. R. R. Co.	Lincoln	Pipe Line at Seneca	Irrig.	.50	18	24	30	Thomas	Dec.	28	1914	......	1396

CLAIMS AND APPLICATIONS BY STREAMS IN DIVISION 2-A—(Continued)

Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate				Date of Priority			Docket No.	App. No.
						S	T	R	County	Month	D	Yr.		
Loup R., So. Br.	Tillson, W. Z.	Poole Siding	Tillson Ditch	Irrig.	15.57	29	12	15	Buffalo	Dec.	28	1894	236	....
Loup R., So. Br.	Boblitz, E. J.	Tuckerville	Boblitz Ditch	Irrig.	.50	10	14	21	Custer	Jan.	17	1895	219a	....
Loup R., So. Br.	Boblitz, E. J.	Tuckerville	....	Power	20.	10	14	21	Custer	Jan.	17	1895	219b	....
Loup R., So. Br.	Callaway Mill Co.	Callaway	....	Power	....	2	15	23	Custer				988*	....
Loup R., So. Br.	Brown, A. D.	Milldale	Brown Canal	Irrig.	.86	31	17	24	Custer	Feb.	23	1897	....	363
Loup R., So. Br.	Hartzell, B. F.	Logan	Hartzell's Ditch	Irrig.	.37	27	18	26	Logan	May	18	1897	....	390
Loup R., So. Br.	Flagg, W. J.	Miller	W. J. Flagg Ditch	Irrig.	5.71	11	12	18	Buffalo	Apr.	15	1913	....	1275
Loup R., So. Br.	Central Power Co.	Grand Island	Grand Island Elec. Co.	Power	840.	35	13	12	Howard	Jan.	18	1915	....	1400
Loup R., So. Br.	Brittan Fred	Arnold	Brittan Elec. Co.	Power	....	25	17	25	Custer	July	19	1916	....	1460*
Muddy Creek	Penn, Chas.	Broken Bow	Penn's Ditch	Irrig.	.50	33	17	20	Custer	Aug.	14	1894	215	....
Muddy Creek	Benson, Wm. C.	Litchfield	Litchfield Mills	Power	....	33	14	16	Sherman				999*	....
Muddy Creek	Mason City Roll M. & L. Plant Co.	Mason City	Mason City Roll. M. & L. Plt. Co.	Power	....	....	....	....	Custer				1042*	....
Mira Creek	McClellan, M. E.	North Loup	Mira Reservoir	Stor.	1.14	26	18	13	Valley	Mar.	8	1912	....	1182
Mira Res.	McClellan, M. E.	North Loup	....	Irrig.	1.32	26	18	13	Valley	Oct.	30	1912	....	1239
Mira Creek	Hutchins, W. T.	North Loup	Hutchins Dam	Irrig.	.20	26	18	13	Valley	Apr.	18	1916	....	1453
Platte River	Fremont C. & P. Co.	Fremont	Fremont Canal	I. & P.	2500.	30	17	4	Butler	June	21	1895	....	40
Platte River	Fremont & Omaha P. Co.	Omaha	Fremont & Omaha	Power	2000.	30	17	4	Butler	Mar.	25	1908	....	894
Platte River	Woods, Mark M., Geo. J.	Lincoln	Nebr. Elec Power Co.	Power	....	4	14	10	Douglas	Mar.	31	1916	....	1451*
Sand Creek	Troyer, J. D.	Callaway	Troyer's Pumping Plt.	Irrig.	.24	10	15	23	Custer	Feb.	21	1916	....	1447



POWER HOUSE OF CENTRAL POWER COMPANY ON LOUP RIVER, BOELUS, NEBRASKA

HEADGATE, INTAKE CANAL, BOELUS, NEBRASKA. CENTRAL POWER COMPANY

CLAIMS AND APPLICATIONS BY STREAMS IN DIVISION 2-A—(Concluded)

Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate S	T	R	County	Date of Priority Month	D	Yr.	Docket No.	App. No.
Shell Creek	Schmitt, P.	Columbus	Schmitt's Irr. Canal	Irrig.	3.	19	18	1	Platte	Dec.	17	1894	292a	
Shell Creek	Schmitt, P.	Columbus	Schmitt's Irr. Canal	Power	30.50	19	18	1	Platte	Dec.	17	1894	292b	
Shell Creek	Gottberg, Max	Columbus	Gottberg Irr. Pl.	Irrig.	1.	24	18	1	Platte	June	6	1895		2
Spring Creek	Hendryx, H. J.	Monroe	Hendryx Ditch	Irrig.	1.33	2	17	3	Platte	June	25	1894	290	
Spring Branch	Milldale F. & L. S. Imp. Co.	Council Bluffs, Ia.	Haskill Ditch	Irrig.	7.	31	17	24	Custer	Feb.	27	1914		1357
Victoria Creek	Daily, Gilligan & Co.	Anselmo	Victoria Irr. Plant	Irrig.	2.29	1	19	21	Custer	Mar.	17	1894	210, 212	
Victoria Creek	Victoria Ditch Ass'n.	Gates	Victoria Ditch	Irrig.	4.29	1	19	21	Custer	July	17	1894	213	
Victoria Creek	Laughran, T. et al.	New Helena	Laughran & Bell D.	Irrig.	4.	3	19	21	Custer	Sept.	22	1894	217	
Victoria Creek	Bishop, E. N.	Gates	Victoria Ditch	Irrig.	15.7	1	19	21	Custer	Apr.	2	1912		1189

CLAIMS AND APPLICATIONS BY STREAMS IN DIVISION 2-B

Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate S	T	R	County	Date of Priority Month	D	Yr.	Docket No.	App. No.
Battle Creek	Steffen, Aug.	Battle Creek	Battle Creek Mills	Power	10.67	36	24	3	Madison	Nov.	12	1898		484
Battle Creek	Steffen, Aug. and Geo. Scheerger	Battle Creek	Battle Creek Mills	Power	20.	36	24	3	Madison	Apr.	20	1906		818
Clear Creek	Lyons Drainage Dist.	Lyons	Main Ditch No. 1	Drain.		14	23	8	Burt	Mar.	9	1911		1060
Elkhorn River	Skrdla, Joseph	Atkinson	Atkinson Mill	Power	38.50	30	30	14	Holt	Nov.	1	1883	271	
Elkhorn River	Elkhorn Irr. Co.	O'Neill	Elkhorn Irr. Canal	Irrig.	131.43	22	29	13	Holt	Feb.	3	1894	259 263	
Elkhorn River	Davis, Jos.	O'Neill	Davis Ditch	Irrig.	1.43	31	29	11	Holt	Feb.	8	1894	260	
Elkhorn River	Carlon, Thos.	O'Neill	Carlon Ditch No. 1	Irrig.	1.	32	29	11	Holt	Feb.	8	1894	261	
Elkhorn River	Carlon, Thos.	O'Neill	Carlon Ditch No. 2	Irrig.	5.	30	29	11	Holt	Feb.	8	1894	262	
Elkhorn River	Cain, N. E. et al	O'Neill		Irrig.	5.	32	29	11	Holt	Feb.	20	1895	283	
Elkhorn River	Ross, Chas. P.	Omaha	Platte River Hydro Elec. Power Co.	Power	500.	14	15	10	Douglas	Nov.	24	1909		971
Elkhorn River	Neligh, W. T. S.	West Point	West Point Hy. E. Pow.	Power	400.	18	22	6	Cuming	Dec.	26	1912		1250
Elkhorn River	Norfolk Cereal & Flour Mills	Norfolk	Norfolk Cereal & F. M.	Power	100.	23	24	1	Madison	Mar.	1	1870	996	
Elkhorn, So. Br.	Rothleutner, Albert	Ewing	Flouring Mill	Power	33.	3	26	9	Holt	Aug.	21	1898		464
Middle Creek	Malone, Robert	Lincoln	Malone Ice Plant	Ice	10.	30	10	6	Lancaster	Dec.	26	1907		883
Oak Creek	Eiche, Herman	Lincoln	Eiche Irri. Plant	Irrig.	.71	17	10	6	Lancaster	Jan.	4	1899		489
Platte River	Ross, Chas. P.	Omaha	Platte River Hydro-Elec. Power Co.	Power	2500.	6	14	10	Douglas	Nov.	24	1909		970
Platte River	Parmalee & Rawls	Plattsmouth	Plattsmouth Power Co.	Power	2000.	32	13	13	Cass	Sept.	4	1914		1379

CLAIMS AND APPLICATIONS BY STREAMS IN DIVISION 2-B—(Concluded)

Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate				Date of Priority			Docket No.	App. No.
						S	T	R	County	Month	D	Yr.		
Ryan's Lake	Elk River Drainage Dist.	Fremont	Cutoff "H"	Drain.	....	4	17	9	Dodge	Oct.	16	1909	....	966
Springs	Newton Land Co.	Omaha	Sp. Br. Aqueduct	Irrig.	.07	13	14	13	Sarpy	June	18	1895	....	29
Silver Creek	Armour & Co.	So. Omaha	Armour & Co. Res.	Ice	10.	7	13	9	Saunders	Oct.	18	1897	....	415
Stevens Creek	Moore, R E.	Lincoln	Stevens Cr. Irr. Proj.	Irrig.	1.	2	10	7	Lancaster	Nov.	19	1913	....	1335
Union & Taylor Creeks	Bley, Louis G.	Madison	Union Val. R. Mills	Power	....	32	22	1	Madison				998*	....

CLAIMS AND APPLICATIONS BY STREAMS IN DIVISION 2-C

Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate				Date of Priority			Docket No.	App. No.
						S	T	R	County	Month	D	Yr.		
Abitz Creek	Fullerton, J. B.	Atkinson	Fullerton Ditch No. 2	Irrig.	.36	18	30	13	Holt	Mar.	23	1896		278
Antelope Creek	Julian, A. R. et al	Gordon	Antelope Ditch	Irrig.	.36	21	32	40	Cherry	June	29	1905		798
Ashburn Creek	Zilmer, W. H.	Valentine	Ashburn Canal	Irrig.	.43	27	34	26	Cherry	June	17	1902		676
Bear Creek	Skinner, Thos.	Springview	Skinner Ditch	Irrig.	.22	15	32	21	Keya Paha	June	20	1888	609	
Bear Creek	Cedarburg, P.	Springview	Cedarburg D. Nos. 1 & 2	Irrig.	.02	3	32	21	Keya Paha	Oct.	3	1898		479
Beeman Ck., Old	Barnard, C. O.	Springview	Barnard Ditch	Irrig.	.43	21	32	20	Keya Paha	June	1	1892	603	
Beeman Creek	Beeman, J. D.	Springview	Beeman Ditch	Irrig.	1.	23	32	20	Keya Paha	May	20	1892	620	
Beeman Creek	Rickman, A. L.	Springview	Beeman & Rickman	Irrig.	.29	23	32	20	Keya Paha	July	25	1895	613	
Big Sandy Creek	Pickler, W. S.	Badger	Badger Ditch	Irrig.	1.14	12	33	14	Holt	May	16	1902		667
Big Sandy Creek	Johnson, C. A.	Butte	Badger Mill	Power	35.	12	33	14	Holt	Aug.	28	1902		685
Blackbird Creek	Mullen, A. F.	O'Neill	Mullen Ditch	Irrig.	1.	20	31	11	Holt	Aug.	18	1894	267	
Bluebird Creek	Murphy, P.	O'Neill	Murphy's Ditch	Irrig.	1.	26	30	11	Holt	Sept.	7	1894	273	
Boardman Creek	Lee, Jos. S.	Chesterfield	Lee Ditch	Irrig.	6.86	6	29	33	Cherry	Apr.	25	1895	973	
Boardman Creek	Bachelor, J. H.	Valentine	Boardman Ditch	Irrig.	28.57	33	30	32	Cherry	Jan.	17	1912		1155
Box Butte Creek	Sandoz, Wm.	Moomaw	Billy's Ditch	Irrig.	.21	29	29	45	Sheridan	Jan.	13	1900		533
Brush Creek	Nebr. Townsite Co.	Perry	Brush Creek Power Co.	Power	15.	23	33	13	Holt	Sept.	28	1898		474
Brush Ck., E. B.	McCarthy, M. H. et al	O'Neill	McCarthy Ditch No. 1	Irrig.	.50	24	32	14	Holt	July	1	1894	264	

CLAIMS AND APPLICATIONS BY STREAMS IN DIVISION 2-C—(Continued)

Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate				Date of Priority			Docket No.	App. No.
						S	T	R	County	Month	D	Yr.		
Brush Ck., W. B.	McCarthy, M. H. et al	O'Neill	McCarthy Ditch No. 2	Irrig.	.63	26	32	14	Holt	Aug.	15	1894	266	
Burton Creek	Mutz, Otto	Springview	Burton Creek Ditch	Irrig.	.57	19	34	19	Keya Paha	June	30	1895	608b	
Burton Creek	Mutz, Otto	Springview	One Trip Ditch	Irrig.	.35	2	33	20	Keya Paha	Sept.	2	1895		142
Canyon	Gilmore, Emery	Glen	Gilmore Canal	Irrig.	14.29	36	30	54	Sioux	July	5	1907		863
Cedar Creek	McNamee, K. M.	Wood Lake	Cedar Creek Ditch	Irrig.	.43	4	30	24	Cherry	Sept.	28	1910		1027
Cottonwood Crk.	Morrissey, Tim	Dunlap	Morrissey's Ditch	Irrig.	.71	17	29	48	Dawes	Feb.	16	1895	481	
Cottonwood Crk.	Fendrich & Lichte	Dunlap	Fendrich & Lichte	Irrig.	.64	22	29	48	Dawes	May	9	1896		336
Cottonwood Crk.	Lichte, Hugo	Dunlap	Dunlap Ditch	Irrig.	.50	22	29	48	Dawes	July	18	1911		1113
Crooked Creek	Mutz, Otto	Springview		Power	3.	19	34	19	Keya Paha	Dec.	31	1889	608a	
Crooked Creek	Mutz, Otto	Springview		Irrig.	1.	19	34	19	Keya Paha	June	30	1895	608b	
Cross Creek	Hutchinson, W. H.	Penbrook	Hutchinson Ditch	Irrig.	.21	8	33	24	Keya Paha	Sept.	1	1888	615	
Cub Creek	Tissue & Patterson	Springview	Tissue & Patterson D.	Irrig.	.03	16	33	22	Keya Paha	June	30	1894	618	
Cub Creek	Josiassin, S.	Meadville	McComber Ditch	Irrig.	.10	28	33	22	Keya Paha	Aug.	15	1894	589	
Eagle Creek	Bokhof, Wm.	Atkinson	Bokhof Ditch	Irrig.	2.86	6	30	13	Holt	Sept.	18	1894	275	
Eagle Creek	Robertson, J. A.	Atkinson	Eagle Valley Ditch	Irrig.	2.29	1	30	14	Holt	Mar.	15	1895	280	
Eagle Ck., S. Br.	Becker, Samuel	Atkinson	Becker Ditch	Irrig.	1.14	8	30	13	Holt	Nov.	30	1894	274	
Fairfield Creek	Kuhre, Wm. M.	Johnstown	Kuhre's Pond	Power	25.	31	33	23	Brown	Sept.	1	1893	612a	
Fairfield Creek	Kuhre, Wm. M.	Johnstown		Irrig.	.14	31	33	23	Brown	Apr.	1	1894	612b	

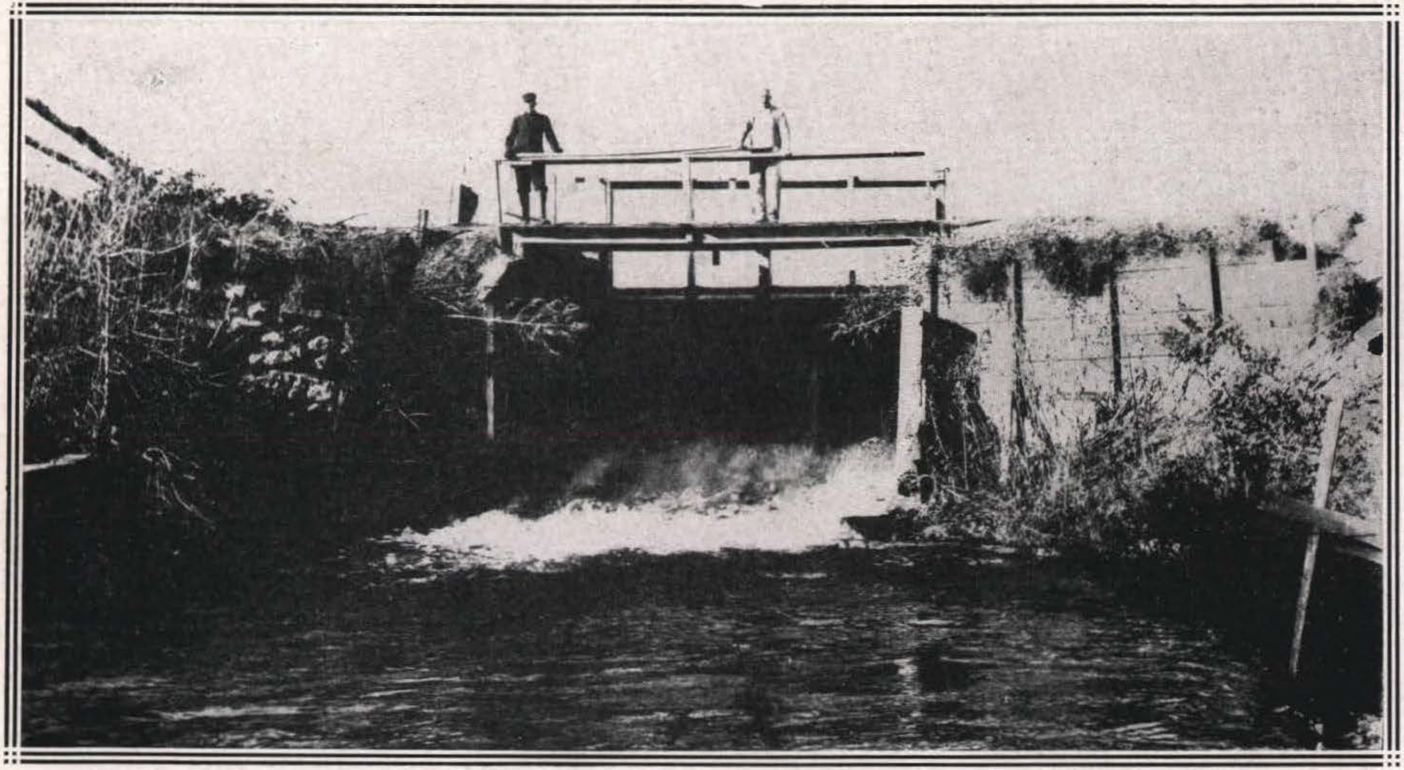
CLAIMS AND APPLICATIONS BY STREAMS IN DIVISION 2-C—(Continued)

Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate S	T	R	County	Date of Priority Month	D	Yr.	Docket No.	App. No.
Holt Creek	Schoettger, F. J.	Enterprise	Schoettger Ditch	Irrig.	.14	32	35	20	Keya Paha	Feb.	23	1895	595	....
Holt Ck., S. Br.	Akers, J. W.	Springview	Akers Ditch	Irrig.	.14	1	34	21	Keya Paha	Aug.	1	1894	611	....
Horse Head Ck.	Bruce, A.	Penbrook	Bruce Ditch	Irrig.	.17	16	33	24	Keya Paha	Sept.	7	1895	....	149
Horse Shoe Lake et al.	Horseshoe Lake Drainage Dist.	Irwin	Horse Shoe Lake Dr.	Drain.	....	13	34	40	Cherry	June	27	1916	....	1461
Huggins Creek	Soper, H. K.	Enterprise	Soper Ditch	Irrig.	.14	21	35	20	Keya Paha	Nov.	6	1894	592	....
Jewett Creek	Jewett, C. P.	Meadville	B. L. Ditch	Irrig.	.71	5	32	21	Keya Paha	Oct.	23	1894	590	....
Keya Paha Riv.	Yocum, J. C.	Butte	Yocum's Ditch	Irrig.	1.14	23	34	15	Boyd	Sept.	7	1894	573	....
Keya Paha Riv.	Bruce, Andrew & Son	Naper	Bruce Roller Mills	Power	100.	24	34	16	Boyd	Oct.	5	1903	....	729
Kibby Creek	Green, Martha J.	Read	Green Ditch	Irrig.	.01	28	34	16	Boyd	Apr.	1	1904	....	747
Lewis Spring	Lewis, Ralph	Enterprise	Lewis Ditch	Irrig.	.14	29	35	19	Keya Paha	Aug.	30	1895	....	139
Long Pine Creek	Kyner, S. H.	Lone Pine	Long Pine L. & P. Plt.	Power	48.	30	30	20	Brown	Apr.	2	1909	....	941
Long Pine Creek	Smith, L. E.	Lone Pine	....	Power	88.	8	30	20	Brown	Feb.	19	1915	....	1391
Middle E. Br.	McGuire, M. W.	Norden	McGuire Ditch	Irrig.	.71	32	33	23	Keya Paha	June	1	1884	606	....
Middle E. Br.	Allen, M. M.	Norden	Allen Ditch	Irrig.	.50	29	33	23	Keya Paha	June	1	1891	616	....
Middle E. Br.	Allen, M. M.	Norden	Continuance Ditch	Irrig.	1.	29	33	23	Keya Paha	May	2	1904	....	753
Minnechaduza	Gilman, S. F. Mill Co.	Neligh	Pierce Milling Co.	Power	35.	30	34	27	Cherry	Sept.	12	1896	....	359
Minnechaduza	City of Valentine	Valentine	Valentine Power Plant	Power	40.	29	34	27	Cherry	Apr.	16	1913	....	1279

CLAIMS AND APPLICATIONS BY STREAMS IN DIVISION 2-C—(Continued)

Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate				Date of Priority			Docket No.	App. No.
						S	T	R	County	Month	D	Yr.		
Minnechaduza	Cornell, Chas. H.	Valentine	Minnechaduza Canal	Irrig.	......	29	34	27	Cherry	July	5	1916	......	1459*
Newman Creek	Newman, Philo	Norden	Newman Ditch	Irrig.	.21	17	33	24	Keya Paha	July	1	1888	617	......
Niobrara River	Richards, B.	Chadron	Lakotah Ditch	Irrig.	7.14	1	30	57	Sioux	Oct.	1	1883	554	......
Niobrara River	The Coffee Cattle Co.	Chadron	Earnest Ditch No. 1	Irrig.	2.86	9	29	56	Sioux	May	1	1885	514a	......
Niobrara River	Bruce, A.	Penbrook	Bruce's Mill	Power	60.	16	33	24	Keya Paha	Apr.	1	1886	610	......
Niobrara River	Cook, J. H.	Agate	McG. & S. Lower No. D.	Irrig.	8.21	25	29	56	Sioux	May	1	1887	513a	......
Niobrara River	Furman, Nellie B.	Marsland	Pioneer Ditches	Irrig.	7.14	36	29	51	Dawes	Aug.	1	1887	442a	......
Niobrara River	McLaughlin, A. H.	Marsland	McLaughlin Ditch	Irrig.	7.14	9	28	52	Box Butte	May	1	1888	566	......
Niobrara River	Cook, J. H.	Agate	McG. & S. L'r S. D.	Irrig.	1.71	25	29	56	Sioux	May	1	1890	513b	......
Niobrara River	The Coffee Cattle Co.	Chadron	Earnest Ditch No.1	Irrig.	2.14	9	29	56	Sioux	May	15	1891	514b	......
Niobrara River	Cook, J. H.	Agate	Cook Ditch No. 1 & 2	Irrig.	3.54	1	28	56	Sioux	May	31	1891	980	......
Niobrara River	Hoyt, Wm. L.	Harrison	Bigelow & Seymour	Irrig.	2.40	19	31	57	Sioux	June	8	1891	510	......
Niobrara River	Skavdahl, Oscar	Marsland	Harris & Neece Ditch	Irrig.	8.57	3	28	55	Sioux	July	1	1892	517	......
Niobrara River	Furman Nellie B.	Marsland	Pioneer Ditches	Power	10.	31	29	50	Dawes	Aug.	1	1893	442b	......
Niobrara River	Roll Mill Co.	Marsland	Roll Mill	Power	35.	5	28	51	Box Butte	Sept.	10	1893	970	......
Niobrara River	Green, Frank J.	Hemingford	Meridian Ditch	Irrig.	.57	25	29	50	Dawes	Jan.	10	1894	459	......
Niobrara River	Wood, J. C. et al	Marsland	Enterprise Ditch	Irrig.	5.71	27	29	50	Dawes	Jan.	27	1894	461	......
Niobrara River	Furman, H. G.	Marsland	Furman Ditch	Irrig.	3 64	29	29	50	Dawes	Feb.	2	1894	462	......
Niobrara River	Johnson, B. F.	Harrison	Johnson Ditch	Irrig.	2.86	36	31	57	Sioux	May	1	1894	511	......
Niobrara River	McMannis, J. T. et al	Hemingford	McM. & Neeland Ditch	Irrig.	.86	29	29	49	Dawes	June	15	1894	463	......
Niobrara River	Fienken, Chas.	Dustin	Fienken Ditch	Irrig.	1.	12	33	16	Boyd	Oct.	1	1894	575	......
Niobrara River	McCully, S. J.	Carns	McCully Ditch	Irrig.	8.57	25	32	20	Keya Paha	Aug.	7	1894	583	......
Niobrara River	Wilson, J. A.	Springview	Wilson Canal	Irrig.	5.71	18	32	21	Keya Paha	Oct.	18	1894	591	......
Niobrara River	Lichte, H.	Dunlap	Lichte Ditch	Irrig.	1.43	27	29	48	Dawes	Jan.	24	1895	479	......
Niobrara River	Warneke, H.	Harrison	Warneke's Ditch	Irrig.	1.57	27	31	57	Sioux	Feb.	13	1895	505	......

Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate				Date of Priority			Docket No.	App. No.
						S	T	R	County	Month	D	Yr.		
Niobrara River	Cook, J. H.	Agate	McG. & S. Upp. Ditch	Irrig.	2.86	23	29	56	Sioux	Feb.	25	1895	521	
Niobrara River	Harris, Octave	Marsland	La Belle Ditch	Irrig.	2.	6	28	54	Sioux	Mar.	12	1895	518	
Niobrara River	Furman, H. G.	Marsland	Snow Ditch	Irrig.	2.86	35	29	51	Dawes	Mar.	26	1895	485	
Niobrara River	Hughes, Mary F.	Marsland	Excelsior Ditch	Irrig.	2.86	10	28	52	Box Butte	May	15	1895	568	
Niobrara River	Hughes, Est. of Jno.	Marsland	Hughes Ditch	Irrig.		1	28	52	Box Butte				987*	
Niobrara River	Mann, John E.	Harrison	Bourrett Ditch	Irrig.	2.	33	30	56	Sioux	June	8	1895		4
Niobrara River	Bourrett, P.	Harrison	Bourrett Sr. Ditch	Irrig.	1.43	29	30	56	Sioux	June	10	1895		5
Niobrara River	Hughes, Estate of Jno. F.	Marsland	Hughes Ditch	Irrig.	1.	1	28	52	Box Butte	June	26	1895		53
Niobrara River	Harris, O.	Marsland	La Belle Ditch	Irrig.	3.14	6	28	54	Sioux	July	3	1895		60
Niobrara River	Bond & Tissot	Peters	Usher Ditch	Irrig.	1.16	19	29	46	Sheridan	July	17	1895		82
Niobrara River	Bennett, Sadie C.	Omaha	Moore Ditch	Irrig.	5.71	9	28	53	Sioux	July	22	1895		88
Niobrara River	Peters, H. A. et al	Hay Springs	Hay Springs Canal	Irrig.	14.29	29	29	47	Dawes	Sept.	27	1895		173
Niobrara River	Mettlen, J. et al	Marsland	Mettlen Ditch	Irrig.	10.	4	28	54	Sioux	Apr.	27	1896		292
Niobrara River	Neeland, Sarah J.	Hemingford	McM. & Neeland Ditch	Irrig.	1.93	29	29	49	Dawes	Apr.	9	1898		448
Niobrara River	Armstrong, T. S.	Butte	Armstrong Canal	Power	150.	9	33	13	Boyd	May	14	1898		452
Niobrara River	Hunter, Jas. A.	Hemingford	Meridian Ditch	Irrig.	5.14	25	29	50	Dawes	Aug	29	1898		469
Niobrara River	Bourrett, J. F.	Harrison	Bourrett's ditch	Irrig.	1.	29	30	56	Sioux	Mar.	5	1900		542
Niobrara River	Bourrett, J. S.	Harrison	J. S. Bourrett Ditch	Irrig.	1.71	19	30	56	Sioux	Mar.	17	1900		546
Niobrara River	Montague, Jas.	Dunlap	Montague & Lichte D.	Irrig.	.43	27	29	48	Dawes	Sept.	27	1900		575
Niobrara River	Fendrich, B.	Dunlap	Chladek Ditch	Irrig.	.30	26	29	48	Dawes	Mar.	18	1901		607
Niobrara River	Fendrich, G. A.	Dunlap	Fendrich Ditch	Irrig.	.29	32	29	48	Dawes	June	1	1901		616
Niobrara River	Fendrich, G. A.	Dunlap	Fendrich Ditch	Irrig.	.27	32	29	48	Dawes	June	1	1901		617
Niobrara River	Cornell, C. H.	Valentine	Valentine Power Plant	Power	1600.	27	24	34	Cherry	Jan.	29	1902		652
Niobrara River	Potmesil Bros.	Dunlap	Potmesil Ditch	Irrig.	6.	26	29	48	Dawes	May	19	1904		757
Niobrara River & Pepper Ck.	Taylor, D. T.	Hay Springs	Taylor's Ditch	Irrig.	4.57	28	29	47	Dawes	Aug.	8	1904		766



MILL OVERFLOW, CHAMPION LIGHT & POWER COMPANY, CHAMPION, NEBRASKA

CLAIMS AND APPLICATIONS BY STREAMS IN DIVISION 2-C—(Continued)

Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate				Date of Priority			Docket No.	App. No.
						S	T	R	County	Month	D	Yr.		
Niobrara River	Kay, John L.	Marsland	Kay Ditch	Irrig.	2.	6	28	53	Dawes	May	12	1905		791
Niobrara River	Kirk, E. L.	Sioux City, Ia.	Nebraska Power Co.	Power	900.	34	32	7	Knox	Sept.	24	1909		961
Niobrara River	Kirk, E. L.	Sioux City, Ia.	Nebraska Power Plt.	Power	700.	34	32	7	Knox	Aug.	9	1910		1019
Niobrara River	Mann, John E.	Harrison	Bieser Ditch	Irrig.	.75	4	29	56	Sioux	Jan.	23	1911		1056
Niobrara River	Mann, John E.	Harrison	Ex. Bourrett Ditch	Irrig.	1.21	33	30	56	Sioux	Jan.	23	1911		1057
Niobrara River	Iodence, W. M.	Dunlap	Lichte Irr. Ditch	Irrig.	3.	27	29	48	Dawes	Apr.	7	1911		1086
Niobrara River	Dieriex, Camille	Rushville	Camille Ditch	Irrig.	1.53	19	30	43	Sheridan	Apr.	10	1911		1087
Niobrara River	Montague, Jas.	Dunlap	Lichte Ditch	Irrig.	.71	27	29	48	Dawes	Apr.	19	1911		1088
Niobrara River	Hopkins, Thos. L.	Hemingford	Potmesil Bros. Ditch	Irrig.	.28	25	29	48	Sioux	Jan.	2	1912		1152
Niobrara River	Bourrett, John	Harrison	John Bourrett Ex. No. 1	Irrig.	.11	29	30	56	Sioux	Mar.	25	1912		1188
Niobrara River	Wells, Harry E.	Butte	Well's Pumping Sys.	Irrig.	1.64	32	32	40	Sheridan	May	2	1912		1193
Niobrara River	Bourrett, John	Harrison	John Bourrett Ex. No. 2	Irrig.	.21	32	30	56	Sioux	July	19	1912		1209
Niobrara River	Buhman, Herman P.	Leigh	Bristow-Lynch P. Plt.	Power	900.	1-6	32	10	Boyd	Nov.	14	1912		1243
Niobrara River	Bennett, Sadie C.	Omaha	Mettlen Ditch	Irrig.	5.	4	28	54	Sioux	Dec.	18	1912		1248
Niobrara River	Bennett, Sadie C.	Omaha	Bennett Ditch	Irrig.	4.	1	28	54	Sioux	Dec.	18	1912		1249
Niobrara River	Fox, Jim	Marsland	Geo. Hitshew Ditch	Irrig.	6.	6	28	52	Box Butte	Feb.	17	1913		1260
Niobrara River	Coffee, Estate of S. B.	Harrison	Coffee Ditch No. 3	Irrig.	2.50	15	29	56	Sioux	Mar.	24	1914		1362
Pine Creek	Clark, Jas.	Rushville	Pine Creek Mill	Power	32.	33	30	44	Sheridan	June	5	1893	415	
Plum Creek	Plum Creek Irr. Co.	Johnstown	Johnstown Ditch	Irrig.	26.	4	29	24	Brown	Dec.	18	1894	405	
Plum Creek	Wilbert, R.	Ainsworth	Wilbert Ditch	Irrig.	.43	35	32	23	Brown	May	5	1896		329
Plum Creek	Ainsworth L. & P. Co.	Ainsworth	Plum Creek Plant	Power	150.	29	32	22	Brown	May	15	1909		947
Pole Creek	Julian, A. R. et al.	Gordon	Pole Creek Ditch	Irrig.	.57	28	32	40	Cherry	June	29	1905		799

CLAIMS AND APPLICATIONS BY STREAMS IN DIVISION 2-C—(Continued)

Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate				Date of Priority			Docket No.	App. No.
						S	T	R	County	Month	D	Yr.		
Rickman Creek	Byington, W. W.	Springview	Byington Ditch	Irrig.	1.	22	32	20	Keya Paha	May	19	1891	582	
Rock Creek	Eastlick, B. J.	Carns	Necessity Ditch	Irrig.	.35	29	32	18	Rock	Jan.	17	1895	395	
Rock Creek	Wile, H.	Mariaville	Wile's Ditch	Irrig.	.86	9	31	18	Rock	Apr.	3	1895	397	
Rock Spgs. Ck.	Moore, W. S.	Meadville	Moore's Ditch	Irrig.	1.43	12	32	22	Keya Paha	June	30	1887	593	
Rock Spgs. Ck.	Van Koten, J.	Springview	Van Koten Ditch	Irrig.	.07	25	33	22	Keya Paha	Jan.	1	1885	619	
Shobe Br.	Lamb, A. J.	Spencer		Irrig.	.14	30	33	11	Holt	July	6	1896		322
Snake River	Jackson, W. S.	Valentine	Snake Hydro Elec Co.	Power	180.	9	31	30	Cherry	Feb.	16	1914		1352
Spring Creek	Kuskie, A. K.	Sparks	Garden Ditch	Irrig.	.86	27	34	25	Cherry	Mar.	30	1900		555
Springs	Bakewell, Geo. C.	Johnstown	Glen Cove Ditch	Irrig.	.85	26	33	24	Brown	Mar.	1	1911		1067
Str., no name	Grant, C. G.	Winfield	Grant Ditch	Irrig.	.14	4	31	20	Rock	Jan.	1	1895	400	
Str., no name	Conger, C. K.	Norden	Conger Ditch	Irrig.	.11	5	33	24	Keya Paha	Sept.	16	1895		158
Snider Creek	Pickler, W. S.	Springview	Olds Ditch	Irrig.	.01	31	33	19	Keya Paha	May	1	1894	607	
Spotted Tail Ck.	Rhodes, J. G.	McLean	Spotted Tail Ditch	Irrig.	.25	4	34	17	Keya Paha	May	17	1895	601	
Sweeney Canyon	Hornback, J.	Sparks	Canon Canal	Irrig.	.21	29	31	25	Cherry	Aug.	10	1893	414	
Turkey Creek	La Rue, Chas.	Norden	Turkey Creek Ditch	Irrig.	.43	35	33	23	Keya Paha	Feb.	9	1900		539
Turkey Creek	La Rue, Chas.	Norden	Turkey Ck. Ditch No. 2	Irrig.	2.	35	33	23	Keya Paha	May	11	1904		754

CLAIMS AND APPLICATIONS BY STREAMS IN DIVISION 2-C—(Concluded)

Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate				Date of Priority			Docket No.	App. No.
						S	T	R	County	Month	D	Yr.		
Verdigris Creek	Hanson, J. W.	Em'tbg, Ia.	Drayton Ditch	Irrig.	2.86	8	28	8	Antelope	Aug.	11	1894	248	....
Whistle Creek	Miller, W. K.	Alliance	Home Ditch	Irrig.	.86	13	28	54	Sioux	June	6	1895	....	65
Whistle Creek	Watson, Mathilda	Canton	Whistle Creek Ditch	Irrig.	1.	12	28	54	Sioux	June	28	1895	....	58
Wooden Sp. Br.	Rhodes, F. J.	Springview	Rhodes Ditch	Irrig.	.21	25	35	20	Keya Paha	June	19	1899	....	512
Wooden Sp. Br.	Rhodes, F. J.	Springview	Rhodes Ditch	Irrig.	.14	25	35	20	Keya Paha	Mar.	12	1900	....	544
Wyman Creek	McCully, R. A.	Carns	McCully Ditch	Irrig.	.80	19	32	19	Keya Paha	June	10	1891	604	....
Wyman Creek	Horton, I.	Carns	Horton Ditch	Irrig.	.14	17	32	19	Keya Paha	June.	5	1894	587	....
Young Creek	Lamb, A. J.	Spencer	Harvey & Lamb Ditch	Irrig.	.21	32	33	11	Holt	June	13	1896	....	311

CLAIMS AND APPLICATIONS BY STREAMS IN DIVISION 2-D—(Continued)

Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate				Date of Priority			Docket No.	App. No.
						S	T	R	County	Month	D	Yr.		
Ash Creek	Compton, W. L.	Whitney		Irrig.	0.03	12	32	51	Dawes	July	15	1893	455	
Ash Creek	Connell, W D.	Whitney	Connell Ditch	Irrig.	0.63	6	32	50	Dawes	June	17	1898		459
Ash Creek	Cripps, Fred W.	Whitney	Cripps Ditch No. 2	Irrig.	1.	13	32	51	Dawes	Jan.	10	1899		491
Ash Creek	Cripps, Fred W.	Whitney	Cripps Ditch	Irrig.	1.14	13	32	51	Dawes	Dec.	26	1903		735
Ash Creek	Howard, W. C.	Whitney	Cripps Ditch	Irrig.	.57	13	32	51	Dawes	Aug.	27	1906		835
Ash Creek, E. B.	Tomlin, H. B.	Whitney	Ox Yoke Ditch	Irrig.	2.86	31	32	50	Dawes	May	31	1880	447	
Ash Creek, E. B.	Aird, Ada L.	Crawford	Barron Ditch	Irrig.	1.14	32	32	50	Dawes	July	1	1888	438	
Ash Creek, E. B.	Ivins, Orville R.	Crawford	Sheldon Ditch	Irrig.	1.43	30	32	50	Dawes	Jan.	26	1899		493
Ash Creek, E. B.	Todd, Frank P.	Crawford	Todd Ditch	Irrig.	0.38	5	31	50	Dawes	Sept.	12	1899		520
Ash Creek, E. B.	Stumph, Nellie	Whitney	Stumph Ditch	Irrig.		31	32	50	Dawes				1023½*	
Ash Creek, W. B.	Vetter, Andrew	Crawford	Mace Ditch	Irrig.	1.	2	31	51	Dawes	July	31	1884	428	
Ash Creek, W. B.	Wall, C. W.	Crawford	W. Ash Ck. Irr. Co. Ditch	Irrig.	1.62	36	32	51	Dawes	July	4	1893	452	
Ash Creek, W. B.	Ivins, Orville R.	Crawford	Woodard Ditch	Irrig.	0.14	25	32	51	Dawes	Feb.	3	1898		434
Ash Creek, W. B.	Broadhurst, Nathan	Crawford	Broadhurst Res.	Stor.	5.	35	32	51	Dawes	Nov.	17	1913		1333
Beaver Creek	Braddock, Wm.	Chadron	Braddock Ditch	Irrig.	0.36	18	34	46	Sheridan	Apr.	15	1895	423	
Beaver Creek	Braddock, J. F.	Chadron		Irrig.	0.04	1	34	47	Dawes	Apr.	15	1895	974	
Beaver Creek	Braddock, Wm.	Chadron	Wm. Lockler Ditch	Irrig.		34	35	47	Dawes					1017*
Beaver Creek	Braddock, J F.	Chadron	Braddock Ditch	Irrig.	0.63	1	34	47	Dawes	Nov.	24	1897		463
Beaver Creek	U. R. Land & Cattle Co.	Chadron	Cilek Ditch	Irrig.	0.36	4	33	46	Sheridan	June	19	1899		513
Beaver Creek	Richman, A. W.	Chadron	Rickman Ditch	Irrig.	1.	9	33	46	Sheridan	July	2	1902		681
Bordeaux Creek	Locket, T. E.	Chadron	Locket Ditch	Irrig.	0.07	11	32	48	Dawes	June	30	1886		494
Bordeaux Creek	Naylor, W. W.	Chadron	Richard's Ditch	Irrig.	0.14	36	33	48	Dawes	Sept.	10	1890	430	
Bordeaux Creek	Bryant, S. A.	Chadron	Bryant's Ditch	Irrig.	0.29	14	33	48	Dawes	Feb.	4	1891	434	

CLAIMS AND APPLICATIONS BY STREAMS IN DIVISION 2-D—(Continued)

Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate				Date of Priority			Docket No.	App. No.
						S	T	R	County	Month	D	Yr.		
Bordeaux Creek..	Hall, O. W.	Chadron	Hall's Ditch	Irrig.	0.07	15	33	48	Dawes	Mar.	1	1891	437	......
Bordeaux Creek..	Naylor, W. W.	Chadron	Richard's Ditch	Irrig.	0.36	36	33	48	Dawes	Sept.	7	1892	446	......
Bordeaux Creek..	Mann, Wm.	Chadron	Mann's Ditch	Irrig.	0.23	25	33	48	Dawes	Dec.	31	1892	975	......
Bordeaux Creek..	Adams, S. L.	Chadron	Adam's Ditch	Irrig.	0.14	2	32	48	Dawes	Mar.	5	1893	450	......
Bordeaux Creek..	County of Dawes	Chadron	County Ditch	Irrig.	0.14	23	33	48	Dawes	July	31	1893	983	......
Bordeaux Creek..	Kebard, K. M.	Chadron	Bacon Ditch	Irrig.	0.21	21	34	48	Dawes	July	1	1894	445	......
Bordeaux Creek..	Morrisey, M.	Chadron	Morrissey Canal	Irrig.	0.08	15	33	48	Dawes	Aug.	25	1894	491	......
Bordeaux Creek..	O'Donnel, John	Chadron	O'Donnell's Ditch	Irrig.	0.14	9	34	48	Dawes	Jan.	17	1898	......	432
Bordeaux Creek..	Nelson, P. B.	Chadron	Nelson's Ditch	Irrig.	0.36	14	33	48	Dawes	Oct.	19	1898	......	478
Bordeaux Creek..	Nelson, P. B.	Chadron	Nelson's Irr. Plant	Irrig.	0.14	14	33	48	Dawes	Jan.	28	1899	......	494
Bordeaux Creek..	Naylor, Chas.	Chadron	Burn's Ditch	Irrig.	4.	36	33	48	Dawes	Nov.	5	1900	......	584
Bordeaux Creek..	Martens, Wm.	Chadron	Marten's Ditch	Irrig.	0.57	28	34	48	Dawes	Sept.	22	1902	......	690
Bordeaux Creek..	Martens, Wm.	Chadron	Marten's Ditch	Irrig.	1.14	21	34	48	Dawes	Jan.	14	1907	......	848
Bordeaux, Lit....	Lebo, Geo. E.	Chadron	Hartzell Canal	Irrig.	0.57	13	33	48	Dawes	June	1	1893	448	......
Bordeaux, Lit..	Butler, J. A.	Chadron	Butler Ditch	Irrig.	0.11	33	33	47	Dawes	June	1	1894	443	......
Bordeaux, Lit....	Frady, C. H.	Chadron	Frady Ditch	Irrig.	......	30	33	47	Dawes				1009*	......
Bordeaux, Lit. ...	Collin, Jacob	Chadron	Collin's Res.	Irrig.	0.31	14	32	48	Dawes	Feb.	27	1905	......	780
Bordeaux, Lit....	Good, J. W.	Chadron	Good Ditch	Irrig.	7.	29	33	47	Dawes	Mar.	6	1905	......	783
Bull Creek	Johnson, W. S.	Glen	Johnson Ditch No. 1	Irrig.	0.29	7	30	53	Sioux	Mar.	13	1895	519	......
Butte Ck. (Trk.)	Chaulk, Jno. J.	Chadron	Chaulk Ditch	Irrig.	3.	25	33	50	Dawes	Mar.	13	1915	......	1406
Cedar Canyon....	Pelren, J. E.	Crawford	Cedar Canyon Ditch	Irrig.	0.43	16	33	53	Sioux	Mar.	1	1897	......	380
Chadron Creek....	City of Chadron	Chadron	Chadron Water Works	W. S.	1.	18	32	48	Dawes	Dec.	31	1888	1022	......

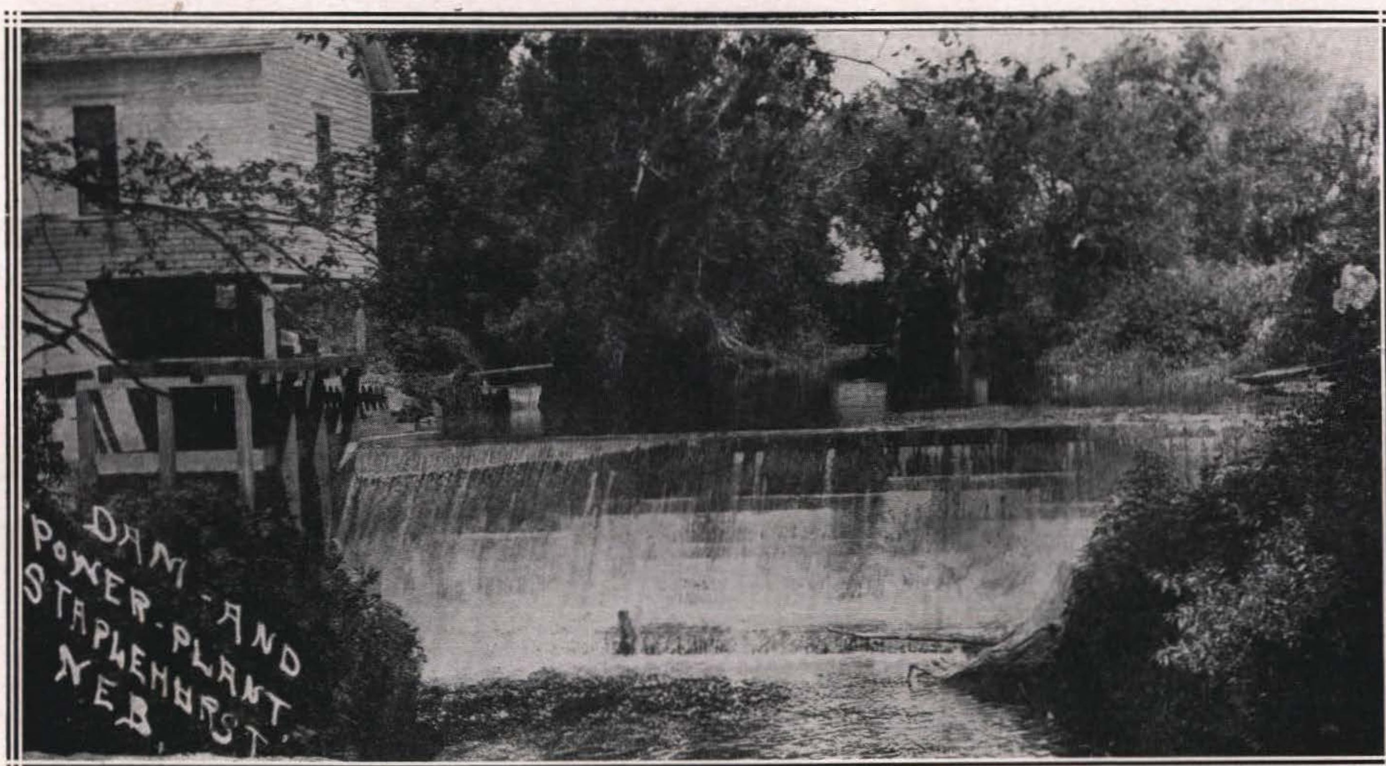
CLAIMS AND APPLICATIONS BY STREAMS IN DIVISION 2-D—(Continued)

Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate S	T	R	County	Date of Priority Month	D	Yr.	Docket No.	App. No.
Chadron Creek	Galleys, W. S.	Chadron	Gallup's Ditch	Irrig.	0.08	15	33	49	Dawes	Dec.	20	1890	426	....
Chadron Creek	Wilson, H. M.	Chadron	Tug Wilson Ditch	Irrig.	0.20	12	32	40	Dawes	July	13	1893	453	....
Chadron Creek	Wilson, W. W.	Chadron	Wallace Wilson Ditch	Irrig.	0.07	12	32	49	Dawes	July	14	1893	454	....
Chadron Creek	Record, A. A.	Hyannis	Half Diamond E. D.	Irrig.	0.57	1	32	49	Dawes	June	17	1894	468	....
Charcoal Creek	Weber, M. J.	Glen	Klein Ditch	Irrig.	0.11	33	31	53	Sioux	Aug.	1	1882	982	....
Cottonwood Ck.	Rasmussen, Jno. J. & C. M.	Whitney	Rasmussen Ditch	Irrig.	2.29	10	33	52	Dawes	Mar.	8	1898	....	444
Cottonwood Ck.	Glendy, W. K.	Whitney	Rasmussen Ditch	Irrig.	18.	10	33	52	Dawes	Dec.	26	1899	....	528
Rav. tb., C't'd Creek	Carlson, A. A.	Crawford	Carlson Ditch	Irrig.	0.71	21	33	52	Dawes	Sept.	20	1897	....	409
Cottonwood, Lit.	Golden, T. F.	Crawford	Thos. Stuart Ditch	Irrig.	0.36	8	32	52	Dawes	Dec.	21	1890	425	....
Cottonwood, Lit.	Price, J. A. B., Golden, T. F.	Crawford	Stuart Bros. Ditch	Irrig.	2.86	8	32	52	Dawes	June	10	1895	....	8
Cottonwood, Lit.	Kusel, Wm. T.	Chadron	Kusel Ditch	Irrig.	1.14	9	32	51	Dawes	Oct.	16	1895	....	183
Cottonwood, Lit.	Simmons, Raner	Crawford	Simmons Ditch	Irrig.	1.14	9	32	51	Dawes	Sept.	12	1899	....	521
Cottonwood, Lit.	Kusel, Wm. T.	Chadron	Kusel Ditch No. 2	Irrig.	0.43	8	32	51	Dawes	May	19	1900	....	560
Cottonwood, Lit.	Dunn, J. G.	Crawford	Dunn's Ditch	Irrig.	1.43	9	32	52	Dawes	Jan.	14	1902	....	649
Cottonwood, Lit.	Erickson, Jno. R.	Crawford	Stuart & Maple Ditch	Irrig.	0.29	3	32	52	Dawes	Mar.	10	1902	....	656
Cottonwood, Lit.	Kusel, Wm. T.	Chadron	Kusel & Speain Ditch	Irrig.	0.71	8	32	51	Dawes	June	30	1902	....	677
Cottonwood, Lit.	Lawrence, Thos. E.	Crawford	Broadhurst Ditch	Irrig.	3.2	7	32	51	Dawes	Feb.	25	1913	....	1264
Cottonwood, Lit.	Dodd & McDowell	Crawford	Dodd & McDonnell Ditch	Stor.	10.	18	32	5	Sioux	Apr.	15	1913	....	1276
Dead Horse Ck.	Kemery, John	Chadron	....	Irrig.	.01	32	32	49	Dawes	Sept.	1	1890	493	....
Dead Horse Ck.	Woodruff, F. B. & E. F.	Chadron	Flag Butte Ditch	Irrig.	.03	32	32	49	Dawes	Apr.	10	1891	427	....
Dead Horse Ck.	Goff, L. L.	Chadron	Goff Ditch	Irrig.	.17	9	31	49	Dawes	Aug.	27	1893	457	....

CLAIMS AND APPLICATIONS BY STREAMS IN DIVISION 2-D

Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate				Date of Priority			Docket No.	App. No.
						S	T	R	County	Month	D	Yr.		
Dead Horse Ck.	Harley, Jas.	Chadron		Irrig.	0.01	32	32	49	Dawes	Aug.	1	1894	488	
Dead Horse Ck.	Goff, G. L.	Chadron	Goff Ditch	Irrig.		4	31	49	Dawes	June	10	1895		7
Dead Horse Ck.	Geiser, B. A.	Chadron	Geiser Ditch	Irrig.	0.15	17	32	49	Dawes	Mar.	18	1902		658
Dead Horse Ck.	Slattery, Roy A.	Chadron		Irrig.	1.29	32	33	49	Dawes	Apr.	6	1904		749
Deadman Creek	Phillips, W. S.	Crawford	Stewart Ditch	Irrig.	0.21	19	30	52	Dawes	May	8	1896		334
Deadman Creek	Phillips, W. S.	Crawford	Phillips Ditch	Irrig.	0.14	18	30	52	Dawes	Mar.	19	1900		547
Deadman Creek	Glendy, Wm. K.	Crawford	Porter & Rasmussen Ditch	Irrig.	1.43	1	30	53	Sioux	May	29	1900		562
Deadman Creek	Linderman, Con.	Crawford	Linderman Ditch	Irrig.	0.14	18	30	52	Dawes	June	11	1900		564
Deep Creek	Green, M. H.	Lynch	Deep Creek Ditch	Irrig.	0.06	9	30	53	Sioux	May	1	1887	525	
Deep Creek	McMasters, Wm. A.	Glen	Green Ditch	Irrig.	0.20	9	30	53	Sioux	Oct.	5	1895		203
Dry Run	Campbell, F. J.	Chadron	Campbell Ditch	Irrig.	1.	35	34	49	Dawes	Nov.	9	1908		919
Dry Run	Guse, William	Crawford	William Guse Res.	Stor.	20.	35	34	52	Dawes	Jan.	13	1914		1345
Dry Run	Harsh & Weston	Crawford	Haish & Weston Ditch	Irrig.	3.	31	34	51	Dawes	Mar.	11	1914		1361
Dry Draw	Earnest, Geo. A.	Chadron	G. Earnest Ditch	Irrig.	3.71	22	35	49	Dawes	Feb.	20	1911		1061
English Creek	McDowell, E. C.	Crawford	McDowell Storage Sys.	Irrig.	0.87	12	31	52	Dawes	Oct.	24	1904		772
Flood Waters	Lenehan, Delia	Crawford	Lenehan Res.	Stor.	4.	25	34	52	Dawes	Apr.	16	1913		1278
Flood Waters	Arner, Jessie B.	Crawford	Arner Ditch	Irrig.	0.14	27	33	53	Sioux	May	6	1913		1289
Hooker Creek	Uhlig, Max	Crawford	McMannis Ditch	Irrig.	1.	7	31	51	Dawes	Dec.	31	1889	492	
Hooker Creek	Sheldon, C. E.	Crawford	Alcorn Ditch	Irrig.	1.21	31	32	51	Dawes	Nov.	17	1905		803

Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate				Date of Priority			Docket No.	App. No.
						S	T	R	County	Month	D	Yr.		
Hooker Creek	Souther, Mable G.	Crawford	Souther Lake	F. & I.	1.43	30	32	51	Dawes	Sept.	24	1908		915
Indian Creek	Seegrist, Isaac	Crawford	Seegrist Ditch	Irrig.	0.03	3	31	50	Dawes	Nov.	1	1893	489	
Indian Creek	Flood, M. F.	Whitney	Flood Ditch	Irrig.	0.07	33	32	50	Dawes	Feb.	13	1894	460	
Indian Creek	Boyer, F.	Whitney	Boyer Ditch	Irrig.	0.86	28	32	50	Dawes	Apr.	30	1900		539
Indian Ck., trib.	Kaiser, Omar A.	Whitney	Kaiser Ditch	Irrig.	0.57	28	32	50	Dawes	Feb.	15	1900		540
Indian Ck., trib.	Honnold Bros.	Whitney	Honnold-Wilson Ditch	Irrig.	0.07	3	31	50	Dawes	May	25	1912		1199
Kane Creek	McConnell, J. F.	Whitney	McConnell Ditch & Res.	Irrig.	4.29	29	34	50	Dawes	Jan.	14	1909		931
Kyle Creek	Colville, David	Glen	Kyle Creek Ditch	Irrig.	0.57	3	30	54	Sioux	June	30	1882	522	
Lone Tree, S. Fk	Thomas, J. C.	Whitney	Thomas Ditch	Irrig.	1.	28	34	51	Dawes	Apr.	29	1905		789
Lone Tree Creek	Sides, Frank	Whitney	Sides Reservoir	Stor.	3.	13	34	52	Dawes	Nov.	25	1914		1392
Madden Creek	Flannigan, T. F.	Chadron	Dams	Irrig.	0.57	26	35	49	Dawes	July	11	1904		763
Madden Creek	Trier, Phillip	Provo, S. D.	Trier Ditch	Irrig.	1.21	6	34	48	Dawes	Aug.	1	1906		830
Madden Creek & North Creek	Flannigan, O. R.	Chadron	Dams	Irrig.	0.57	31	35	48	Dawes	Oct.	17	1904		771
Rush Creek	Braddock, H. T.	Chadron	Braddock Ditch	Irrig.	3.	10	34	49	Dawes	May	4	1903		706
Rush Creek	Braddock, H. T.	Chadron	Braddock Ditch Ext.	Irrig.	1.57	11	34	49	Dawes	May	31	1906		825
Sand Creek, trib. to Cottonwood	Metz, Scott & Greenwood, A. G.	Crawford	Bendex Ditch	Irrig.	0.57	35	33	53	Sioux	Nov.	19	1895		189
Sand Creek, trib. to Cottonwood	Carlson & Rasmussen	Crawford	C. & R. Sand Creek Ditch	Irrig.	30.	32	33	52	Dawes	Apr.	12	1904		767



DAM AND POWER PLANT, STAPLEHURST, NEBRASKA

16-FT. CONCRETE SLAB, CLAY COUNTY

CLAIMS AND APPLICATIONS BY STREAMS IN DIVISION 2-D—(Continued)

Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate S	T	R	County	Date of Priority Month	D	Yr.	Docket No.	App. No.
Sand Creek, trib. to Cottonwood	Arner, J. & H.	Crawford	Arner Ditch	Irrig.	2.57	26	33	53	Sioux	Jan.	12	1905		779
Sand Creek, trib. to Cottonwood	Rasmussen, K.	Whitney	Rasmussen Ditch	Irrig.	17.	3	32	52	Dawes	Jan.	8	1906		811
Sand Creek, trib. to Cottonwood	Dunn, John T.	Crawford	Syndicate Ditch	Irrig.	27.42	32	33	52	Dawes	Apr.	2	1912		1190
Sand Creek, trib. to Cottonwood	Jordon, M. D.	Adelia	Jordon Ditch	Irrig.	0.50	31	33	53	Sioux	Apr.	2	1900		551
Sand Creek, trib. to Little Cottonwood	Everson, Jas.	Crawford	Extension Bendex D.	Irrig.	0.64	35	33	53	Dawes	June	16	1916		1457
Saw Log, East	Stewart, H. E.	Crawford	Little San Log Ditch	Irrig.	0.71	12	30	52	Dawes	Jan.	23	1907		849
Saw Log, East	Stephenson, Chas.	Crawford	Stephenson Ditch	Irrig.	1.14	25	31	52	Dawes	Mar.	5	1907		852
Saw Log, East	Baker, A. D.	Crawford	Baker Ditches	Irrig.	0.29	5	30	51	Dawes	Jan.	3	1908		884
Saw Log, East	Van Treek, P. H.	Crawford	Van Treek Canal & Ponds	Irrig.	0.37	4	30	51	Dawes	May	8	1911		1098
Sheridan Creek	Getchell, G. C.	Pine Ridge	Getchell Ditch	Irrig.	0.07	27	34	45	Sheridan	Aug.	1	1894	418	
Soldier Creek	Rodgers, J. J.	Crawford	Rodgers Ditch	Irrig.	0.14	5	31	53	Sioux	Apr.	30	1883	546	
Spring Br., trib. to White River	Tucker, J. S.	Glen	Tucker Ditch	Irrig.	0.17	34	31	54	Sioux	June	1	1883	557	
Spring Creek	Swinbank, Sam'l et al.	Crawford	Moszeter Ditch	Irrig.		13	32	52	Dawes				1014*	
Spring Creek	Forbes, J. D.	Crawford	Forbes Ditch No. 1	Irrig.	0.57	20	32	52	Dawes	Apr.	28	1902		663
Spring Creek	Swinbank, Sam'l	Crawford	Swinbank Res.	Stor.	2.	13	32	52	Dawes	Mar.	3	1914		1358

CLAIMS AND APPLICATIONS BY STREAMS IN DIVISION 2-D—(Continued)

Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate				Date of Priority			Docket No.	App. No.
						S	T	R	County	Month	D	Yr.		
Spring Ck., trib. to Little Cottonwood	Pinney, B. G.	Crawford	Spring Creek Ditch	Irrig.	0.86	13	32	52	Dawes	May	10	1894	466	
Spring Ck., trib. to Little Cottonwood	Lawrence, Thos. E.	Crawford	Spring Ck. Ditch No. 1	Irrig.	2.	7	32	51	Dawes	Dec.	1	1894	473	
Spring Ck., trib. to D. Horse Creek	Lawrence, Thos. E.	Crawford	Spring Ck. Ditch No. 1	Irrig.	5.	13	32	52	Dawes	Apr.	7	1905		788
Spring Ck., trib. to Little Cottonwood	Goff, T. L.	Chadron	Goff Ditch	Irrig.	0.14	30	32	49	Dawes	Apr.	2	1891	441	
Squaw Creek	Daniels & Stetson	Crawford	Daniels & Stetson Ditch	Irrig.	0.29	19	31	51	Dawes	June	17	1895		27
Squaw Creek	Hall, LeRoy & F. L.	Crawford	Cooper Ditch	Irrig.	2.29	36	32	52	Dawes	May	8	1896		333
Squaw Creek	McDowell, E. C.	Crawford	Squaw Creek	Stor.	3.	12	31	52	Dawes	Oct.	3	1911		1132
Trunk Butte Ck.	Smock, M.	Whitney	Smock's Ditch	Irrig.	0.07	26	32	50	Dawes	June	28	1895	465	
White Clay Ck.	Davidson, J. E.	Crawford	McFarland Ditch	Irrig.	1.64	35	32	52	Dawes	May	18	1891	960	
White Clay Ck.	Hazleton, Wm. S.	Crawford	Hazleton Ditch	Irrig.	1.14	13	31	52	Dawes	May	15	1894	475	
White Clay Ck.	White River Irr. Co.	Crawford	White River Ditch	Irrig.	8.71	35	32	52	Dawes	Dec.	31	1894	477	
White Clay Ck.	Hall, LeRoy & F. L.	Crawford	Cooper Ditch	Irrig.	3.71	2	31	52	Dawes	June	22	1895		42
White Clay Ck.	Brockway, D. L.	Red Oak, Ia.	Brockway Ditch	Irrig.	0.71	36	31	52	Dawes	Feb.	27	1896		256
White Clay Ck.	Pine Ridge Ind. Ag.	Pine Ridge I. Ag. S. D.	Pine Ridge Irr. Ditch	Irrig.					Sheridan				419*	

Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate				Date of Priority			Docket No.	App. No.
						S	T	R	County	Month	D	Yr.		
White Clay Ck.	Adams, Geo. M.	Crawford	Rincker Ditch	Irrig.	0.57	11	31	52	Dawes	June	8	1901		618
White Clay Ck.	Hutzel, John C.	Rushville	Hutzel Ditch	Irrig.	0.57	13	31	52	Dawes	Apr.	30	1903		704
White Clay Ck.	Brooks, J. N.	Rushville	Brook's Ditch	Irrig.	0.42	36	35	45	Sheridan	Aug.	2	1911		1120
White Clay Ck.	Townsend, Charles	White Clay	Townsend Ditch	Irrig.	0.80	25	25	45	Sheridan	Jan.	21	1911		1054
White Clay Ck.	Handschugel, Eva U.	Crawford	Handschiegel's Lake	Stor.	1.3	11	31	52	Dawes	Dec.	17	1915		1441
White Clay, E. Br.	Stewart, H. E.	Crawford	Little San Log Ditch	Irrig.	0.71	12	30	52	Dawes	Jan.	23	1907		849
White Clay and Squaw Creek	White River Irr. Co.	Crawford	White River Irr.	Irrig.	8.	36	32	52	Dawes	Mar.	3	1902		655
White River	Jacobson, M.	Glen	Jacobson Ditch	Irrig.	0.14	32	31	53	Sioux	Oct.	1	1882	561	
White River	Hall, LeRoy	Crawford	Hall's Ditch 1 & 2	Irrig.	24.83	34	32	52	Dawes	Sept.	10	1885	478a	
White River	Diedrickson, N.	Glen	Dedrickson Ditch	Irrig.	0.21	1	30	54	Sioux	Sept.	1	1890	562	
White River	Pinney, B. G. et al.	Crawford	Harris & Cooper Ditch	Irrig.	16.78	25	32	52	Dawes	Mar.	9	1894		
White River	Pinney, B. G. et al.	Crawford	Harris & Cooper Ditch	Irrig.	1.57	25	32	52	Dawes	June	15	1894	464	
White River	Pinney, B. G. et al.	Crawford	Harris & Cooper Ditch	Irrig.	0.28	25	32	52	Dawes	Oct.	31	1894		
White River	Estate of Chas. Rasher	Crawford	Rasher Ditch	Irrig.	1.14	19	32	51	Dawes	June	20	1894	467	
White River	Welling, Estate of N.	Crawford	Welling Ditch	Irrig.	0.57	17	32	51	Dawes	July	13	1894	469	
White River	Carpenter, E. J. & Co.	Whitney	Carpenter Ditch	Irrig.	2.86	1	32	51	Dawes	Dec.	2	1894	487	
White River	White River Irr. Co.	Crawford	White River Irr. Co. Ditch	Irrig.	8.71	35	32	52	Dawes	Dec.	31	1894	477	
White River	Hall, LeRoy	Crawford	Hall's Mill	Power	26.4	34	32	52	Dawes	Jan.	10	1895	478b	
White River	City of Crawford	Crawford	Crawford Water Sys.	City		32	32	52	Dawes				1026*	
White River	C., B. & Q. R. R. Co.	Lincoln	C. B. & Q. Line at Crawford	I.D.&P.	0.8	3	31	52	Dawes	Sept.	14	1889	1030	
White River	Mecham, S. R. et al.	Whitney	Mecham Ditch	Irrig.	2.86	17	32	51	Dawes	June	27	1895		500

CLAIMS AND APPLICATIONS BY STREAMS IN DIVISION 2-D—(Continued)

Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate				Date of Priority			Docket No.	App. No.
						S	T	R	County	Month	D	Yr.		
White River, (Seepage)	Mason, J. F.	Glen	Mason's Ditch	Irrig.	0.14	32	31	53	Sioux	May	12	1896		337
White River	Coffee, C. F.	Chadron	Lewis Ditch	Irrig.	0.14	27	31	55	Sioux	May	19	1896		340
White River	Bartlett, A. M.	Chadron	Jones Ditch	Irrig.	0.71	18	34	48	Dawes	May	21	1897		391
White River	Schwabe, Lena	Chadron	Schwabe Ditch	Irrig.	1.14	25	34	49	Dawes	June	24	1897		394
White River	Wilkinson, Thos.	Crawford	Wilkinson Ditch	Irrig.	0.71	24	32	52	Dawes	Nov.	18	1897		421
White River	Wright, Frank	Whitney	Sandy Stewart Ditch	Irrig.	0.94	10	32	52	Dawes	Jan.	8	1898		427
White River	Forbes, Jeanette et al.	Crawford	Rasher Ditch	Irrig.	0.50	19	32	51	Dawes	May	23	1898		456
White River	Zurn, Adam	Crawford	Zurn & Schmeizleh D.	Irrig.	1.	19	32	51	Dawes	Oct.	13	1898		475
White River	Shaefer, Geo. et al.	Whitney	Schaeffer & Blust D.	Irrig.	3.	2	32	51	Dawes	Dec.	18	1899		525
White River	Rasher, Frank	Crawford	Rasher Ditch	Irrig.	1.43	19	32	51	Dawes	Jan.	16	1900		534
White River	Carlson, John	Whitney	Carlson Ditch	Irrig.	1.43	6	32	50	Dawes	Nov.	26	1900		588
White River	Village of Crawford	Crawford	Crawford Pump Sta.	Power	18.00	3	31	52	Dawes	Mar.	30	1903		702
White River	Minnie L Hebbert & Scott DeForest Hebbert	Chadron	Hebbert Irr. Ditch	Irrig.	0.29	34	33	50	Dawes	May	11	1903		707
White River	Nance & Simmons Irr. Co.	Whitney	Simmons & Harris Irr. Co. Ditch	Irrig.	1.	16	32	51	Dawes	Oct.	26	1903		730
White River	Peterson, Chas. R.	Crawford	Ext to C Rasher Ditch	Irrig.	1.29	20	32	51	Dawes	Feb.	5	1904		740
White River	Schwabe, August	Chadron	Schwabe Ditch	Irrig.	0.57	24	34	49	Dawes	June	13	1904		758
White River	Schwabe, August	Chadron	Schwabe Power Plant	Power	5.	24	34	49	Dawes	June	13	1904		759
White River	Wright Bros.	Whitney	Wright's Ditch	Irrig.	4.	16	32	51	Dawes	Dec.	5	1904		775
White River	Schwabe, August	Chadron	Schwabe Ditch	Irrig.	0.29	24	34	49	Dawes	Mar.	19	1906		815
White River	Roby, I. M.	Crawford	Roby Ditch	Irrig.	0.33	3	31	52	Dawes	Sept.	13	1906		838
White River	Stephenson, Ira J.	Crawford	Stephenson Power Pl.	Power	15.	34	31	53	Sioux	Mar.	15	1907		854
White River	White River Irr. Co.	Crawford	White River Irr. Co.'s S. Br.	Irrig.	1.43	25	32	52	Dawes	Mar.	11	1909		936

CLAIMS AND APPLICATIONS BY STREAMS IN DIVISION 2-D—(Concluded)

Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate				Date of Priority			Docket No.	App. No.
						S	T	R	County	Month	D	Yr.		
White River	Schwabe, August	Chadron	Schwabe Canal	Irrig.	3.43	31	34	48	Dawes	July	23	1908		908
White River	Jenson, J. L.	Whitney	Jenson Irr. Plant	Irrig.	1.14	26	33	50	Dawes	June	27	1911		1110
White River	Pinney, B. G. & Denslon, J. H.	Crawford	Pinney & Denslon Res. 1, 2 & 3	I. & S.	20.	26	32	52	Dawes	Aug.	10	1911		1122
White River	Forbes, Wm. T.	Crawford	Forbes Extension	Irrig.	0.85	19	32	51	Dawes	Sept.	26	1911		1128
White River	Minnie L. & Scott DeForest Hebbert	Chadron	Hebbert Ditch	Irrig.	0.71	34	33	50	Dawes	Mar.	10	1914		1360
Canyons trib. to White River	Martens, Wm.	Chadron	Marten's Ditch	Irrig.	0.29	14	34	48	Dawes	Dec.	26	1902		696
Canyons trib. to White River	Jones, Sarah M. et al.	Crawford	Jones Ditch	Irrig.	0.29	9	31	51	Dawes	May	20	1907		860

CLAIMS AND APPLICATIONS BY STREAMS IN DIVISION 2-E

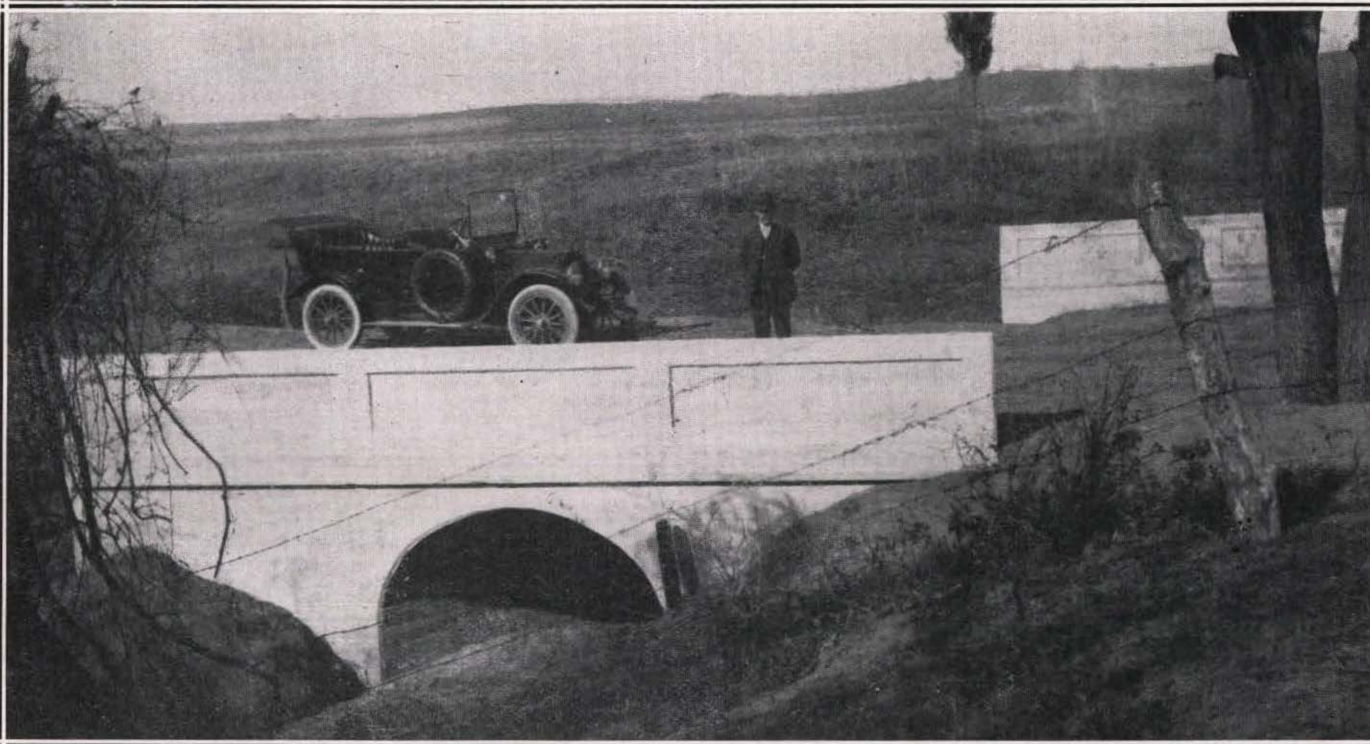
Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate				Date of Priority			Docket No.	App. No.
						S	T	R	County	Month	D	Yr.		
Antelope Creek	Turner, Estate of Geo. H.	Harrison	Turner Ditch	Irrig.	0.86	26	34	57	Sioux	Oct.	31	1894	537	
Antelope Creek	Seaman, S. R.	Warren, Wyo	Ellis Ditch	Irrig.	0.29	9	33	57	Sioux	May	17	1896		338
Antelope Creek	Gayhart, M. J.	Montrose	Gayhart Ditch	Irrig.	2.43	16	34	55	Sioux	June	18	1904		760
Antelope Ck., N. Br.	Story, S. R.	Story	Story's Ditch	Irrig.	2.	8	34	56	Sioux	Nov.	11	1895		168
Boggy Creek	Holly, Thos.	Crawford		Irrig.	0.11	30	33	54	Sioux	Dec.	31	1888	956	
Boggy Creek	Smith, J. W.	Harrison	Smith's Ditch	Irrig.	0.28	31	33	54	Sioux	May	1	1892	526	
Boggy Creek	Readinger, H. Y.	Omaha	Wickersham Ditch	Irrig.	3.	31	33	54	Sioux	Feb.	28	1903		701
Boggy Ck., Mid. Br.	Bannon, J. F.	Harrison	Bannon's Ditch	Irrig.	0.06	7	32	54	Sioux	July	1	1886	560	
Boggy Ck., Mid. Br.	Marten, Wm.	Harrison	Martin's Ditch	Irrig.	0.36	18	32	54	Sioux	May	19	1896		342
Boggy Ck., Mid. Br.	Hill, Albert F.	Harrison	Hill Irr. Ditch	Irrig.	0.86	11	32	55	Sioux	Jan.	20	1908		886
Boggy Creek, E. Fk.	Wickersham, Howard	Harrison	Chain Lake Res. No. 2	Stor.	1.	7	32	54	Sioux	Apr.	30	1915		1413
Boggy Creek, W. Fk.	Wickersham, Howard	Harrison	Chain Lake Res. No. 1	Stor.	1.	7	32	54	Sioux	Apr.	30	1915		1414
Cedar Creek	Knori, Samuel	Harrison	Schelt's Creek Ditch	Irrig.	0.57	35	33	56	Sioux	May	15	1885	507	
Cedar Creek	Valdez, M.	Harrison	Valdez Ditch	Irrig.	0.50	10	32	56	Sioux	Apr.	5	1886	976	
Cedar Creek	Plunkett, John	Harrison		Irrig.		4	32	56	Sioux				985*	
Cherry Creek	Ruffing, M.	Harrison	Cherry Creek Ditch	Irrig.	0.03	29	33	54	Sioux	May	1	1893	549	

CLAIMS AND APPLICATIONS BY STREAMS IN DIVISION 2-E—(Continued)

Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate				Date of Priority			Docket No.	App. No.
						S	T	R	County	Month	D	Yr.		
Dry Gulches	Childs, Roy C.	Story	Roy C. Child's Ditch	Irrig.	0.57	28	34	56	Sioux	Aug.	14	1914		1376
Hat Creek	Brewster, B. E.	Harrison	W. Hat Creek Ditch	Irrig.	0.43	16	32	55	Sioux	June	1	1880	553a	
Hat Creek	Coffee, Chas. F.	Harrison	C. F. Coffee Ditch	Irrig.	4.29	26	33	55	Sioux	Sept.	1	1881	512	
Hat Creek	Brewster, B. E.	Harrison	W. Hat Ditch	Irrig.	0.57	16	32	55	Sioux	May	31	1886	553	
Hat Creek	Coffee, J. T. et al.	Harrison	Miller Ditch	Irrig.	0.37	23	33	55	Sioux	May	19	1896		341
Hat Creek	Haas, Peter	Harrison	Haas Ditch	Irrig.	0.08	2	33	55	Sioux	May	8	1899		510
Hat Creek	Lyon, E. B.	Harrison	Antrim's Ditch	Irrig.	0.57	3	32	55	Sioux	Dec.	24	1900		594
Hat Creek	Lyon, E. B.	Harrison	Antrim's Dam	Irrig.	0.57	3	32	55	Sioux	Aug.	20	1906		834
Hat Creek	Coffee, Jno. T.	Harrison	Coffee & Son Fld. W. D.	Irrig.	6.	14	33	55	Sioux	Oct.	22	1912		1236
Hat Creek	Zerbe, Harry T.	Harrison	Zerbe Reservoir	Stor.	2.	35	33	55	Sioux	Mar.	25	1915		1407
Canyon, trib. to Hat Creek	Kourath, Jas.	Montrose	Konrath Ditch	Irrig.	1.43	17	34	54	Sioux	Dec.	28	1905		808
Draw, trib. to Indian Creek	Meier, Aug.	Ardmore, S. D.	Meier Dam	Irrig.	2.	24	35	55	Sioux	Nov.	5	1900		585
Draw, trib. to Indian Creek	Hibbeln, Jno.	Ardmore, S. D.	Hibbeln Ditch	Irrig.	2.	24	35	56	Sioux	Oct.	4	1907		872
Jim Creek	Dout, L.	Harrison	Dout Bros. Ditch	Irrig.	0.86	7	33	56	Sioux	May	15	1889	981	
Jim Creek	Anderson, Nels	Harrison	Jim Creek Ditch	Irrig.	0.43	8	33	56	Sioux	Dec.	15	1890	502	
Jim Creek	Slattery, Wm.	Harrison	Slattery Ditch	Irrig.	0.29	13	33	57	Sioux	May	31	1891	543	
Jim Creek	Hunter, H. C.	Adelia	Hunter Ditch	Irrig.	0.03	26	33	54	Sioux	May	12	1898		451
Jim Ck., E. Fk.	Wassenberger, J.	Montrose	Wassenberger Ditch	Irrig.	2.29	29	34	54	Sioux	Oct.	13	1900		581
Little Red Ck.	Zerbst, R.	Harrison	Zerbst Ditch	Irrig.	0.14	25	33	56	Sioux	May	1	1893	551	

CLAIMS AND APPLICATIONS BY STREAMS IN DIVISION 2-E—(Continued)

Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate S	T	R	County	Date of Priority Month	D	Yr.	Docket No.	App. No.
Lickett Creek	Coffee, S. B.	Chadron	Lickett Ditch	Irrig.		27	33	54	Sioux				1005*	
Lickett Creek	Coffee, S. B. Est.	Chadron	Lickett Ditch	Irrig.	1.43	27	33	54	Sioux	Mar.	21	1900		549
Long Branch	Borky, Sol	Ardmore, S. D.	Borky Dam	Irrig.	0.64	23	35	54	Sioux	Apr.	14	1900		557
Long Branch	O'Connell, Dennis	Ardmore, S. D.	O'Connel Ditch	Irrig.	0.20	22	35	54	Sioux	Nov.	10	1900		587
Long Branch	Ebert, L. J.	Ardmore, S. D.	Elert Ditch	Irrig.	0.14	19	35	53	Sioux	Aug.	22	1901		635
Monroe Creek	Knori, Samuel	Harrison	Big Monroe Creek D.	Irrig.	1.43	33	33	56	Sioux	May	1	1888	506	
Monroe Creek	Knori, Samuel	Harrison	Schilt's Monroe Ditch	Irrig.	0.50	27	33	56	Sioux	July	2	1888	509	
Monroe Creek	Noreisch, Wm.	Harrison	Noreisch's Ditch	Irrig.	0.04	33	33	56	Sioux	July	19	1895		83
Monroe Creek	Jordan, C.	Montrose	Neil Jordan Ditch	Irrig.	2.20	13	33	56	Sioux	Nov.	12	1906		841
Monroe Creek	Jordan, C.	Montrose	Cornelius Jordan Ditch	Irrig.	2.0	13	33	56	Sioux	July	30	1914		1375
Monroe Creek	Jordan, Richard	Harrison	Wooden Shoe	Stor.	5.	22	33	56	Sioux	Aug.	24	1914		1377
Monroe Creek	Jordan, Cornelius	Montrose	Neal Jordan, Est to No. 841	Stor.	4.	14	33	56	Sioux	Jan.	14	1915		1390
Prairie Dog Ck.	Knori, Samuel	Harrison	Schilt's P. Dog Ditch	Irrig.	1.14	35	33	56	Sioux	May	31	1886	508	
Sou Belly Creek	Schaefer, W. J.	Harrison	Old Sou Belly Ditch	Irrig.	3.	7	32	55	Sioux	June	1	1887	533	
Sou Belly Creek	Montgomery, Sarah	Harrison	Montgomery Ditch	Irrig.	1.	21	33	55	Sioux	Dec.	1	1890	559	
Sou Belly Creek	Jordan, Sarah	Harrison	Jordan Ditch	Irrig.	0.43	21	33	55	Sioux	June	1	1895	556	
Sou Belly Creek	Nutto, F.	Harrison	Nuttos Ditch	Irrig.	0.43	24	32	56	Sioux	Sept.	4	1897		404
Sou Belly Creek	Jordan, Sarah	Harrison	Jordan Ditch	Irrig.	0.50	21	33	55	Sioux	May	11	1896		424
Sou Belly Creek	Carroll, M. J.	Harrison	Carrol Ditch	Irrig.	0.14	7	32	55	Sioux	July	12	1899		516
Sou Belly Creek	Zimmerman, W. H.	Harrison	Zimmerman Ditch	Irrig.	0.71	34	33	55	Sioux	Jan.	11	1900		532



ARCH CULVERT, SEWARD COUNTY.

CLAIMS AND APPLICATIONS BY STREAMS IN DIVISION 2-E—(Continued)

Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate S	T	R	County	Date of Priority Month	D	Yr.	Docket No.	App. No.
Sou Belly Creek	Jordan, S.	Harrison	Jordan Ditch	Irrig.	0.14	21	33	55	Sioux	May	26	1902		668
Sou Belly Creek	Barnes, Paul T.	Harrison	Barnes Res.	Stor.	10.	19	32	55	Sioux	Mar.	24	1913		1268
Sou Belly Creek	O'Connell, M. J.	Montrose	O'Connell Canal	Irrig.	10.	9	33	55	Sioux	May	5	1913		1288
Spring Ck., trib. to Sou Belly Ck.	Hall, W. S. & F. M.	Harrison	Hall's Spring Creek D.	Irrig.	0.57	6	32	55	Sioux	Mar.	26	1889	550	
Spring Ck., trib. to Sou Belly Ck.	Schaefer, N. J.	Harrison	Spring Creek Ditch	Irrig.	0.29	7	32	55	Sioux	June	1	1893	532	
Spring Br., trib. to S. Warbonnet Ck.	Biehle, Chas.	Harrison	Beihle Ditch	Irrig.	0.23	32	33	56	Sioux	Apr.	1	1891	538	
Spring Br., trib. to S. Warbonnet Ck.	Garton, O. A.	Harrison	Garton Ditch	Irrig.	1.43	31	33	56	Sioux	Oct.	16	1893	503	
Spring Br., trib. to N. Warbonnet Ck.	Kay, J. L.	Harrison	Kay's Ditch	Irrig.	0.14	26	33	57	Sioux	May	1	1887	958	
Spring Br., trib. to Warbonnet Creek	Easley, Jas. H.	Harrison	Nolan Ditch No. 1	Irrig.	0.01	23	33	57	Sioux	Mar.	15	1887	957	
Spring Br., trib. to Warbonnet Creek	Easley, Jas. H.	Harrison	Nolan Ditch No. 2	Irrig.	0.29	23	33	57	Sioux	May	1	1888	959	

CLAIMS AND APPLICATIONS BY STREAMS IN DIVISION 2-E—(Concluded)

Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate				Date of Priority			Docket No.	App. No.
						S	T	R	County	Month	D	Yr.		
Squaw Creek	Dunn, Thos.	Harrison	Dunn's Ditch	Irrig.	0.36	15	33	57	Sioux	June	1	1890	552	
Squaw Creek	Hamlin, N. D.	Harrison	Hamlin's Ditch	Irrig.	0.01	10	33	57	Sioux	Apr.	1	1891	555	
Squaw Creek	Dunn, Thos.	Harrison	Thos. Dunn Ditch & R.	Irrig.	0.57	10	33	57	Sioux	Aug.	5	1895		100
Squaw Creek	Dunn, P. D.	Harrison	Phillip Dunn's Ditch	Irrig.	0.19	3	33	57	Sioux	Jan.	22	1897		376
Squaw Ck., W. Br.	Thomas, S. M.	Harrison	Thomas Ditch	Irrig.	0.50	10	33	57	Sioux	July	23	1901		627
Str., no name Trib. to Jim Ck.	Coffee, S. D.	Harrison	Homestead Ditch	Irrig.	0.22	22	33	54	Sioux	May	31	1890	984	
Warbonnet Ck.	Brewster, B. E.	Harrison	Warbonnet Ditch	Irrig.	3.63	21	33	56	Sioux	July	31	1880	548	
Warbonnet Ck.	Anderson, J. A.	Harrison	Warbonnet Ditch No. 2	Irrig.	1.43	20	33	56	Sioux	Mar.	11	1908		892
Warbonnet Ck., N. Br. of S. B.	Anderson, J. A.	Harrison	Daut Ditch	Irrig.	0.71	30	33	56	Sioux	May	31	1889	539a	
Warbonnet Ck., N. Br. of S. B.	Anderson, J. A.	Adelia		Irrig.	0.29	30	33	56	Sioux	Dec.	31	1891	539b	
Warbonnet Ck., Br.	Zerbst, Carl F.	Harrison	Zerbst Ditch No. 1	Irrig.	0.03	26	33	57	Sioux	Mar.	6	1915		1405
Warbonnet Ck., Br.	Zerbst, Carl F.	Harrison	Zerbst Ditch No. 2	Irrig.	0.17	25	33	57	Sioux	Mar.	6	1915		1404
Whitehead Ck.	Harrison, R.	Adelia	Harrison Ditch	Irrig.	0.06	13	33	54	Sioux	May	30	1888	547	

CLAIMS AND APPLICATIONS BY STREAMS IN DIVISION 2-F

Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate				Date of Priority			Docket No.	App. No.
						S	T	R	County	Month	D	Yr.		
Bazile Creek	Packard, J. L.	Creighton	Creighton Mill Race	Power		21	29	5	Knox				1002*	
Bazile Creek	Moss, O. H., and Buckler, Fred	Battle Creek	Creighton Mills	Power	30.	21	29	5	Knox	Sept.	24	1908		914
Mud Creek	Horan, T. W.	Fort Crook	Horan Canal	Irrig.	0.37	34	14	13e	Sarpy	Aug.	12	1909		958
Tekamah Creek	Glasson, Joseph	Tekamah	Tekamah Roller Mills	Power	10.	19	21	11e	Burt	Sept.	17	1906		839
Tekamah Creek	Glasson, Joseph	Tekamah	Tekamah Roller Mills	Ice	1.	19	21	11e	Burt	Jan.	21	1908		887

APPLICATIONS APPROVED, SEPTEMBER 1, 1914, TO NOVEMBER 1, 1916

Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate S	T	R	County	Date of Priority Month	D	Yr.	Docket No.	App. No.
Horse Creek	Foster, C. B. et al.	Caldwell	Caldwell Ditch	Irrig.	5.	3	22	60	Wyoming	Mar.	28	1911		1078
Horse Creek	Marsh & Braziel	Caldwell	Marsh Braziel Canal	Irrig.	13.	4	22	60	Wyoming	Sept.	18	1911		1126
Sheep Creek	Sheep Ck. Lateral Co.	Morrill	Sheep Creek Lateral	Irrig.	5.	17	23	57	Scotts Bluff	Feb.	26	1912		1176
Victoria Creek	Bishop, E. N.	Gates	Victoria Ditch	Irrig.	15.7	1	19	21	Custer	Apr.	2	1912		1189
Spotted Tail Ck.	Roberts, Samuel L.	Mitchell	Roberts Ditch	Irrig.	2.	16	23	56	Scotts Bluff	Nov.	6	1912		1241
Big Blue River	Steinmeyer, Geo. W.	Holmesville	Barnston Power Plant	Power	500.	13	1	7	Gage	Feb.	18	1913		1262
Soubelly Creek	O'Connell, M. J.	Montrose	O'Connell Ditch	Irrig.	10.	9	33	55	Sioux	May	5	1913		1288
Seepage	Enterprise Irr. Dist.	Scottsbluff	Nelson Draw Seepage Ditch	Irrig.	10.	24	23	57	Scotts Bluff	May	21	1913		1290
Lodge Pole Ck.	Krueger, Wm.	Sidney	Wm. Krueger Ditch No. 1	Irrig.	1.2	39	14	48	Cheyenne	June	30	1913		1301
Sheep Creek	Langholf, Edw. F.	Morrill	Langholf Ditch	Irrig.	1.	1	25	58	Sioux	July	5	1913		1303
Wiggle Creek	Bender, Geo. O.	Callaway		Irrig.	2.21	3	15	23	Custer	Oct.	16	1913		1326
Slough	Novotny, John	Schuyler	Novotny Ditch	Irrig.	3.	24	17	3	Colfax	Oct.	20	1913		1327
Middle Loup River	Austin Irr. Ditch Co.	Loup City	Austin Irr. Ditch	Irrig.	50.	32	13	14	Sherman	Nov.	6	1913		1330
Methodist Creek	Keester, Nora D.	Alma	Meadow Brook	Irrig.	3.14	2	1	18	Harlan	Nov.	11	1913		1331
Middle Loup River	Lewis, Abraham M.	Loup City	The Lewis Pipe Line	Irrig.	2.4	20	15	14	Sherman	Nov.	17	1913		1334
Stevens Creek	Moore, R. E.	Lincoln	Stevens Creek Irr. Project	Irrig.	1.	2	10	7	Lancaster	Nov.	19	1913		1335
Big Blue, W. Fk.	Boyes, Burdette	Seward	Blue River Power Pl.	Power		5	8	4	Saline	Nov.	28	1913		1336
Driftwood Creek	Wasson, I. H. & Sons	McCook, R 3	Sylvan Dell	Irrig.	2.8	1	2	30	Red Willow	Dec.	6	1913		1340
Frenchman Stinking Water	Frenchman Val. Irr. Dist.	Culbertson	Frenchman Valley Irr. Dist.	Irrig.	.60	36	5	34	Hayes	Dec.	23	1913		1342

APPLICATIONS APPROVED, SEPTEMBER 1, 1914, TO NOVEMBER 1, 1916—(Continued)

Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate S	T	R	County	Date of Priority Month	D	Yr.	Docket No.	App. No.
Sand Creek	Troyer, Jacob D.	Callaway	J. D. Troyer's Res. & Pumping Plant	Irrig.	.28	10	15	23	Custer	Jan.	24	1914		1347
Big Blue River	Withers, Martha F.	Ulysses	Ulysses Flour Mill	Power	40.	28	13	2	Butler	Feb.	3	1914		1349
Birdwood Ck.	Birdwood Irr. & Power Co.	Lincoln	Birdwood Irr. & Power Co.	Irrig.	75.	14	16	33	Lincoln	Feb.	9	1914		1350
Snake River	Jackson, Walter S.	Valentine	Snake Hydro Elec. Co.	Power	180.	9	31	30	Cherry	Feb.	16	1914		1352
Big Blue River	Beardslee, Chas. O.	Lincoln	Power Station No. 3	Power	175.	3	4	5	Gage	Feb.	17	1914		1355
Big Blue River	Beardslee, Chas. O.	Lincoln	Power Station No. 4	Power	200.	19	4	6	Gage	Feb.	17	1914		1356
Spring Branch	Milldale Farm & L. S. Imp. Co.	Council Bluffs, Ia.	Haskill	Irrig.	7.	31	17	24	Custer	Feb.	27	1914		1357
Lodge Pole Ck.	Ruttner, Carl	Sunol	Karl Ruttner Ditch	Irrig.	.14	30	14	47	Cheyenne	Mar.	4	1914		1359
Niobrara River	S. B. Coffee Estate	Harrison	Coffee Ditch No. 3	Irrig.	2.50	15	29	56	Sioux	Mar.	24	1914		1362
Frenchman Riv.	Frenchman Val. Irr. Dist.	Culbertson	Frenchman Valley Irr. Dist. Canal	Irrig.	.31	31	5	34	Hayes	Apr.	6	1914		1364
Pawnee Creek	Janssen, H.	Gothenburg	Janssen's Canal	Irrig.	8.	20	13	27	Lincoln	Apr.	8	1914		1365
Big Blue River	C. B. & Q. R. Co.	Lincoln	C. B. & Q. Pipe Line	Irrig.	.50	2	9	3	Seward	Apr.	30	1914		1366
White River	Kusel, Wm. T.	Chadron	Kusel White River D.	Irrig.	6.	10 40	32	17	Dawes	May	5	1914		1367
Trib. Dry Trunk Butte Creek	Snyder, Frank W.	Whitney	Snyder Ditch	Irrig.	.57	14	32	50	Dawes	May	5	1914		1368
Warbonnet Ck.	Anderson, John A.	Harrison	Warbonnet Ditch No. 3	Irrig.	2.50	20	33	56	Sioux	May	12	1914		1369
Eternal Spring	Nichols, Yorick	Henry	Dyer Ditch	Irrig.	.35	34	24	58	Scotts Bluff	June	1	1914		1370
Long Branch	Forster, Jacob	Ardmore, S. D.	Long Branch Reservoir	Stor.	10.	36	35	54	Sioux	June	15	1914		1371
Driftwood Creek	Fitch, Wm. S.	McCook	W. S. Fitch	Irrig.	1.	36	3	30	Red Willow	July	2	1914		1372
Blue Creek	Delatour, S. P.	Lewellen	Delatour Reservoir	Stor.	90.	32	17	42	Garden	July	22	1914		1374
Monroe Creek	Jordan, Cornelius	Montrose	Cornelius Jordan	Irrig.	2.	13	33	56	Sioux	July	30	1914		1375

APPLICATIONS APPROVED, SEPTEMBER 1, 1914, TO NOVEMBER 1, 1916—(Continued)

Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate				Date of Priority			Docket No.	App. No.
						S	T	R	County	Month	D	Yr.		
Dry Gulches	Childs, Roy C.	Story	Roy C. Childs Dam & Ditch	Irrig.	.57	28	34	56	Sioux	Aug.	14	1914		1376
Monroe Creek Dry Draw	Jordan, Richard	Harrison	Wooden Shoe	Stor.	5.	26	33	56	Sioux	Aug.	24	1914		1377
Nemaha River	White, G. B.	Unadilla	White's Reservoir	Stor.	5.	11	8	10	Otoe	Aug.	26	1914		1378
Platte River	Parmele & Rawls	Plattsmouth	Plattsmouth Power Pl.	Power	2000.	32	13	13	Cass	Sept.	4	1914		1379
Pumpkin Creek	Airedale Ranch & Cattle Co.	Scottsbluff	Airedale No. 1	Irrig.	.54	2	19	55	Banner	Sept.	4	1914		1380
Republican Riv.	Romjue, Willis A.	Alma	W. A. Romjue	Irrig.	2.9	3	1	18	Harlan	Sept.	17	1914		1381
South Platte River	McConnell, Edw. B.	Hershey	McConnell South Side	Irrig.	37.8	34	14	33	Lincoln	Sept.	25	1914		1382
Spring	Mann, Chas.	Chadron	Mann's Spring Ditch	Irrig.	.50	18	32	48	Dawes	Sept.	28	1914		1383
Lodge Pole Ck.	Neumann, A. G.	Chappell	A. G. Neumann	Irrig.	6.	26	13	45	Deuel	Oct.	2	1914		1385
Rock Creek	Pringle, Geo. N.	Parks	Parks Reservoir	Stor.	12.	31	2	29	Dundy	Oct.	16	1914		1387
Flood Waters	Serres, Joseph	Harrison	Joe Serre's Dam & D.	Irrig.	1.71	9	33	54	Sioux	Nov.	9	1914		1389
Long Pine Ck.	Smith, L. E.	Long Pine		Power	88.	8	30	20	Brown	Nov.	24	1914		1391
Lone Tree Creek	Sides Frank	Whitney	Side's Reservoir	Stor.	3.	13	34	52	Dawes	Nov.	25	1914		1392
Loup River	C. B. & Q. R. R. Co.	Lincoln	Pipe Line at Ravenna	Irrig.	.50	9	12	14	Buffalo	Dec.	24	1914		1393
Big Blue River	C. B. & Q. R. R. Co.	Lincoln	Pipe Line at Wymore	Irrig.	.50	21	2	7	Gage	Dec.	24	1914		1394
Big Blue River	C. B. & Q. R. R. Co.	Lincoln	Pipe Line at Seward	Irrig.	.50	21	11	3	Seward	Dec.	24	1914		1395
Middle Loup River	C. B. & Q. R. R. Co.	Lincoln	Pipe Line at Seneca	Irrig.	.50	18	24	30	Thomas	Dec.	28	1914		1396
Cedar Creek	Belmont Irr. C. & W. P. Co.	Bridgeport	Cedar Creek Feeder	Irrig.	5.	23	18	48	Morrill	Jan.	7	1915		1397
Sheep Creek (Seepage)	Sheep Ck. Lateral Co.	Morrill	Sheep Ck. Lateral Co.	Irrig.	.92	8	23	57	Scotts Bluff	Jan.	12	1915		1398
Monroe Creek	Jordan, Cornelius	Montrose	Neal Jordan Ext. to 841	Stor.	4.	14	33	56	Sioux	Jan.	14	1915		1399
South Loup Riv.	Central Power Co.	Grand Island	Grand Island Elec. Co.	Power	840.	35	13	12	Howard	Jan.	18	1915		1400

APPLICATIONS APPROVED, SEPTEMBER 1, 1914, TO NOVEMBER 1, 1916—(Continued)

Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate S	T	R	County	Date of Priority Month	D	Yr.	Docket No.	App. No.
North Loup Riv.	Stone, Myron K.	Lisco	M. H. Stone Irr. Canal	Irrig.	1.	28	18	46	Morrill and Garden	Jan.	19	1915		1401
Driftwood Creek	Hoyt, Jas. L.	McCook		Irrig.	1.42	25	2	31	Hitchcock	Feb.	13	1915		1402
Sheep Ck. Draw	Sheep Ck. Lateral Co.	Morrill	Sheep Ck. Lateral Co.	Irrig.	.29	8	23	57	Scotts Bluff	Feb.	20	1915		1403
Br. Warbonnet Creek	Zerbst, Carl F.	Harrison	Zerbst's Ditch No. 2	Irrig.	.17	25	33	57	Sioux	Mar.	6	1915		1404
Br. Warbonnet Creek	Zerbst, Carl F.	Harrison	Zerbst's Ditch No. 1	Irrig.	.03	26	33	57	Sioux	Mar.	6	1915		1405
Trunk Butte Ck.	Chaulk, John J.	Chadron	Chaulk Ditch	Irrig.	3.	25	33	50	Dawes	Mar.	13	1915		1406
Hat Creek	Zerbe, Harry T.	Harrison	Zerbe Reservoir	Stor.	2.	35	33	55	Sioux	Mar.	25	1915		1407
Frenchman Riv.	Athey, G. G.	Wauneta	Wauneta Elec. L. Plant	Power	70.	11	5	36	Chase	Apr.	1	1915		1408
Little Blue Riv.	Lyons, Geo., Jr.	Nelson	Lyons Little Blue Elec. Co.	Power	150.	29	4	6	Nuckolls	Apr.	26	1915		1410
Little Blue Riv.	Lyons, Geo., Jr.	Nelson		Irrig.	4.	18	4	6	Nuckolls	Apr.	26	1915		1411
Deep Holes Ck.	Hanway, F. P.	Broadwater	Emma Canal	Irrig.	.71	3	18	49	Morrill	Apr.	28	1915		1412
Boggy Creek, E. Fk.	Wickersham, Howard	Harrison	Chain Lake Res. No. 2	S. Res.	1.	7	32	54	Sioux	Apr.	30	1915		1413
Boggy Creek, W. Fk.	Wickersham, Howard	Harrison	Chain Lake Res. No. 1	Stor.	1.	7	32	54	Sioux	Apr.	30	1915		1414
Cedar River	Erickson Lake Co.	Lincoln	Ericson Lake Co.	Power	175.	25	21	12	Wheeler	May	24	1915		1415
Big Blue River	Johnson, Jas. F.	Lincoln	Power Station No. 4	Power	125.	19	4	6	Gage	June	7	1915		1416
Big Blue River	Johnson, Jas. F.	Lincoln	Power Station No. 2	Power	100.	1	5	4	Gage	June	7	1915		1417
Beaver Creek	Willard, D. A.	Genoa		Power	125.	14	17	3	Nance	June	19	1915		1418
Lodge Pole Ck.	Soderquist, Peter	Chappell	Soderquist Ditch	Irrig.	2.33	36	13	45	Deuel	June	29	1915		1420
Big Blue River	Johnson, Jas. F.	Lincoln	Power Station No. 1	Power	120.	35	7	4	Saline	July	7	1915		1421

APPLICATIONS APPROVED, SEPTEMBER 1, 1914, TO NOVEMBER 1, 1916—(Continued)

Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate				Date of Priority			Docket No.	App. No.
						S	T	R	County	Month	D	Yr.		
Big Blue River	Johnson, Jas. F.	Lincoln	Power Station No. 3	Power	175.	3	4	5	Gage	July	7	1915		1422
Seepage Red Willow Draw	Alliance Irr. Dist.	Bridgeport	Alliance Irr. & Ditch Canal	Irrig.	60.	6	20	51	Morrill	Aug.	5	1915		1429
Seepage from Nine Mile Canyon	Nine Mile Irr. Dist.	Bayard	Nine Mile Seep. Canal	Irrig.	79.	10	21	53	Morrill	Aug.	19	1915		1431
Red Willow Seepage	Dobson, W. A.	Davenport, Ia.	Dobson Ditch	Irrig.	2.	12	20	51	Morrill	Sept.	10	1915		1432
N. Platte Riv.	French, John E.	Henry	French Ditch	Irrig.	3.	9	23	60	Wyoming	Sept.	11	1915		1433
Trib. Dry Trunk Butte Creek	Snyder, Frank W.	Whitney	Snyder Ditch	Irrig.	.57	14	32	50	Dawes	Oct.	4	1915		1434
Platte River and Red Willow Creek	Dobson, W. A.	Davenport, Ia.	Dobson Lateral	Irrig.	.57	12	20	51	Morrill	Nov.	3	1915		1436
Lawrence Fork Creek	King, W. O.	Kearney	King's Canal	Irrig.	4.	15	18	52	Buffalo	Dec.	8	1915		1440
White Clay Ck.	Handschiegel, Eva U.	Crawford	Handschiegel's Lake	Stor.	1.3	11	31	52	Dawes	Dec.	17	1915		1441
Republican Riv.	Bartlett, Wm. C.	Alma	Lake Disappointment	Stor.	5.	32	2	18	Harlan	Dec.	18	1915		1442
Republican Riv.	Everson, P. M., Mitchell, J. C.	Alma	The Everson Canal	Irrig.	1.07	13	2	18	Harlan	Dec.	18	1915		1443
N. Fk. Republican River	Pringle, Geo. N.	Parks	The Parks Ditch	Irrig.	2.	20	1	39	Dundy	Dec.	31	1915		1444
Lodge Pole Ck.	Neumann, A. G.	Chappell	A. G. Neuman Ditch	Irrig.	6.	26	13	45	Deuel	Jan.	5	1916		1445
Winter Creek Draw	The Winters Creek Canal Co.	Scottsbluff	Winter's Creek Canal	Irrig.	70.	19	22	54	Scotts Bluff	Feb.	2	1916		1446
Sand Creek	Troyer, Jacob D.	Callaway	Troyer's Pumping Pl.	Irrig.	.24	10	15	23	Custer	Feb.	21	1916		1447

APPLICATIONS APPROVED, SEPTEMBER 1, 1914, TO NOVEMBER 1, 1916—(Concluded)

Source	Name of Claimant	Post-Office Address	Name of Ditch	Use to which applied	Second feet granted	Location of Headgate S	T	R	County	Date of Priority Month	D	Yr.	Docket No.	App. No.
N. Platte River..	Liebhardt Bros.	Denver, Colo.	Liebhardt Lateral	Irrig.	Lot 2.92	11 6	20	52	Morrill	Mar.	1	1916		1448
N. Platte River..	Atkins, A. W.	Bridgeport	Atkins	Irrig.	5.	15	19	49	Morrill	Mar.	27	1916		1449
N. Platte River..	Atkins, A. W.	Bridgeport	Atkins	Irrig.	5.	15	19	49	Morrill	Mar.	27	1916		1450
N Platte River..	Intermountain Ry. L. & P. Co.	Colorado Spgs, Colo.	Gering-Hydro Elec. Pl.	Power	250.	28	22	55	Scotts Bluff.	Apr.	5	1916		1452
Mira Creek	Hutchins, W. T.	North Loup	Hutchins Dam	Irrig.	.02	26	18	13	Valley	Apr.	18	1916		1453
North Platte, (Waste Water) ..	Mann, John H.	Bridgeport	Wastewater Ditch	Irrig.	2.3	30	21	50	Morrill	June	2	1916		1455
Sand Creek	Everson, Jas.	Crawford	Ext. of Bendix Ditch	Irrig.	.64	35	33	53	Dawes	June	16	1916		1457
Pumpkin Seed Creek	Airedale Ranch & Cattle Co.	Scottsbluff	Airedale No. 1	Irrig.	.10	3	19	55	Scotts Bluff..	June	23	1916		1458
Horse Shoe Lake and Other Lakes	Horse Shoe Lake Drainage Dist.	Irwin	Horse Shoe Lake Drainage Dist.	Drain.		13	34 35	40	Cherry	June	27	1916		1461
Seepage from Sheep Creek Basin	Ramshorn Ditch Co.	Morrill		Irrig.	45.5	19	23	57	Scotts Bluff..	Sept.	12	1916		1465
White River	C. B. & Q. R. R. Co.	Lincoln	Pipe Line at Crawford	Irrig.	.8	3	31	52	Dawes	Sept.	14	1889	1030	

APPLICATION AND DOCKETS DISMISSED, SEPTEMBER 1, 1914, TO NOVEMBER 1, 1916

STREAM	NAME OF APPLICANT	LOCATION OF HEADGATE				Docket No.	App. No.
		S	T	R	County		
Big Blue River	C. B. & Q. R. R. Co.	21	2	7	Gage	1038	......
Loup River	C. B. & Q. R. R. Co.	9	12	14	Buffalo	1039	......
Middle Loup River	C. B. & Q. R. R. Co.	18	24	30	Thomas	1040	......
Blue Blue River	C. B. & Q. R. R. Co.	21	11	3	Seward	1041	......
Crescent Lake	Orr, Roberts & Eggers	20	20	44	Garden	......	1024
Surface & Seepage of Nine Mile Canyon	L. F. Flower	34	22	53	Scottsbluff	......	1164
Loup River, North Branch	Farmers Land Co.	27	23	22	Blaine-Loup	......	1210
Platte River	Fremont Canal & Power Co.	29	17	4	Butler-Saunders	......	1232
Big Blue, West Fork	Edwin Olmstead	32	9	3	Seward	......	1247
Birdwood Creek	Willis Todd	3	15	33	Lincoln	......	1251
Loup River	H. E. Babcock	14	15	8	Nance	......	1255
Loup River	H. E. Babcock	1	17	5	Nance	......	1256
Loup River	H. E. Babcock	18	15	9	Nance	......	1257
Cedar River	Frank G. Arnold	33	17	6	Nance	......	1274
Seep Water	Anders Anderson	5	1	36	Dundy	......	1309
Sheep Creek	Peter Vonberg	8	23	57	Scottsbluff	......	1311
Askey Lake (Rep. River)	B. R. Askey	5	3	21	Furnas	......	1317
Cedar River	Frank G. Arnold	33	17	6	Nance	......	1320
Platte River	South Side Irrigation Co.	9	10	24	Dawson	......	1328
Sheep Creek	E. Leon Perrine	8	23	57	Scottsbluff	......	1337
Birdwood Creek	Birdwood Irrigation & Power Co.	15	16	33	Lincoln	......	1351
Big Blue River	Chas. O. Beardslee	13	1	17	Gage	......	1363
Chadron Creek	Chas. Mann	18	32	48	Dawes	......	1384
Chadron Creek	Chas. Mann	12	32	48	Dawes	......	1386
Chadron Creek	City of Chadron	18	32	48	Dawes	......	1388
Tub Springs Creek	J. H. Hall	5	22	55	Scottsbluff	......	1390

APPLICATION AND DOCKETS DISMISSED, SEPTEMBER 1, 1914, TO NOVEMBER 1, 1916—(Concluded)

STREAM	NAME OF APPLICANT	LOCATION OF HEADGATE				Docket No.	App. No.
		S	T	R	County		
Hat Creek	Harry T. Zerbe	35	33	55	Sioux		1409
Big Blue River	Jas. F. Johnson	1	1	7	Gage		1419
Little Blue River	Jas. F. Johnson	31	1	4	Jefferson		1424
Little Blue River	Jas. F. Johnson	10	1	3	Jefferson		1425
Little Blue River	Jas. F Johnson	9	2	2	Jefferson		1426
Little Blue River	Jas. F. Johnson	21	3	1	Thayer		1427
Little Blue River	Jas. F. Johnson	4	2	1	Thayer		1428
A Private Drain Ditch	A. W. Atkins	15	19	49	Morrill		1435
Seepage	Jas. O'Hollaren	28	21	52	Morrill		1434
Little Blue River	City of Fairbury	9	2	2	Jefferson		1437
Little Blue River	City of Fairbury	21	3	1	Jefferson		1438
Little Blue River	City of Fairbury	10	3	1	Jefferson		1439

APPLICATION AND DOCKETS CANCELLED, SEPTEMBER 1, 1914, TO NOVEMBER 1, 1916

STREAM	NAME OF APPLICANT	LOCATION OF HEADGATE				Docket No.	App. No.
		S	T	R	County		
White River	Crawford Company	23	31	53	Sioux	444-501	....
Niobrara River	Est. of Thos. L. Hopkins (Mirrage Irr. Co.)	26	29	48	Dawes	474	....
White River	J. Butterworth	3	31	52	Dawes	490	....
Loup River	H. E. Babcock	13	15	8	Nance	....	291
Beaver Creek	F. Stastney (E. Hamilton)	4	33	46	Sheridan	....	330
Spring Creek	Ferd Wolff (F. G. Metzgar)	21	32	52	Dawes	....	739
Soldier Creek	Geo. Swanson	4	31	53	Sioux	....	786
Willow Creek	C. G. Hollibough (H. G. Furman)	10	29	50	Dawes	....	898
Niobrara River	Arnold C. Koenig	24	32	8	Knox	....	996
Big Blue River	E. J. Ashton (Wm. Ashton)	4	8	4	Saline	....	1035
North Loup River	Burwell Electric Co.	10	21	16	Garfield	....	1077
Horse Creek	C. B. Foster et al	3	22	60	Wyoming	....	1078
Lodge Pole Creek	Wm. Krueger	39	14	48	Cheyenne	....	1301
Sheep Creek	Edw. F. Langholf	1	25	58	Sioux	....	1303
Lodge Pole Creek	John D. Bennett	22	15	55	Kimball	....	1313
Cedar River	Frank G. Arnold	36	18	7	Nance	....	1325
Wiggle Creek	Geo. O. Bender	3	15	23	Custer	....	1326
Slough	John Novotny	13-14, 23-24	17	3	Colfax	....	1327
Methodist Creek	Nora D. Keester	2	1	18	Harlan	....	1331
Middle Loup	Abraham M. Lewis	20	15	14	Sherman	....	1334
Big Blue, West Fork	Burdette Boyes	5	8	4	Saline	....	1336
Platte River	Rawls & Parmele	33	13	13	Cass	....	1343
Frenchman, Stinking Water	Frenchman Valley Irrigation District	36	5	34	Hayes	....	1342
Lone Tree Creek	Earl Beam	22-23	34	52	Dawes	....	1346

APPLICATION AND DOCKETS CANCELLED, SEPTEMBER 1, 1914, TO NOVEMBER 1, 1916—(Concluded)

STREAM	NAME OF APPLICANT	LOCATION OF HEADGATE				Docket No.	App. No.
		S	T	R	County		
Sand Creek	Jacob D. Troyer	10	15	23	Custer	....	1347
Big Blue River	Martha F. Withers	28	13	2	Butler	....	1349
Birdwood Creek	Birdwood Irrigation & Power Co.	14	16	33	Lincoln	....	1350
Big Blue River	Chas. O. Beardslee	35	7	4	Saline	....	1353
Big Blue River	Chas. O. Beardslee	1	5	4	Saline	....	1354
Big Blue River	Chas. O. Beardslee	3	4	5	Gage	....	1355
Big Blue River	Chas. O. Beardslee	19	4	6	Gage	....	1356
Lodge Pole Creek	Karl Ruttner	30	14	47	Cheyenne	....	1359
Frenchman River	Frenchman Valley Irrigation District	31	5	34	Hayes	....	1364
Pawnee Creek	H. Janssen	20	13	27	Lincoln	....	1365
White River	Kusel	10-40	32	17	Dawes	....	1367
Trib. Dry Trunk Butte Creek	Frank W. Snyder	14	32	50	Dawes	....	1368
Warbonnet Creek	John A. Anderson	20	33	56	Sioux	....	1369
Eternal Springs	Yorick Nichols	34	24	58	Scottsbluff	....	1370
Long Branch	Jacob Forster	36	35	54	Sioux	....	1371
Driftwood Creek	Wm. S. Fitch	36	3	30	Red Willow	....	1372
Platte River	Farmers Union Ditch Co.	6	18	19	Dawson	623	......
Blue Creek	S. P. Delatoúr	32	17	42	Garden	....	1374
Nemaha River	G. B. White	11	8	10	Otoe	....	1378
Republican River	Willis A. Romjue	3	1	18	Harlan	....	1381
Springs	Chas. Mann	18	32	48	Dawes	....	1383
Lodge Pole Creek	A. G. Neumann	26	13	45	Deuel	....	1385
Rock Creek	Geo. N. Pringle	31	2	29	Dundy	....	1387
Flood Waters	Joseph Serres	9	33	54	Sioux	....	1389
Driftwood Creek	James L. Hoyt	25	2	31	Hitchcock	....	1402
Trib. of Dry Trunk Butte Creek	Frank W. Snyder	14	32	50	Dawes	....	1434

RELOCATION

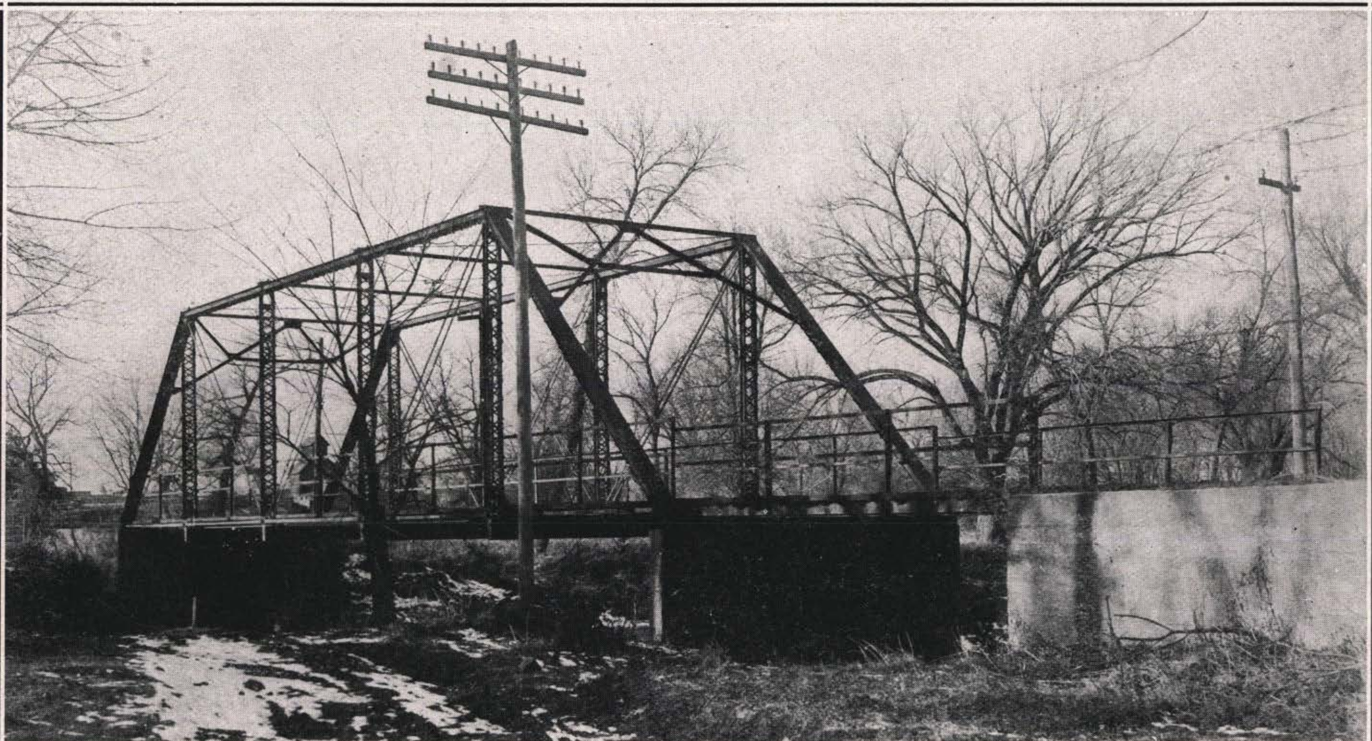
In the following Appropriations, the Locations of Headgate has been changed

No.	Stream	Name of Canal	NEW LOCATION			
			S	T	R	County
D. 461	Niobrara River	Enterprise	27	29	50	Dawes
A. 850	Lodge Pole Creek	Ralton	12	12	45	Deuel
A. 1398 A. 1176 A. 1403	Seepage Water Sheep Creek	Sheep Creek Lateral	8	23	57	Scotts Bluff
A. 1110	White River	Jansen Irrigation Plant	26	33	50	Dawes
D. 697a D. 697b	Lonergan Creek	Soehl's Canal	17	15	39	Keith
D. 725	Sand Creek	Patrick Ditch	10	15	40	Keith
A. 1295	Little Spring Creek	Shramek Canal	22	22	55	Scotts Bluff
D. 858	North Platte River	Empire Canal Co.	18	20	51	Morrill
D. 710	North Platte River	Sheridan Ditch	19	14	35	Keith
A. 768	North Platte River Pathfinder Reservoir	Fort Laramie Canal of North Platte Project	11	26	25	
D. 801	North Platte River	Spohn Ditch	13	17	45	Garden

PRIORITIES IN WATER DISTRICTS.

The following tables give complete list of all claims and applications for water which have been granted by the State Board of Irrigation, Highways and Drainage and which have never been cancelled. In these tables the claims and applications have been arranged for each drainage area according to the date of priority for that particu'ar drainage area.

No.	NAME OF STREAM	NAME OF CANAL	Use	Sec. Ft.	Location S	Location T	Location R	Date of Priority Month	D	Yr.
D 994	Wood River		Power	40.00	1	9	13	Oct.	16	1873
D 993	Wood River		Power	40.00	13	9	14	Nov.	1	1873
D 995	Wood River		Power	25.40	13	9	16	May	1	1881
D 1034a	Cedar Creek	Radcliffe Ditch	Irrig.	2.77	28	18	48	June	1	1882
D 1023	Platte River	Kearney Elec. Pow. & Water Co.	I. & P.	125.00	3	8	16	Sept.	10	1882
D 904	Pumpinseed Creek	Wright Ditch No. 1	Irrig.	2.00	5	19	54	Dec.	31	1882
D 658	White Horse Creek	Lamplough	Irrig.	2.86	8	14	30	Dec.	31	1883
D 635	North Platte River	North Platte Canal	Irrig.	300.00	13	14	34	May	31	1884
D 1034b	Cedar Creek	Radcliffe Ditch	Irrig.	1.23	34	18	48	July	1	1885
D 915	Pumpkin Seed Creek	Kelly Ditch	Irrig.	1.43	5	19	54	May	10	1886
D 825	Lawrence Fork		Irrig.	.51	28	18	52	Dec.	31	1886
D 916	Pumkinseed Creek	Heard's Ditch Nos. 1 & 2	Irrig.	1.29	14	19	54	June	1	1887
D 918	North Platte River	Farmer's Canal	Irrig.	1142.86	3	23	58	Sept.	16	1887
D 905	Pumpkinseed Creek	Wright Ditch No. 2	Irrig.	2.86	5	19	54	Dec.	31	1887
D 919	North Platte River	Minatare Canal	Irrig.	249.43	32	22	54	Jan.	14	1888
D 748	Clear Creek	Clear Creek Ditch	Irrig.	2.86	32	16	41	July	1	1888
D 952	North Platte River	Winter Creek Canal	Irrig.	124.29	17	22	55	Oct.	18	1888
D 920	North Platte River	Enterprise Ditch	Irrig.	173.71	27	23	57	Mar.	28	1889
D 921	North Platte River	Castle Rock Ditch	Irrig.	82.57	4	21	54	Apr.	18	1889
D 697a	Lonergan Creek	Soehl Canal	Irrig.	2.00	17	15	39	May	10	1889
D 698	Sand Creek	Holcombe & Smith	Irrig.	7.00	7	10	15	May	20	1889
D 699	Lonergan Creek	East Lonergan	Irrig.	9.14	17	15	39	May	25	1889
D 923	Winters Creek	Bouton's Ditch	Irrig.	1.00	3	22	54	Aug.	17	1889
D 820	Lawrence Fork	Redington Ditch	Irrig.	.57	36	19	52	Oct.	9	1889
D 821	North Platte River		Irrig.	5.71	19	20	50	Oct.	17	1889
D 828	North Platte River	Belmont Canal	Irrig.	270.00	18	20	51	Dec.	19	1889
D 830	Greenwood Creek	Coulter	Irrig.	4.00	15	18	50	Feb.	3	1890
D 1034c	Cedar Creek	Radcliffe Ditch	Irrig.	.76	27	18	48	Feb.	14	1890



90-FT. FIFTEEN TON BRIDGE NEAR McCOOL JCT, YORK COUNTY, NEBRASKA
OVER BLUE RIVER

SMALL CULVERT, SEWARD COUNTY

PRIORITIES, WATER DIVISION NO. 1-A—(Continued)

No.	NAME OF STREAM	NAME OF CANAL	Use	Sec. Ft.	Location S	Location T	Location R	Date of Priority Month	D	Yr.
D 763	Blue Creek	Union Irr. Co. & W. P. Canal	Irrig.	24.64	18	16	42	May	16	1890
D 765	Ash Creek	Vance Ditch	Irrig.	1.14	27	16	42	June	14	1890
D 704	Spring Creek, trib to White Tail Creek	Spring Creek Ditch	Irrig.	1.57	19	15	37	June	21	1890
D 926	North Platte River	Central Irr. Canal & W. P. Canal	Irrig.	36.00	27	22	55	June	23	1890
D 836	Springs	Finn Bros. Ditch	Irrig.	.50	28	18	49	July	1	1890
D 645a	Platte River	Gothenburg Irr. & Power Co.	I. & P.	200.00	29	12	26	July	5	1890
D 749	White Tail Creek	McCarthy Ditch	Irrig.	1.00	36	15	36	July	15	1890
D 902	Pumpkinseed Creek	Logan Ditch	Irrig.	4.00	7	19	55	July	16	1890
D 709	North Platte River	Myers & Phelps	Irrig.	7.14	34	15	39	Sept.	11	1890
D 840	Pumpkinseed Creek	Court House Rock	Irrig.	30.50	30	19	50	Oct.	6	1890
D 710	North Platte River	Sheridan & Wilson	Irrig.	10.00	20	14	35	Oct.	9	1890
D 842	Pumpkinseed Creek	Smith & Wheeler S. D.	Irrig.	1.57	26	19	51	Oct.	16	1890
D 636	Pawnee Creek	Holcombe Ditch	Irrig.	8.00	13	13	28	Oct.	18	1890
D 843	Pumpkinseed Creek	Mutual Ditch Co.	Irrig.	8.57	33	19	52	Nov.	1	1890
D 844	North Platte River	Chimney Rock Canal	Irrig.	60.00	1	20	53	Dec.	3	1890
D 1031	North Platte River	Chimney Rock	Irrig.	....	1	20	53	Dec.	3	1890
D 812	Ash Creek	Gilliard Ditch	Irrig.	1.43	3	16	42	Dec.	31	1890
D 847	Pumpkinseed Creek	Waitman Ditch	Irrig.	2.86	25	19	53	Mar.	12	1891
D 1032	Otter Creek	Cascade Ditch	Irrig.	3.30	4	15	40	Apr.	1	1891
D 849	Greenwood Creek	Trinnier Canal	Irrig.	6.29	28	18	50	Apr.	6	1891
D 903	Pumpkinseed Creek	Endered Ditch	Irrig.	1.00	21	19	53	May	27	1891
D 725	Sand Creek	Patrick Ditch	Irrig.	2.43	3	15	40	May	31	1891
D 858	North Platte River	Empire Canal	Irrig.	28.57	18	20	51	June	25	1891
D 870	Springs, trib. to Middle Creek	Bartling Ditch	Irrig.	.29	28	18	51	July	31	1891
D 861	Lawrence Fork	Crigler Ditch	Irrig.	.57	1	18	52	Sept.	11	1891
D 862	Lawrence Fork	Spring Branch	Irrig.	1.00	11	18	52	Oct.	23	1891
D 944	North Platte River	Kah Ditch	Irrig.	4.57	11	21	54	Nov.	1	1891
D 857	North Platte River	Browns Creek Ditch	Irrig.	188.71	29	20	50	Jan.	20	1892

PRIORITIES, WATER DIVISION NO. 1-A—(Continued)

No.	NAME OF STREAM	NAME OF CANAL	Use	Sec. Ft.	Location S	Location T	Location R	Date of Priority Month	D	Yr.
D 1033	North Platte River	Browns Creek Canal	Irrig.		20	20	50	Jan.	20	1892
D 954	Wind Springs	Wind Springs	Irrig.	1.43	12	24	55	Mar.	1	1892
D 866	Camp Creek	Camp Creek Ditch	Irrig.	1.43	13	18	49	Mar.	16	1892
D 938	Kiowa Creek	Currie Ditch	Irrig.	9.14	13	21	57	Mar.	23	1892
D 845	Greenwood Creek	Nelson Canal	Irrig.	3.00	33	18	50	Apr.	1	1892
D 881	Scheutz Spring	Scheutz Spring Canal	Irrig.	.21	28	18	50	May	10	1892
D 941	North Platte River	Homestead Ditch	Irrig.	11.43	21	22	55	June	29	1892
D 872	S. W. Lower Dugout	Cooper Ditch	Irrig.	.86	4	19	48	Aug.	15	1892
D 874	North Platte River	Alliance Canal	Irrig.	100.00	5	20	52	Dec.	26	1892
D 890	Greenwood Creek	Capron & Lamb	Irrig.	2.00	15	18	50	Jan.	1	1893
D 875	North Platte River	Clarke Canal	Irrig.	9.43	22	20	51	Feb.	2	1893
D 876	Pumpkinseed Creek	Meredith & Ammer	Irrig.	18.86	23	19	50	Feb.	20	1893
D 945	North Platte River	Ramshorn Ditch	Irrig.	45.71	13	23	58	Mar.	20	1893
D 906	Pumpkinseed Creek	Hampton Ditch	Irrig.	1.29	25	20	57	Apr.	5	1893
D 697b	Lonergan Creek	Soehl Canal	Irrig.	.86	17	15	39	Apr.	27	1893
D 893	Lawrence Fork	Redington Ditch	Irrig.	.50	11	18	52	May	1	1893
D 946	North Platte River	Short Line Canal	Irrig.	65.57	25	21	53	May	1	1893
D 754	Clear Creek	Clear Creek Canal	Irrig.	14.57	29	16	41	May	30	1893
D 756	Clear Creek	Clear Creek Ditch	Irrig.	1.14	32	16	41	May	30	1893
D 717	White Tail Creek	Holloway & Phelps	Irrig.	4.00	36	15	38	June	1	1893
D 745	Clear Creek	Green Ditch	Irrig.	1.14	29	16	41	June	1	1893
D 719	Lonergan Creek	Haney Ditch	Irrig.	1.14	17	15	39	July	1	1893
D 856	North Platte River	Lisco Ditch	Irrig.	32.86	14	18	47	July	1	1893
D 781	Blue Creek	Blue Creek Ditch	Irrig.	12.86	6	16	42	Sept.	7	1893
D 646	Birdwood Creek	Birdwood Ditch	Irrig.	100.00	35	15	33	Oct.	21	1893
D 925	North Platte River	Nine Mile Canal	Irrig.	200.00	18	21	53	Dec.	6	1893
D 785	Blue Creek	Blue Creek Canal	Irrig.	107.43	33	17	42	Dec.	27	1893
D 649	North Platte River	Cody & Dillon	Irrig.	127.00	9	14	31	Dec.	29	1893

No.	NAME OF STREAM	NAME OF CANAL	Use	Sec. Ft.	Location S	Location T	Location R	Date of Priority Month	D	Yr.
D 652	Birdwood Creek	West Birdwood Ditch	Irrig.	8.57	22	15	33	Jan.	16	1894
D 686	Fremont Creek	Fremont Creek Ditch	Irrig.	9.29	15	13	30	Jan.	31	1894
D 722	North Platte River	Sutherland & Paxton	Irrig.	186.00	18	14	36	Feb.	2	1894
D 653	North Platte River	Paxton & Hershey	Irrig.	130.00	18	14	33	Feb.	12	1894
D 786	Blue Creek	Iowa Irr. & Imp. Co.	Irrig.	12.00	7	16	42	Feb.	24	1894
D 787	North Platte River	Bower Ditch	Irrig.	21.37	6	17	45	Mar.	27	1894
D 788	Blue Creek	Graf Ditch	Irrig.	61.43	19	16	42	Apr.	2	1894
D 755	South Platte River	Eaton & McGrath	Irrig.	20.00	25	13	41	Apr.	3	1894
D 833	Pumpkinseed Creek	Last Chance	Irrig.	8.00	27	19	50	Apr.	12	1894
D 747	Clear Creek	Scott & Williams	Irrig.	1.00	28	16	41	May	18	1894
D 662	North Platte River	Farmers & Merchants Canal	Irrig.	183.00	12	14	33	May	22	1894
D 884	Pumpkinseed Creek	Round House Rock	Irrig.	3.00	28	19	51	May	29	1894
D 850	Lawrence Fork	Doran Canal	Irrig.	1.14	15	18	52	June	1	1894
D 891	Middle Creek	Bartling Ditch No. 1	Irrig.	.29	28	18	51	June	1	1894
D 666	Platte River	Farmers Ditch & Canal	Irrig.	280.00	17	13	29	June	2	1894
D 723	South Platte River	Hollingsworth Ditch	Irrig.	30.00	12	13	29	June	5	1894
D 567	Snake Creek	Oasis Ditch Co.	Irrig.	54.86	6	24	51	June	6	1894
D 667	North Platte River	South Side Irr. L. Canal	Irrig.	270.00	14	14	34	June	6	1894
D 669	Pawnee Creek	Murphy Ditch	Irrig.	8.57	29	13	27	June	9	1894
D 789	North Platte River	Midland Ditch	Irrig.	2.00	2	16	44	June	9	1894
D 621	Platte River	Farmers Irr. Ditch	Irrig.	114.00	25	10	23	June	14	1894
D 672	Pawnee Creek	Plumer Ditch	Irrig.	10.00	19	13	27	June	15	1894
D 724	Spring Creek	Spring Creek Ditch	Irrig.	.57	12	15	40	June	18	1894
D 622	Platte River	Farmers & Merchants Ditch	Irrig.	1142.86	18	10	23	June	26	1894
D 885	Pumpkinseed Creek	Maxwell Ditch	Irrig.	.50	23	19	52	June	30	1894
D 673	Platte River	Maxwell Ditch	Irrig.	27.14	29	13	28	July	5	1894
D 657	North Platte River	Keith Canal	Irrig.	71.00	36	14	30	July	7	1894
D 674	Platte River	Appleford Ditch	Irrig.	10.00	15	13	29	July	7	1894

PRIORITIES, WATER DIVISION NO. 1-A—(Continued)

No.	NAME OF STREAM	NAME OF CANAL	Use	Sec. Ft.	Location S	Location T	Location R	Date of Priority Month	D	Yr.
D 629	Platte River	Sides Ditch	Irrig.	20.00	13	8	14	July	23	1894
D 950	North Platte River	Rooster Ditch	Irrig.	5.71	10	23	58	July	29	1894
D 676	North Platte River	Smith's Canal	Irrig.	20.00	36	14	30	Aug.	9	1894
D 791	North Platte River	Overland Irr. Ditch	Irrig.	20.00	1	16	44	Aug.	14	1894
D 624	Platte River	Platte River Irr. Co.	Irrig.	400.00	13	19	22	Sept.	15	1894
D 677	Birdwood Creek	Beauchamp	Irrig.	3.00	15	15	33	Sept.	19	1894
D 645b	Platte River	Gothenburg Irr. & Power Co.	Irrig.	240.00	29	12	26	Sept.	22	1894
D 886	North Platte River	Hannah Irr. Canal	Irrig.	5.71	24	18	47	Sept.	24	1894
D {234, 235, 628}	Wood River	Farmers Canal	Irrig.	180.00	12	8	16	Sept.	24	1894
D 795	Blue Creek	High Line Ditch	Irrig.	20.00	21	17	42	Sept.	27	1894
D 796	Cold Water Creek	Cold Water Ditch	Irrig.	4.29	26	18	46	Sept.	28	1894
D 797	North Platte River	Oshkosh Ditch	Irrig.	40.00	33	17	44	Oct.	5	1894
D 727	White Tail Creek	Little Dandy	Irrig.	2.00	22	15	38	Oct.	12	1894
D 887	North Platte River	Beerline	Irrig.	30.00	24	19	49	Oct.	13	1894
D 679	Platte River	McCullough	Irrig.	30.00	35	13	28	Oct.	20	1894
D 680	Platte River	Six Mile Ditch	Irrig.	40.00	11	11	26	Oct.	22	1894
D 681	Platte River	Gothenburg S. S.	Irrig.	357.14	30	12	26	Oct.	26	1894
D 730	White Tail Creek	Foster Keystone	Irrig.	13.86	36	15	38	Oct.	30	1894
D 625	Platte River	Booker Canal	Irrig.	100.00	16	11	25	Nov.	9	1894
D 800	Blue Creek	West Side Ditch	Irrig.	21.00	28	17	42	Nov.	20	1894
D 801	North Platte River	Spohn	Irrig.	13.14	13	17	45	Dec.	6	1894
D 802	North Platte River	Rush Creek Canal	Irrig.	9.04	2	17	46	Dec.	11	1894
D 683	South Platte River	Stebbins Ditch	Irrig.	30.00	32	14	32	Dec.	17	1894
D 744	South Platte River	Riverside Canal	Irrig.	2.86	17	13	39	Dec.	22	1894
D 803	North Platte River	Lyons Irr. Canal	Irrig.	42.14	30	17	44	Dec.	22	1894
D 811	North Platte River	Orr & Vance Ditch	Irrig.	2.93	29	16	42	Dec.	24	1894

	No.	NAME OF STREAM	NAME OF CANAL	Use	Sec. Ft.	Location S	T	R	Date of Priority Month	D	Yr.
D	626	Platte River	Cozad Ditch	Irrig.	614.29	15	11	25	Dec.	28	1894
D	804	North Platte River	Robins & Williams	Irrig.	26.57	35	16	42	Jan.	4	1895
D	805	South Platte River	Miller & Warren	Irrig.	53.86	7	12	42	Jan.	5	1895
D	806	North Platte River	Gyger Ditch	Irrig.	10.86	10	16	44	Jan.	5	1895
D	684	North Platte River	Dikeman Ditch	Irrig.	30.00	9	14	32	Jan.	14	1895
D	807	North Platte River	Signal Bluff	Irrig.	30.13	16	16	43	Jan.	16	1895
D	732	North Platte River	Hayland Ditch	Irrig.	5.71	29	15	39	Jan.	19	1895
D	627	Platte River	Orchard & Alfalfa Ditch	Irrig.	300.00	9	10	24	Jan.	23	1895
D	687	Platte River	Lincoln & Dawson Co.	Irrig.	642.86	9	13	29	Feb.	22	1895
D	688	Ravine	Newberry Canal	Irrig.	1.14	22	14	32	Feb.	25	1895
D	889	Pumpkinseed Creek	Dunlap Ditch	Irrig.	.36	24	19	51	Mar.	1	1895
D	736	South Platte River	Home Irr. Ditch	Irrig.	3.14	30	13	40	Mar.	2	1895
D	691	North Platte River	Hubartt & Hall Ditch	Irrig.	65.70	20	14	30	Mar.	3	1895
D	737	North Platte River	Fernstrom & Nissen	Irrig.	4.00	25	15	39	Mar.	23	1895
D	738	North Platte River	Alfalfa Irr. Dist.	Irrig.	100.00	1	15	42	Mar.	25	1895
D	888	Pumpkinseed Creek	Willard Ditch	Irrig.	1.43	25	19	51	Mar.	27	1895
D	809	North Platte River	Bushnell Bros. Ditch	Irrig.	7.14	12	16	44	Mar.	27	1895
D	690	Platte River	Appleford Ditch	Irrig.	2.86	15	13	29	Mar.	28	1895
D	740	Skunk Creek	Miller Ditch	Irrig.	2.29	1	14	37	Apr.	1	1895
D	750	Mathews Creek	Mathews Ditch	Irrig.	1.14	28	15	37	Apr.	1	1895
D	733	South Platte River	South Side Plain Ditch	Irrig.	1.43	17	13	39	Apr.	27	1895
D	810	South Platte River	Big Spring Canal	Irrig.	8.93	35	13	42	Apr	27	1895
D	751	White Tail Creek	Reed Ditch	Irrig.	.57	15	15	38	May	15	1895
D	892	Pumpkinseed Creek	Bird Cage Ditch	Irrig.	1.00	19	19	51	June	1	1895
A	1	North Platte River	Holcombe Ditch	Irrig.	15.49	16	15	40	June	4	1895
A	41	Snake Creek	Elmore Canal	Irrig.	5.71	30	25	51	June	22	1895
D	964	Clear Creek	Finch Ditch	Irrig.	1.43	4	15	41	June	30	1895
A	69	Coon Creek	Coon Creek Ditch	Irrig.	.71	34	15	37	July	3	1895

PRIORITIES, WATER DIVISION NO. 1-A—(Continued)

No.	NAME OF STREAM	NAME OF CANAL	Use	Sec. Ft.	Location S	Location T	Location R	Date of Priority Month	D	Yr.
A 160	Golden Creek	Thees Ditch	Irrig.	2.71	25	15	39	Sept.	17	1895
A 184	South Platte River	Paxton Southern	Irrig.	1.43	2	13	36	Oct.	17	1895
A 186	North Platte River	Steamboat Ditch	Irrig.	15.00	4	21	54	Oct.	22	1895
A 231	South Platte River	Lute & Sheridan	Irrig.	13.43	9	13	37	Feb.	17	1896
A 243	North Platte River	North Platte River Irr. Canal	Irrig.	168.29	14	18	47	Feb.	24	1896
A 283	South Platte River	Meyer Canal	Irrig.	1.46	22	13	40	Apr.	14	1896
A 294	Greenwood Creek	Meglemre Ditch	Irrig.	.57	10	18	50	May	6	1896
D 842	Pumpkinseed	Smith & Wheeler No. D	Irrig.	.71	26	19	51	June	1	1896
A 357	South Platte River	Cereal Irr. Ditch	Irrig.	4.86	16	13	39	July	10	1896
A 327	North Platte River	La More Ditch	Irrig.	20.00	34	19	48	July	18	1896
A 350	North Platte River	Steamboat Ditch	Irrig.	....	4	21	54	July	22	1896
A 353	North Platte River	Tetreault Ditch 2	Irrig.	3.43	1	19	50	Aug.	15	1896
A 370	South Platte River	Allen Ditch	Irrig.	6.58	24	13	40	Dec.	15	1896
A 365	North Platte River	Gering Canal	Irrig.	208.62	24	23	58	Mar.	15	1897
A 393	South Platte River	Western Irr. Ditch	Irrig.	180.00	29	13	41	June	14	1897
A 407	Horse Creek	State Line Ditch	Irrig.	3.07	33	23	58	Sept.	10	1897
A 411	Owl Creek	Sunflower	Irrig.	.78	12	22	58	Sept.	17	1897
A 410	Spring Branch	Brogan Bros. Ditch	Irrig.	.57	35	15	37	Sept.	24	1897
A 418	North Platte River	Shermerhorn Ditch	Irrig.	29.71	16	20	51	Oct.	25	1897
A 420	White Tail Creek		Irrig.	1.43	36	15	38	Oct.	29	1897
A 449	Spotted Tail Creek		Irrig.	1.00	10	23	56	May	2	1898
A 476	Lawrence Fork	Spring Branch Ext.	Irrig.	.57	1	18	52	Oct.	13	1898
A 482	South Platte River	Leach & Kimball Underflow Ditch	Irrig.	3.57	4	12	42	Nov.	8	1898
A 486	Lawrence Fork	Crigler Extension	Irrig.	1.43	1	18	52	Nov.	25	1898
A 515	Blue Creek	Paisley Ditch	Irrig.	4.00	33	17	42	July	14	1899
A 545a	Wood River	White Bridge P. K.	Irrig.	.03	8	9	15	Mar.	14	1900
A 545b	Wood River	White Bridge P. K.	Power	10.00	8	9	15	Mar.	14	1900

PRIORITIES, WATER DIVISION NO. 1-A—(Continued)

No.	NAME OF STREAM	NAME OF CANAL	Use	Sec. Ft.	Location S	Location T	Location R	Date of Priority Month	D	Yr.
A 550	Lawrence Fork	Niehus Canal	Irrig.	1.86	11	18	52	Mar.	23	1900
A 570	W. Buffalo Creek	Henry Ditch	Irrig.	.07	23	11	23	July	2	1900
A 576	Platte River	Lexington South Side Canal	Irrig.	58.00	8	9	22	Sept.	28	1900
A 602	Birdwood Creek	McCabe Ditch	Irrig.	5.00	3	16	33	Mar.	1	1901
A 606	Sand Creek	Nissen Ditch	Irrig.	3.07	10	15	40	Mar.	18	1901
A 641	Kiowa Creek	Kellums Ditch	Irrig.	2.43	11	22	58	Oct.	18	1901
A 650	Willow Creek	Willow Springs 1	Irrig.	.57	16	19	56	Jan.	21	1902
A 651	Willow Creek	Willow Springs 2	Irrig.	.86	16	19	56	Jan.	21	1902
A 659	Little Spring Creek	Little Springs Canal	Irrig.	.57	29	15	37	Apr.	1	1902
A 660	North Platte River	Columbia	Irrig.	600.00	3	23	58	Apr.	14	1902
A 662b	White Tail Creek	Keystone Canal	Irrig.	51.71	26	15	38	Apr.	26	1902
A 669	Lawrence Fork	Harper Ditch	Irrig.	1.43	11	18	52	May	27	1902
A 670	Lawrence Fork	Bicket Ditch	Irrig.	.57	11	18	52	May	27	1902
A 674	Spring Branch, trib to Lawrence	Harper's Ditch 2	Irrig.	2.00	1	18	52	June	16	1902
D 913	Pumpkinseed Creek	Peters Ditch	Irrig.	2.57	34	20	56	July	1	1902
A 698	Pumpkinseed Creek	Airedale Canal 1	Irrig.	5.52	2	19	55	Jan.	24	1903
A 699	Pumpkinseed Creek	Airedale Canal 2	Irrig.	3.22	1	19	55	Jan.	24	1903
A 711	Pumpkinseed Creek	Reservoir Nos. 1, 2, 3	Irrig.	1.31	7	19	55	June	24	1903
A 717	Brown's Creek	Hackberry	Irrig.	.43	19	20	48	July	17	1903
A 742	Horse Creek	Horse Creek Ditch	Irrig.	.86	34	23	58	Feb.	29	1904
A 743	Spotted Tail Creek	Stewart Reservoir	Irrig.	1.43	2	23	56	Mar.	2	1904
A 745	Sheep Creek	Little Moon	Irrig.	1.00	10	24	58	Mar.	23	1904
A 746	Kiowa Creek	Ellis Lowry Canal	Irrig.	.52	31	22	57	Mar.	25	1904
A 751	Borrow Pits, trib. to North Platte Riv.	Borrow Pit Ditch	Irrig.	.29	19	21	52	Apr.	23	1904
A 768	North Platte River	Pathfinder	Irrig.		19	29	83	Sept.	19	1904
A 770	Owl Creek	Sunflower	Irrig.	1.14	12	22	58	Oct.	10	1904
A 778	Huntington Springs	Cord Ditch	Irrig.	1.43	9	20	58	Dec.	23	1904
A 819	Pumpkinseed Creek		Irrig.	2.29	2	19	55	Apr.	20	1906

PRIORITIES, WATER DIVISION NO. 1-A—(Continued)

No.	NAME OF STREAM	NAME OF CANAL	Use	Sec. Ft.	Location			Date of Priority		
					S	T	R	Month	D	Yr.
A 836	Pumpkinseed Creek	Beaty Ditch	Irrig.	.86	8	19	55	Sept.	1	1906
A 843	White Tail Creek	Keystone Ditch	Irrig.	4.29	26	15	38	Nov.	30	1906
A 844	Greenwood Creek	Dean Ditch	Irrig.	8.86	10	18	50	Dec.	5	1906
A 851	Pumpkinseed Creek	Swanger Ditch	Irrig.	.43	29	19	50	Feb.	28	1907
A 853	Greenwood Creek	Meglemre Extension	Irrig.	1.50	10	18	50	Mar.	11	1907
A 855	Pumpkinseed Creek	Pumpkin Creek Mills	Power	25.00	23	19	50	Mar.	26	1907
A 902	North Platte River	Belmont Canal	Irrig.	115.71	18	20	51	Mar.	28	1907
A 859	Sheep Creek	Nebraska Reservoir	Irrig.	3.57	36	27	58	May	18	1907
A 865	Lower Dugout Creek	Mulloy Ditch	Irrig.	1.00	27	20	48	July	18	1907
A 866	North Platte River	Empire Extension	Irrig.	1.00	18	20	51	July	20	1907
A 868	Trib. to North Platte River	Frazier Lake	Ice	4.00	35	14	30	Sept.	6	1907
A 871	Sheep Creek	West Fork Ditch	Irrig.	5.14	1	26	58	Sept.	21	1907
A 873	Trib. to Sheep Creek	Favorable	Irrig.	.27	19	26	57	Oct.	25	1907
A 875	Sheep Creek	Lower Canal	Irrig.	.37	11	25	58	Nov.	2	1907
A 876	Sheep Creek	Home Ranch	Irrig.	1.79	25	26	58	Nov.	2	1907
A 877	Sheep Creek	Horse Pasture	Irrig.	1.29	25	26	58	Nov.	2	1907
A 879	Owl Creek	Sunflower Ditch 2	Irrig.	1.14	12	22	58	Nov.	29	1907
A 880	Kiowa Creek	Kellums Ditch 2	Irrig.	.57	1	22	58	Nov.	29	1907
A 881	Owl Creek	Sunflower Extension No. 1	Irrig.	.57	12	22	58	Nov.	29	1907
A 885	Sheep Creek	Horse Camp Reservoir	Irrig.	2.86	36	27	58	Jan.	20	1908
A 888	Pumpkinseed Creek	Clearfield Canal	Irrig.	1.70	31	20	56	Jan.	23	1908
A 890	Sheep Creek	No. Two	Irrig.	2.50	2	25	58	Feb.	24	1908
A 918	Buckhorn Springs		Irrig.	2.29	8	14	36	Oct.	3	1908
A 921	Horse Creek	Marsh & Braziel Canal	Irrig.	8.00	4	22	60	Nov.	24	1908
A 937	Lake	Huffman Ditch	Irrig.	6.43	26	21	54	Mar.	19	1909
A 968	Skunk Creek	Skunk Creek Ditch	Irrig.	5.00	6	14	36	Nov.	5	1909
A 974	Sand Creek	Sand Creek Ditch	Irrig.	15.70	9	14	36	Jan.	3	1910
A 983	Horse Creek	Gilmore Ditch	Irrig.	9.00	33	23	58	Feb.	21	1910

PRIORITIES, WATER DIVISION NO. 1-A—(Continued)

No.	NAME OF STREAM	NAME OF CANAL	Use	Sec. Ft.	Location S	Location T	Location R	Date of Priority Month	D	Yr.
A 986	Wind Springs Creek	Smith's Ditch	Irrig.	2.86	12	24	55	Mar.	14	1910
A 991	North Platte River	Lisco Ditch	Irrig.	3.00	14	18	47	Apr.	6	1910
A 992	North Platte River	Round House Rock	Irrig.		4	21	54	Apr.	13	1910
A 994	Horse Creek	State Line Ditch	Irrig.	2.00	33	23	58	Apr.	21	1910
A 1000	Horse Creek	Jackson Extension	Irrig.	1.07	27	23	58	May	19	1910
A 1001	White Tail Creek	West Keystone	Irrig.	1.76	26	15	38	May	27	1910
A 1002	Spring Creek, trib to No. Platte Riv.	Spring Creek No. 1	Irrig.	1.13	19	15	37	May	27	1910
A 1003	White Tail Creek	Keystone Canal	Irrig.	9.86	26	15	38	May	27	1910
A 1004	Pumpkinseed Creek	Beaty Canal	Irrig.	.19	5	19	55	June	2	1910
A 1005	Lower Dugout Creek	Hubbard Ditch	Irrig.	.29	4	19	48	June	23	1910
A 1009	Blue Creek	Fairview	Power	62.60	4	18	43	July	18	1910
A 1018	Beaver Lake	Beaver Ditch	Irrig.	170.00	16	24	44	Aug.	6	1910
A 1038	Wood River	Jacobson Canal	Irrig.	.50	31	10	16	Nov.	10	1910
A 1040	Spring Creek	Freiday Canal	Irrig.	1.00	20	9	20	Nov.	25	1910
A 1051	Cedar Creek	Cedar Creek Ditch	Irrig.	1.57	17	14	35	Jan.	3	1911
A 1052	Pumpkinseed Creek	Seeley Irr. Ditch	Irrig.	.57	27	19	52	Jan.	19	1911
A 1072	Spotted Tail Creek	Brown's Ditch	Irrig.	2.28	2	23	56	Mar.	17	1911
A 1100	Lawrence Fork	Randall Bros. Ditch	Irrig.	2.57	21	18	52	May	15	1911
A 1104	Snake Creek	Kilpatrick Reservoir	Irrig.	200.00	1	24	52	June	7	1911
A 1111	Clear Creek	Clear Creek Canal	Irrig.	1.14	31	16	41	July	5	1911
A 1126	Horse Creek	Marsh & Braziel Extension	Irrig.	13.00	4	22	60	Sept.	18	1911
A 1133	Pumpkinseed Creek	Airedale Canal No. 2	Irrig.	1.57	1	19	55	Oct.	26	1911
A 1148	Springs & Slough	Cundall Ditch	Irrig.	.71	19	20	51	Dec.	15	1911
A 1149	North Platte River	French Ditch	Irrig.	11.00	9	23	60	Dec.	21	1911
A 1154	Blue Creek	The Eggers Extension	Irrig.	.41	33	17	42	Jan.	4	1912
A 1159	Snake Creek	Kilpatrick Ditch No. 2	Irrig.	200.00	6	24	51	Jan.	25	1912
A 1165	North Platte River	Liebhardt Lateral	Irrig.	2.85	4	21	54	Feb.	1	1912
A 1176	Sheep Creek	Sheep Creek Lateral	Irrig.	5.00	8	23	57	Feb.	26	1912

PRIORITIES, WATER DIVISION NO. 1-A—(Continued)

No.	NAME OF STREAM	NAME OF CANAL	Use	Sec. Ft.	Location S	Location T	Location R	Date of Priority Month	D	Yr.
A 1181	North Platte River	Dobson's Lateral	Irrig	3.14	5	20	52	Feb.	28	1912
A 1198	Otter Creek	Otter Canal	Irrig.	11.00	5	15	40	May	24	1912
A 1215	Spotted Tail Creek	Whitehead Power Plant	Power	10.00	26	24	56	Aug.	10	1912
A 1217	Sheep Creek	General Utility L. & P. Co.	Power	70.00	17	23	57	Aug.	17	1912
A 1220	Spring Creek, trib. to No. Platte Riv.	Gatch Ditch	Irrig.	.93	25	21	54	Aug.	21	1912
A 1225	Coon Creek	Coon Creek Ditch	Irrig.	1.42	34	15	37	Sept.	16	1912
A 1227	Wood River	Kimbrough Canal	Irrig.	4.00	36	10	13	Sept.	21	1912
A 1238	Lower Dugout	Hagerty Ditch	Irrig.	1.00	4	19	48	Oct.	26	1912
A 1240	Otter Creek	Peterson Ditch	Irrig.	1.32	5	15	40	Nov.	6	1912
A 1241	Spotted Tail Creek	Roberts Ditch	Irrig.	2.00	16	23	56	Nov.	6	1912
A 1286	Wood River	Wood River Ditch	Irrig.	2.28	14	11	18	May	1	1913
A 1290	Seepage	Nelson Draw Seepage Ditch	Irrig.	10.00	24	23	57	May	21	1913
A 1295	Little Spring Creek	Shramek Canal	Irrig.	1.50	22	22	55	June	9	1913
A 1310	Little Spring Creek		Irrig.	.14	22	22	55	July	29	1913
A 1316	White Horse Creek	John Bratt Ditch	Irrig.	6.00	19	14	30	Aug.	25	1913
A 1344	Plum Creek Springs	Plum Creek Ditch & Reservoir	Irrig.	1.14	23	16	42	Jan.	12	1914
A 1380	Pumpkinseed Creek	Airedale No. 1	Irrig.	.51	2	19	55	Sept.	4	1914
A 1382	South Platte River	McConnell South Side	Irrig.	37.8	34	14	33	Sept.	25	1914
A 1397	Cedar Creek	Cedar Creek Feeder	Irrig.	5.00	23	18	48	Jan.	7	1915
A 1398	Sheep Creek	Sheep Creek Lateral Co.	Irrig.	.92	8	23	57	Jan.	12	1915
A 1401	North Platte River	M. H. Stone Irr. Canal	Irrig.	1.00	28	18	46	Jan.	19	1915
A 1403	Sheep Creek Draw	Sheep Creek Lateral Co.	Irrig.	.28	8	23	57	Feb.	20	1915
A 1429	Red Willow Draw	Alliance Irr. Ditch	Irrig.	60.00	6	20	51	Aug.	5	1915
A 1431	Nine Mile Canyon	Nine Mile Seepage Canal	Irrig.	.79	10	21	53	Aug.	19	1915
A 1432	Red Willow Seepage	Dobson Ditch	Irrig.	2.00	12	20	51	Sept.	10	1915
A 1433	North Platte River	French Ditch	Irrig.	3.00	9	23	60	Sept.	11	1915
A 1436	Platte River & Red Willow Creek	Dobson Lateral	Irrig.	.59	12	20	51	Nov.	3	1915
A 1440	Lawrence Fork Creek	King's Canal	Irrig.	4.00	15	18	52	Dec.	8	1915

PRIORITIES, WATER DIVISION NO. 1-A—(Concluded)

No.	NAME OF STREAM	NAME OF CANAL	Use	Sec. Ft.	Location S	Location T	Location R	Date of Priority Month	D	Yr.
A 1446	Winters Creek Draw	Winters Creek Canal	Irrig.	70.00	19	22	54	Feb.	2	1916
A 1448	North Platte River	Liebhardt Lateral	Irrig.	2.90	6	20	52	Mar.	1	1916
A 1449	North Platte River	Atkins Ditch	Irrig.	5.00	15	19	49	Mar.	27	1916
A 1450	North Platte River	Atkins Ditch	Irrig.	5.00	15	19	49	Mar.	27	1916
A 1452	North Platte River	Gering Hydro Elec. Plant	Power	250.00	28	22	55	Apr.	5	1916
A 1455	North Platte River, Waste Water	Waste Water Ditch	Irrig.	2.30	30	21	50	June	2	1916
A 1458	Pumpkinseed Creek	Airedale No. 1	Irrig.	10.00	3	19	55	June	23	1916
A 1465	Sheep Creek Basin		Irrig.	45.57	19	23	57	Sept.	12	1916

PRIORITIES, WATER DIVISION NO. 1-B

No.	NAME OF STREAM	NAME OF CANAL	Use	Sec. Ft.	Location			Date of Priority		
					S	T	R	Month	D	Yr.
D 183	Turkey Creek		Power		4	1	16	Dec.	31	1874
D 1036	Republican River, S. F.	Guthrie & Co.	Power	400.00	34	1	7	Sept.	1	1877
D { 92, 93	Medicine Creek		Power	68.00	29	4	25	Dec.	31	1878
D 1029	Republican River	Arapahoe Star Mills	Power	196.00	27	4	23	July	24	1879
D 185	Big Cottonwood Creek	Bloomington Ditch	Irrig.	.50	25	2	16	Dec.	31	1881
D 138	Rock Creek	Phelan Ditch	Irrig.	4.29	17	1	39	Dec.	31	1883
D 159 D 173	{ Horse Creek Horse Creek }	Horse Creek Ditch	Irrig.	1.86	23	1	39	Aug.	31	1885
D 181	Red Willow Creek	Red Willow Mill	Power		16	3	28	Jan.	1	1886
D 178	Frenchman River	Wauneta Mill	Power	35.00	11	5	36	July	31	1886
D 1013	Frenchman River	Lamar Roller Mills	Power	30.00	18	6	40	Sept.	30	1887
D 179	Frenchman River	Champion Mill	Power	28.30	21	6	39	Dec.	31	1887
D 50	Frenchman River	Aberdeen	Irrig.	2.00	3	5	38	July	1	1888
D 56	Frenchman River	Harlum Ditch	Irrig.	2.00	1	5	38	July	1	1888
D 103	Republican River	Carson Ditch No. 1	Irrig.	1.43	27	3	30	July	1	1888
D 1025	Republican River, No. Fork	Haigler Land & Cattle Co.	Irrig.	77.00	2	1	43	Apr.	4	1890
D { 24, 25, 29, 30	Frenchman River } Stinking Water Creek }	Culbertson Irr. & Imp Co.	Irrig.	215.00	31	5	33	May	16	1890
D 115	Republican River, N. Fork	Sand Point Ditch Co.	Irrig.	11.00	11	1	42	Sept.	25	1890
D 117	Buffalo Creek	Allen & Larned	Irrig.	6.00	18	1	40	Oct.	16	1890
D 118	Republican River	Dundy County Ditch	Irrig.	45.00	24	1	39	Nov.	22	1890
D 171	Buffalo Creek	Porter & Sons	Irrig.	2.86	1	1	41	Nov.	26	1890
D 3	Republican River	Trites & Davenport	Irrig.	7.00	20	3	31	Dec.	18	1890

No.	NAME OF STREAM	NAME OF CANAL	Use	Sec. Ft.	Location S	T	R	Date of Priority Month	D	Yr.
D 4, 7, 89	Republican River	Meeker Canal	Irrig.	143.00	15	3	31	Dec.	22	1890
D 47	Frenchman River	Champion Irr. & W. P. Co.	Irrig.	48.46	23	6	40	Dec.	23	1890
D 5	Republican River	Trenton Farmers Irr Ditch	Irrig.	32.00	10	2	34	Dec.	24	1890
D 95	Red Willow Creek	Holland Ditch	Irrig.	35.00	16	3	28	Jan	23	1891
D 50	Frenchman River	Aberdeen Ditch	Irrig.	.50	3	5	38	Feb.	2	1891
D 133	Republican River	Neighbor's Ditch	Irrig.	2.86	24	1	39	Mar.	18	1891
D 102	Republican River	Carson Ditch No. 2	Irrig.	18.00	27	3	30	May	5	1891
D 89	Republican River	C & A Irr. & Imp. Co.	Irrig.	170.00	28	4	25	Aug.	26	1891
D 148, 147	Republican River	Republican River Irr. Co. Ditch	Irrig.	30.00	29	1	38	May	2	1892
D 150	Republican River	White & Larned	Irrig.	3.00	22	1	40	Apr.	29	1893
D 10	Frenchman River	Farmers Canal	Irrig.	10.00	11	3	32	Dec.	19	1893
D 647	Red Willow Lake	Red Willow	Irrig.	2.00	36	9	33	Dec.	20	1893
D 11	Republican River	Marr Ditch	Irrig.	4.29	16	3	31	Jan.	22	1894
D 151	Republican River	Anderson Ditch	Irrig.	2.00	1	1	37	Jan.	26	1894
D 57	Stinking Water	Chase County L & Live Stk. Co.	Irrig.	2.86	10	7	38	Mar.	10	1894
D 153	Republican River	Groesbeck & Cannon	Irrig.	10.00	10	1	37	Mar.	27	1894
D 154	Republican River	Thomas Ditch	Irrig.	2.00	24	1	40	June	5	1894
D 91	Republican River	Ballard Ditch	Irrig.	8.00	8	3	21	June	9	1894
D 62	Frenchman River	Fuller Ditch	Irrig.	25.00	4	5	36	June	12	1894
D 155	Republican River, S. F.	Karr Ditch	Irrig.	2.00	20	1	37	July	28	1894
D 18	Frenchman River	Riverside Canal	Irrig.	12.00	33	4	32	July	28	1894
D 156	Republican River, S. F.	Riverside Ditch	Irrig.	13.00	29	1	37	Aug.	5	1894
D 182	Center Creek	Gregory Ditch	Irrig.	4.00	1	1	15	Aug.	11	1894
D 38	Frenchman River	Frenchman Valley Canal	I. & P.	10.00	32	5	33	Aug.	23	1894
D 65	Stinking Water Creek	McLain Ditch	Irrig.	2.50	28	7	37	Sept.	24	1894
D 109	Republican River	Wilcox Ditch	Irrig.	4.50	32	3	29	Oct.	4	1894

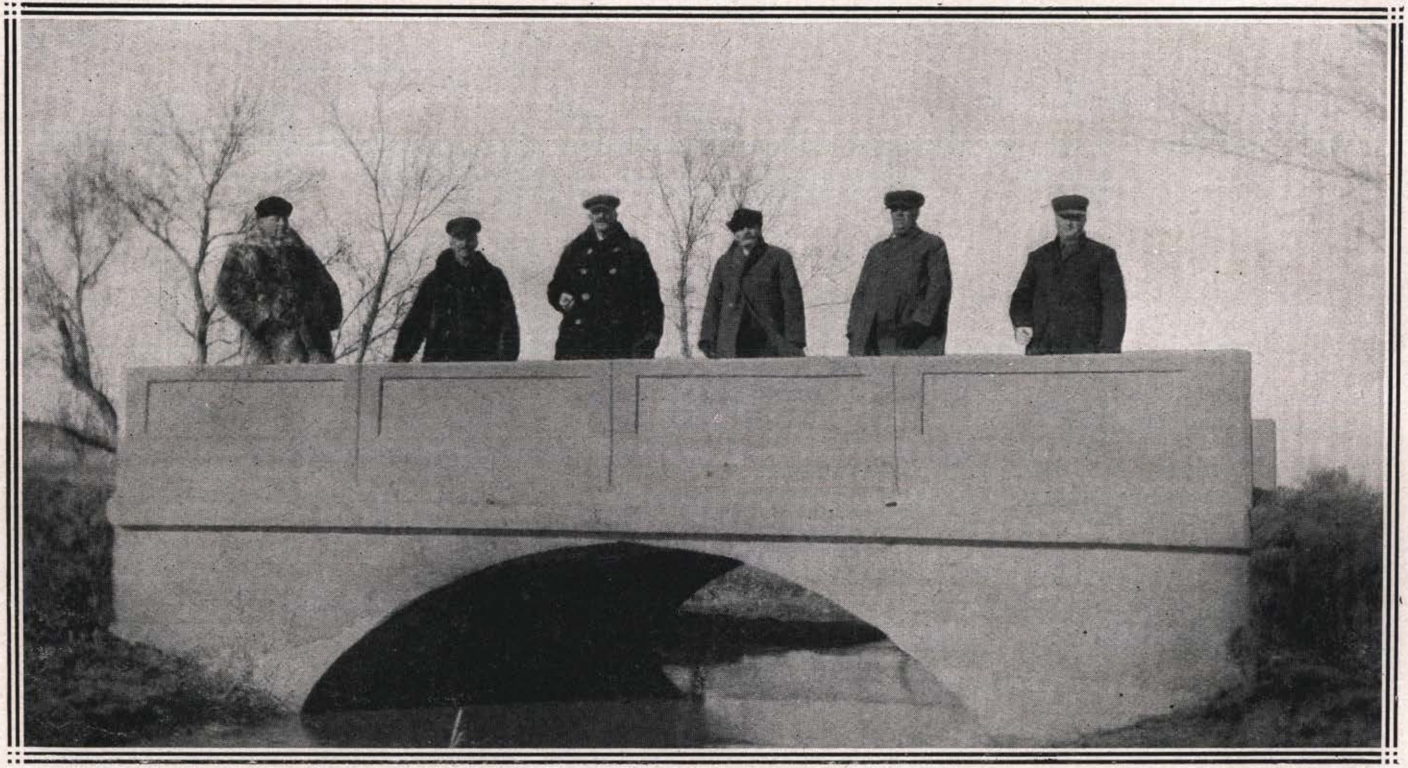
No.	NAME OF STREAM	NAME OF CANAL	Use	Sec. Ft.	Location S	Location T	Location R	Date of Priority Month	D	Yr.
D 67	Frenchman River	Gould Ditch	Irrig.	2.00	1	5	38	Oct.	9	1894
D 68	Frenchman River	Grant Ditch	Irrig.	2.00	3	5	38	Oct.	16	1894
D 70, 71, 72	Frenchman River	Maranville Ditch	Irrig.	6.00	12	6	41	Dec.	8	1894
D 175	Stinking Water Creek	Chase County L. & Live Stk. Co.	Irrig.	4.57	36	7	37	Dec.	21	1894
D 42	Frenchman River	Wise Ditch	Irrig.	2.00	15	5	35	Dec.	28	1894
D 157	Republican River	Delaware & H Ditch	Irrig.	20.00	17	1	37	Jan.	7	1895
D 74	Frenchman River	N. Gurnsey Ditch	Irrig.	5.00	3	5	37	Jan.	14	1895
D 75	Frenchman River	S. Gurnsey Ditch	Irrig.	24.00	10	5	37	Jan.	14	1895
D 110	Republican River	Allen Ditch	Irrig.	14.00	2	3	26	Jan.	26	1895
D 76	Stinking Water Creek	Chase County L. & Live Stk. Co.	Irrig.	2.00	13	7	38	Jan.	28	1895
D 77	Stinking Water Creek	Chase County L. & Live Stk. Co.	Irrig.	1.50	14	7	38	Jan.	29	1895
D 78	Stinking Water Creek	Chase County L. & Live Stk. Co.	Irrig.	1.71	14	7	38	Jan.	29	1895
D 83	Medicine Creek	Sanders Irr. Plant	Irrig.	1.43	27	7	27	Feb.	8	1895
D 111	Red Willow Creek		Irrig.	2.00	17	3	28	Feb.	18	1895
D 79	Frenchman River	Inman Ditch	Irrig.	1.50	17	6	40	Feb.	28	1895
A 237	Indian Creek	Thompson & Van Sickle	Irrig.	.93	8	2	37	June	20	1895
A 261	Indian Creek	Kinsey Ditch	Irrig.	.31	10	2	37	June	20	1895
A 265	Rock Creek	Owens Ditch	Irrig.	.36	31	2	39	June	20	1895
A 268	Indian Creek	Wilson Ditch	Irrig.	1.42	23	2	36	June	22	1895
A 56	Stinking Water Creek	Chase County L. & Live Stk. Co.	Irrig.	.91	14	7	38	June	27	1895
A 57	Stinking Water Creek	Chase County L. & Live Stk. Co.	Irrig.	.70	4	7	38	June	27	1895
A 240	Indian Creek	Chamberlain Ditch	Irrig.	.06	18	2	36	Oct.	4	1895
A 251	Cook Creek	Sharpnac Ditch	Irrig.	1.00	4	1	18	Feb.	21	1896
A 246	Frenchman River	Northside Irr. Co.	Irrig.	.79	21	6	39	Feb.	25	1896
A 373	Spring Creek	Benkelman Ditch	Irrig.	1.29	19	1	37	Dec.	31	1896
A 364	Springs, trib. to Horse Creek	Pringle Ditch	Irrig.	.57	11	1	39	Jan.	12	1897

PRIORITIES, WATER DIVISION NO. 1-B—(Continued)

No.	NAME OF STREAM	NAME OF CANAL	Use	Sec. Ft.	Location S	T	R	Date of Priority Month	D	Yr.
A 413	Republican River	Private Ditch	Irrig.	1.00	25	1	40	Oct.	7	1897
A 423	Frenchman River	Shallenberger	Irrig.	1.77	25	6	39	Dec.	21	1897
A 436	Frenchman River	Inman	Irrig.	6.43	17	6	40	Feb.	10	1898
A 483	Big Cottonwood Creek	Bloomington Mill Race	Power	6.00	25	2	16	Nov.	23	1898
A 483	Big Cottonwood Creek	....	Irrig.	1.57	25	2	16	Nov.	23	1898
A 501	Coates Creek	....	Irrig.	.37	33	2	14	Mar.	6	1899
A 526	Rock Creek	Rock Creek Ditch Co	Irrig.	.33	13	2	40	Dec.	18	1899
A 535	Republican River	Harmon Ditch	Ice	10 00	32	3	29	Jan.	22	1900
A 537	Republican River	Walsh Canal	Irrig.	11.00	35	3	30	Jan.	31	1900
A 577	Republican River	Republicn River Irr. Co. Ditch.	Irrig.	20.00	29	1	38	Aug.	22	1900
A 591	Frenchman River	Creamery	Power	34.40	21	6	39	Dec.	12	1900
A 644	Republican River, South Fork	McDonald Ditch	Irrig.	.79	36	1	38	Nov.	13	1901
A 648	Center Creek	Rose Ditch	Irrig.	.29	36	2	15	Jan.	10	1902
A 665	Crooked Creek	Fish Pond	Fish	1.00	1	1	11	May	7	1902
A 705	Frenchman River	Follette & Krotter	Irrig.	4.29	35	5	34	Apr.	30	1903
A 708	Frenchman River	Krotter Power Plant	Power	19.00	35	5	34	May	12	1903
A 714	Frenchman River	Goker Ditch	Irrig.	20.00	8	4	33	July	6	1903
A 720	Frenchman River	Extension Follett & Krotter	Irrig.	2.57	35	5	34	Aug.	11	1903
A 748	Frenchman River	Krotter Power Plant	Power	12.00	35	5	34	Apr.	5	1904
A 781	Red Willow Creek	Red Willow Valley Mound	Irrig.	14.29	31	4	28	Feb.	27	1905
A 824	Springs tributary to Horse Creek	Pringle Ditch	Irrig.	1.57	14	1	39	May	11	1906
A 828	Republican River	Campbell Irr. Canal	Irrig.	9.14	9	2	34	July	13	1906
A 858	Medicine Creek	Maywood Milling Co.	Power	11.88	16	8	29	May	4	1907
A 907	Stinking Water Creek	Electric Light & Power Co.	Power	30.00	30	5	33	June	30	1908
A 924	Buffalo Creek	Jenkins Land & Live Stk. Co.	Irrig.	4.29	18	1	40	Dec.	12	1908
A 935	Frenchman River	....	Irrig.	.86	19	5	34	Mar.	11	1909
A 975	Frenchman River	Follett & Krotter	Irrig.	10.46	35	5	34	Jan.	15	1910
A 979	Arickaree River	Haigler Reservoir Canal	Irrig.	171.00	15	1	42	Jan.	21	1910

PRIORITIES, WATER DIVISION NO. 1-B—(Continued)

No.	NAME OF STREAM	NAME OF CANAL	Use	Sec. Ft.	Location			Date of Priority		
					S	T	R	Month	D	Yr.
A 997	Republican River	Haigler Reservoir No 2	Irrig.	24.00	27	1	41	Apr.	29	1910
A 1021	Frenchman River	Krotter Power Plant	Power	55.00	35	5	34	Aug.	17	1910
A 1042	Red Willow Creek	Helm Ditch	Irrig.	10.00	8	3	28	Dec.	5	1910
A 1046	Frenchman River	F. C. Krotter No. 2	Irrig.	3.00	35	5	34	Dec	15	1910
A 1047	Frenchman River	F. C. Krotter No. 3	Irrig.	2.42	35	5	34	Dec.	15	1910
A 1049	Republican River	Shadeland Park Ditch	Irrig.	38.00	26	3	29	Jan.	3	1911
A 1055	Republican River	McConnell Bros. Irr. Canal	Irrig.	180.00	10	2	34	Jan.	23	1911
A 1068	Republican River	H. D. Irr. Canal	Irrig.	7.00	28	2	35	Mar.	2	1911
A 1070	Indian Creek	Stoneberg Ditch	Irrig.	1.00	2	2	37	Mar.	13	1911
A 1093	Republican River	G. Cappel Ditch	Irrig.	1.57	19	3	30	May	1	1911
A 1094	Frenchman River	Hokes Pump & Power Plant	Irrig.	2.28	21	6	39	May	1	1911
A 1108	Frenchman River	Kilpatrick Reservoir No. 1	Stor.	60.00	23	6	40	June	22	1911
A 1117	Frenchman River	Extension of Aberdeen Ditch	Irrig.	1.57	2	5	38	July	29	1911
A 1129	Republican River	Shadeland Park Ditch	Irrig.	7.00	25	3	29	Sept.	28	1911
A 1136	Frenchman River	Wauneta Mills & Elec. L. Plant	Power	75.00	11	5	36	Nov.	16	1911
A 1142	Frenchman River	Arteburn Storage Reservoir	S. & I.	160.00	11	6	41	Nov.	28	1911
A 1143	Maurer Springs	Burlington Pipe Line	Irrig.	1.48	23	2	11	Nov.	28	1911
A 1145	Frenchman River	Inman Storage Reservoir	Stor.	125.00	17	6	40	Dec.	8	1911
A 1160	Kilpatrick Reservoir	Kilpatrick Reservoir Ditch	Irrig.	17.00	30	6	39	Jan.	25	1912
A 1172	Republican River	Cottonwood Ditch	Irrig.	3.35	6	1	36	Feb.	19	1912
A 1192	Republican River	Rupert Ditch	Irrig.	20.00	32	3	32	Apr.	19	1912
A 1201	Brush Creek	Brush Creek Reservoir	Stor.	3.5	3	20	29	June	1	1912
A 1202	Republican River, North Fork	Parks Ditch	Irrig.	17.00	20	1	39	June	18	1912
A 1212	Red Willow Creek	Master's Ditch	Irrig.	1.14	6	3	28	July	29	1912
A 1213	Crooked Creek	Slawson's Ice Pond	Stor.	.75	1	1	11	Aug.	8	1912
A 1221	Republican River		Power	300.00	15	1	19	Aug.	26	1912
A 1245	Rock Creek	Benkelman Light Association	Power	20.00	8	1	39	Nov.	30	1912
A 1284	Frenchman River	Oliver Bros. Irr. Power Plant	Power	50.00	7	5	35	Apr.	28	1913



SMALL CONCRETE ARCH, FILLMORE COUNTY

PRIORITIES, WATER DIVISION NO. 1-B—(Concluded)

No.	NAME OF STREAM	NAME OF CANAL	Use	Sec. Ft.	Location S	T	R	Date of Priority Month	D	Yr.
A 1285	Frenchman River	Oliver Bros. Canal	Irrig.	3.20	7	5	35	Apr.	28	1913
A 1287	Driftwood Creek	Schmitz Irr. Works	Irrig.	1.50	12	2	30	May	3	1913
A 1298	Buffalo Creek	J. R. Porter Ditch	Irrig.	3.32	1	1	41	June	23	1913
A 1299	Indian Creek	Stoneberg Ditch No. 2	Irrig.	1.00	11	2	37	June	23	1913
A 1304	Frenchman River	Harvey Reservoir	Stor.	300.00	3	5	38	July	10	1913
A 1315	Elk Creek	Murray Irr. Works	Irrig.	2.85	11	4	23	Aug.	13	1913
A 1321	Republican River	W. J. Bailey Ditch	Irrig.	.64	6	3	21	Sept.	8	1913
A 1332	Driftwood Creek	Hesterwerth Irr. Works	Irrig.	1.00	14	2	30	Nov.	17	1913
A 1339	Frenchman River	Krotter Power Plant	Power	65.00	35	5	34	Dec.	2	1913
A 1340	Driftwood Creek	Sylvan Dell	Irrig.	2.80	1	2	30	Dec.	6	1913
A 1408	Frenchman River	Wauneta Elec. Light Plant	Power	70.00	11	5	36	Apr.	1	1915
A 1442	Republican River	Lake Disappointment	Stor.	5.00	32	2	18	Dec.	18	1915
A 1443	Republican River	The Everson Canal	Irrig.	1.07	13	2	18	Dec.	18	1915
A 1444	Republican River, North Fork	The Parks Ditch	Irrig.	2.00	20	1	39	Dec.	31	1915

PRIORITIES, WATER DIVISION NO. 1-C

No.	NAME OF STREAM	NAME OF CANAL	Use	Sec. Ft.	Location S	Location T	Location R	Date of Priority Month	D	Yr.
A 1219	Little Blue River	Crystal Lake	Stor.	1.50	27	6	10	Aug.	17	1912
A 1410	Little Blue River	Lyons Little Blue Elec Co.	Power	150.00	29	4	6	Apr.	26	1915
A 1411	Little Blue River		Irrig.	4.00	18	4	6	Apr.	26	1915
A 1467	Little Blue River	Meyer Hydro Elec. Power Co.	Power	150.00	16	3	5	July	7	1916

PRIORITIES, WATER DIVISION NO. 1-D

No.	NAME OF STREAM	NAME OF CANAL	Use	Sec. Ft.	Location			Date of Priority		
					S	T	R	Month	D	Yr.
D 963	Beaver Creek		Power	40.00	7	10	2	Nov.	1	1878
D 1021	Big Blue River	Holmesville Mill & Power Co.	Power	500.00	29	3	7	Apr.	....	1882
A 81	Turkey Creek	Lane Model	Irrig.	.09	4	7	3	July	16	1895
A 455	Bear Creek	Feeble Minded Institution	D. & I.	1.00	36	4	6	May	20	1898
A 1006	Big Blue River		Power	200.00	19	9	4	July	8	1910
A 1095	Big Blue River	Holmesville Mill & Power Co.	Power	500.00	29	3	7	May	3	1911
A 1135	Big Blue River	Jacobs Electric Co.	Power	41.00	26	12	2	Nov.	13	1911
A 1153	Big Blue River	Blue River Power Plant 2	Power	100.00	32	9	3	Jan.	3	1912
A 1262	Big Blue River	Barnston Power Plant	Power	500.00	13	1	7	Feb.	18	1913
A 1265	Big Blue River	Blue River Power Plant 3	Power	100.00	5	8	4	Mar.	13	1913
A 1314	Big Blue River	Marr's Irr. Canal	Irrig.	2.28	2	6	4	Aug.	12	1913
A 1366	Big Blue River	C. B. & Q. Pipe Line	Irrig.	.50	2	9	3	Apr.	30	1914
A 1394	Big Blue River	Pipe Line at Wymore	Irrig.	.50	21	2	7	Dec.	24	1914
A 1395	Big Blue River	Pipe Line at Seward	Irrig.	.50	21	11	3	Dec.	24	1914
A 1416	Big Blue River	Power Station No. 4	Power	125.00	19	4	6	June	7	1915
A 1417	Big Blue River	Power Station No. 2	Power	100.00	1	5	4	June	7	1915
A 1421	Big Blue River	Power Station No. 1	Power	120.00	35	7	4	July	7	1915
A 1422	Big Blue River	Power Station No. 3	Power	175.00	3	4	5	July	7	1915

PRIORITIES, WATER DIVISION NO. 1-E

No.	NAME OF STREAM	NAME OF CANAL	Use	Sec. Ft.	Location S	Location T	Location R	Date of Priority Month	D	Yr.
D 347	Lodge Pole Creek	Bay State Ditch	Irrig.	1.50	29	15	55	Dec.	31	1876
D 368	Lodge Pole Creek	Adams & Tobin	Irrig.	1.14	35	14	50	Oct.	1	1878
D 305	Lodge Pole Creek	Gunderson Ditch	Irrig.	1.43	1	14	52	June	1	1879
D 339	Lodge Pole Creek	Runge Ditch No. 1	Irrig.	1.71	20	14	50	Apr.	15	1880
D 338	Lodge Pole Creek	Runge Ditch No. 2	Irrig.	.50	20	14	50	Apr.	15	1882
D 373	Lodge Pole Creek	Anderson Ditch No. [illegible]	Irrig.	2.50	8	14	51	June	30	1882
D 346	Lodge Pole Creek	Circle Arrow	Irrig.	3.71	29	15	55	July	1	1882
D 308	Lodge Pole Creek	Urback Ditch	Irrig.	.86	15	14	51	Sept.	1	1882
D 320	Lodge Pole Creek	Hale Ditch No. 3	Irrig.	.57	36	14	49	April	30	1883
D 321	Lodge Pole Creek	Hale Ditch No. 4	Irrig.	.71	36	14	49	April	30	1883
D 322	Lodge Pole Creek	Hale Ditch No 5	Irrig.	.57	36	14	49	April	30	1883
D 317	Lodge Pole Creek	L. Whitney Ditch	Irrig.	.29	31	14	48	May	1	1883
D {309, 310}	Lodge Pole Creek	Booth's Canal	Irrig.	4.29	29	14	47	May	31	1883
D 814	Lodge Pole Creek	McAuliff Ditch	Irrig.	2.29	21	13	45	Dec	31	1884
D 348	Lodge Pole Creek	Kinney Ditch No. 2	Irrig.	2.71	33	15	56	Dec.	31	1884
D 312	Lodge Pole Creek	Libby Ditch	Irrig.	2.00	36	14	47	Dec.	31	1884
D 969	Lodge Pole Crek		Irrig.	1.14	26	14	47	Jan.	1	1885
D 336	Lodge Pole Creek	Howard Ditch	Irrig.	.86	31	14	47	Apr.	10	1885
D 323	Lodge Pole Creek	Krueger Ditch No. 3	Irrig.	1.14	32	14	48	May	1	1885
D 813	Lodge Pole Creek	Wolf Ditch	Irrig.	1.00	18	13	45	Dec.	31	1885
D 351	Lodge Pole Creek	McIntosh Ditch	Irrig.	3.31	29	15	55	Apr.	16	1886
D 324	Lodge Pole Creek	Krueger Ditch No. 2	Irrig.	2.29	32	14	48	Oct.	10	1886
D 301	Lodge Pole Creek	Bergquist	Irrig.	1.29	34	14	49	Apr.	30	1887
D 300	Lodge Pole Creek	Bergquist	Irrig.	0.71	34	14	49	Apr.	30	1887
D 316	Lodge Pole Creek	Upper Whitney Ditch	Irrig.	2.29	36	14	49	May	1	1887
D 966	Lodge Pole Creek	McLaughlin	Irrig.	1.00	25	14	48	May	1	1887
D 318	Lodge Pole Creek	Hale Ditch No. 1	Irrig.	1.14	36	14	49	July	1	1887

	No.	NAME OF STREAM	NAME OF CANAL	Use	Sec. Ft.	Location S	T	R	Date of Priority Month	D	Yr.
D	304	Lodge Pole Creek		Irrig.	0.86	8	14	51	Sept.	1	1887
D	330	Lodge Pole Creek	Tobin Ditch	Irrig.	2.29	28	14	47	July	31	1888
D	303	Lodge Pole Creek	Bordwell Ditch	Irrig.	1.43	35	14	49	Aug.	1	1888
D	340	Lodge Pole Creek	Premier	Irrig.	2.43	3	14	58	Apr.	11	1889
D	341	Lodge Pole Creek	Smeed	Irrig.	1.43	8	14	58	Apr.	12	1889
D	302	Lodge Pole Creek	Bordwell Ditch	Irrig.	0.86	35	14	49	Apr.	27	1889
D	342	Lodge Pole Creek	Polly Ditch	Irrig.	.79	30	15	55	May	6	1889
D	343	Lodge Pole Creek	Independent	Irrig.	3.14	7	14	58	May	6	1889
D	344	Lodge Pole Creek		Irrig.	.43	30	15	55	May	6	1889
D	345	Lodge Pole Creek	Kinney Ditch	Irrig.	2.00	31	15	56	May	14	1889
D	349	Lodge Pole Creek	Young Ditch	Irrig.	0.50	33	15	57	May	28	1889
D	307	Spring Creek	Oberfelder Ditch	Irrig.	2.29	31	14	46	May	29	1889
D	350	Lodge Pole Creek	Ruttner Ditch	Irrig.	1.14	36	15	57	June	4	1889
D	333	Lodge Pole Creek	Oberfelder Ditch	Irrig.	.43	31	14	46	June	10	1889
D	319	Lodge Pole Creek	Hale Ditch No. 2	Irrig.	.43	36	14	49	June	26	1889
D	296	Lodge Pole Creek		Irrig.	9.14	3	13	46	June	25	1889
D	297	Lodge Pole Creek	Persinger Ditch	Irrig.	4.57	33	14	46	June	25	1889
D	325	Lodge Pole Creek	Krueger Ditch No. 1	Irrig.	3.00	29	14	48	June	26	1889
D	352	Lodge Pole Creek	Brady Ditch	Irrig.	.71	29	15	55	Aug.	16	1889
D	353	Lodge Pole Creek	Hoover Ditch	Irrig.	1.43	12	14	59	Sept.	4	1889
D	329	Lodge Pole Creek	Ickes Ditch	Irrig.	2.50	28	14	50	Mar.	25	1891
D	371	Lodge Pole Creek	Adams Ditch	Irrig.	1.43	3	14	52	July	1	1891
D	354	Lodge Pole Creek	Hurley, et al	Irrig.	2.57	26	15	56	Oct.	1	1891
D	366	Lodge Pole Creek	Christenson	Irrig.	.57	7	14	51	Apr.	15	1893
D	367	Lodge Pole Creek	Christenson	Irrig.	.43	7	14	51	Apr.	15	1893
D	365	Lodge Pole Creek	Trognitz	Irrig.	1.00	36	14	50	June	1	1893
D	306	Lodge Pole Creek	Oberfelder	Irrig.	2.00	31	14	46	Dec.	30	1893
D	968	Lodge Pole Creek	Krueger Ditch	Irrig.	1.00	29	14	48	May	1	1894

PRIORITIES, WATER DIVISION NO. 1-E—(Continued)

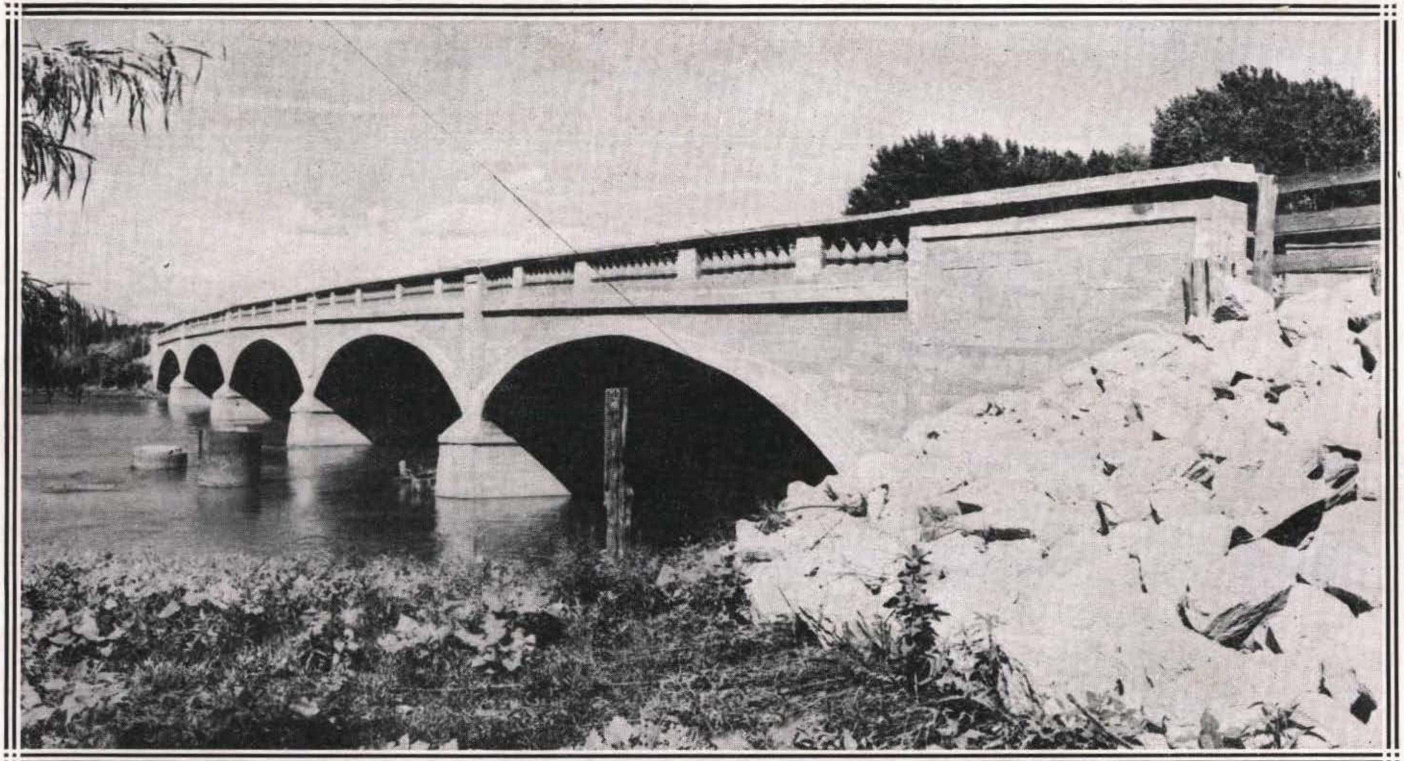
No.	NAME OF STREAM	NAME OF CANAL	Use	Sec. Ft.	Location S	Location T	Location R	Date of Priority Month	D	Yr.
D 372	Lodge Pole Creek	Anderson Ditch No. 2	Irrig.	.57	10	14	51	June	1	1894
D 370	Lodge Pole Creek	Adams	Irrig.	1.43	10	14	52	Sept.	1	1894
D 337	Lodge Pole Creek	Lyngholm	Irrig.	.36	14	14	51	Nov.	1	1894
D 335	Spring Creek		Irrig.	.04	14	13	51	Mar.	19	1895
D 369	Lodge Pole Creek	Adams Ditch	Irrig.	.50	10	14	52	Aug.	1	1895
D 967	Lodge Pole Creek		Irrig.	2.29	33	14	47	May	10	1896
A 381	Lodge Pole Creek		Irrig.	.14	30	15	53	Mar.	3	1897
A 437	Lodge Pole Creek	Bullock Canal	Irrig.	.57	4	13	46	Feb.	16	1898
A 454	Lodge Pole Creek	Maltese Cross	Irrig.	.21	36	15	57	May	16	1898
A 504	Lodge Pole Creek	Bushnell Ditch	Irrig.	3.00	2	14	58	Apr.	15	1899
A 563	Lodge Pole Creek	Wiegand Ditch	Irrig.	2.00	17	13	45	May	31	1900
A 565	Lodge Pole Creek	Neuman Canal 1 & 2	Irrig.	1.89	36	13	45	June	12	1900
A 600	Lodge Pole Creek	Wertz Bros. Ditch	Irrig.	2.86	12	13	46	Feb.	14	1901
A 611	Lodge Pole Creek	Neuman Canal	Irrig.	1.29	26	13	45	Apr.	17	1901
A 612	Lodge Pole Creek	Johnson's Canal	Irrig.	2.14	23	13	45	Apr.	17	1901
A 623	Spring Creek	Spring Branch Ditch	Irrig.	.29	36	14	47	July	1	1901
A 657	Lodge Pole Creek	Bennett Live Stock Co.	Irrig.	22.29	29	15	55	Mar.	13	1902
A 661	Lodge Pole Creek	Nasland Ditch	Irrig.	0.90	1	12	45	Apr.	16	1902
A 683	Lodge Pole Creek	Clausen South Side	Irrig.	.57	27	15	54	July	25	1902
A 684	Lodge Pole Creek	Clausen North Side	Irrig.	.57	26	15	54	July	25	1902
A 691	Lodge Pole Creek	Bennett Live Stock Co.	Irrig.	1.87	29	15	55	Oct.	2	1902
A 703	Lodge Pole Creek	Forsling	Irrig.	1.50	34	15	57	April	24	1903
A 718	Lodge Pole Creek		Irrig.	1.83	33	15	56	July	25	1903
A 719	Lodge Pole Creek	Bickel Ditch	Irrig.	.93	30	15	55	Aug.	3	1903
A 723	Lodge Pole Creek	Pomeroy Ditch No. 1	Irrig.	.57	15	14	51	Aug.	20	1903
A 724	Lodge Pole Creek		Irrig.	.14	30	15	55	Sept.	9	1903
A 725	Lodge Pole Creek	Oswasco	Irrig.	22.28	29	15	55	Sept.	12	1903
A 734	Lodge Pole Creek	Oswasco	Irrig.	1.75	29	15	55	Dec.	15	1903

PRIORITIES, WATER DIVISION NO. 1-E—(Concluded)

No.	NAME OF STREAM	NAME OF CANAL	Use	Sec. Ft.	Location S	T	R	Date of Priority Month	D	Yr.
A 806	Lodge Pole Creek	Forsling Ditch	Irrig.	.86	34	15	57	Dec.	6	1905
A 850	Lodge Pole Creek	Smith Ditch	Irrig.	3.57	12	12	45	Aug.	18	1906
A 847	Lodge Pole Creek	Ralton Irr. System	Irrig.	19.14	36	13	45	Jan.	4	1907
A 857	Lodge Pole Creek	Yoder Extension	Irrig.	2.71	36	15	57	April	9	1907
A 869	Lodge Pole Creek	Walker Ditch	Irrig.	1.71	31	15	56	Sept.	16	1907
A 870	Lodge Pole Creek	Tracy Ditch	Irrig.	.50	12	14	59	June	20	1895
A 882	Lodge Pole Creek	Ralton Irr. District	Irrig.	12.40	36	13	45	Sept.	21	1907
A 897	Lodge Pole Creek	Kimball Stor. & Res. Irr. System	Irrig.	20000.00	36	15	57	April	15	1908
				a ft.				Dec.	4	1907
A 904	Lodge Pole Creek	Wild's Ditch	Irrig.	1.71	11	13	46	June	2	1908
A 906	Lodge Pole Creek	Ruttner Canal	Irrig.	.50	30	14	47	June	25	1908
A 934	Lodge Pole Creek	Bennett Ditch No. 5	Irrig.	1.00	29	15	54	Feb.	17	1909
A 1091	Flood Water from Hills	Fifield Ditch	Irrig.	.57	22	15	56	April	27	1911
A 1127	Lodge Pole Creek	McGinnis Ice Pond	Stor.	3.00	26	15	56	Sept.	19	1911
A 1237	Lodge Pole Creek	Soderquist Ditch	Irrig.	2.00	36	13	45	Oct.	22	1912
A 1322	Lodge Pole Creek	Wiegand Ditch No. 3	Irrig.	1.28	16	13	45	Sept.	10	1913
A 1323	Lodge Pole Creek	Wiegand Ditch No. 2	Irrig.	.42	16	13	45	Sept.	10	1913
A 1420	Lodge Pole Creek	Soderquist Ditch	Irrig.	2.33	36	13	45	June	29	1915
A 1445	Lodge Pole Creek	A. G. Neumann Ditch	Irrig.	6.00	26	13	45	Jan.	5	1916

PRIORITIES, WATER DIVISION NO. 1-F

No.	NAME OF STREAM	NAME OF CANAL	Use	Sec. Ft.	Location			Date of Priority		
					S	T	R	Month	D	Yr.
A 955	Weeping Water	Gilmore Ditch	Ice	8.00	2	10	11	Aug.	5	1909



SUPERIOR STATE AID BRIDGE, REPUBLICAN RIVER, 1916. TWO 50-FT., TWO 55-FT., ONE 60-FT. CONCRETE ARCHES

No.	NAME OF STREAM	NAME OF CANAL	Use	Sec. Ft.	Location S	T	R	Date of Priority Month	D	Yr.
D 229	Middle Loup River	Sherman County Canal	Power	125.00	26	17	16	Fall	of	1888
D 227 228 232	North Loup River	North Loup Ditch	Irrig.	143.00	27	19	14	Sept.	30	1893
D 210	Victoria Creek	Victoria Irr. Plant	Irrig.	2.29	1	19	21	Mar.	17	1894
D 202	Middle Loup River	Middle Valley Irr. Co.	Irrig.	560.29	15	21	22	June	6	1894
D 289	Looking Glass Creek	Monroe Ditch	Irrig.	2.86	1	17	3	June	12	1894
D 290	Spring Creek	Hendryx Ditch	Irrig.	1.33	2	17	3	June	25	1894
D 194	Caw Creek	Homestead Ditch	Irrig.	2.29	7	26	27	July	14	1894
D 213	Victoria Creek	Victoria Ditch	Irrig.	4.29	1	19	21	July	17	1894
D 189 188 356	North Loup River	Lee Ditch	Irrig.	40.00	25	27	29	Aug.	7	1894
D 214	Middle Loup River	Wescott Irr Ditch	Irrig.	88.57	15	19	18	Aug.	8	1894
D 229	Middle Loup River	Sherman County Canal	Irrig.	244.00	26	17	16	Aug.	13	1894
D 215	Muddy Creek	Penns Irr. Ditch	Irrig.	.50	33	17	20	Aug.	14	1894
D 198	Middle Loup River	Thedford Ditch	I. & P.	43.00	4	23	29	Aug.	25	1894
D 224	North Loup River	Burwell Irr. Ditch	Irrig.	110.00	27	21	17	Sept.	7	1894
D 199	Middle Loup River	Norway Ditch	Irrig.	2.86	31	24	29	Sept.	8	1894
D 221	Cedar River	Cedar River Canal	Irrig.	175.00	22	21	12	Sept.	14	1894
D 217	Victoria Creek	Loughran & Bell	Irrig.	4.00	3	19	21	Sept.	22	1894
D 216 204	Middle Loup River	Lillian Precinct Ditch	Irrig.	140.00	30	21	21	Oct.	19	1894
D 287	Beaver River	Pioneer Ditch	Irrig.	3.57	22	20	6	Dec.	8	1894
D 292a	Shell Creek	Schmitt's Irr. Ditch	Irrig.	3.00	19	18	1	Dec.	17	1894
D 292b	Shell Creek		Power	30.50	19	18	1	Dec.	17	1894
D 236	South Loup River	Tillson Ditch	Irrig.	15.57	29	12	15	Dec.	28	1894
D 219	South Loup River	Bobbits Ditch	Power	20.00	10	14	21	Jan.	17	1895

PRIORITIES, WATER DIVISION NO. 2-A—(Continued)

No.	NAME OF STREAM	NAME OF CANAL	Use	Sec. Ft.	Location			Date of Priority		
					S	T	R	Month	D	Yr.
D 219	South Loup River		Irrig.	.50	10	14	21	Jan.	17	1895
D 205	North Loup River	Newton Irr. Co.	I. & P.	115.14	35	23	21	Feb.	5	1895
D 209	Goose Creek	Ericksons Ditch	Irrig.	8.00	18	25	24	April	3	1895
D 187	Goose Creek	Giles Ditch	Irrig.	10.00	2	25	25	June	1	1895
A 2	Shell Creek	Gottbrog	Irrig.	1.00	24	18	1	June	6	1895
A 40	Platte River	Fremont Canal	I. & P.	2500.00	30	17	4	June	21	1895
A 113	Middle Loup River	Jewett Ditch	Irrig.	4.29	30	22	24	Aug.	12	1895
A 248	Middle Loup River	Harris Canal	Irrig.	5.71	16	22	25	Feb.	21	1896
A 262	Middle Loup River	Arcada	Irrig.	20.00	16	17	16	Mar.	6	1896
A 277	Beaver River	Wind Mill Irr.	Irrig.	.14	14	17	4	Mar.	31	1896
A 345	Goose Creek	Crook Ditch	Irrig.	8.00	33	25	24	June	2	1896
A 301	North Loup River	Tzschuck Canal	Irrig.	242.86	30	22	19	June	5	1896
A 363	South Loup River	Brown Canal	Irrig.	.86	31	17	24	Feb.	23	1897
A 390	South Loup River	Hartzell Ditch	Irrig.	.37	27	18	26	May	1	1897
A 397	Gracie Creek	Gracie High Line	Irrig.	.29	29	23	17	July	9	1897
A 442	Middle Loup River	Webster	Irrig.	1.71	20	19	17	Mar.	5	1898
A 636	Cedar River	Fullerton Elec. L. & P Co.	Power	200.00	12	16	6	Sept.	9	1901
A 639	Beaver River	Albion Elec. L. & P. Co.	Power	67.00	26	20	6	Oct.	3	1901
A 709	Loup River	Columbus Development	I. & P.	2700.00	27	17	4	June	10	1903
A 807	Dry Creek	Fisher Canal	Irrig.	4.29	24	23	17	Dec.	27	1905
A 894	Platte River	Fremont & Omaha Power Co	Power	2000.00	30	17	4	Mar.	25	1908
A 1058	Beaver River	St. Edward Elec. Power Co.	Power	134.00	27	19	5	Feb.	11	1911
A 1175	Middle Loup River	Long Wood Irr. Canal	Irrig.	12.93	20	19	17	Feb.	21	1912
A 1182	Mira Creek	Mira Reservoir	Stor.	1.14	26	18	13	Mar.	8	1912
A 1185	Middle Loup River	Mullen Grist & Light Plant	Power	124.00	6	24	32	Mar.	12	1912
A 1187	Loup River	Schuyler Development	Power	2000.00	28	17	1	Mar.	23	1912
A 1189	Victoria Creek	Victoria Ditch	Irrig.	15.7	1	19	21	April	2	1912
A 1207	Dane Creek		Irrig.	.14	20	19	14	July	5	1912

PRIORITIES, WATER DIVISION NO. 2-A—(Concluded

No.	NAME OF STREAM	NAME OF CANAL	Use	Sec. Ft.	Location S	Location T	Location R	Date of Priority Month	D	Yr.
A 1216	Middle Loup River	St. Paul Elec. Works	Power	2000.00	3	14	10	Aug.	12	1912
A 1224	Middle Loup River	Lundy Mill & Power Plant	Power	400.00	9	19	19	Sept.	16	1912
A 1226	Middle Loup River	Nursery Ditches	Irrig.	1.00	3	22	26	Sept.	16	1912
A 1233	Lillian Creek	Lillian Creek Canal	Irrig.	5.00	1	19	20	Oct.	14	1912
A 1234	Middle Loup River	Middle Loup Power Plant	Power	500.00	36	20	21	Oct.	15	1912
A 1239	Mira Reservoir		Irrig.	1.32	26	18	13	Oct.	30	1912
A 1275	South Loup River	W. J. Flagg	Irrig.	5.71	11	12	18	April	15	1913
A 1294	Middle Loup River	Loup Valley Irr. Canal	Irrig.	.85	36	20	21	May	31	1913
A 1300	Middle Loup River	Lundys Lake Canal	Irrig.	28.31	4	19	19	June	27	1913
A 1306	Middle Loup River	Lundys Lake	Stor.	8.00	2	19	19	July	19	1913
A 1307	Middle Loup River	Lundys Lake	Irrig.	6.34	4	19	19	July	19	1913
A 1308	Middle Loup River	Bills Lake Canal	Irrig.	118.00	36	20	21	July	19	1913
A 1330	Middle Loup River	Austin Irr. Ditch	Irrig.	50.00	32	13	14	Nov.	6	1913
A 1357	Spring Branch	Haskill	Irrig.	7.00	31	17	24	Feb.	27	1914
A 1373	Middle Loup River	Central Power Co.	Power	1000.00	30	13	12	July	14	1914
A 1393	Loup River	Pipe Line at Ravenna	Irrig.	.50	9	12	14	Dec	24	1914
A 1396	Middle Loup River	Pipe Line at Seneca	Irrig.	.50	18	24	30	Dec.	28	1914
A 1400	South Loup River	Grand Island Elec. Co.	Power	840.00	35	13	12	Jan.	18	1915
A 1415	Cedar River	Erickson Lake Co.	Power	175.00	25	21	12	May	24	1915
A 1418	Beaver Creek		Power	125.00	14	17	3	June	19	1915
A 1447	Sand Creek	Troyers Pumping Plant	Irrig.	.24	10	15	23	Feb.	21	1916
A 1453	Mira Creek	Hutchins Dam	Irrig.	.20	26	18	13	April	18	1916

PRIORITIES, WATER DIVISION NO. 2-B

No.	NAME OF STREAM	NAME OF CANAL	Use	Sec. Ft.	Location S	Location T	Location R	Date of Priority Month	D	Yr.
D 996	Elkhorn River, South Branch	Sugar City Cereal Mills	Power	100.00	23	24	1	Mar.	1	1870
D 271	Elkhorn River	Atkinson Mill	Power	38.50	30	30	14	Nov.	1	1883
D 259	Elkhorn River									
D 263	Elkhorn River	Elkhorn Irr. Co.	Irrig.	131.43	22	29	13	Feb.	3	1894
D 260	Elkhorn River	Davis Ditch	Irrig.	1.43	31	29	11	Feb.	8	1894
D 261	Elkhorn River	Carlon Ditch No. 1	Irrig.	1.00	32	29	11	Feb.	8	1894
D 262	Elkhorn River	Carlon Ditch No. 2	Irrig.	5.00	30	29	11	Feb.	8	1894
D 283	Elkhorn River	....	Irrig.	5.00	32	29	11	Feb.	20	1895
A 29	Springs	Spring Brook Aqueduct	Irrig.	.07	13	14	13	June	18	1895
A 415	Silver Creek	Armour & Co. Ditch	Ice	10.00	7	13	9	Oct.	18	1897
A 464	Elkhorn River, South Branch	Flouring Mill	Power	33.00	3	26	9	Aug.	21	1898
A 484	Battle Creek	Battle Creek Mills	Power	10.67	36	24	3	Nov.	12	1898
A 489	Oak Creek	Eiche Irr. Plant	Irrig.	.71	17	10	6	Jan.	4	1899
A 818	Battle Creek	Battle Creek Mills	Power	20.00	36	24	3	April	20	1906
A 883	Middle Creek	Malone Ice Pond	Irrig.	10.00	30	10	6	Dec.	26	1907
A 966	Ryan's Lake	Cut Off "H"	Drain.	....	4	17	9	Oct.	16	1909
A 970	Platte River	Platte River Hydro Elec. P. Co.	Power	2500.00	6	14	10	Nov.	24	1909
A 971	Elkhorn River	Platte River Hydro Elec. P. Co.	Power	500.00	14	15	10	Nov.	24	1909
A 1069	Clear Lake	Main Ditch No. 1	Drain.	....	14	23	8	Mar.	9	1911
A 1250	Elkhorn River	West Point Hydro Elec. Dev.	Power	400.00	18	22	6	Dec.	26	1912
A 1335	Stevens Creek	Stevens Creek Irr. Project	Irrig.	1.00	2	10	7	Nov.	19	1913
A 1379	Platte River	Plattsmouth Power Plant	Power	2000.00	32	13	13	Sept.	4	1914

No.	NAME OF STREAM	NAME OF CANAL	Use	Sec. Ft.	Location			Date of Priority		
					S	T	R	Month	D	Yr.
D 554	Niobrara River	Lakatah	Irrig.	7.14	1	30	57	Oct.	1	1883
D 606	Middle Creek	McGuire Ditch	Irrig.	.71	32	33	23	June	1	1884
D 619	Rock Creek	Van Koten Ditch	Irrig.	.07	25	33	22	Jan.	1	1885
D 514a	Niobrara River	Earnest Ditch No. 1	Irrig.	2.86	9	29	56	May	1	1885
D 610	Niobrara River	Bruce Mill Dam	Power	60.00	16	33	24	April	1	1886
D 513a	Niobrara River	McGinley & Stover	Irrig.	8.21	25	29	56	May	1	1887
D 593	Rock Springs	Moore's Ditch	Irrig.	1.43	12	32	22	June	30	1887
D 442a	Niobrara River	Pioneer Ditches	Irrig.	7.14	36	29	51	Aug.	1	1887
D 566	Niobrara River	McLaughlin Ditch	Irrig.	7.14	9	28	52	May	1	1888
D 609	Bear Creek	Skinner Ditch	Irrig.	.22	15	32	21	June	20	1888
D 617	Newman Creek	Neumann Ditch	Irrig.	.21	17	33	24	July	1	1888
D 615	Cross Creek	Hutchinson Ditch	Irrig.	.21	8	33	24	Sept.	1	1888
D 608a	Crooked Creek	Burton Ditch	Power	3.00	19	34	19	Dec.	31	1889
D 513b	Niobrara River	McGinley & Stover	Irrig.	1.71	25	29	56	May	1	1890
D 514b	Niobrara River	Ernest Ditch No. 1	Irrig.	2.14	9	29	56	May	15	1890
D 582	Rickman Creek	Byington Ditch	Irrig.	1.00	22	32	20	May	19	1891
D 980	Niobrara River	Cook Ditch Nos. 1 & 2	Irrig.	3.54	1	28	56	May	31	1891
D 616	West Middle Creek	Allen Ditch	Irrig.	.50	29	33	23	June	1	1891
D 510	Niobrara River	Bigelow Ditch	Irrig.	2.40	19	31	57	June	8	1891
D 604	Wyman Creek	McCulley Ditch	Irrig.	.80	19	32	19	June	10	1891
D 620	Beeman Creek	Beeman Ditch	Irrig.	1.00	23	32	20	May	20	1892
D 603	Old Beeman Creek	Barnard	Irrig.	.43	21	32	20	June	1	1892
D 517	Niobrara River	Harris & Niese	Irrig.	8.57	3	28	55	July	1	1892
D 415	Pine Creek	Pine Creek Mills	Power	32.00	33	30	44	June	5	1893
D 442b	Niobrara River	Pioneer Ditches	Power	10.00	31	29	50	Aug.	1	1893
D 414	Sweeney Canyon	Cannon Canal	Irrig.	.21	29	31	25	Aug.	10	1893
D 612a	Fairfield Creek	Kuhres Ditch	Power	25.00	31	33	23	Sept.	1	1893
D 970	Niobrara River	Roll Milling Co.	Power	35.00	5	28	51	Sept.	10	1893

PRIORITIES, WATER DIVISION NO. 2-C—(Continued)

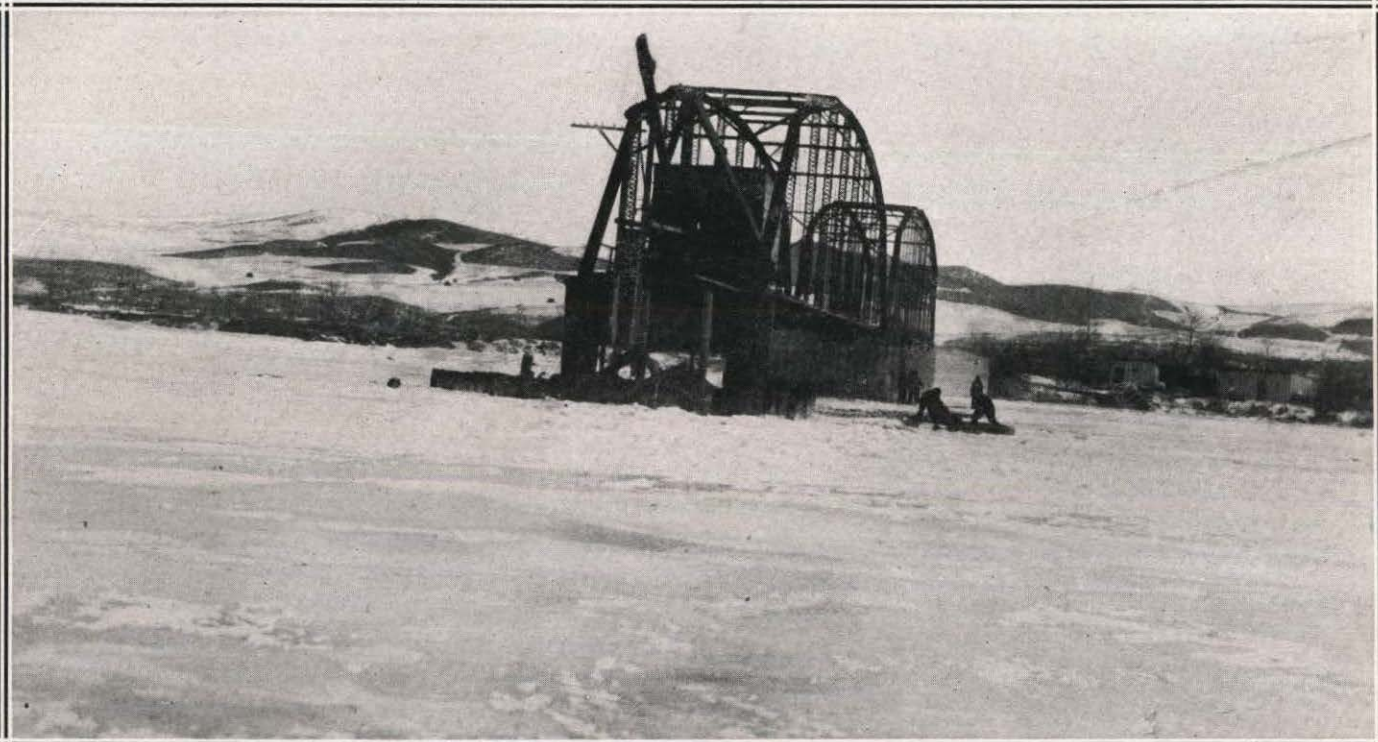
No.	NAME OF STREAM	NAME OF CANAL	Use	Sec. Ft.	Location S	Location T	Location R	Date of Priority Month	D	Yr.
D 459	Niobrara River	Meridan	Irrig.	.57	25	29	50	Jan.	10	1894
D 461	Niobrara River	Enterprise	Irrig.	5.71	27	29	50	Jan.	27	1894
D 462	Niobrara River	Furman	Irrig.	3.64	29	29	50	Feb.	2	1894
D 612b	Fairfield Creek		Irrig.	.14	31	33	23	April	1	1894
D 511	Niobara River	Johnson Ditch	Irrig.	2.86	36	31	57	May	1	1894
D 607	Snider Creek	Olds Ditch	Irrig.	.01	31	33	19	May	1	1894
D 587	Wyman Creek	Horton Ditch	Irrig.	.14	17	32	19	June	5	1894
D 463	Niobrara River	McManus & Neeland	Irrig.	.86	29	29	49	June	15	1894
D 618	Cub Creek	Tissue & Patterson	Irrig.	.03	16	33	22	June	30	1894
D 264	East Brush Creek	McCarthy Ditch No. 1	Irrig.	.50	24	32	14	July	1	1894
D 611	Holt Creek	Akers Ditch	Irrig.	.14	1	34	21	Aug.	1	1894
A 329	Plum Creek	Wilbert	Irrig.	.43	35	32	23	May	5	1896
A 336	Cottonwood Creek	Fendrick & Liebte	Irrig.	.64	22	29	48	May	9	1896
A 311	Young Creek	Harvey & Lambe	Irrig.	.21	32	33	11	June	13	1896
A 322	Shobe & Sizer Branch		Irrig.	.14	30	33	11	July	6	1896
A 359	Minnechaduza Creek	Pierce Milling Co.	Power	35.00	30	34	27	Sept.	12	1896
A 448	Niobrara River	McManus & Neeland	Irrig.	1.93	29	29	49	April	9	1898
A 452	Niobrara River	Armstrong	Power	150.00	9	33	13	May	14	1898
A 469	Niobrara River	Meridan	Irrig.	5.14	25	29	50	Aug.	29	1898
A 474	Brush Creek	Brush Creek Power Co.	Power	15.00	23	33	13	Sept.	28	1898
A 479	Bear Creek	Ciderberg Ditch No. 1	Irrig.	.02	3	32	21	Oct.	3	1898
A 512	Wooden Spring Branch	Rhodes Ditch	Irrig.	.21	25	35	20	June	19	1899
A 533	Box Butte Creek	Billys Ditch	Irrig.	.21	29	29	45	Jan.	13	1900
A 539	Turkey Creek	Turkey Creek	Irrig.	.43	35	33	23	Feb.	9	1900
A 542	Niobrara River	Bourrett Ditch	Irrig.	1.00	29	30	56	Mar.	5	1900
A 544	Wooden Spring	Rhodes Ditch	Irrig.	.14	25	35	20	Mar.	12	1900
A 546	Niobrara River	Bourrett Ditch	Irrig.	1.71	19	30	56	Mar.	17	1900
A 555	Spring Creek	Garden Ditch	Irrig.	.86	27	34	25	Mar.	30	1900

PRIORITIES, WATER DIVISION NO. 2-C—(Continued)

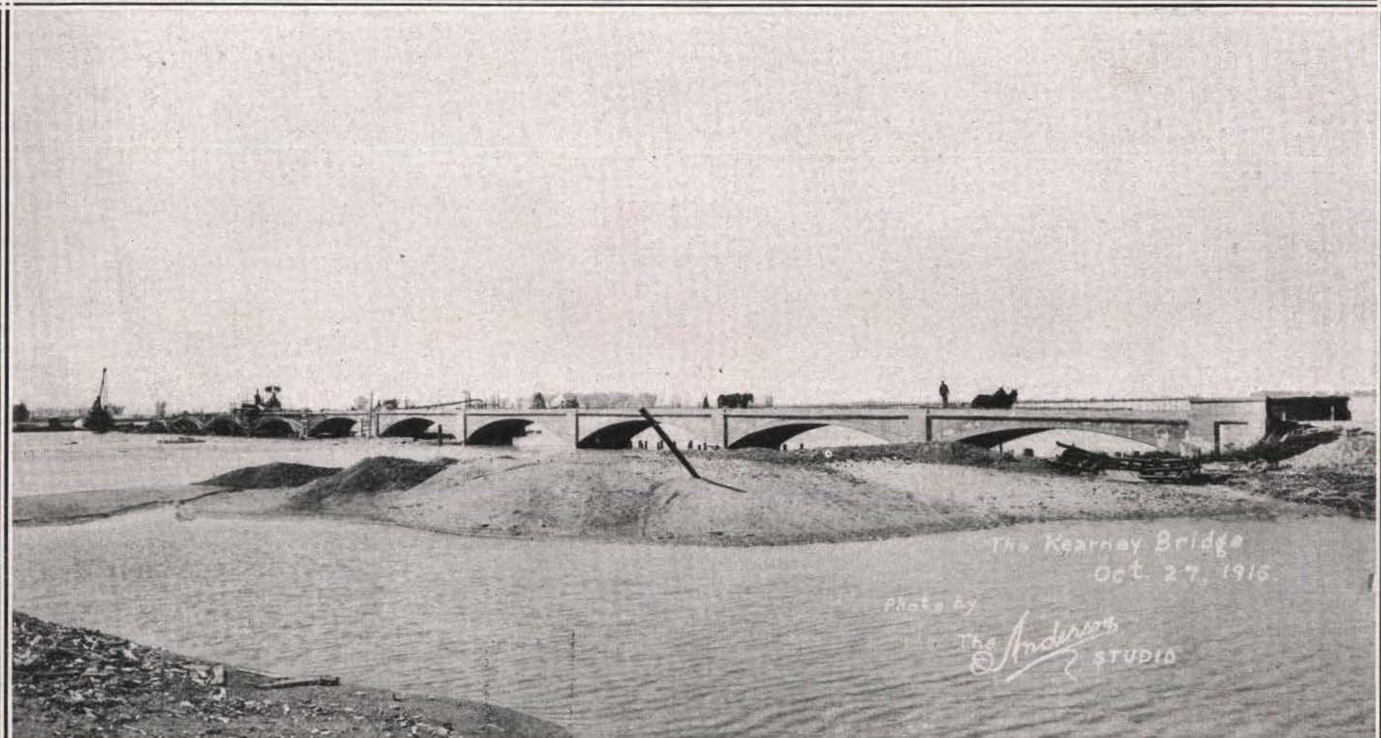
No.	NAME OF STREAM	NAME OF CANAL	Use	Sec. Ft.	Location S	Location T	Location R	Date of Priority Month	D	Yr.
A 575	Niobrara River	Montague & Lichte	Irrig.	.43	27	29	48	Sept.	27	1900
A 607	Niobrara River	Chladek Ditch	Irrig.	.30	26	29	48	Mar.	18	1901
A 616	Niobrara River	Fendrick Ditch	Irrig.	.29	32	29	48	June	1	1901
A 617	Niobrara River	Fendrick Ditch	Irrig.	.27	32	29	48	June	1	1901
A 667	Big Sandy Creek	Badger Ditch	Irrig.	1.14	12	33	14	May	16	1902
A 676	Ashburn Creek	Ashburn Canal	Irrig.	.43	27	34	26	June	17	1902
A 685	Big Sandy Creek	Badger Mill	Power	35.00	12	33	14	Aug.	28	1902
A 729	Keya Paha River	Bruce Roller Mills	Power	100.00	24	34	16	Oct.	5	1903
A 747	Kibby Creek	Green Ditch	Irrig.	.01	28	34	16	April	1	1904
A 753	West Middle Creek	Continuance M. M. Allen Ditch	Irrig.	1.00	29	33	23	May	2	1904
A 754	Turkey Creek	Turkey Creek No. 2	Irrig.	2.00	35	33	23	May	11	1904
A 757	Niobrara River	Potmesel Ditch	Irrig.	6.00	26	29	48	May	19	1904
A 766	Niobrara River and Pepper Creek	Taylors Ditch	Irrig.	4.57	28	29	47	Aug.	8	1904
A 791	Niobrara River	John L. Kay	Irrig.	2.00	6	28	53	May	12	1905
A 798	Antelope Creek	Antelope Ditch	Irrig.	.36	21	32	40	June	29	1905
A 799	Pole Creek	Pole Creek Ditch	Irrig.	.57	28	32	40	June	29	1905
A 863	Dry Canyon	Gilmore Canal	Irrig.	14.29	36	30	54	July	5	1907
A 941	Long Pine Creek	Long Pine L. & P. Plant	Power	48.00	30	30	20	April	2	1909
A 947	Plum Creek	Plum Creek	Power	150.00	29 32	32	22	May	15	1909
A 961	Niobrara River	Nebraska Power Co.	Power	900.00	34	32	7	Sept.	24	1909
A 1019	Niobrara River	Nebraska Power Co.	Power	700.00	34	32	37	Aug.	9	1910
D 583	Niobrara River	McCulley Ditch	Irrig.	8.57	25	32	20	Aug.	7	1894
D 248	Verdigris Creek	Drayton Irrigation Ditch	Irrig.	2.86	8	28	8	Aug.	11	1894
D 266	West Brush Creek	McCarthy Ditch No. 2	Irrig.	.63	26	32	14	Aug.	15	1894
D 589	Cub Creek	McComber Ditch	Irrig.	.10	28	33	22	Aug.	15	1894
D 267	Blackbird Creek	Mullen Ditch	Irrig.	1.00	20	31	11	Aug.	18	1894
D 273	Bluebird Creek	Murphy's Ditch	Irrig.	1.00	26	30	11	Sept.	7	1894

PRIORITIES, WATER DIVISION NO. 2-C—(Continued)

No.	NAME OF STREAM	NAME OF CANAL	Use	Sec. Ft.	Location			Date of Priority		
					S	T	R	Month	D	Yr.
D 573	Keya Paha River	Yocum Ditch	Irrig.	1.14	23	34	15	Sept.	7	1894
D 275	Eagle Creek	Bokhof Ditch	Irrig.	2.86	6	30	13	Sept.	18	1894
D 575	Niobrara River	Fienken Ditch	Irrig.	1.00	12	33	16	Oct.	1	1894
D 591	Niobrara River	Wilson Ditch	Irrig.	5.71	18	32	21	Oct.	18	1894
D 590	Jewett Creek	B. L. Ditch	Irrig.	.71	5	32	21	Oct.	23	1894
D 592	Huggings Creek	Soper Ditch	Irrig.	.14	21	35	20	Nov.	6	1894
D 274	Eagle Creek, South Branch	Becker Ditch	Irrig.	1.14	8	30	13	Nov.	30	1894
D 405	Plum Creek	Johnstown Ditch	Irrig.	26.00	4	29	24	Dec.	18	1894
D 400	Stream, no name	Grant Ditch	Irrig.	.14	4	31	20	Jan.	1	1895
D 395	Rock Creek	Necessity	Irrig.	.35	29	32	18	Jan.	17	1895
D 479	Niobrara River	Lichte Ditch	Irrig.	1.43	27	29	48	Jan.	24	1895
D 505	Niobrara River	Wareake	Irrig.	1.57	27	31	57	Feb.	13	1895
D 481	Cottonwood Creek	Morrissey's Ditch	Irrig.	.71	17	29	48	Feb.	16	1895
D 595	Holt Creek	Schoettger Ditch	Irrig.	.14	32	35	20	Feb.	23	1895
D 521	Niobrara River	McGinley & Stover	Irrig.	2.86	23	29	56	Feb.	25	1895
D 518	Niobrara River	Labelle Ditch	Irrig.	2.00	6	28	54	Mar.	12	1895
D 280	Eagle Creek	Eagle Valley Ditch	Irrig.	2.29	1	30	14	Mar.	15	1895
D 485	Niobrara River	Snow Ditch	Irrig.	2.86	35	29	51	Mar.	26	1895
D 397	Rock Creek Branch	Wiles Ditch	Irrig.	.86	9	31	18	April	3	1895
D 973	Boardman Creek	Lee Ditch	Irrig.	6.86	6	29	33	April	25	1895
D 568	Niobrara River	Excelsior	Irrig.	2.86	10	28	52	May	15	1895
D 601	Spotted Tail Creek	Spotted Tail Ditch	Irrig.	.25	4	34	17	May	17	1895
D 608b	Burton Creek	Burton Creek Ditch	Irrig.	.57	19	34	19	June	30	1895
A 4	Niobrara River	Bourrett Ditch	Irrig.	2.00	33	30	56	June	8	1895
A 65	Whistle Creek	Home Ditch	Irrig.	.86	13	28	54	June	6	1895
A 5	Niobrara River	Bourrett Ditch	Irrig.	1.43	29	30	56	June	10	1895
A 53	Niobrara River	Hughes Ditch	Irrig.	1.00	1	28	52	June	26	1895
A 58	Whistle Creek	Whistle Creek Ditch	Irrig.	1.00	12	28	54	June	28	1895



REDBIRD STATE AID BRIDGE OVER NIOBRARA RIVER NEAR LYNCH, UNDER CONSTRUCTION
ADDITION OF ONE 180-FT. TRUSS AND OTHER REPAIRS



KEARNEY STATE AID BRIDGE, OCTOBER 27, 1916, PLATTE RIVER, UNDER CONSTRUCTION
TWO 55-FT., TWO 60-FT., TWO 65-FT., TWO 70-FT., TWO 75-FT., TWO 80-FT., TWO 85-FT. CONCRETE ARCHES

PRIORITIES, WATER DIVISION NO. 2-C—(Continued)

No.	NAME OF STREAM	NAME OF CANAL	Use	Sec. Ft.	Location S	Location T	Location R	Date of Priority Month	D	Yr.
A 60	Niobrara River	Labelle Ditch	Irrig.	3.14	6	28	54	July	3	1895
A 82	Niobrara River	Ussher Ditch	Irrig.	1.16	19	29	46	July	17	1895
A 88	Niobrara River	Moore Ditch	Irrig.	5.71	9	28	53	July	22	1895
D 613	Beeman Creek	Beeman & Rickman	Irrig.	.29	23	32	20	July	25	1895
A 139	Lewis Spring Creek	Lewis	Irrig.	.14	29	35	19	Aug.	30	1895
A 142	Burton Creek	One Trip	Irrig.	.35	2	33	20	Sept.	2	1895
A 149	Horse Head Creek	Bruce	Irrig.	.17	16	33	24	Sept.	7	1895
A 158	Stream, no name	Conger Dam	Irrig.	.11	5	33	24	Sept.	16	1895
A 173	Niobrara River	Hay Springs Ditch	Irrig.	14.29	29	29	47	Sept.	27	1895
A 278	Abitz Creek	Fullerton Ditch No. 2	Irrig.	.36	18	30	13	Mar.	23	1896
A 292	Niobrara River	Mettlin Ditch	Irrig.	10.00	4	28	34	April	27	1896
A 1027	Cedar Creek	Cedar Creek Ditch	Irrig.	.43	4	30	24	Sept.	28	1910
A 1056	Niobrara River	Bieser Ditch	Irrig.	.75	4	29	56	Jan.	23	1911
A 1057	Niobrara River	Ex. Bourrett Ditch	Irrig.	1.21	33	30	56	Jan.	23	1911
A 1067	Springs	Glen Cove Ditch	Irrig.	.85	26	33	24	Mar.	1	1911
A 1086	Niobrara River	Lichte Irrigation Ditch	Irrig.	3.00	27	29	48	April	7	1911
A 1087	Niobrara River	Camille Ditch	Irrig.	1.53	19	30	43	April	10	1911
A 1088	Niobrara River	Lichte Ditch	Irrig.	.71	27	29	48	April	19	1911
A 1113	Cottonwood Creek	Dunlap Ditch	Irrig.	.50	22	29	48	July	18	1911
A 1152	Niobrara River	Potmesil Bros. Ditch	Irrig.	.28	25	29	48	Jan.	2	1912
A 1155	Boardman Creek	Boardman Ditch	Irrig.	28.57	33	30	32	Jan.	17	1912
A 1188	Boardman Creek	Bourrett Extension No. 1	Irrig.	.11	29	30	56	Mar.	25	1912
A 1193	Niobrara River	Wells Pumping System	Irrig.	1.64	32	32	40	May	2	1912
A 1209	Niobrara River	Bourrett Extension No. 2	Irrig.	.21	32	30	56	July	19	1912
A 1243	Niobrara River	Bristow-Lynch Power Plant	Power	900.00	1-6	32	10	Nov.	14	1912
A 1248	Niobrara River	Mettlen Ditch	Irrig.	5.00	4	28	54	Dec.	18	1912

PRIORITIES, WATER DIVISION NO. 2-C—(Concluded

No.	NAME OF STREAM	NAME OF CANAL	Use	Sec. Ft.	Location S	Location T	Location R	Date of Priority Month	D	Yr.
A 1249	Niobrara River	Bennett Ditch	Irrig.	4.00	1	28	54	Dec.	18	1912
A 1260	Niobrara River	Geo. Hitshew Ditch	Irrig.	6.00	6	28	52	Feb.	17	1913
A 1279	Minnechaduza Creek	Valentine Power Plant	Power	40.00	29	34	27	April	16	1913
A 1352	Snake Creek	Snake Hydro Electric Co.	Power	180.00	9	31	30	Feb.	16	1914
A 1362	Niobrara River	Coffey Ditch No. 3	Irrig.	2.50	15	29	56	Mar.	24	1914
A 1391	Long Pine Creek		Power	88.00	8	30	20	Feb.	19	1915
A 1461	Horse Shoe Lake et al	Horse Shoe Lake Drain	Drain.		13	34	40	June	27	1916

PRIORITIES, WATER DIVISION NO. 2-D

No.	NAME OF STREAM	NAME OF CANAL	Use	Sec. Ft.	Location			Date of Priority		
					S	T	R	Month	D	Yr.
D 447	East Ash Creek	Ox Yoke	Irrig.	2.86	31	32	50	May	31	1880
D 522	Kyle Creek	Kyle Creek Ditch	Irrig.	.57	3	30	54	June	30	1882
D 982	Charcoal Creek	Klein Ditch	Irrig.	.11	33	31	53	Aug.	1	1882
D 561	White River	Jacobson Ditch	Irrig.	.14	32	31	53	Oct.	1	1882
D 546	Soldier Creek	Rodgers Ditch	Irrig.	.14	5	31	53	April	30	1883
D 557	Spring Branch, trib. to White River	Tuckers Ditch	Irrig.	.17	34	31	54	June	1	1883
D 428	West Ash Creek	Mase Ditch	Irrig.	1.00	2	31	51	July	31	1884
D 478a	White River	Halls Ditch No. 1 and 2	Irrig.	24.83	34	32	52	Sept.	10	1885
D 494	Big Bordeaux Creek	Locket Ditch	Irrig.	.07	11	32	48	June	30	1886
D 525	Deep Creek	Deep Creek Ditch	Irrig.	.06	9	30	53	May	1	1887
D 438	East Ash Creek	Barron	Irrig.	1.14	32	32	50	July	1	1888
D 1022	Chadron Creek	Chadron Water Works	W. S.	1.00	18	32	48	Dec.	31	1888
D 1030	White River	C. B. & Q. Pipe Line, Crawford	Irrig.	.80	3	31	52	Sept.	14	1889
D 492	Springs, trib. to Hooper Creek	McMannis Ditch	Irrig.	1.00	7	31	51	Dec.	31	1889
D 493	Dead Horse Creek		Irrig.	.01	32	32	49	Sept.	1	1890
D 562	White River	Diedrickson Ditch	Irrig.	.21	1	30	54	Sept.	1	1890
D 430	Big Bordeaux Creek	Richards Ditch	Irrig.	.14	36	33	48	Sept.	10	1890
D 426	Chadron Creek	Gallups Ditch	Irrig.	.08	15	33	49	Dec.	20	1890
D 425	Little Cottonwood Creek	Thomas Stuart	Irrig.	.36	8	32	52	Dec.	21	1890
D 434	Big Bordeaux Creek	Bryants Ditch	Irrig.	.29	14	33	48	Feb.	4	1891
D 437	Bordeaux Creek	Halls Ditch	Irrig.	.07	15	33	48	Mar.	1	1891
D 441	Springs	Goff Ditch	Irrig.	.14	30	32	49	April	2	1891
D 427	Dead Horse Creek	Flag Butte	Irrig.	.03	32	32	49	April	10	1891
D 960	White Clay Creek	McFarland Ditch	Irrig.	1.64	35	32	52	May	18	1891
D 446	Bordeaux Creek	Richards	Irrig.	.36	36	33	48	Sept	7	1892
D 975	Bordeaux Creek	Manns Ditch	Irrig.	.23	25	33	48	Dec.	31	1892
D 450	Bordeaux Creek	Adams Ditch	Irrig.	.14	2	32	48	Mar.	5	1893
D 448	Little Bordeaux Creek	Hartzell Ditch	Irrig.	.57	13	33	48	June	1	1893

PRIORITIES, WATER DIVISION NO. 2-D—(Continued)

No.	NAME OF STREAM	NAME OF CANAL	Use	Sec. Ft.	Location S	Location T	Location R	Date of Priority Month	D	Yr.
D 452	West Ash Creek	West Ash Creek Irr. Co.	Irrig.	1.62	36	32	51	July	4	1893
D 453	Chadron Creek	Tug Wilson	Irrig.	.20	12	32	45	July	13	1893
D 454	Chadron Creek	Wallace Wilson	Irrig.	.07	12	32	49	July	14	1893
D 455	Ash Creek		Irrig.	.03	12	32	51	July	15	1893
D 983	Big Bordeaux Creek	County Ditch	Irrig.	.14	23	33	48	July	31	1893
D 457	Dead Horse Creek	Goff Ditch	Irrig.	.17	9	31	49	Aug.	27	1893
D 489	Indian Creek	Siegrist Ditch	Irrig.	.03	3	31	50	Nov.	1	1893
D 460	Indian Creek	Flood Ditch	Irrig.	.07	33	32	50	Feb.	13	1894
D 464	White River	Harris & Cooper, F. A.	Irrig.	16.79	25	32	52	Mar.	9	1894
D 466	Spring Creek	Spring Creek Ditch	Irrig.	.86	13	32	52	May	10	1894
D 475	White Clay Creek	Hazelton Ditch	Irrig.	1.14	13	31	52	May	15	1894
D 443	Little Bordeaux	Bulter Ditch	Irrig.	.11	33	33	47	June	1	1894
D 464	White River	Harris & Cooper, F. A.	Irrig.	1.57	25	32	52	June	15	1894
D 468	Chadron Creek	Half Diamond	Irrig.	.57	1	32	49	June	17	1894
D 467	White River	Rasher Ditch	Irrig.	1.14	19	32	51	June	20	1894
D 445	Bordeaux Creek	Bacon Ditch	Irrig.	.21	21	34	48	July	1	1894
D 469	White River	Welling Ditch	Irrig.	.57	17	32	51	July	13	1894
D 418	Sheridan Creek	Getchell Ditch	Irrig.	.07	27	34	45	Aug.	1	1894
D 488	Dead Horse Creek		Irrig.	.01	32	32	49	Aug.	1	1894
D 491	Bordeaux Creek	Morrisey Canal	Irrig.	.08	15	33	48	Aug.	25	1894
D 464	White River	Harris & Cooper Ditch	Irrig.	.28	25	32	52	Oct.	31	1894
D 473	Spring Creek	Spring Ditch No. 1	Irrig.	2.00	7	32	51	Dec.	1	1894
D 487	White River	Carpenter's Irr. Ditch	Irrig.	2.86	1	32	51	Dec.	2	1894
D 477	White River and White Clay Creek	White River Irr. Ditch	Irrig.	8.71	35	32	52	Dec.	31	1894
D 478b	White River	Hall's Mill	Power	26.40	34	32	52	Jan.	10	1895
D 519	Bull Creek	Johnson Ditch No. 1	Irrig.	.29	7	30	53	Mar.	13	1895
D 423	Beaver Creek	Braddock	Irrig.	.36	18	34	46	April	15	1895
D 974	Beaver Creek		Irrig.	.04	1	34	47	April	15	1895

No.	NAME OF STREAM	NAME OF CANAL	Use	Sec. Ft.	Location S	Location T	Location R	Date of Priority Month	D	Yr.
A 7	Dead Horse Creek	Goff Ditch	Irrig.		4	31	49	June	10	1895
A 8	Little Cotonwood	Stuart Ditch	Irrig.	2.86	8	32	52	June	10	1895
A 27	Squaw Creek	Stetson Ditch	Irrig.	.29	19	31	51	June	17	1895
A 42	White Clay Creek	Cooper Ditch	Irrig.	3.71	2	31	52	June	22	1895
A 500	White River	Metcham et al. Ditch	Irrig.	2.86	17	32	51	June	27	1895
D 465	Trunk Butte Creek	Smock's Ditch	Irrig.	.07	26	32	50	June	28	1895
A 203	Deep Creek	Green Ditch	Irrig.	.20	9	30	53	Oct.	5	1895
A 183	Little Cottonwood	Kusel Ditch	Irrig.	1.14	9	32	51	Oct.	16	1895
A 189	Sand Creek	Bendix Irr. Ditch	Irrig.	.57	35	33	53	Nov.	19	1895
A 256	White Clay Ck. and Little Sawlog Gk.	Brockway Ditch	Irrig.	.71	36	31	52	Feb.	27	1896
A 333	Squaw Creek	Cooper Ditch	Irrig.	2.29	36	32	52	May	8	1896
A 334	Deadman Creek	Stewart Ditch	Irrig.	.21	19	30	52	May	8	1896
A 337	Seepage, White River	Mason	Irrig.	.14	32	31	53	May	12	1896
A 340	White River	Lewis Ditch	Irrig.	.14	27	31	55	May	19	1896
A 380	Cedar Canyon	Cedar Canyon Ditch	Irrig.	.43	16	33	53	Mar.	1	1897
A 391	White River	Jones Ditch	Irrig.	.71	18	34	48	May	21	1897
A 394	White River	Schwabe Ditch	Irrig.	1.14	25	34	49	June	24	1897
A 409	Ravine, trib. to Cottonwood	Carlson Ditch	Irrig.	.71	21	33	52	Sept.	20	1897
A 463	Beaver Creek	Braddock Ditch	Irrig.	.63	1	34	47	Nov.	24	1897
A 421	White River	Wilkinson Ditch	Irrig.	.71	24	32	52	Nov.	18	1897
A 427	White River	Sandy Stewart	Irrig.	.94	10	32	51	Jan.	8	1898
A 432	Bordeaux Creek	O'Donnell	Irrig.	.14	9	34	48	Jan.	17	1898
A 434	West Ash Creek	Woodard Ditch	Irrig.	.14	25	32	51	Feb.	3	1898
A 444	Big Cottonwood	Rasmussen Ditch	Irrig.	2.29	10	33	52	Mar.	8	1898
A 456	White River	Rasher Ditch	Irrig.	.50	19	32	51	May	23	1898
A 459	Ash Creek	Connell Ditch	Irrig.	.63	6	32	50	June	17	1898
A 475	White River	Zeun & Schmeizle	Irrig.	1.00	19	32	51	Oct.	13	1898
A 478	Bordeaux Creek	Nelson's Ditch	Irrig.	.36	14	33	48	Oct.	19	1898

PRIORITIES, WATER DIVISION NO. 2-D—(Continued)

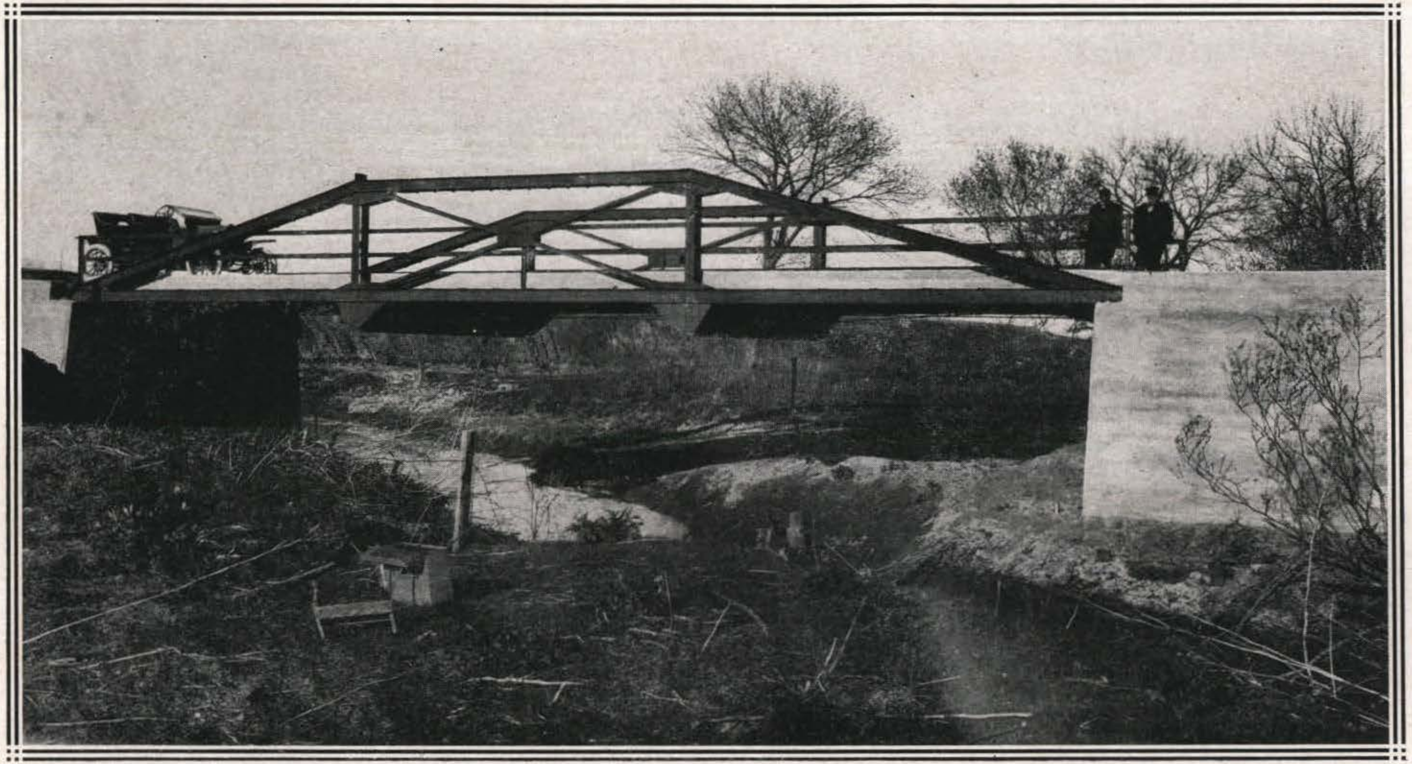
No.	NAME OF STREAM	NAME OF CANAL	Use	Sec. Ft.	Location S	Location T	Location R	Date of Priority Month	D	Yr.
A 491	Ash Creek	Cripp's Ditch	Irrig.	1.00	13	32	51	Jan.	10	1899
A 493	East Ash Creek	Sheldon Ditch	Irrig.	1.43	30	32	50	Jan.	26	1899
A 494	Bordeaux Creek	Nelson Ditch	Irrig.	.14	14	33	48	Jan.	28	1899
A 513	Beaver Creek	Celek Ditch	Irrig.	.36	4	33	46	June	19	1899
A 520	East Ash Creek	Todd Ditch	Irrig.	.38	5	31	50	Sept.	12	1899
A 521	Little Cottonwood Creek	Simmons	Irrig.	1.14	9	32	51	Sept.	12	1899
A 525	White River	Shaefer Blust Ditch	Irrig.	3.00	2	32	51	Dec.	18	1899
A 528	Cottonwood Creek	Rasmussen	Irrig.	18.00	10	33	52	Dec.	26	1899
A 534	White River	Rasher Ditch	Irrig.	1.43	19	32	51	Jan.	16	1900
A 540	Indian Creek Tributary	Kaiser	Irrig.	.57	28	32	50	Feb.	15	1900
A 547	Deadman Creek	Phillip's Ditch	Irrig.	.14	18	30	52	Mar.	19	1900
A 551	Sand Creek Tributary	Jordon	Irrig.	.50	31	33	53	April	2	1900
A 559	Indian Creek	Boyer	Irrig.	.86	28	32	50	April	30	1900
A 560	Little Cottonwood Creek	Kusel Ditch No. 2	Irrig.	.43	8	32	51	May	19	1900
A 562	Deadman Creek	Porter & Rasmussen	Irrig.	1.43	1	30	53	May	29	1900
A 564	Deadman Creek	Lindeman Ditch	Irrig.	.14	18	30	52	June	11	1900
A 584	West Bordeaux Creek	Burns' Ditch	Irrig.	4.00	36	33	48	Nov.	5	1900
A 588	White River	Carlson Ditch	Irrig.	1.43	6	32	50	Nov.	26	1900
A 618	White Clay Creek	Rinker Ditch	Irrig.	.57	11	31	52	June	8	1901
A 649	Little Cottonwood Creek	Dunn Ditch	Irrig.	1.43	9	32	52	Jan.	14	1902
A 655	White Clay Creek	White River Irr. Co.	Irrig.	8.00	36	32	52	Mar.	3	1902
A 656	Little Cottonwood	Stewart & Maple Ditch	Irrig.	.29	3	32	52	Mar.	10	1902
A 658	Dead Horse Creek	Geiser Ditch	Irrig.	.15	17	32	49	Mar.	18	1902
A 663	Spring Creek	Forbes Ditch No. 1	Irrig.	.57	20	32	52	April	28	1902
A 677	Little Cottonwood	Kusel & Spearman	Irrig.	.71	8	32	51	June	30	1902
A 681	Beaver Creek	Rickman	Irrig.	1.00	9	33	46	July	2	1902
A 690	Bordeaux Creek	Martens	Irrig.	.57	28	34	48	Sept.	22	1902
A 696	White River	Martens	Irrig.	.29	14	34	48	Dec.	26	1902

PRIORITIES, WATER DIVISION NO. 2-D—(Continued)

No.	NAME OF STREAM	NAME OF CANAL	Use	Sec. Ft.	Location S	Location T	Location R	Date of Priority Month	D	Yr.
A 702	White River	Crawford Pumping Station	Power	18.00	3	31	52	Mar.	30	1903
A 704	White Clay Creek	Hutzell Irr. Ditch	Irrig.	.57	13	31	52	April	30	1903
A 706	Rush Creek	Braddock Ditch	Irrig.	3.00	10	34	49	May	4	1903
A 707	White River	Hebbert Irr. Ditch	Irrig.	.29	34	33	50	May	11	1903
A 730	White River	Simmons, Harris Irr. Co.	Irrig.	1.00	16	32	51	Oct.	26	1903
A 735	Ash Creek	Cripp's Ditch No. 2	Irrig.	1.14	13	32	51	Dec.	26	1903
A 740	White River	Ext. to Rasher Ditch	Irrig.	1.29	20	32	51	Feb.	5	1904
A 749	Dead Horse Creek		Irrig.	1.29	32	33	49	April	6	1904
A 767	Sand Creek	Carlson Rasmus Sand Co. Ditch	Irrig.	30.00	32	33	52	April	12	1904
A 758	White River	Schwabe Ditch	Irrig.	.57	24	34	49	June	13	1904
A 759	White River	Schwabe Power Plant	Power	5.00	24	34	49	June	13	1904
A 763	Madden Creek	Dams	Irrig.	.57	26	35	49	July	11	1904
A 771	Madden and North Creek	Dams	Irrig.	.57	31	35	48	Oct.	17	1904
A 772	English Creek	McDowell Stor. Irr. Sys.	Irrig.	.87	12	31	52	Oct.	24	1904
A 775	White River	Wright's Ditch	Irrig.	4.00	16	32	51	Dec.	5	1904
A 779	Sand Creek	Arner Ditch	Irrig.	2.51	26	33	53	Jan.	12	1905
A 780	Bordeaux Little	Collins' Reservoir	Irrig.	.31	14	32	48	Feb.	27	1905
A 783	Bordeaux Little	Good Ditch	Irrig.	7.00	29	33	47	Mar.	6	1905
A 788	Spring Creek	Spring Creek No. 1	Irrig.	5.00	13	32	52	April	7	1905
A 789	Lone Tree Creek	J. C. Thomas Ditch	Irrig.	1.00	28	34	51	April	29	1905
A 803	Hooker Creek	Alcorn Ditch	Irrig.	1.21	31	32	51	Nov.	17	1905
A 811	Sand Creek	Kirstine & Rasmussen	Irrig.	17.00	3	32	52	Jan.	8	1906
A 815	White River	Schwabe Ditch	Irrig.	.29	24	34	49	Mar.	19	1906
A 825	Rush Creek	Ext. Braddock Ditch	Irrig.	1.57	11	34	49	May	31	1906
A 830	Madden Creek	Trier Ditch	Irrig.	1.21	6	34	48	Aug.	1	1906
A 835	Ash Creek	Cripp's Ditch	Irrig.	.57	13	32	51	Aug.	27	1906
A 838	White River	Roby Ditch & Dam	Irrig.	.33	3	31	52	Sept.	13	1906
A 848	Bordeaux Creek	Marten Ditch	Irrig.	1.14	21	34	48	Jan.	14	1907

PRIORITIES, WATER DIVISION NO. 2-D—(Continued)

No.	NAME OF STREAM	NAME OF CANAL	Use	Sec. Ft.	Location S	Location T	Location R	Date of Priority Month	D	Yr.
A 849	Little Saw Log and White Clay	Little Sawlog	Irrig.	.71	12	30	52	Jan.	23	1907
A 852	East Saw Log	Stephenson Ditch	Irrig.	1.14	25	31	52	Mar.	5	1907
A 854	White River	Stephenson's Power Plant	Power	15.00	34	31	53	Mar.	15	1907
A 860	Stream, trib. to White River	Jones' Ditch	Irrig.	.29	9	31	51	May	20	1907
A 884	East Saw Log	Baker Ditch	Irrig.	.29	5	30	51	Jan.	3	1908
A 908	White River	Schwabe Ditch	Irrig.	3.43	31	34	48	July	23	1908
A 915	Hooker Creek	Souther Lake	F. & I.	1.43	30	32	51	Sept.	24	1908
A 919	Dry Run	Campbell Ditch	Irrig.	1.00	35	34	49	Nov.	9	1908
A 931	Kane Creek	McConnell Ditch & Reservoir	Irrig.	4.29	29	34	50	Jan.	14	1909
A 936	White River									
A 936	White Clay Creek	White River Irr. Co., So. Branch	Irrig.	1.43	25	32	52	Mar.	11	1909
A 1054	White Clay Creek	Townsend Ditch	Irrig.	.80	25	25	45	Jan.	21	1911
A 1061	Dry Draw	G. Earnest Ditch	Irrig.	3.71	22	35	49	Feb.	20	1911
A 1098	Saw Log	Van Treek Ditch	Irrig.	.37	4	30	51	May	8	1911
A 1110	White River	Jensen Irrig. Plant	Irrig.	1.14	26	33	50	June	27	1911
A 1120	White Clay Creek	Brooks Ditch	Irrig.	0.42	36	35	45	Aug.	2	1911
A 1122	White River	Pinney & Denslow Res. 1, 2 & 3.	I. & S.	20.00	26	32	52	Aug.	10	1911
A 1128	White River	Forbes Ext.	Irrig.	.85	19	32	51	Sept.	26	1911
A 1132	Squaw Creek	Squaw Creek Ditch	Stor.	3.00	12	31	52	Oct.	3	1911
A 1190	Sand Creek Tributary	Syndicate Ditch	Irrig.	27.42	32	33	52	April	2	1912
A 1199	Indian Creek	Honnold Wilson Ditch	Irrig.	.07	3	31	50	May	25	1912
A 1264	Little Cottonwood	Broadhurst Ditch	Irrig.	3.20	7	32	51	Feb.	25	1913
A 1276	Little Cottonwood	Dodd & McDonnell	Stor.	10.00	18	32	53	April	15	1913
A 1278	Flood Water	Lenehan Reservoir	Stor.	4.00	25	34	52	April	16	1913
A 1289	Flood Water	Arner Ditch	Irrig.	.14	27	33	53	May	6	1913
A 1333	Ash Creek, West Branch	Broadhurst Reservoir	Stor.	5.00	35	32	51	Nov.	17	1913



60-FT. FIFTEEN TON SPAN IN POLK COUNTY NEAR STROMSBURG

PRIORITIES, WATER DIVISION NO. 2-D—(Concluded)

No.	NAME OF STREAM	NAME OF CANAL	Use	Sec. Ft.	Location S	Location T	Location R	Date of Priority Month	D	Yr.
A 1345	Dry Run	Wm. Guse Reservoir	Stor.	20.00	35	34	52	Jan.	13	1914
A 1358	Spring Creek	Swinbank Reservoir	Stor.	2.00	13	32	52	Mar.	3	1914
A 1360	White River	Hebbert Ditch	Irrig.	0.71	34	33	50	Mar.	10	1914
A 1361	Dry Run	Harsh & Weston Ditch	Irrig.	3.00	31	34	51	Mar.	11	1914
A 1392	Lone Tree Creek	Sides Reservoir	Stor.	3.00	13	34	52	Nov.	25	1914
A 1406	Butte Creek	Chaulk Ditch	Irrig.	3.00	25	33	50	Mar.	13	1915
A 1441	White Clay Creek	Handschiegel's Lake	Stor.	1.30	11	31	52	Dec.	17	1915
A 1457	Sand Creek	Extension Bendix Ditch	Irrig.	.64	35	33	53	June	16	1916

PRIORITIES, WATER DIVISION NO. 2-E

	No.	NAME OF STREAM	NAME OF CANAL	Use	Sec. Ft.	Location S	Location T	Location R	Date of Priority Month	D	Yr.
D	553a	Hat Creek	W. Hat Creek Ditch	Irrig.	.43	16	32	55	June	1	1880
D	548	Warbonnet Creek	Warbonnet Ditch	Irrig.	3.63	21	33	56	July	31	1880
D	512	Hat Creek	Coffee Ditch	Irrig.	4.29	26	33	55	Sept.	1	1881
D	507	Cedar Creek	Schilts' Ditch	Irrig.	.57	35	33	56	May	15	1885
D	976	Cedar Creek	Valdez Ditch	Irrig.	.50	10	32	56	April	5	1886
D	553	West Hat Creek	West Hat Creek Ditch	Irrig.	.57	16	32	55	May	31	1886
D	508	Prairie Dog Creek	Schilts Prairie Dog Ditch	Irrig.	1.14	35	33	56	Mar.	31	1886
D	560	Boggy Creek	Bannon's Ditch	Irrig.	.06	7	32	54	July	1	1886
D	957	Warbonnet Creek, Branch	Nolan Ditch No. 1	Irrig.	.01	23	33	57	Mar.	15	1887
D	958	Warbonnet Creek, North Branch	Kay's Ditch	Irrig.	.14	26	33	57	May	1	1887
D	533	Sowbelly Creek	Old Sow Belly Ditch	Irrig.	3.00	7	32	55	June	1	1887
D	506	Big Monroe Creek	Big Monroe Creek Ditch	Irrig.	1.43	33	33	56	May	1	1888
D	959	Warbonnet Creek Branch	Nolan Ditch No. 2	Irrig.	.29	23	33	57	May	1	1888
D	547	Tributary of White Head Creek	Harrison Ditch	Irrig.	.06	13	33	54	May	30	1888
D	509	Monroe Creek	Schilts' Ditch	Irrig.	.50	27	33	56	July	2	1888
D	956	Boggy Creek		Irrig.	.11	30	33	54	Dec.	31	1888
D	550	Spring Creek, trib. to Sowbelly	Hall's Ditch	Irrig.	.57	6	32	55	Mar.	26	1889
D	981	Jim Creek	Dout Bros. Ditch	Irrig.	.86	7	33	56	May	15	1889
D	539a	Warbonnet Creek	Dout Ditch No. 2	Irrig.	.71	30	33	56	May	31	1889
D	984	Tributary of Jim Creek	Homestead Ditch	Irrig.	.22	22	33	54	May	31	1890
D	552	Squaw Creek	Dunn's Ditch	Irrig.	.36	15	33	57	June	1	1890
D	559	Sowbelly Creek	Montgomery Ditch	Irrig.	1.00	21	33	55	Dec.	1	1890
D	502	Jim Creek	Jim Creek Ditch	Irrig.	.43	8	33	56	Dec.	15	1890
D	538	Spring Branch, trib. to Warbonnet Ck.	Biehl's Ditch	Irrig.	.23	32	33	56	April	1	1891
D	555	Squaw Creek	Hamlin Ditch	Irrig.	.01	10	33	57	April	1	1891
D	543	Jim Creek	Slattery Ditch	Irrig.	.29	13	33	57	May	31	1891
D	539b	Warbonnet Creek	Dout Ditch No. 2	Irrig.	.29	30	33	56	Dec.	31	1891
D	526	Boggy Creek	Smith's Ditch	Irrig.	.28	31	33	54	May	1	1892

PRIORITIES, WATER DIVISION NO. 2-E—(Continued)

No.	NAME OF STREAM	NAME OF CANAL	Use	Sec. Ft.	Location S	Location T	Location R	Date of Priority Month	D	Yr.
D 549	Cherry Creek	Cherry Creek Ditch	Irrig.	.03	29	33	54	May	1	1893
D 551	Little Red Creek	Zerbst Ditch	Irrig.	.14	25	33	56	May	1	1893
D 532	Spring Creek, trib. to Sowbelly	Spring Creek Ditch	Irrig.	.29	7	32	55	June	1	1893
D 503	Spring Branch, trib. to Warbonnet Ck.	Gorton Ditch	Irrig.	1.43	31	33	56	Oct.	16	1893
D 537	Antelope Creek	Turner Ditch	Irrig.	.86	26	34	57	Oct.	31	1894
D 556	Sowbelly Creek	Jordan's Ditch	Irrig.	.43	21	33	55	June	1	1895
A 83	Monroe Creek	Noreisch Ditch	Irrig.	.04	33	33	56	July	19	1895
A 100	Squaw Creek	Thos. Dunn's Ditch & Res.	Irrig.	.57	10	33	57	Aug.	5	1895
A 168	Antelope, North Branch	Story's Ditch	Irrig.	2.00	8	34	56	Nov.	11	1895
A 424	Sowbelly Creek	Jordan Ditch	Irrig.	.50	21	33	55	May	11	1896
A 338	Antelope Creek	Ellis Ditch	Irrig.	.29	9	33	57	May	17	1896
A 341	Hat Creek	Miller Ditch	Irrig.	.37	23	33	55	May	19	1896
A 342	East Boggy Creek	Martin Ditch	Irrig.	.36	18	32	54	May	19	1896
A 376	Squaw Creek	Phillip Dunn Ditch	Irrig.	.19	3	33	57	Jan.	22	1897
A 404	Sowbelly Creek	Nutto Ditch	Irrig.	.43	24	32	56	Sept.	4	1897
A 451	Jim Creek Tributary	Hunter Ditch	Irrig.	.03	26	33	54	May	12	1898
A 510	Hat Creek	Haas Ditch	Irrig.	.08	2	33	55	May	8	1899
A 516	Sowbelly Creek	Carroll Ditch	Irrig.	.14	7	32	55	July	12	1899
A 532	Sowbelly Creek	Zimmerman Ditch	Irrig.	.71	34	33	55	Jan.	11	1900
A 549	Licket Creek	Licket Ditch	Irrig.	1.43	27	33	54	Mar.	21	1900
A 557	Long Branch Creek	Borky Ditch	Irrig.	.64	23	35	54	April	14	1900
A 581	Jim Creek Tributary	Wasserberger Ditch	Irrig.	2.29	29	34	54	Oct.	13	1900
A 585	Peterson Draw	Meyer Dam	Irrig.	2.00	24	35	56	Nov.	5	1900
A 587	Long Branch Creek	O'Connell Ditch	Irrig.	.20	22	35	54	Nov.	10	1900
A 594	Hat Creek	Antrim's Ditch	Irrig.	.57	3	32	55	Dec.	24	1900
A 627	West Squaw Creek	Thomas Irr. Ditch	Irrig.	.50	10	33	57	July	23	1901
A 635	Long Branch Creek	Ebert Ditch	Irrig.	.14	19	35	53	Aug.	22	1901
A 668	Sowbelly Creek	Jordan Canal	Irrig.	.14	21	33	55	May	26	1902

PRIORITIES, WATER DIVISION NO. 2-E—(Concluded)

No.	NAME OF STREAM	NAME OF CANAL	Use	Sec. Ft.	Location			Date of Priority		
					S	T	R	Month	D	Yr.
A 701	Boggy Creek	Wickersham Ditch	Irrig.	3.00	31	33	54	Feb.	28	1903
A 760	Antelope Creek	Gayhart Ditch	Irrig.	2.43	16	34	55	June	18	1904
A 808	Canyon, trib. to Hat Creek	Joseph Konrath Ditch	Irrig.	1.43	17	34	54	Dec.	28	1905
A 834	Hat Creek	Antrim Dam	Irrig.	.57	3	32	55	Aug.	20	1906
A 841	Monroe Creek	Niel Jordon Dam	Irrig.	2.20	13	32	56	Nov.	12	1906
A 872	Dry Draw, trib. to Indian Creek	Hebbeln's Ditch	Irrig.	2.00	24	35	56	Oct.	4	1907
A 886	Little Boggy Creek	Hill Irr. Ditch	Irrig.	.86	11	32	55	Jan.	20	1908
A 892	Warbonnet Creek	Warbonnet Ditch No. 2	Irrig.	1.43	20	33	56	Mar.	11	1908
A 1236	Hat Creek	Coffey & Son Fld. W. D.	Irrig.	6.00	14	33	55	Oct.	22	1912
A 1268	Sowbelly Creek	Barnes Reservoir	Stor.	10.00	19	32	55	Mar.	24	1913
A 1288	Sowbelly Creek	O'Connell Canal	Irrig.	10.00	9	33	55	May	5	1913
A 1375	Monroe Creek	Cornelius Jordan Ditch	Irrig.	2.00	13	33	56	July	30	1914
A 1376	Dry Gulches	Roy C. Childs Ditch	Irrig.	0.57	28	34	56	Aug.	14	1914
A 1377	Monroe Creek	Wooden Shoe	Stor.	5.00	22	33	56	Aug.	24	1914
A 1399	Monroe Creek	Neal Jordan, Ext. to No. 841	Stor.	4.00	14	33	56	Jan.	14	1915
A 1404	Warbonnet Creek	Zerbst Ditch No. 2	Irrig.	.17	25	33	57	Mar.	6	1915
A 1405	Warbonnet Creek	Zerbst Ditch No. 1	Irrig.	.03	26	33	57	Mar.	6	1915
A 1407	Hat Creek	Zerbe Reservoir	Stor.	2.00	35	33	55	Mar.	25	1915
A 1413	Boggy Creek, East Fork	Chain Lake Res. No. 2	Stor.	1.00	7	32	54	April	30	1915
A 1414	Boggy Creek, West Fork	Chain Lake Res. No. 1	Stor.	1.00	7	32	54	April	30	1915

PRIORITIES, WATER DIVISION NO. 2-F

No.	NAME OF STREAM	NAME OF CANAL	Use	Sec. Ft.	Location S	Location T	Location R	Date of Priority Month	D	Yr.
A 839	Tekamah Creek	Tekamah Roller Mills	Power	10.00	19	21	11	Sept.	17	1906
A 887	Tekamah Creek	Tekamah Roller Mills	Ice	1.00	19	21	11	Jan.	21	1908
A 914	Bazile Creek	Creighton Milling Co.	Power	30.00	21	29	5	Sept.	24	1908
A 958	Mud Creek	Horan Canal	Irrig.	.37	34	14	13	Aug.	12	1909

WATER POWER

Water Power in Nebraska.

The first law relating to the use of water for irrigation or water power was passed by the Legislature of 1877. This law was very brief and merely gave to companies desiring to construct such work the right of eminent domain and declared them to be works of internal improvement. No mention whatever was made of any course of procedure whereby title or the right of property to be use of water could be acquired.*

The next legislation covering the use of water was passed by the Legislature of 1889. This act provided the right to acquire the use by appropriation of running water flowing in any river or stream or down any canyon or ravine; provided that the same be used for beneficial or useful purposes, and that when any appropriator or successor in interest ceased to use the water so appropriated for such a purpose the right ceased; that no land was to be burdened by more than one ditch, without the consent of the owner thereof; that all ditches were exempt from taxation; that the point of diversion might be changed if others were not injured; that the water so diverted must be returned to the stream from which it was taken; that as between appropriators the one first in time was first in right; that a notice be posted by the party desiring to appropriate water at the point of intended diversion, stating the point of diversion, the amount of appropriation, the purpose for which claimed, the place of intended use, and the means by which it was intended to divert; that a copy of the notice be recorded in the office of the County Clerk of the County in which the notice was posted; that excavation must commence within sixty days from the time of posting notice and continue to completion; that completion meant conducting the water to the place of intended use; that a permanent right was granted to the use of all water beneficially used through ditches which had previously been completed; that owners of lands bordering on streams were entitled to use of water on adjoining lands; that the right was given for condemnation for right of way; sites for reservoirs, and to enlarge ditches; that ditch companies were authorized to borrow money and issue bonds; that canals constructed for irrigating or water power purposes were declared works of internal improvement; that ditches must be kept in proper repair; and provided a penalty for interfering with ditches of gates.†

The next law governing the use of water was enacted by the Legislature of 1895, which passed the first comprehensive law regarding and relating to the use of water for irrigation and water power purposes. The most important features of this law as pertaining to water

*Session Law of Nebraska for 1877, page 168.

†Session Laws of Nebraska for 1889, chapter 68, page 503.

power were as follows: The dedication of the water of every natural stream to public use; the right to divert unappropriated water for beneficial use was never to be denied; stated the priority of the use of water gave preference to the use as follows: first, for domestic uses, second, for irrigation and third for power and manufacturing purposes; divided the state into two water divisions and these divisions into districts; provided for the measurement of water in streams; created the State Board of Irrigation; required County Clerks to send certified copies of notices of all water appropriations on their records to the State Board; provided for the adjudication of existing rights by the State Board; provided for the future applications for appropriations of water; the examination and approval or disallowance of said applications; appeals from the decision of the Board; and a complete record of all water rights to be kept in the office of the State Board.* This law has been amended from time to time and improvement in it made thereby.

The State Board of Irrigation organized itself on April 24, 1895, being composed of the Governor, as President of the Board, the Attorney General and the Commissioner of Public Lands and Buildings. The State Board appointed its secretary, state engineer and other assistants, and at once prepared claim blanks which were sent to water users of record in the offices of the different county clerks, which were filled out and returned to the office of the State Board. Hearings were had on those claims and the rights of the different claimants adjudicated. For convenience in keeping a record of these claims, the hearings were numbered in order in which they were held, and were called "Dockets." Thus all claims for the right to the use of water prior to April, 1895, are known as "Dockets." Special attention is called to this for the reason that it is necessary to know the docket number of a particular water right in order to look it up.

After a hearing on one of these claims which were presided over by the Secretary, an Opinion was rendered by the State Board upon the evidence submitted, which determined the amount of water, the use to which it was applied, the point of diversion, the location of the project, and the date of priority. These Opinions are bound in book form in the office of the State Board and are final and binding except where appealed from to the District Court.†

For all water rights since April, 1895, the Board upon its organization at once prepared blanks, known as "Application Blanks," which were supplied to persons desiring to obtain a permit for the use of the waters of the State of Nebraska. These were filed on the date and hour received at the office of the Board, given a numerical number and recorded. All rights, acquired since 1895 are therefore known as "Ap-

*Session Laws of Nebraska for 1895, chapter 69, page 244.

†Copies of the claim blanks used for water power purposes together with complete record of adjudication of the water right may be found in the office of the State Engineer.

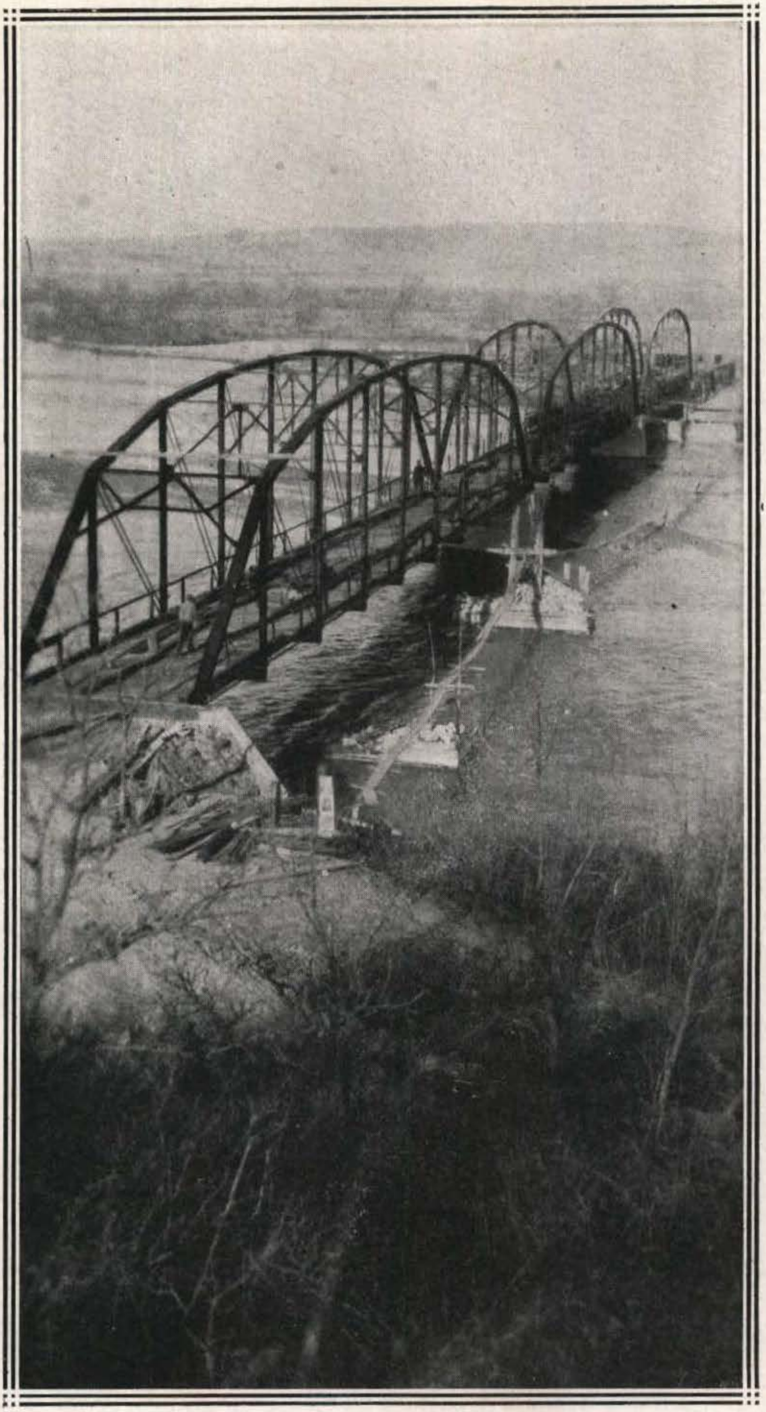
plication No. ———." These blanks, among other things, set forth the name of the applicant, his address, the source of the appropriation, amount, and use to which applied. The date of priority to the right to use water under all applications, dates from the filing of the application in the office of the State Board, which is considered the date of priority. These applications are taken up, investigated by the Secretary and acted upon by the Board through the Secretary and either approved or dismissed.

Under the law as it exists at present, an applicant feeling himself aggrieved by the action taken by the State Board on his application for a permit to appropriate water, may ask for a hearing before the State Board at which hearing, testimony may be submitted for and against any proposed appropriation, the State Board having the right to summon any witnesses and in all things act as a court rendering a final decision in the matter, from which decision an applicant may appeal directly to the Supreme Court of the State, the same as in cases before the State Railway Commission. Cases pertaining to irrigation and water coming before the Supreme Court are advanced on the docket, so as to receive prompt consideration.

Upon the allowance of an application, the applicant shall begin the actual work of excavation and construction within six months from the date of approval of said application. The application being in fact, simply a permit to the right of the water and no perfected rights are supposed to have been acquired until the project has been completed and the water beneficially used and applied. The work of construction of a power plant must be vigorously, diligently and uninterruptedly prosecuted to completion and one-tenth of the total work must be completed within one year from the date of approval. Also the applicant must file by the tenth of each month a report under oath to the State Board, giving the actual amount of money expended on such power development during the preceding calendar month.

The time for completing the appropriation and applying the water to beneficial use is left to the discretion of the State Board, and in most cases a year is allowed after the completion of the construction work for the application of water to beneficial use. When the time for applying the water to beneficial use has expired the applicant is required to file a proof of appropriation on a blank furnished by the state. This proof of appropriation shows how much water has been applied to beneficial use and the purpose, and is made under oath and attested to by witnesses. Upon receipt of this the Secretary of the Board makes a personal investigation and verifies the proof.

If everything is found to be according to law the certificate is issued, which certificate grants the applicant the right to the use of the water which has been applied to the beneficial purpose and the right to the use of the same for as long as the applicant shall apply the same to said beneficial use.



PARSHALL STATE AID BRIDGE, NIOBRARA RIVER NEAR BUTTE, 1917
THREE 170-FT. TRUSSES

Prior to 1911, ten years' non-use of a water right constituted an abandonment, this being a decision of the Supreme Court. Under the law of 1911, three years consecutive non-use of the water under any water rights constitutes an abandonment and a forfeiture to the state. A water right for irrigation purposes attaches to the land to which it is applied. A water right for power purposes attaches to the project and a relocation of the same which would constitute a new project is not permitted.*

Water Power Plants That Are Now Under Construction or in Operation.

Creighton Water Power Development (Application 914). This development is located on Bazile Creek, and is used to operate mill and electric light plant; develops approximately 60 horse power.

Ravenna Mill Development (D-1037) Beaver Creek. This development was first constructed in 1891, and has been in continuous use with the exception of two or three short periods, when a portion of the dam was washed out. The present dam is constructed of cribs with concrete abutment at each end.

Holmesville Power Plant (D-1021). On the Big Blue River. Has an appropriation of 500 second feet. Power is used exclusively for hydro-electric purposes, current being furnished to the towns of Beatrice, Wymore, Blue Springs, and Holmesville. The plant is constructed entirely of concrete, and was finished in December, 1911, being operated continuously ever since. Fourteen feet head is provided for, capable of developing 675 horse power. Average output of the plant for the last five years has been one million K. W. H. per year, but during the past year it will run as high as one million three hundred thousand, which is about the capacity of the plant. On this account another plant is being contemplated at Barnston to take care of the increase in business.

Staplehurst Power Development (A-1135). This power plant is located on the Big Blue River at Staplehurst; power is obtained from 30 inch Leffel Turbine. Dam is 8 feet high. The power is used daily for light and power.

Ericson Lake Development (A-1415). The development of the Ericson Lake Co., on the Cedar River about one and one-half miles below the village of Ericson, Neb., consists of an earth dam with concrete spillway and flume for the installation of two 150 horse power units. The flow of the river is normally about 250 second feet. The water level is raised twelve and one-half feet and the head thus created will produce approximately 190 continuous horse power.

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*Blanks used for making application for water power purposes, proofs of appropriation and certificate of appropriation may be had upon application to the State Board.

The cut-off wall is of Lackawanna steel sheet piling driven twenty to thirty-five feet under the concrete structure, and the heavy portion of the earth fill, a distance of about two hundred feet.

The spillway and flume is of mass concrete, the flume being twelve feet wide at the bottom and sixteen feet at the top. The spillway is forty feet long designed for an overflow four feet deep. The earth embankment is approximately forty feet wide on top with side slopes of two to one. The material is the sand mixed with fine earth taken from borrow pits below the dam with the top and up stream face covered to a depth of one and one-half feet with clay taken from the south bank.

The lake above the dam covers an area of about 160 acres. The main purpose of the development is to build up a summer resort; but incidentally to also develop the power and ice business.

The cost of work done to date is about $25,000. The power units have not as yet been installed, but it is expected this will be done in the spring.

Neligh Mills Development. This development is located on the Elkhorn River at Neligh, developing 300 horse power, under 12 foot head. There has been considerable trouble in the past years due to the dam washing out, or cutting through the dikes back of the dam. During the past few years the Milling Company have constructed a concrete dam and waste-way and since that time there has been very little trouble. Owing to the low banks on the Elkhorn river it is necessary to maintain a dike running from each end of the dam, about two miles up stream, and in the past it has been very difficult to maintain these dikes.

Norfolk Mills Development (D-996). Elkhorn River. This development was started in 1870, enlarged in 1888, and in 1893 a permanent dam was constructed, developing 150 horse power through two turbine wheels.

Champion Hydro Development. This plant is located at Champion, Nebraska, on the Frenchman River. The dam is 150 feet long, 7 foot head, with a 44 foot overflow, and operates an electric light and pumping plant.

Wauneta Development (A-1284). This development is on the Frenchman River, near Wauneta, Nebraska. Fifty horse power is developed under a 10 foot head, and is used to operate an 8-inch pump to irrigate 150 acres of land.

Wauneta Mills (D-178). This development is using a maximum head of 12 feet, operating two Lamson wheels, one a 30 inch which is driving a 100 B. B. T. flour mill, and the other a 24 inch, which is driving a 15 K. W. D. C. generator, furnishing light to the town.

Long Pine Light and Power Plant Development (A-941). This development is located on Long Pine Creek, the head of which creek commences about four miles south of Long Pine, and flows northeast about twenty-five miles, where it empties into the Niobrara River. The current is very swift and is fed all along the stream by numerous springs which furnish the purest water in the United States, testing 99% pure. This stream runs into a canyon. In 1885 a wooden dam was built which furnished power for a burr mill. This was remodeled to the roller system in 1888, also in 1900. In 1909 the Long Pine Light & Power plant was installed by S. H. Kyner. In order to have more power a concrete dam was constructed, giving the plant a 20 foot head. There is a 54 inch tube 75 feet long which conveys the water from the pond to a steel penstock, where a 26 inch Sampson water wheel is installed which furnishes the power for the dynamo located in the concrete building, with the switch board and other electrical appliances, water wheel and governor, etc. The plant is giving continuous service. Owing to increasing business, it is contemplated installing another unit and a 30 inch Sampson wheel of the horizontal type.

Hydro-Electric Development at Boelus, under application 1373—Central Power Co. The hydro-electric development consists of a diversion dam across the Middle Loup River, a canal three miles in length with a generating station at the lower end discharging into the South Loup River. The resultant head at the power house is 30 feet which with the minimum flow of the Middle Loup River makes possible the development of 2500 K. V. A.

The dam is a concrete structure built on piling. It is 50 feet in height from bottom of concrete foundation to top of concrete crest. It is set 8 feet below normal river level and therefore raises the normal level 2 feet on the upper side of the dam. On the top of the concrete portion is three feet of flash board. The normal river level is therefore raised 5 feet by the dam when the flash boards are in place. The piling under the dam are steel sheeting 40 feet long making a complete cut-off wall under the crest. Under the apron are round piling 40 feet long spaced 10 feet center to center and a further cut-off wall 10 feet from the down stream edge of 30 feet wakefield piling. The dam is 523 feet long over all and out of this is a sluiceway on the south end of 62 feet consisting of four openings. Two of these have steel gates with hand operated racks and the two nearest the spillway are fitted with stop logs. The spillway extends 43 feet with the river and is protected from underwash by the steel sheeting. On the north end of the dam is an earth fill 3000 feet long protected for 700 feet by steel sheet piling driven in line with that under the concrete portion. This fill is 20 feet wide on top with 3 to 1 slopes on the up stream side and 2 to 1 on the down stream side. It is paved with rip-rap where the wash strikes it on the up-stream side.

On the south end and at right angles to the spillway are the headgates which are controlled by stop logs. There are 5 gates, each opening being 11 feet wide by 9 feet high and protected by trash racks which also are arranged that they act as ice guards. Over the headgates and sluice way are concrete walks from 8 feet to 10 feet wide with hand rails and openings for handling stop logs and on which the gate rigging is mounted.

The water on leaving the headgates passes into the canal which is 30 feet wide on the bottom with 2½ to 1 slopes for the first half mile and 2 to 1 slopes from there on. The canal carries 10 feet of water and has a fall of 3 feet in the three miles of length. For some 10,000 feet is necessary to build dikes in order to provide sufficient margin for the required depth, the minimum cut being 5 feet while on the other hand the deepest cut is approximately 22 feet. The material thru which the canal passes is, for the first half mile a fine sand, for the rest of the length it is almost entirely yellow clay. The total yardage is about 400,000 cubic yards. At the lower end the canal widens into a small forebay about 500 feet wide by 1,000 feet long.

The power house which is built largely of re-inforced concrete is in two distinct parts. The part nearest the South Loup River which houses the generators and electrical equipment, is 46 feet wide facing the river, and 30 feet deep towards the canal. The discharge flumes from the wheels pass under this portion. These flumes being 20 feet wide each and some 20 feet deep, about 13 feet being below river level; a re-inforced concrete floor covers these flumes and above this are concrete beams and columns carrying a concrete roof.

The sidewalks are of brick 8 inches thick, and steel factory sash. The wall nearest the canal is solid concrete 3 feet thick and forms a bulkhead to hold back the water in the wheel pits. The shafts of the turbines pass through this wall to the generators which are direct coupled.

The other portion of the building which, as has been indicated, is on the canal side, consists of two flumes or wheel pits each 20 feet wide, 50 feet long, and varying in depth from 18 to 25 feet. In each flume is mounted a turbine of the horizontal type, and the discharge from the turbine is carried through the floor into a draft tube which is 10 feet in diameter, where it leaves the wheels and curving at right angles discharges horizontally into the discharge flumes under the generator portion of the power house through openings 20 feet wide and 11 feet high. The walls of the wheel pits, which are of re-inforced concrete are two feet thick at the base and batter to 9 inches at the top. Across the flumes is a concrete bridge capable of carrying a 20 ton roller, and the trash racks and stop logs for the flumes are on the canal side of this bridge. Water from the canal is received through a flume which is 60 feet wide and 16 feet deep on the canal side, with battered sides and bottom to join the wheel flumes. The length of this auxiliary portion is 20 feet, making the total length of the powerhouse 100 feet.

The wheels as previously stated are horizontal, 42 inches in diameter and are mounted two on a shaft. Each wheel is capable of developing 1,500 horse power when passing 630 cubic feet of water per minute and turning 180 R. P. M. This will develop 1,250 K. V. A. on each generator or a total of 2,500 K. V. A. for the plant. Each unit carries its own exciter direct connected and besides there is a 50 K. W. moter driven exciter sufficient to excite both generators. The wheels are controlled by oil pressure governors of 15,000 feet pounds capacity.

In the generator room is also placed three 750 K. V. A. 2,300 to 33,000 volt water cooled transformers. These stop the power from generator voltage to high line voltage. All connections between generators, switchboard and transformers are lead covered cables carried in the floor in 3½ inch Orangeburg Conduit. Some of these cables are so large it was found necessary to run two sets in order to get a size that could be easily handled. The 33,000 volt lines are carried out of the building through roof bushings. From the bushings they pass through choke coils and airbreak switches to the line; the coils, switch and electrolitic arrester being mounted on the roof.

The switchboard consists of seven panels among which are (besides the ordinary generator panels) the high line control panel, and a control panel for the auxiliary plant which will be built on the South Loup River below the main power house, and the small feeder panels. Where the auxiliary plant is to be located a 10 foot fall is available by making an 800 foot cut through a bend in the river and a 500 K. V. A. unit will be installed to take advantage of this. It will be floated on the line without a governor or a special attendant. Making the cut mentioned will take the South Loup about a half mile from the power house and will relieve it of all difficulties due to flood waters in the tail race and this is the principal reason for making this part of the development.

The outgoing lines from the station are the 33,000 volt line to the steam plant at Grand Island; the 2,300 volt line to the auxiliary plant, a 2,300 volt line to Boelus and also to the 6,600 volt outside substation which is located just east of the building. This consists of three 50 K. V. A. 2,300 to 6,600 volt transformers and from this sub-station to the 6,600 volt transmission line goes east to Dannebrog and St. Paul.

The hydro-plant is of such capacity as to be admirably suited to the territory it is to serve, being centrally located in a growing country and the waterpower should soon be loaded to full capacity for a considerable portion of the time, the peaks being carried by the steam plant.

Cambridge Water Power Development (D92-93). This development is located on Medicine Creek at Cambridge, Nebraska, and develops approximately 100 horse power, with a fourteen foot head, and is used to operate the Cambridge Mill.

Hydro-Electric Development at Valentine, under application 652 was approved November 13, 1902, and completed in the summer of 1916. They are building a distributing system for the sale of electricity for light and power in the City of Valentine. Two hundred and seventy horse power is now installed, but they have sufficient water to develop 1,000 horse power at the present head, when they find market for same. This development is located on the Niobrara River.

Kearney Water & Electric Power Development (D-1023). Located on the Platte River. This Company has a right to 140 second feet of water, which is diverted from the Platte River about three miles southeast of Elm Creek and returns the water near Kearney. This plant has been in operation for a long period of time for power, being used at one time to operate a cotton mill and has been furnishing current to the city of Kearney since about 1886. This canal is approximately twenty-four miles long and is operated throughout the entire year. Within the past year the Company has reconstructed the plant, installing new water turbine and generator, also steam turbine auxiliary at a cost of about $65,000.

Arapahoe Development (D-1029). Republican River. This development was first started in 1879 and enlarged from time to time, until it now furnishes power to operate a mill of 100 barrel capacity.

Shell Creek Development (D-292). This development is located at Columbus, and operates a flour mill; also pumps water to irrigate 25 acres of land. Total power generated is 74 horse power, which is practically steady the entire season.

Blue Mills Power Development (D-995). This development is located on Wood River, at Kearney, Nebraska. The dam is 84 feet long, with 12 foot head; 70 foot flume from dam to the turbine wheels, which carries the entire flow of the stream.

On the following pages is a tabulated list of all appropriations on record in this office relating to water power developments, some of which have been granted, others upon which final certificates have been issued, and others now pending before the State Board of Irrigation.

LOUP RIVER DRAINAGE AREA

No.	SOURCE	Sec. feet Granted	Head	Theo. H. P.	Date of Comp.	REMARKS
D 219	South Loup River	20	4.5	10	1895	
D 292	Shell Creek	30.5	15	52	1897	Flour mill in operation
D 988	South Loup River		9	85	1890	Grist mill—pending
D 999	Mud Creek		12	74	1889	Flour mill in operation—p'd'g
D 1024	Middle Loup River		11	250	1886	Power plant in op'tion—p'd'g
D 1037	Beaver Creek		13	121	1896	Flour mill in operation—p'd'g
D 1042	Muddy Creek		12	934	1890	Flour mill in operation—p'd'g
A 636	Cedar River	200	12	273	1902	Fullerton Light Plant
A 639	Beaver Creek	67	9	69	1902	Albion Light Plant
A 709	Loup River	2700	110	33800	1912	In operation
A 1029	Loup River	3200				Same as A 709—pending
A 1058	Beaver River	134	7.5	114	1912	St. Edwards Light Plant
A 1185	Middle Loup River	124	6	81	1913	Grist mill and light plant
A 1187	Loup River	2000	66	15000	1915	Not completed
A 1216	Middle Loup River	2000	5	100	1913	Power plant in operation
A 1224	Middle Loup River	400	11	500	1914	Hydro-electric plant and mill
A 1234	Middle Loup River	500	17	966	1914	Hydro-electric plant
A 1373	Middle Loup River	1000	27	3068		Power plant in operation
A 1400	South Loup River	840	7	670	1916	Not in operation
A 1415	Cedar River	175	12.5	250	1916	Ericson Lake Co.
A 1418	Beaver Creek	125	7	100	1916	Hydro-electric plant
A 1460	South Loup River		10	100	1916	Pending

PLATTE RIVER DRAINAGE AREA

No.	SOURCE	Sec. feet Granted	Head	Theo. H. P.	Date of Comp.	REMARKS
D 645a	Platte River	200	45	1022	1891	Good condition
D 683	South Platte River	30				Never built
D 993	Wood River	40	10	46	1873	Flour mill
D 994	Wood River	40	11.5	52	1873	Flour mill in operation
D 995	Wood River	25	13	38	1881	Flour mill in operation
D 1023	Platte River	140	60	954	1882	Kearney Electric Light Plant
A 40	Platte River	2500	150	42600	1906	Not in use
A 894	Platte River	2000	150	34100	1915	Same as A 40
A 545a	Wood River	10	4	5	1901	Pumping plant for garden
A 855	Pumpkinseed Creek	25	8	23	1908	Mill
A 970	Platte River	2500	70	19900	1913	Under construction
A 1009	Blue Creek	63	10	71	1913	Flour and feed mill
A 1050	Winters Creek		60	6820		Pending
A 1215	Spotted Tail Creek	10	10	13	1913	Hydro-elect. plant, rep. same
A 1217	Sheep Creek	70	12	96	1913	Never built
A 1379	Platte River	2000	17	3862		Hydro-electric plant
A 1451	Platte River		15	5000	1919	Pending
A 1452	North Platte River	250	75	2130	1920	Gering hydro-electric plant

ELKHORN RIVER AND TRIBUTARIES

No.	SOURCE	Sec. feet Granted	Head	Theo. H. P.	Date of Comp.	REMARKS
D 271	Elkhorn River	39	7	31	1883	Atkinson light plt., also mill'g
D 996	North Elkhorn River	100	13	148	1870	Cereal mill & generat'g current
D 998	Union & Taylor		14	119		Pend'g, flour mill in operation
A 464	S. Fork Elkhorn	33	8	30	1900	In operation. Flour mill
A 484	Battle Creek	11	12	15	1906	Mills, in operation
A 818	Battle Creek	20	13	30	1907	Flour mill in operation
A 971	Elkhorn River	500	70	3980	1913	Under construction
A 1250	Elkhorn River	400	22	1000	1915	Power plant

NIOBRARA RIVER DRAINAGE AREA

No.	SOURCE	Sec. feet Granted	Head	Theo. H. P.	Date of Comp.	REMARKS
D 415	Pine Creek	32	14	50	1893	Flour mill
D 442	Niobrara River	10	18	20	1893	Flour and feed mill
D 608a	Crooked Creek	3			1889	Mill
D 610	Niobrara River	60	5	31	1886	Flour and saw mill
D 612a	Fairfield Creek	25	7	20	1893	Feed and saw mill
D 970	Niobrara River	35	11	44	1893	Flour and meal mill
A 359	Minnechaduza Creek	35	29	114	1901	Mill in use, certificate issued
A 452	Niobrara River	150			1901	Pumping & running mach.
A 474	Niobrara River	15			1901	
A 652	Niobrara River	1600	50	9090	1907	In operation
A 685	Big Sandy Creek	35	15	60	1903	Flour mill
A 729	Keya Paha River	100	5	57	1905	Roller mills
A 941	Long Pine Creek	48	18	99	1912	Light plant in operation
A 947	Plum Creek	150	30	511	1910	Ainsw'th light plt., in op'tion
A 961	Niobrara River	900	50	5110	1912	Not completed
A 1019	Niobrara River	700	50	3980	1912	Not completed
A 1243	Niobrara River	900	98	10023	1915	Not completed
A 1279	Minnechaduza Creek	40	30	150	1914	Valentine light plant
A 1352	Snake Creek	180	44	900		Power plant
A 1391	Long Pine Creek	88	30	1363	1916	

BIG BLUE RIVER DRAINAGE AREA

No.	SOURCE	Sec. feet Granted	Head	Theo. H. P.	Date of Comp.	REMARKS
D 963	Beaver Creek	40	10	46	1878	Mill and manufacturing
D 990	Turkey Creek		17	35	1870	Flour mill—pending
D 1021	Big Blue River	500	12	782	1882	Light plant at Holmesville
D 1044	Big Blue River					Milford Mills—pending
A 1006	Big Blue River	200	18	409	1911	Power plant in operation
A 1095	Big Blue River					To raise Holmesv'e dam--p'd'g
A 1135	Big Blue River	41	8	30	1912	Electric light plant
A 1153	W. Fork, Big Blue	100	12	135	1913	In operation
A 1261	Big Blue River		12	272		Pending
A 1262	Big Blue River	500	15	838		Under construction
A 1265	W. Fork, Big Blue	100	13	147	1915	Under construction
A 1416	Big Blue River	125	14	199	1916	Power Station No. 4
A 1417	Big Blue River	100	15	170	1916	Power Station No. 2
A 1421	Big Blue River	120	18	245	1916	Power Station No. 1
A 1422	Big Blue River	175	15	298	1916	Power Station No. 3
A 1423	Big Blue River		13	295		Pending—Power Station No. 6
A 1430	Blue R. and Sch. Ck.		4	32	1916	Pending—B. R. Amusem't P'k
A 1464	Big Blue River		12	409		Pending
A 1410	Little Blue River	150	13	290	1916	Lyons Little Blue Electric Co.
A 1462	Little Blue River		17	290	1916	Pending
A 1463	Big Blue River		18	200	1918	Pending
A 1467	Little Blue River	150	14	200		In operation

LEXINGTON STATE AID BRIDGE, NORTH PLATTE RIVER, 1916
TWENTY-FIVE, 35-FT. 6-IN. CONCRETE GIRDERS

REPUBLICAN RIVER DRAINAGE AREA

No.	SOURCE	Sec. feet Granted	Head	Theo. H. P.	Date of Comp.	REMARKS
D 92	Medicine Creek	68	9	80	1878	Flour mill in operation
D 178	Frenchman River	35	12	50	1886	Flour mill in operation
D 179	Frenchman River	29	12	40	1887	Champion mills & mfg.
D 181	Red Willow Creek	....	....	....	......	Abandoned fifteen years ago
D 183	Turkey Creek	....	18	33	1874	Good running order
D 185	Cottonwood Creek	50	30	....	1888	Flour mill in operation Undershot wheel
D 364	Medicine Creek	66	15	112	1888	Flour mill
D 997	Sappa Creek	....	8	37	1887	Flour mill in operation—p'd'g
D 1013	Frenchman River	30	12	35	1887	Flour and feed mill
D 1029	Republican River	196	8	178	1879	Flour mill at Arapahoe
D 1036	Republican River	400	21	1000	1878	Flour mill in operation
D 1043	Republican River					Orleans M. & E. Co.—pending
A 591	Frenchman River	35	8	31	1902	Creamery and factory
A 708	Frenchman River	19	12	26	1904	Pumping plant, abandoned
A 748	Frenchman River	12	12	17	1906	Pumping for irrigation
A 858	Medicine Creek	12	18	24	1907	Flour mill
A 907	Stinking Water	30	8	27	1911	Electric light plant
A 1021	Frenchman River	55	18	113	1914	Electric power in operation
A 1136	Frenchman River	75	14	120	1912	Flour mill in operation & elec.
A 1221	Republican River	300	42	1480	......	Never built
A 1245	Rock Creek	20	30	65	1914	Hydro-electric power
A 1284	Frenchman River	70	2	15	1915	Electric power plant
A 1339	Frenchman River	50	8	50	1914	Pumping plant for irrigation
A 1408	Frenchman River	65	20	270	1914	Same as A1021 for 55 ft. more. Already built

WHITE RIVER DRAINAGE AREA

A 702	White River	18	10	21	1904	Abandoned
A 759	White River	5	10	6	1905	Pump for irrigation
A 854	White River	15	15	26	1908	Abandoned

MISCELLANEOUS DRAINAGE AREA

D 1002	Bazile Creek	....	8	10	......	Creighton mill, pending
A 839	Tekamah Creek	10	20	23	1907	Flour mill
D 914	Bazile Creek	30	12	41	1909	Flour mill at Creighton

RULES OF PROCEDURE

Adopted by

STATE BOARD OF IRRIGATION, HIGHWAYS AND DRAINAGE

Governing Matters Coming Before the Department

CLAIMS

Section 6795, Cobbey's Annotated Statutes of Nebraska for 1911, reads as follows (Same—Determination of priorities.) It shall be the duty of the State Board to make proper arrangements for the determination of priorities of right to use the public waters of the state, and determine the same. The method of determining the priority and amount of appropriation shall be fixed by the said Board."

Filing of Claim Affidavit:—

1. Claimants of the right to the use of public waters of the State of Nebraska for irrigation, power, or other useful purposes, who base their claims upon the law of 1877, upon the law of 1889, or by actual and beneficial use, shall file in the office of the State Engineer, a claim affidavit, which shall be made upon a blank, prepared by the State Engineer, furnished by him free of cost, and filed by him under date of its receipt at his office.

2. This claim shall give the location of the diversion works, the land through which the canal runs, specifically describe the land irrigated, if for irrigation purposes; the location of all dams, flumes, headgates, canals, power house, etc., if for power or other purposes.

The claim shall also set forth the date of beginning construction work, the date of completion, and the time of the application of the water to the beneficial use for which it is claimed.

3. Upon the filing of any such claim affidavit, the State Engineer shall fix a time and place for the holding of a hearing.

Notices:—

Notice of hearing shall be served in the following manner:

1. The State Engineer shall prepare an official notice, setting forth the time and place of the hearing, together with a general description of the rights claimed, and calling upon all interested parties to appear and protect their rights, to be inserted in a local paper of general circulation in the county in which the diversion works or plant of claimant is located, and also in some newspaper of general circulation in the

state published at the State Capitol, which notice shall run for four consecutive weeks in said papers at the expense of the claimant.

2. The State Engineer shall send by registered mail a duly certified copy of the above notice to each water user in the watershed, in which the claim is located, as their names and addresses appear on the records in the State Engineer's office, at least thirty days before the date of said hearing, together with a copy of these rules.

3. Letters so addressed, shall be registered, according to the rules of the postoffice department, with a request for a return card, which card when returned, shall be preserved with the papers in such case.

Hearing:—

1. A hearing shall be held for the purpose of receiving testimony, offered by parties in interest in support of and adverse to the rights claimed and shall be presided over by the State Engineer, or one of his assistants, as he may designate, who shall keep a complete record of the proceedings thereof.

2. All evidence shall be submitted in typewritten or printed form. If oral, it shall be taken down and transcribed at the expense of the claimant or contestant offering the same.

3. Claimants may appear in person or by attorney; but appearance must be made at time and place specified for hearing.

4. If any party to the proceedings shall desire to take the testimony of witnesses residing outside the state, or whose attendance cannot be secured at any of the times and places fixed by the State Engineer, the testimony of such witnesses may be taken by deposition in the same manner and upon the same notice as that required for the taking of depositions in cases pending in the District Court.

5. The State Engineer shall have the power to limit the time for the completion of the taking of the testimony.

6. When the taking of such testimony shall be completed, or the time fixed for the completion thereof shall have expired, the State Engineer shall fix the time for hearing argument upon the evidence taken, and permit interested parties to file briefs.

Opinion:—

1. Upon the receipt of the written testimony, taken at the hearing and any other investigations that the State Engineer may deem necessary to make, and briefs, if presented, there shall be rendered an opinion of facts and of law based upon the evidence presented.

2. Upon the rendition of a decision, the State Engineer shall forward a duly authorized copy of the same by registered mail to all interested parties or their attorneys making an appearance of record in said hearing, as their names and addresses appear upon the records in the

State Engineer's office, together with a copy of these rules. Return registry cards shall be requested and filed with papers in such cases.

Rehearings and Contests:—

1. Any person deeming himself aggrieved by any decision may at any time within thirty days after receipt of such decision file with the State Engineer a petition for a rehearing. Said petition shall set forth the grounds relied upon for a rehearing and be duly verified.

2. In case sufficient reasons are found in the petition, provided for above to grant a rehearing, the petitioner will be notified of the same by the State Engineer.

3. Notices of holding of rehearings shall be given by mail to interested parties or their attorneys appearing of record.

4. The said rehearing shall be held at a time and place designated, and interested parties may file briefs and oral argument may be made and limited to a reasonable time. In general, rules governing the original hearing shall apply to rehearing.

5. A contest against a claimant shall not be heard until after the rendition of a decision on the claim.

APPLICATIONS.

Any application made in accordance with the Irrigation Laws of the State of Nebraska to appropriate any of the public waters of the state shall be acted upon in the following manner:

Blanks:—

1. Applications shall be made on blanks furnished by the State Engineer's office free of charge.

2. All questions shall be fully and carefully answered.

3. A careful drawing on township plat, showing all streams with their names, canals and other improvements should be made; if for irrigation, land to be irrigated must be carefully shaded.

4. If application for permit to irrigate, owners of land should acknowledge their consent to have their lands watered through the allowance of the proposed application before a notary.

Filing Fees:—

1. IRRIGATION—$5 for each 1,000 acres irrigated or fraction thereof.

2. STORAGE—$5 for each 5,000 acre feet or fraction thereof stored.

3. POWER—$5 for each 50 theoretical horsepower or fraction thereof.

Rule on determining theoretical horsepower: The amount of theoretical water horse power upon which fees shall be paid under the provisions of Section 6918 of Cobbey's Annotated Statutes of Nebraska for 1911, shall be computed by multiplying the maximum amount of water claimed or diverted, expressed in cubic feet per second, by the average total fall utilized, expressed in feet, and dividing the product by 8.8.

Filings:—

Upon receipt at the State Engineer's office of an application accompanied by the proper filing fee, the application shall be filed under date received and duly recorded.

Corrections:—

1. Thirty days shall be given after date of filing for the State Engineer to examine an application and if any defect is found therein, to return the same to the applicant for correction with the endorsement of the State Engineer upon the same, as to the corrections desired.

2. If application is returned, corrected within thirty day limit, it shall take priority of original filing.

Action Taken:—

1. The State Board, through the State Engineer, shall approve or dismiss the application according to the results of his investigation of the same as set forth by law.

2. The State Engineer shall return to the applicant by registered mail his application, with the endorsement of the State Engineer thereon, accompanied with a copy of these rules. Registry receipts shall be requested and filed with papers in above case.

3. Upon the receipt of an approved application by the applicant, the applicant shall be duly authorized to begin work of construction.

Work:—

(Prosecution of Construction.) Within six months after the approval of any application for water for irrigation, power or other useful purpose under this act by the State Board of Irrigation the person or persons, corporation or association making such application shall commence the excavation or construction of the works in which it is intended to divert the water, also the actual construction of any water power plant and reservoir or reservoirs for storage in connection therewith, and shall vigorously, diligently and uninterruptedly prosecute such work to completion unless temporarily interrupted by some unavoidable and natural cause, and a failure to comply with this section shall work a forfeiture of the appropriation and all rights thereunder.

Provided further that the cost of promotion and engineering work shall not be considered as a part of the cost of construction, and that the progress of the construction work shall be such that one-tenth of the total work shall have been completed within one year from the date of approval of the application. The applicant shall at the end of six months after the allowance of his application furnished to the State Board a detailed report of the total amount of work necessary to complete the project, which report shall conform to the requirements of the State Engineer, together with satisfactory evidence that the work of construction has been begun.

Provided, also that the construction of all work required in connection with the proposed project shall be prosecuted in the manner above described and with such a force as shall assure the average rate of constructional progress necessary to complete such work or works within the time stipulated in the approval of such application, notwithstanding the ordinary delay and casualities that must be expected and provided against, to assure the completion of the project within a time certain.

Provided further, that in the case of an application for an appropriation granted for the development of water power, it shall be the duty of such grantee, on or before the 10th day of each month after the date fixed for the commencement of such work to report under oath to the State Board of Irrigation the actual amount of money expended upon such power development during the preceding calendar month for right of way and land, labor, salaries, material and machinery, not including construction, equipment delivered upon the ground, and said report shall be made in form, detail and manner prescribed by said Board. A failure to carry on the construction of either an irrigation or water power project, as outlined above, or in the case of a water power development, to fail to file the above reports within the time required, shall work a forfeiture of the appropriation and all rights thereunder and the State Board shall cancel said appropriation within thirty days of such failure.

Provided further, the State Engineer or his assistants shall have free access to all records, books, and papers of any irrigation or water power company and have the right to go upon the right of way and land of any said company, and shall inspect said works to see that it is being done according to plans and specifications approved by the State Engineer's office and shall also keep a record of the cost of construction work where the same is deemed advisable for physical valuation purposes.

Maps:—

Section 6808 of Cobbey's Annotated Statutes for 1911 reads as follows: (May—Plat—Penalty.) Upon approval and allowance of an application, the applicant shall file in the office of the State Board of Irrigation, Highways and Drainage, within six months thereafter, a map or plat, which map or plat shall be made to conform to the rules and regulations of said Board as to material, size and coloring, and upon a scale of not less than two inches to the mile. Such map or plat shall show the source from which the proposed appropriation is to be taken, and all proposed dams, dykes, reservoirs, canals, power houses and any other structures for the purpose of storing, conveying or using water for any purpose whatsoever under the irrigation law of this state, and their true courses or positions in connection with the boundary lines and corners of lands which they occupy, and when lands are listed for irrigation, such lands must be shown in government subdivisions, or fractions thereof, as the case may be, and no rights shall be deemed to have been acquired until this section of the statutes shall have been complied with, and a failure to comply with this section shall work a forfeiture of the appropriation and all rights thereunder.

2. (1) All maps filed to comply with the above law, must be on tracing cloth 14 inches wide and 16 inches long, with a one inch margin on the top, bottom and right hand end, and a 3 inch margin on the left hand end for binding. Where the whole area cannot be shown on one sheet, additional sheets must be used, each sheet representing a township, until the whole area is covered.

(2) Short ditches and small areas must be made on a scale of 4, 6 or 8 inches to the mile, where, by using such scale, the area of the map will not exceed 12 inches square. In all other cases, where this cannot be done and where larger areas are to be shown, a scale of 2 inches to the mile is to be used.

(3) The position of the headgate must be indicated by some tie to a government section or quarter section corner, giving the course and distance therefrom. The course of the ditch or canal must also be shown.

(4) At intersections of section lines the distance from the nearest government corner to the center line of the ditch must be given in feet and where the land reclaimed is fractional, the fractional area to be irrigated, of each quarter-quarter section must be marked on plat in acres.

(5) The center line of the proposed canal must be in red. Any other canals and all streams and drains must be in medium blue. The area proposed to be irrigated must be carefully shaded in light red. If topography is shown by contour lines, such lines must be in burnt sienna. All other matter, such as hatching, land lines, lettering, figures, etc., must be in black.

(6) All maps must be made from actual measurements on the ground and properly certified by some competent engineer or surveyor.

(7) The presumption of the law is, that after a permit is allowed, it will require not more than six months to make the proper surveys, get the necessary information and construct and file required map.

(8) The following certificates must be printed upon the first sheet properly filled out and signed.

State of Nebraska
..............................County } ss.

I hereby certify that the survey of..............................
was made under my direction, and is accurately represented on this map consisting of.............. sheets.

....
Engineer (or Surveyor)

Dated..............................19.......

State of Nebraska
..............................County } ss

I hereby certify that this map consisting of.............................. sheets was made with my full knowledge and consent, and at my request, and correctly shows the location and course of the distributing works, the source from which the appropriation is taken, and the legal subdivisions of the land upon which the water appropriated is to be applied, as shown by Application No...................., filed in the office of the State Board of Irrigation on the......................day of..............................

Dated..............................19.......

(9) If the appropriation is for any purpose other than irrigation, this certificate must be so worded as to agree with the facts.

(10) At the time an application is filed, a preliminary map is to be made upon the township plats accompanying the blanks furnished by this office, and which is made a part of the application, and the applicant should follow out the foregoing instructions as to color and shading and such other matter as is possible to gather and place upon a preliminary map. This map must contain sufficient data upon which to base an opinion in handling the application."

Contests and Hearings:—

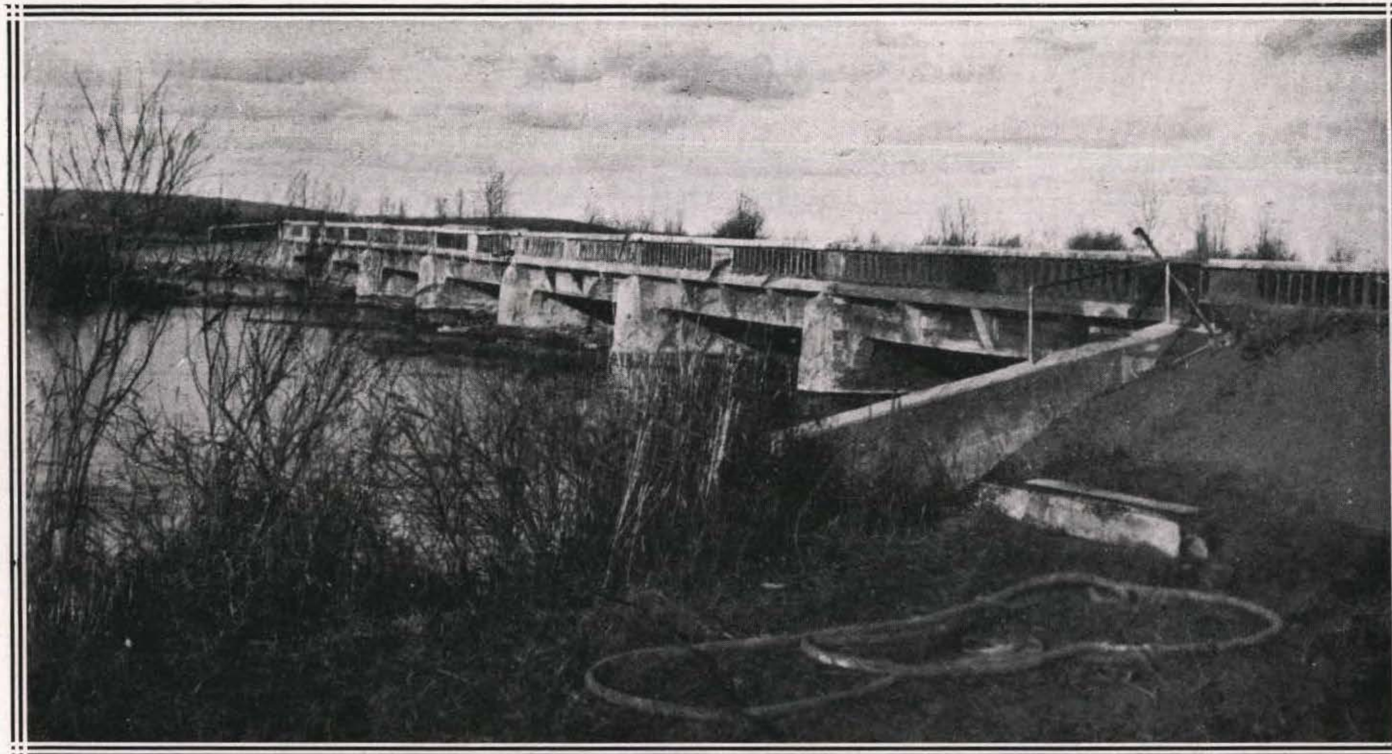
1. Any person deeming himself aggrieved by any decision may at any time within thirty days after the receipt of such decision, file with the State Engineer a petition for a hearing. Said petition shall set forth the grounds relied upon for such hearing and must be duly verfied.

2. In case sufficient reasons are found in the petition, provided for above, to grant a hearing, the time and place for holding the same shall be set and notices of the same shall be given interested parties by registered mail by the State Engineer thirty days in advance of the holding of said hearing.

3. Interested parties may file with the State Engineer a brief, and also appear in person to introduce evidence and make oral argument.

4. A duly verified copy of a final decision shall be sent to all interested parties making an appearance, by registered mail by the State Engineer.

ST. PAUL STATE AID BRIDGE, LOUP RIVER, 1916
FIVE 145-FT. TRUSSES, ONE 20-FT. APPROACH



SUTHERLAND STATE AID BRIDGE, SOUTH PLATTE RIVER, 1917. TWO BRIDGES OF SEVEN 36-FT CONCRETE GIRDERS EACH

5. After the allowance of an application, contests may be brought by any interested party to show that the applicant has not faithfully complied with the Irrigation Laws of this state, or that the proposed project is a detriment to the public welfare.

6. An applicant feeling himself aggrieved by the opinion rendered by the State Board in the hearing had, may institute proceeding in the Supreme Court of Nebraska to reverse, vacate or modify the order complained of, the procedure to obtain such reversal, vacation or modification of any such decision or order made and adopted upon which a hearing has been had before said Board, shall be governed by the same provisions now in force with reference to appeals and error proceedings from the district court to the Supreme Court of Nebraska. The evidence presented before the Board as reported by its official stenographer and reduced to writing, shall be duly certified to by said stenographer and the chairman of the State Board as the true bill of exceptions, which, together with the pleadings and filings duly certified in said case under the seal of the State Board shall constitute the complete record, and the evidence upon which the case shall be presented to the appellate court, provided, however, that the time for appeal from the orders and rulings of said Board to the Supreme Court shall be limited to sixty days.

DAMS

Plans and specifications of dams and petitions for approval of same. (Dam: reservoir.) Any person, corporation or association hereafter intending to construct any dam for reservoir purposes or across the channel of any running stream, shall before beginning such construction, submit the plan of the same to the State Board of Irrigation, Highways and Drainage for their examination and approval, and no dam shall be constructed until the same shall have been approved by such board. Any person constructing such a dam across the channel of any running stream without having obtained the consent and approval of the State Board therefor, shall be guilty of a misdemeanor and upon conviction thereof, shall be fined in any sum not exceeding $100 and stand committed until the fines and costs are paid, and for every day that such dam so unlawfully constructed is maintained, it shall be considered as a new offense and as a new violation of the provision hereof and it shall be the duty of the secretary of the State Board to cause the provisions of this act to be strictly enforced.

Drawings:—

The drawings representing the plan of a proposed dam should be made with a good quality of India ink upon sheets of tracing cloth 14 inches wide and 16 inches long with a 3 inch margin on the left hand end for binding (but extra lengths not to exceed 30 inches, are allowable if necessary) as many such sheets to be used as requirements demand. These drawings must be numbered and given a proper title. They must include:

1. A map of the site showing the position of the dam, the meanders of the stream and the flow line boundaries of the reservoir, all properly connected to land lines and government corners, also the surface area of the reservoir and the cubic contents in acre feet.

2. A cross section of the stream where the dam is to be built, showing the surface of the ground in profile with a sufficient number of soundings to indicate the underlying formation, the elevation of the dam and spillway, the surface of the impounded water and such openings or conduits through the dam as are contemplated.

3. A sketch of the dam in plan, or as viewed from above, outlining the top and slope lines of the dam, the water line, spillways, side walls, buttresses, etc.

4. Cross sections of the dam at several points such as will show the mechanical construction of the different parts.

5. Specifications must accompany the drawings, explaining them and setting forth the material to be used and the methods of construction in clear, plain and unmistakable terms.

6. Drawings must be certified to by some competent engineer and also by applicant with a certificate of the general form of the one set forth under maps of application.

Petition for Approval:—

Following is a general form of petition for approval of plans which can be varied according to requirements. This petition should show whether the petitioner is an individual, a partnership, or a corporation and by what authority the waters of the State of Nebraska are appropriated.

BEFORE THE STATE BOARD OF IRRIGATION, HIGHWAYS AND DRAINAGE

In the matter of the Petition for Approval of plans for the Construction of a proposed dam under application No........... made by .... to appropriate the waters of the state of Nebraska for..............................

To the Honorable State Board of Irrigation, Highways and Drainage:

Comes now your petitioner..and states:

1. That he is the original applicant for the appropriation of water from.................................. in the ....¼..................¼........................ of Section ............................T........................N., R.................................. in County, Nebraska, under Application No....................., filed in your office ....19........, and approved..19........

2. That in order to carry out, perfect and consummate the object of said appropriation, it is necessary to construct a dam across said ....to a height of more than ten feet, and according to the laws of the State of Nebraska, in such cases made and provided a plan of such proposed dam must be submitted to the State Board for their examination and approval, which approval must be obtained before such proposed dam can be constructed.

3. That your petitioner has employed engineers to make proper soundings and other measurements at the site of the proposed dam and to make plans and specifications for the proper construction of the same, which specifications are submitted herewith with plans marked: Sheet No. 1, General Map; Sheet No. 2, Cross Section of dam site, showing borings; Sheet No. 3, General drawings of dam; Sheet No. 4, Details of Dam with cross sections; Sheet No. 5, Details and location of power house; each of said sheets being also marked ".." and each of said sheets, with the specifications being made a part of this petition.

Wherefore your petitioner prays that said plans and specifications as above described and as submitted herewith be approved and that such order be made by this Board as shall be just and equitable to this petitioner.

....

State of Nebraska. } ss.
....County }

....being first duly sworn upon his oath says that he is the original applicant for an appropriation of water under Application No..........................and that the matters and facts set forth in the foregoing petition are true as he verily believes.

....

Subscribed in my presence and sworn to before me this........................ ....day of ....19........

....
Notary Public.

In cases where the petitioner is a corporation and in cases where transfers have been made, the following forms of statements are suggested, but in all cases the facts must be shown, and the petition verified to correspond:

"Comes now your petitioner.. and states that it is a corporation duly organized and existing under and by virtue of the laws of the State of Nebraska, being organized for the purpose of..."

"That on the..................................day of... filed in your office Application No................, for a permit to appropriate the waters of the state of Nebraska, which application was on the ....day of.. approved by this Board

"That on the..........................day of..said ....assigned to this petitioner all of his rights and privileges under said permit, and that this petitioner then undertook to fulfill the conditions necessary to complete the appropriation contemplated under said permit."

Where the petitioner is a partnership, the statement should read:

"Comes now your petitioners.. and state that they are a partnership doing business under the name and style of..."

Action:—

1. Upon receipt of plans of a dam and petition for approval of the same, they shall be filed under date of arrival and the plans shall be given an official number for filing purposes.

2. The State Engineer may require more complete data than that shown upon plans and specifications or may require changes in the same as in his judgment is best and shall have the right to return plans and specifications for corrections.

3. If at the discretion of the State Engineer, or upon request of any person, he deem it necessary, a personal inspection shall be made of the proposed dam site.

4. The State Engineer shall first act on the plans and specifications for a dam, which action shall be subject to the approval of the State Board.

5. In approving plans of a dam of any kind the right is always reserved by the State Engineer to inspect said work while being built and order any changes he may deem necessary. Also after a dam is built, he may order changes or repairs as he may deem proper for public safety.

Contests and Hearings:—

1. Any person deeming himself aggrieved by any decision may at any time within thirty days after the receipt of such decision file with the State Engineer a petition for a hearing. Said petition shall set forth the grounds relied upon for such hearing and must be duly verified.

2. In case sufficient reasons are found in the petition provided for above to grant a hearing, the time and place for holding the same shall be set, and notices of the same shall be given interested parties by registered mail by the State Engineer fifteen days in advance of the holding of said hearing.

3. Interested parties may file with the State Engineer a brief and also appear in person to introduce evidence and make oral argument.

4. A duly verified copy of a final decision shall be sent to all interested parties by registered mail by the State Engineer.

5. After the approval of dam plans, contests may be brought by any interested party to show that the applicant has not faithfully complied with the Irrigation Laws of the State or that the proposed dam is a detriment to the public welfare.

Fees:—

1. For examination of plans for any proposed dam, fifty cents for each foot in height and actual expenses while visiting and examining the site thereof.

2. The height of a dam shall be measured from the deepest part of the foundations to the crest or top of the dam.

3. Piling of any sort shall be considered as part of the foundations.

PETITIONS

Petitions for extension of time in which to complete work:

Following is a general form of petition for extension of time which can be varied according to requirements. This petition should state whether the petitioner is an individual, a partnership or a corporation and by what authority the waters of the State of Nebraska are appropriated and all transfers of title if any.

Form for Petition for Extension of Time:

BEFORE THE STATE BOARD OF IRRIGATION, HIGHWAYS AND DRAINAGE.

In the Matter of the petition for an extension of time in which to complete work under Application No.................. made by.................................. ....for a permit to appropriate the waters of the State of Nebraska.

To the Honorable State Board of Irrigation, Highways and Drainage:

Comes now your petitioner.. and states:

1. That he is the original applicant for an appropriation of water from..in the ....¼..........................¼ of Section................................, T..............................N, R.............................,in ....County, Nebraska, under application No................. filed in your office...and approved...............................

2. Your petitioner represents that he has used due diligence in the prosecution of the work of construction required to complete the ditch, and other work by the time required. (State reasons for cause of delay, which reasons must constitute good and sufficient grounds upon which to base an extension of time.)

3. Your petitioner represents that notwithstanding the foregoing hindrances and embarrassments, the causes of delay are now removed, and he is now ready, willing and able to complete said work of construction and the application of water by... 19........

Wherefore your petitioner prays that the time for completing said canal under said permit granted under Application No............................. be extended for a period of at least... from and after..or until................................, 19....... and the date for the application of water to beneficial use be fixed not earlier than..., 19........, and that such order be made by this Board as shall be just and equitable to this petitioner.

State of Nebraska, ...County, ss.

....being first duly sworn on his oath states that he is the original applicant under Application No.................................... for the appropriation of waters of the State of Nebraska; that he has read the above and foregoing petition and knows the contents thereof and that the facts therein set forth are true, as he verily believes.

Subscribed in my presence and sworn to before me this........................ ....day of.., 19........

....

Notary Public.

Action:—

1. Upon receipt at the State Engineer's Office, the petition shall be filed under date of arrival and shall be acted upon by the State Board through the State Engineer.

Hearing:—

1. Any person deeming himself aggrieved by any decision may at any time within thirty days after the receipt of such decision file with the State Engineer a petition for a hearing. Said petition shall set forth the grounds relied upon for such hearing and must be duly verified.

2. In case sufficient reasons are found in the petition provided for above to grant a hearing, the time and place for holding the same shall be set, and notices of the same given interested parties by registered mail by the State Engineer thirty days in advance of the holding of said hearing.

3. Interested parties may file with the State Engineer a brief, and also appear in person to introduce evidence and make oral argument.

4. A duly verified copy of a final decision shall be sent to all interested parties by registered mail by the State Engineer.

Fee:—

A filing fee of fifty cents shall be charged for filing of above petition.

CONTESTS

General Rules:—

1. Any party desiring to contest a claim shall file with the State Engineer a written notice of contest and petition setting forth the grounds therefor, together with a verified proof of service of notice and petition upon the opposite party. Within fifteen days from the date of service of said notice and petition, the contestee shall file with the State Engineer his answer thereto, if any he desires to make, together with a verified proof of service of a copy of said answer upon the contestant, who shall then have ten days from the date of service of same in which to file with the said Engineer a reply; provided, however, that the State Engineer may extend the time for answer and reply upon good cause shown.

2. Where the contestee is a non-resident or cannot be found within the state, then the said contestant shall file with the State Engineer in lieu of said verified proof of service of notice of contest and petition, an affidavit setting forth the fact, that service cannot be made in the State, whereupon the State Engineer shall designate some newspaper published at the county seat of the county within which the original notice of appropriation was filed, in which newspaper shall be published for four consecutive weeks, a notice setting forth the following facts: (a) That such contest has been instituted, together with the name and address of the contestant or his attorney of record; (b) the name of the claimant and the name of the stream from which the contested appropriation is claimed, together with the location of the point of diversion of such appropriation; (c) that a notice of contest and petition stating the grounds therefor are on file with the State Engineer; (d) the date upon or before which the answer must be filed by the contestee, which date shall not be earlier than ten days from the last date of publication of notice.

3. On or before the date set for the filing of the contestee's answer, said non-resident or absent contestee shall file the same with the State Engineer, together with a verified proof of service of a copy thereof upon the contestant or his attorney of record.

4. The said petition stating grounds of contest and answer thereto shall be verified.

5. Service upon corporations may be made upon the same officers and in the same manner as provided in the case of a summons issued by a court of law.

6. Proof of publication of the above notice shall be filed with the State Engineer on or before the date set for the filing of the contestee's answer.

7. When the issues have thus been made up, the State Engineer shall set a date and place for taking testimony and the hearing of the cause and each party thereto shall be notified thereof by registered mail.

8. At the time and place designated for hearing, each party shall produce his evidence, the contestant opening and closing.

9. Continuances may be granted at the discretion of the State Engineer to either party at or before the time for hearing upon good cause shown.

10. The testimony offered may be oral or by deposition. If oral, it should be taken down by a stenographer and transcribed at the expense of the party offering the same, except in case of cross examination, the expense of which shall be borne by the opposite party; the stenographer to receive legal rate per folio therefor, payable at the time such evidence is offered. Depositions submitted must have been taken in accordance with the rules in a court of law.

11. Copies of decisions in matters of contests shall be mailed to parties in interest.

12. If the postoffice address of any person is unknown, then the decision shall be mailed to said claimant in care of the County Clerk of the County within which the claim is located.

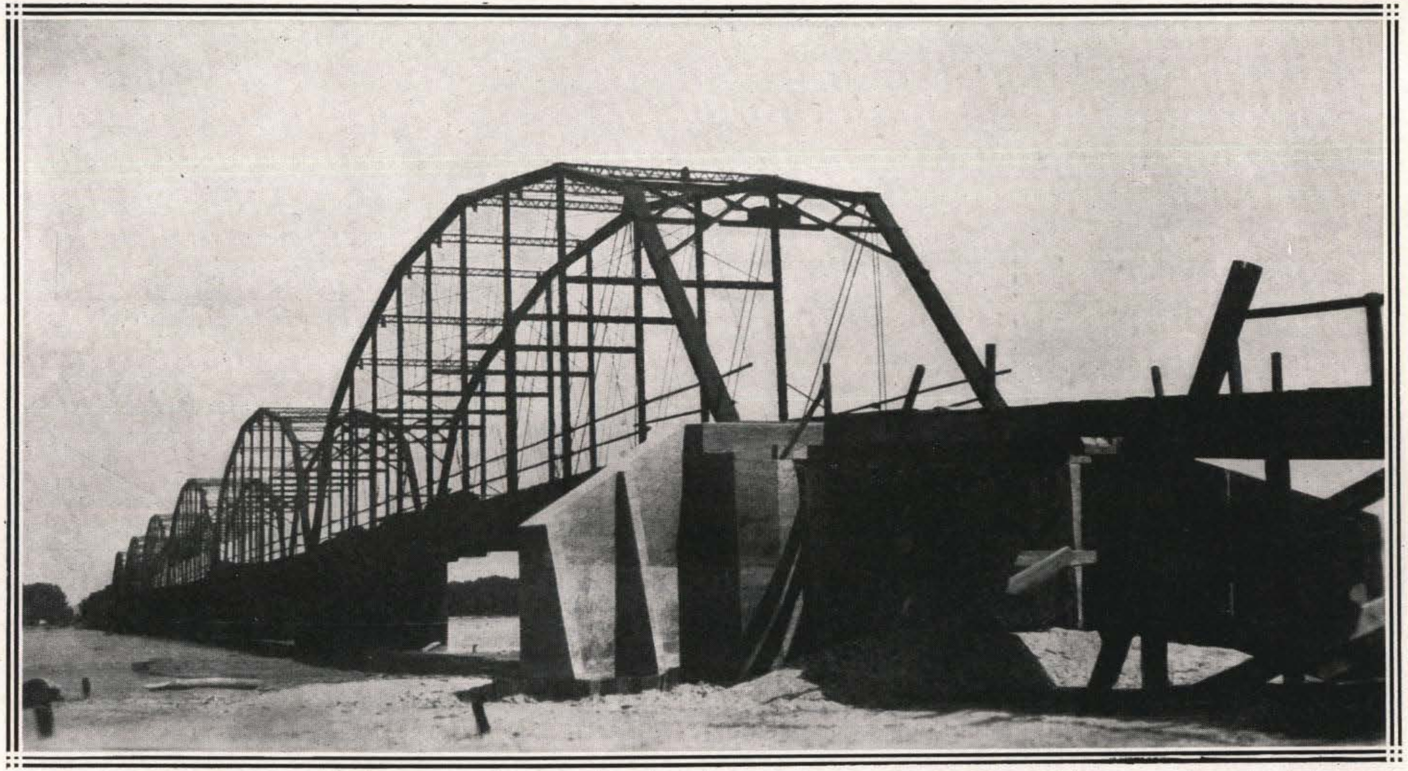
Rehearing:—

1. Any person deeming himself aggrieved by any decision, may at any time within thirty days after receipt of such decision file with the State Engineer a petition for a rehearing. Said petition shall set forth the grounds relied upon for a rehearing and be duly verified.

2. In case sufficient reasons are found in the petition provided for above, to grant rehearing, the petitioner shall be notified of the same by the State Engineer.

3. Interested parties may file with the State Engineer a brief and also appear in person to introduce evidence and make oral argument.

4. In general, the case shall be made up and be controlled by the rules governing contests.



SCHUYLER STATE AID BRIDGE, PLATTE RIVER. UNDER CONSTRUCTION
ADDITION OF FOUR 175-FT. TRUSSES AND OTHER REPAIRS

STATE AID BRIDGES.

Name	County	River
Superior	Nuckolls	Republican
North Platte	Lincoln	North Platte
St. Paul	Howard	Middle Loup
Gretna	Sarpy	Elkhorn
Schuyler	Colfax and Butler	Platte
South Platte	Lincoln	South Platte
Parshall	Boyd and Holt	Niobrara
Kearney	Buffalo and Kearney	Platte
Red Bird	Boyd and Holt	Niobrara

BIDS ON SUPERIOR STATE AID BRIDGE

Received at Nelson, Nebr., March 3, 1915

BIDDERS	Leonard, Wilson Engineering Co. Lincoln, Neb.	Midland Bridge Co. Kansas City, Mo.	Ward & Weighton Sioux City, Iowa	Lincoln Construction Co. Lincoln, Neb.	Elkhorn Construction Co. Fremont, Neb.	N. M. Stark & Co. Des Moines, Iowa	Omaha Structural Steel Works Omaha, Neb.	Standard Bridge Co. Omaha, Neb.
Reinforced concrete arch bridge, 16-ft. roadway—complete	$17980.00	$21517.00	$13000.00	$16890.00	$21340.00	$19130.00	$21300.00	$19800.00
Earth work in fills, per cubic yard	0.295	0.55	0.25	0.40	....	....	....	....
Surfacing on fills and bridge, per cubic yard	1.00	3.30	1.10	0.60	....	....	....	....
Extra plain concrete, per cubic yard in place	15.00	17.05	13.75	14.50	14.00	10.00	Add. 20.00 Deduct 9.00	15.00
Extra reinforcing steel, per pound in place	0.035	0.04	0.03	0.035	0.035	0.021	0.035	0.035
Extra Wakefield piling, per lin. ft. in place	0.70	0.44	0.35	0.90	1.90	0.50	0.65	0.50
Extra round piling, per lin. ft. in place	0.45	0.50	0.57	0.50	0.60	0.40	0.55	0.50
Extra 9-in. steel sheet piling, per sq. ft. in place	0.90	0.83	0.75	1.00	1.50	0.60	1.50	1.00
Added to estimate (royalty on patent)	10%	10%	0.00	10%	10%	10%	10%	10%

Contract let to Ward & Weighton.

	Canton Bridge Co. Canton, Ohio	Western Bridge Co. Omaha, Neb.	Midland Bridge Co. Kansas City	Monarch Eng. Co. Falls City, Neb.	Lincoln Const. Co. Lincoln, Neb.	N. M. Stark & Co. Des Moines, Ia.	Omaha Structural Steel Co. Omaha, Neb.	J. L. Mullen Lincoln, Neb.
Reinforced concrete arch bridge, 20-ft. roadway, steel piling, complete	$46127.00	....	$46400.00	....	$42000.00	$48549.00	$46920.00	$40000.00
Reinforced concrete arch bridge, 20-ft. roadway, concrete piling, complete	....	....	43000.00	....	49000.00	63130.00	55000.00	41515.00
Reinforced concrete arch bridge, 20-ft. roadway, wood piling; complete	45813.00	....	42550.00	....	38500.00	39919.00	41400.00	37000.00
Low truss steel bridge, 20-ft. roadway, steel piling, complete	30272.00	34850.00	31470.00	$29748.00	36000.00	....	29250.00	29410.00
Earthwork in fills and approaches, per cubic yard, complete	0.22	0.20	0.18	0.19	0.20	0.20	0.18	0.25
Surfacing fills and roadway, per cubic yard, complete	0.90	1.50	0.75	0.75	0.75	2.00	0.75	2.00
Extra concrete in place, per cubic yard, complete	14.00	15.00	15.00	17.50	15.00	14.00	14.00	14.50
Extra reinforced steel, per pound in place, complete	0.035	0.03	0.035	0.04	0.035	0.03	0.035	0.04
Extra Wakefield piling in place, per lin. ft., complete	1.00	0.45	1.00	1.00	1.00	3.00	1.00	1.00
Extra steel sheet piling in place, per sq. ft., complete	2.00	1.50	1.00	1.75	1.50	0.60	1.50	1.50
Extra round piling in place, per lin. ft., complete	0.70	0.50	0.60	0.65	0.50	0.48	0.65	0.60
Extra Bethlehem H's in place, per lin. ft., complete	2.15	2.00	1.30	1.85	1.50	1.50	2.00	1.45
Extra fabricated steel in place, per pound, complete	0.0575	0.05	0.045	0.05	0.06	....	0.04	0.05
Engineer's estimate, earth fill, 25000 cubic yards	....	....	....	....	....	....	4500.00	....
Engineer's estimate, surfacing, 3000 cubic yards	....	....	....	....	....	....	2250.00	....

Contract let to Omaha Structural Steel Co., for steel bridge, complete with fills $36000.00.

BIDS ON ST. PAUL STATE AID BRIDGE

Received at St. Paul, Nebr., September 3, 1915

	Standard Bridge Co.	Lincoln Const. Co.	Western Bridge & Construction Co.	Omaha Structural Steel Works	Elkhart Bridge & Iron Co.	Monarch Eng'ng Co.	Midland Bridge Co.	Beaty Contracting Co.	Central States Bridge Co.	Elkhorn Const. Co.
Steel truss bridge, 5-145-ft. spans, complete	$36660.00	$36890.00	$38500.00	$33880.00	$34700.00	$33941.00	$34497.00	$35950.00	$27936.00	$36000.00
Earth work in fills, per cu. yd., 2500 yds.	.30	.40	.50	.30	.31	.28	.20	.35	.28	.28
Surfacing on fills, per cu. yd.	....	....	....	....	....	....	....	....	....	....
Extra plain concrete, per cu. yd.	12.50	13.00	14.00	12.00	16.50	14.85	15.00	11.50	15.00	12.00
Extra reinforced steel, per pound	.03	.04	.04	.03½	.03	.05½	.03¾	.03	.03	.03¼
Extra Wakefield piling, per lin. ft.	.46	2.50	....	.45	.36	.95	1.00	.55	.50	.75
Extra round piling, per lin. ft.	.40	.40	.80	.48	.60	.80	.55	.60	.60	.70
Extra steel sheet piling, per sq. ft.	1.60	.80	1.45	1.50	1.00	1.85	1.50	.90	1.40	1.25
Extra 8-in. Beth. H. col's., per lin. ft.	2.60	2.10	2.40	2.15	2.00	2.10	2.00	1.50	1.25	1.60
Extra fabricated steel, per pound	.05	.06	.06	.05	.04	.06¾	.05½	.05	3.9	.04½

Contract let to The Central States Bridge Co., of Indianapolis, Ind., for bridge and 2500 yds. fill, for $28636.00.

BIDS ON GRETNA STATE AID BRIDGE

Received at Papillion, Nebr., February 10, 1916

	Monarch Eng Co. Falls City	East St. Louis Br. Co., E. St. Louis, Mo.	Iowa Bridge Co. Des Moines	Midland Bridge Co. Kansas City, Mo.	Omaha Struct. Steel Wks., Omaha	Standard Bridge Co. Omaha	Chas. Thompson Papillion, Neb.	Ward & Weighton Sioux City, Iowa	Beaty Contr. Co. Blair, Neb.	Elkhart Br. & Iron Co., Elkhart, Ind.	Elkhorn Construction Co., Fremont, Neb.	Western Br. & Con. Co., Omaha	Illinois Bridge Co. Chicago
Steel truss bridge, 3-100-ft. spans	$11843.00	$12222.00	$13600.00	$13900.00	$14500.00	$14600.00	$13500.00	$15600.00	$16700.00	$21000.00	$17800.00	$16700.00	$23700.00
Earth work in fills, per cu. yd.	.25	.30	.50	.25	.24	.30	.20	.245	.28	.25	.26	.35	.39
Surfacing, per cu. yd.	1.00	1.50	1.25	1.00	.75	1.00	1.00	1.50	1.40	3.25	.70	3.50	5.80
Plain concrete, per cu. yd.	8.50	10.00	16.00	15.00	12.00	12.00	15.00	16,00	16.50	11.00	16.00	21.00	18.85
Reinforcing steel, per cu. yd.	.035	.03	.04	.045	.045	.035	.03	.045	.045	.04	.045	.03	.04
Wakefield piling, per lin. ft.	1.50	1.45	1.00	1.00	1.25	1.75	1.50	.70	.60	1.00	.90	1.70	1.20
Steel sheet piling, per sq. ft.	2.10	2.25	2.50	1.75	2.00	1.05	1.40	1.40	1.25	1.05	1.60	2.00	1.60
Wood piling, per lin. ft.	0.40	0.50	.60	.60	.60	0.50	.65	.90	.85	.48	.80	.60	.60
8-in. H. piling, per lin. ft.	2.75	3.00	2.50	2.00	1.95	2.00	1.55	1.35	1.10	1.90	2.00	2.30	2.70
Fabricated steel, per lb.	.06	.05	.055	.0575	.06	.055	.06	.065	.065	.05	.055	.06	.08
Extra work, cost plus per cent	25%	20%	15%	15%	10%	15%	10%	20%	15%	20%	24%	25%	20%

Contract let to Monarch Engineering Co., Falls City.

LIST OF BIDS ON SCHUYLER STATE AID BRIDGE

Received at Schuyler, Nebr., February 12, 1916

	Elkhart Bridge and Iron Co.	Vincennes Bridge Co.	Minneapolis Steel & Machinery Co.	East St. Louis Bridge Co.	Midland Bridge Co.	Illinois Steel Bridge Co.	Ward & Weighton	Omaha S. S. Works	Lincoln Const. Co.
New bridge, 4-175-ft. spans	$32000.00	$35500.00	$33900.00	$34850.00	$32300.00	$34900.00	$36500.00	$31927.00	$36450.00
Repair work on old spans	17000.00	19800.00	16000.00	15900.00	17400.00	17900.00	20500.00	19100.00	18050.00
Miscellaneous work, cost plus per cent	20	20	15	20	20	15	20	22	....
Earth work in fills, per cu. yd.	.25	.30	.25	.25	.25	.30	.25	.35	.23
Surfacing, per cu. yd.	1.25	1.35	1.25	1.25	1.00	1.35	1.25	1.40	1.25
For keeping bridge open during construction	3500.00	Cost + 20%	2000.00	Cost + 10%	Cost + 15%	....	3900.00	Cost + 18%	4500.00
Fabricated steel, per lb.	.05	.06½	.05¾	.06	.06	.06	.06¾	.05	.06
Reinforced steel, per lb.	.04	.04½	.04	.04	.04½	.04	.05	.03¾	.04
Plain concrete, per cu. yd.	12.00	15.00	15.00	17.00	15.00	19.50	16.50	....	12.00
Steel tubes, per lin. ft.	7.50	25.50	21.00	20.00	25.00	30.00	65.00	19.00	14.00
8-in. H. piles, per lin. ft.	1.90	2.75	2.00	3.00	2.25	2.75	3.00	2.40	2.25
Wood piles, per lin. ft.	.50	.65	.75	.70	.60	.90	1.00	.60	.55
Steel sheet piles, per sq. ft.	1.00	2.00	2.00	2.25	1.75	2.10	1.95	1.40	1.00
Drains, each	1.00	5.00	.05 lb.	1.50	5.00	9.00	1.00	....	....

LIST OF BIDS ON SCHUYLER STATE AID BRIDGE—(Continued)

Received at Schuyler, Nebr., February 12, 1916

	Western Bridge & Construction Co.	Elkhorn Const. Co.	Standard Bridge Co.	Blodgett Const. Co.	Nebraska Const. Co.	Canton Bridge Co.	Illinois Bridge Co.	Monarch Eng. Co.	Wood, Bancroft & Doty
New bridge, 4-175-ft. spans	$36250.00	$32500.00	$32225.00	$36500.00	$33000.00	$33000.00	$59997.00	$34245.00	$33000.00
Repair work on old spans	19900.00	19000.00	17775.00	19900.00	19000.00	18000.00	included in above	17000.00	17000.00
Miscellaneous work, cost plus per cent	25	10	20	20	20	20	....	25	15
Earth work in fills, per cu. yd.	.35	.27	.28	.30	.27	.26	....	.25	.25
Surfacing, per cu. yd.	1.75	.90	1.50	1.35	1.50	1.28	....	1.25	1.25
For keeping bridge open during construction	Cost + 25%	Cost + 10%	1000.00	....	Cost + 20%	4000.00	....	Cost + 15%	....
Fabricated steel, per lb.	.06	.06	.06	.06½	.06	.06	.05	.06	.06
Reinforced steel, per lb.	.03½	.04½	.03½	.04½	.04	.03½	.04	.04	.04
Plain concrete, per cu. yd.	17.50	14.00	12.00	16.50	12.00	12.00	18.00	15.00	12.00
Steel tubes, per lin. ft.	18.50	19.00	35.00	26.50	25.00	15.00	125.00	22.00	22.00
8-in. H. piles, per lin. ft.	2.90	2.50	2.25	2.80	2.00	2.30	2.60	2.75	2.00
Wood piles, per lin. ft.	.65	.80	.60	.62½	.50	.60	.60	.60	.50
Steel sheet piles, per sq. ft.	1.65	1.50	1.50	2.10	2.00	1.20	1.75	....	2.00
Drains, each	7.50	6.00	2.50	....	17.00	12.00	....	3.00	15.00

Contract let to Elkhart Bridge & Iron Co., **Elkhart, Indiana.**

BIDS ON SOUTH PLATTE STATE AID BRIDGE

Received at North Platte, February 15, 1916

	East St. Louis Bridge Co.	Midland Bridge Co.	Beaty Contr. Co. Blair, Neb	Omaha Structural Steel Works	M. Stark & Co. Des Moines, Ia.	Monarch Eng Co. Falls City, Neb.	Western Bridge Co. Omaha	Ward & Weighton Sioux City
Concrete girder bridge, 14-36-ft. spans	$16948.00	$19905.00	$20800.00	$20300.00	$18712.00	$19990.00	$21200.00	$19720.00
Steel truss bridge, 6-85 ft. spans	18560.00	20990.00	25600.00	21500.00	....	21900.00	23000.00	24000.00
Earth work in fills, per cu. yd	.23	.22	.25½	.25	.25½	.25	.30	.22
Surfacing, per cu. yd	1.00	1.00	1.00	.75	1.00	1.00	1.10	.90
Plain concrete, per cu. yd	16.00	15.00	11.50	11.00	9.00	15.00	14.50	16.00
Reinforcing steel, per lb	.04½	.04½	.04	.03½	.03½	.04	.04	.04½
Wakefield piling, per lin. ft	1.65	1.50	1.00	1.00	4.00	1.50	1.50	.75
Steel sheet piles, per sq. ft	1.80	2.00	1.25	1.50	1.05	2.00	2.00	2.00
Wood piles, per lin. ft	.50	.65	.55	.50	.35	.60	.60	.85
8-in. H. piles, per lin. ft	2.75	2.50	1.75	1.95	....	2.75	3.00	2.10
Fabricated steel, per lb	.06½	.06	.06½	.06	....	.06	.06	.06

GRETNA STATE AID BRIDGE, DEC. 1, 1916. ELKHORN RIVER. UNDER CONSTRUCTION
THREE 100-FT. TRUSSES

BIDS ON SOUTH PLATTE STATE AID BRIDGE—(Continued)

Received at North Platte, February 15, 1916

	Wood, Bancroft & Doty, David City	Wilson Reinforced Concrete Co. Waboo	Elkhorn Const. Co. Fremont	Pickus Eng Co.	Lincoln Con. Co. Lincoln	J. W. Hopp Cedar Rapids, Ia.	Hotelling & Atwater, Beatrice
Concrete girder bridge, 14-36-ft. spans	$21500.00	$20980.00	$20000.00	$19980.00	$19980.00	$23000.00	$18369.00
Steel truss bridge, 6-85-ft. spans	20100.00	23975.00	26400.00	....	20000.00	....	....
Earth work in fills, per cu. yd.	.24	.25½	.26	.25	.25	.55	.24
Surfacing, per cu. yd.	1.00	1.00	1.00	1.00	1.00	1.00	.75
Plain concrete, per cu. yd.	12.00	13.80	12.00	16.00	15.00	10.00	12.00
Reinforcing steel, per lb.	.04	.05	.04½	.04	.04½	.04	.04
Wakefield piling, per lin. ft.	1.80	1.40	.80	.55	1.00	.80	.60
Steel sheet piles, per sq. ft.	1.75	2.00	1.80	.80	2.00	1.26	1.00
Wood piles, per lin. ft.	.65	.52	.80	.75	.65	.70	.60
8-in. H. piles, per lin. ft.	2.40	2.25	2.20	1.80	3.00	....	1.75
Fabricated steel, per lb.	.06	.05½	.06	.05	.06½	....	....

Contract let to East St. Louis Bridge Co., East St. Louis, Ill.

LIST OF BIDS ON PARSHALL STATE AID BRIDGE

Received at Butte, Nebr., March 10, 1916

	Monarch Engineering Co.	Midland Bridge Co.	Western Bridge & Construction Co.	Norfolk Bridge & Construction Co.	Iowa Bridge Co.	Lincoln Const. Co.	Vincennes Bridge Co.	Omaha Structural Steel Works	Elkhorn Const. Co.
Steel truss bridge, 3-170-ft. 3-in. spans	$25698.00	$28290.00	$25555.00	$28598.00	$26796.00	$27990.00	$27525.00	$25998.00	$28540.00
Plain concrete, per cu. yd.	21.50	12.00	18.00	17.90	17.50	15.00	18.00	14.00	22.00
Reinforcing steel, per lb.	.04	.04	.04	.0475	.05	.045	.05	.045	1.03
Wakefield piling, per lin. ft.	4.75	1.00	4.00	68.00	1.25	.85	1.75	1.50	1.75
Steel sheet piling, per sq. ft.	2.50	2.00	2.00	1.00	2.00	1.75	2.00	2.25	1.65
Wood piles, per lin. ft.	.98	.65	.95	.70	.75	.60	.60	.65	1.30
8-in. H. piles, per lin. ft.	3.75	2.25	3.00	2.50	1.50	2.20	2.50	2.45	2.50
Fabricated steel, per lb.	.0725	.065	.065	.059	.06	.06	.065	.06⅜	.08
Floor drains, each	6.00	5.00	2.50	3.00	....	3.00	5.00	5.00	7.00
Creosoted lumber, per M	80.00	60.00	75.00	69.00	75.00	75.00	60.00	56.00	60.00
Fir lumber, per M	49.00	38.00	49.50	49.00	40.00	44.00	35.00	42.00	25.00
Extra work, cost +—%	25	15	25	20	25	22	25	20	25

Contract let to Western Bridge & Construction Co., Omaha, Nebr.

BIDS ON KEARNEY STATE AID BRIDGE

Received at Kearney, Nebr., May 23, 1916

	Elkhart Bridge & Iron Co. Elkhart, Ind.	Wood, Bancroft & Doty David City, Neb.	Wilson Reinforced Concrete Co. Wahoo, Neb.	Western Bridge & Construction Co. Omaha, Neb.	East St. Louis Br. Co. East St. Louis, Ill.	Midland Bridge Co. Kansas City, Mo.	Central States Br. Co. Indianapolis, Ind.	N. M. Stark Des Moines, Iowa	Omaha Structural Steel Works Omaha, Nebr.
Steel truss bridge, 10-100-ft. spans	$52925.00	$55000.00	$..........	$57500.00	$49900.00	$52293.00	$58910.00	$..........	$48500.00
Concrete arch bridge, 14 spans, 55-ft to 85-ft	52100.00	45325.00	45620.00	56000.00	46000.00	49253.00	....	48876.00	44350.00
Earth work in fills, per cu. yd	.14	.16	.22	.25	.23	.16	.27	.20	.17
Surfacing, per cu. yd	.75	.80	1.15	1.50	1.10	.80	1.50	1.20	.75
Plain concrete, per cu. yd	18.00	12.50	15.75	15.00	17.50	15.00	18.00	16.50	18.00
Reinforcing steel, per lb	.05	.06	.06	.055	.06	.06	.06	.055	.06
Wakefield piling, per lin. ft	5.00	1.50	4.00	4.00	3.85	2.00	4.50	1.20	4.00
Steel sheet piling, per sq. ft	2.50	2.00	2.95	3.00	3.15	3.50	2.50	2.20	3.00
Wood piling, per lin. ft	.90	.75	.65	.65	.70	1.10	.90	.80	.60
8-in. H. piling, per lin. ft	3.00	2.00	3.25	3.00	3.00	3.00	2.00	2.50	2.50
Fabricated steel, per lb	.07	.065	.065	.06⅞	.0675	.0625	.09	.07	.06

Contract let to Omaha Structural Steel Works, $54150.00; includes 40000 cu. yds. fill and 4000 yds. surface.

LIST OF BIDS ON RED BIRD STATE AID BRIDGE

Received at O'Neill, Neb., June 30, 1916

	Illinois Steel Bridge Co.	Monarch Engineering Co.	Wilson Reinforced Concrete Co.	Midland Bridge Co.	Vincennes Bridge Co.	Elkhart Bridge & Iron Co.	Omaha Structural Steel Works	Western Bridge & Construction Co.
New bridge, 1-180-ft. span	$12340.00	$11880.00	$10685.00	$11990.00	$12980.00	$15266.00	$12775.00	$9600.00
Miscellaneous work, cost plus per cent	30	25	25	25	25	25	25	25
Fabricated steel, per lb	.08	.08	.06	.07	.08	.065	.0775	.07
Reinforcing steel, per lb	.04	.08	.045	.06	.06	.045	.0775	.07
Plain concrete, per cu. yd	18.00	20.00	17.75	18.00	20.00	18.00	21.00	18.00
8-in. H piles, per lin. ft	3.50	4.00	2.95	3.50	4.00	3.00	3.40	3.00
Wood piles, per lin. ft	.90	1.10	.75	.90	1.25	.90	1.20	.95
Wakefield piling, per lin. ft	2.00	3.50	2.50	3.50	2.50	3.80	3.75	4.00
Steel sheet piles, per sq. ft	2.50	4.50	2.00	3.50	4.50	2.10	4.05	4.00

Contract let to Western Bridge & Construction Co., Omaha.

LIST OF APPLICATIONS FOR STATE AID NOW ON FILE.

County	Bridge	Stream
Buffalo	Shelton	Platte
Dawson	Cozad	Platte
Dawson	Willow Island	Platte
Douglas	Valley	Elkhorn
Garden (2)		North Platte
Greeley	Scotia	North Loup
Hitchcock (2)		Republican
Holt	Ewing	Elkhorn
Howard	Boelus	Middle Loup
Knox	Verdigre	Verdigre Creek
Merrick	Prairie Island	Platte
Merrick and Polk	Silver Creek	Platte
Merrick and Polk	Havens	Platte
Red Willow	Bartley	Republican
Saunders and Douglas	Yutan	Platte
Scottsbluff	Minatare-Melbeta Scottsbluff-Gering Mitchell Valley-Scottsbluff Mitchell Morrill Henry	Platte

COUNTY BRIDGE WORK.

The legislature in 1915 passed a law, changing the loading of bridges, and we have prepared a complete set of plans to conform to this law.

During the past two years we have co-operated with the counties, in assisting the various County Boards to select the proper size and type of bridge to be used in the different locations, and also made final inspection of the work before the contractors were paid. This has resulted in a great deal better class of work, and by assisting the counties in letting contracts we have been able to reduce the average cost considerably.

I call your attention to the tabulations of averages for the years 1914, and 1915-1916. These averages are tabulated from the annual report of all of the counties on twenty ton bridges. There have been a few fifteen ton bridges constructed in the past year. The average cost of the fifteen ton bridges is approximately 15 per centum less than the cost of the twenty ton bridges. You will note that the price has been reduced, notwithstanding the fact that material has increased considerably during the past two years.

I would also like to call your attention to the chart showing the price of bridge steel for the past five years.

AVERAGE BID OF ALL BRIDGE CONTRACTS LET FOR 1914 ON STATE PLANS

Steel Superstructure Complete in Place Except Fl.

Pan-els	L'gth	Type	Pin Connected Wood	Pin Connected Conc.	Riveted Wood	Riveted Conc.
			Floor			
3	35'	Low	$21 48		$23 05	
3	40'		22 13		23 55	
3	45'		22 21		23 85	
3	50'		23 28		24 75	
4	50'		24 51		25 12	
3	55'		23 65		25 17	
4	55'		24 53		25 64	
3	60'		23 88		25 50	
4	60'		24 79		26 18	
4	65'		25 33		25 41	
4	70'		26 41		27 43	
5	70'		26 94		27 53	
4	75'		27 04		27 78	
5	75'		27 06		27 24	
4	80'		27 36		28 37	
5	80'		28 22		29 03	
5	85'		28 94		29 41	
5	90'		28 38		29 75	
5	100'		29 86		31 01	
6	110'	High				
7	120'					
8	130'					
8	140'					

Steel Tube Shells Per Vertical Foot in Place

Type	Diam.	1/4"	5/16"	3/8"	1/2"
A	36"	$ 6 74	$ 8 07	$ 9 04	$10 58
B	42"	7 79	9 26	10 47	12 09
C	48"	8 49	10 76	11 88	13 64
D	54"	10 03	11 66	13 26	15 16
E	60"	11 02	13 07	14 60	15 88

Steel Caps Per Foot of Cap in Place

A	2- 6" Channels	$ 1 02
B	2- 7" Channels	1 26
C	2- 8" Channels	1 51
D	2-10" Channels	1 93
E	2-12" Channels	2 34

Superstructure

Panel	L'gth	I Beam 14' R'dw'y Wood	I Beam 14' R'dw'y Conc.	I Beam 16' R'dw'y Wood	I Beam 16' R'dw'y Conc.	I Beam 18' R'dw'y Wood	I Beam 18' R'dw'y Conc.	Steel Girder 18' R'd'y Wood	Steel Girder 18' R'd'y Conc.	Steel Girder 14' R'd'y Wood	Steel Girder 14' R'd'y Conc.	Steel Girder 16' R'd'y Wood	Steel Girder 16' R'd'y Conc.	Wood 14' Wood	Wood 16' Wood	Wood 18' Wood
1	12'			$7 78	$8 57										$5 39	
1	14'			8 77	9 45										5 47	
1	16'			9 05	9 88										5 87	
1	18'			9 83	10 12										6 01	
1	20'			10 10	10 69										6 47	
1	22'			11 26	11 90										6 45	
1	24'			11 37	13 46										7 15	
1	26'			13 35	14 22										6 98	
1	28'			13 73	14 69										7 59	
1	30'			14 17	16 52					21 73	22 11				8 17	
1	32'			14 52	17 55					21 82	22 35				8 29	
1	34'									21 93	23 84					
1	36'									22 79	24 47					
1	38'									22 17	24 67					
1	40'									24 63	36 38					

Steel Piling Per Foot in Place

A	8"-18-lb. I	$1 30
B	Built 8"-33¾-lb.	2 27
C	Beth. "H"-8" 32-lb.	2 24
D	Beth. "H"-8" 32-lb.	2 27

Wood Piling Per Foot of Pile in Place

Red Cedar under 24 feet long	$ .42	$ .458
Red Cedar over 24 feet long	.448	.487
White Oak under 24 feet long	.44	.626
White Oak over 24 feet long	.46	.507
Fir Piling untreated	.527	.582
Fir Piling creosoted		

Wakefield piling for cofferdams per M. BM. in place	$58 03
Wakefield piling for permanent use per M. BM. in place	69 36
Round piling 9" top driven in place per lineal foot	52
Reinforcing any condition in place per lb.	037
Mass concrete in place per cubic foot	409
Architectural concrete in place per cubic foot	631
Dry excavation per cubic foot	028
Wet excavation per cubic foot	234
Rock excavation per cubic foot	407
Forms for architectural concrete per M. BM. in place	32 44
Forms for mass concrete per M. BM. in place	18 45

Fir lumber untreated per M. BM. in place		
Fir lumber creosoted per M. BM. in place	38 72	42 11
Pine lumber untreated per M. BM. in place	60 66	65 12
Pine lumber creosoted per M. BM. in place	41 66	46 22
White Oak untreated per M. BM. in place	62 08	67 09
Tearing out old lumber per M. BM.	46 05	50 88
Replacing old lumber per M. BM.	5 24	6 27
Fir Floor complete in place per lin. ft. of br.	8 92	9 57
Creosoted block floor complete in place per sq. yd.	3 92	4 66
Overhaul per ton per mile	311	
Fabricated steel not otherwise bid per lb. in pl.	055	

All other labor or material, cost plus 11.22 per cent.

AVERAGE BID OF ALL BRIDGE CONTRACTS LET FOR 1915–1916 ON STATE PLANS

Steel Superstructure Complete in Place Except Fl.

Pan-els	L'gth	Type	Pin Connected Wood	Pin Connected Conc.	Riveted Wood	Riveted Conc.
			Floor			
3	35'	Low	$12 48	$19 15	$16 05	$20 51
3	40'	....	16 00	18 16	16 60	20 66
3	45'	....	12 12	18 83	17 20	21 42
3	50'	....	15 72	18 32	17 45	20 83
4	50'	....	18 10	8 25	18 52	24 76
3	55'	....	16 95	21 30	17 45	31 52
4	55'	....	24 33	....	23 30	26 75
3	60'	....	17 30	19 66	18 35	23 88
4	60'	....	17 75	18 15	18 90	23 41
4	65'	....	17 33	22 45	19 25	22 79
4	70'	....	21 30	22 74	19 85	25 43
5	70'	....	19 45	16 75	19 52	....
4	75'	....	20 30	23 63	22 05	25 11
5	75'	....	16 50	....	20 20	28 90
4	80'	....	24 12	19 19	20 95	26 24
5	80'	....	21 05	22 56	21 55	25 71
5	85'	....	20 38	24 29	21 90	25 12
5	90'	....	20 95	24 99	21 65	26 98
6	90'	High	27 36	....	30 00	....
5	95'	Low	17 65	23 85	22 20	26 39
6	95'	High	26 75	....	....	....
5	100'	Low	22 15	26 74	22 85	27 97
6	100'	High	25 55	....	....	30 75

Steel Tube Shells Per Vertical Foot in Place

Type	Diam.	1/4"	5/16"	3/8"	1/2"
A	36"	$ 6 00	$ 7 73	$ 6 75	$ 5 00
B	42"	6 90	8 93	7 25	5 00
C	48"	8 00	10 28	8 30	5 00
D	54"	8 98	11 65	5 50	5 50
E	60"	9 01	19 92	5 50	6 00

Steel Caps Per Foot of Cap in Place

A	2- 6" Channels	$ 84
B	2- 7" Channels	1 06
C	2- 8" Channels	1 78
D	2-10" Channels	1 63
E	2-12" Channels	1 66

Superstructure

Panel	L'gth	I Beam 14' R'dw'y Wood	I Beam 14' R'dw'y Conc.	I Beam 16' R'dw'y Wood	I Beam 16' R'dw'y Conc.	I Beam 18' R'dw'y Wood	I Beam 18' R'dw'y Conc.	Steel Girder 18' R'd'y Wood	Steel Girder 18' R'd'y Con	Steel Girder 16' R'd'y Wood	Steel Girder 16' R'd'y Con.	Steel Girder 14' R'd'y Wood	Steel Girder 14' R'd'y Con.	Wood 14' Wood	Wood 16' Wood	Wood 18' Wood
1	12'	$ 5 97	$ 6 53	$ 6 25	$ 6 90	$ 2 52	$ 3 12	....	....	....	....	....	....	....	$4 55	$5 50
1	14'	5 85	6 86	6 70	7 35	3 45	3 82	....	....	....	....	....	....	....	4 60	6 00
1	16'	6 57	7 03	6 65	7 50	3 45	3 87	....	....	....	....	....	....	....	5 20	6 50
1	18'	7 19	7 78	7 60	8 10	3 50	3 87	....	....	....	....	....	....	....	5 18	7 75
1	20'	7 66	7 90	7 72	8 40	3 75	4 12	....	....	....	....	....	....	....	5 70	7 75
1	22'	8 10	8 53	8 35	9 20	4 00	4 37	....	....	....	....	....	....	....	5 90	8 50
1	24'	8 29	8 98	8 80	10 30	4 25	4 62	....	....	....	....	....	....	....	6 15	8 50
1	26'	9 10	9 66	10 30	11 00	5 00	5 50	....	....	....	....	....	....	....	6 35	7 00
1	28'	9 56	10 28	11 00	11 45	5 05	5 55	....	....	....	....	....	....	....	6 60	7 50
1	30'	9 99	10 86	11 20	13 60	5 50	6 00	....	....	15 00	17 20	....	....	....	7 25	7 90
1	32'	10 75	11 83	11 40	13 20	5 00	6 00	....	....	15 20	17 35	....	....	....	7 35	8 75
1	34'	....	....	....	....	....	....	....	....	15 60	18 65	....	....	....	....	....
1	36'	....	....	....	....	....	....	....	....	16 45	18 95	....	....	....	....	....
1	38'	....	....	....	....	....	....	....	....	17 25	12 30	....	....	....	....	....
1	40'	....	....	....	....	....	....	....	....	17 55	12 90	....	....	....	....	....

Steel Piling Per Foot in Place

A	8"-18-lb. I	$1 02
B	Built 8"-33¾-lb.	1 95
C	Beth. "H"-8" 32-lb.	1 97
D	Beth. girder-8" 32½-lb.	2 11

Wood Piling Per Foot of Pile in Place

Red Cedar under 24 feet long	$ .38	$ .43
Red Cedar over 24 feet long	.40	.45
White Oak under 24 feet long	.41	.46
White Oak over 24 feet long	.43	.48
Fir Piling untreated	.47	.47
Fir Piling creosoted	.63	.62

Wakefield piling for cofferdams per M. BM. in place	$50 00
Wakefield piling for permanent use per M. BM. in place	55 00
Round piling 9" tops driven in place per lineal foot	45
Reinforcing any condition in place per lb.	038
Mass concrete in place per cubic foot	35
Architectural concrete in place per cubic foot	56
Dry excavation per cubic foot	064
Wet excavation per cubic foot	156
Rock excavation per cubic foot	328
Forms for architectural concrete per M. BM.	24 85
Forms for mass concrete per M. BM.	16 35

Fir lumber untreated per M. BM. in place	36 30	40 00
Fir lumber creosoted per M. BM. in place	53 60	57 40
Pine lumber untreated per M. BM. in place	35 20	41 30
Pine lumber creosoted per M. BM. in place	53 75	57 00
White Oak untreated per M. BM. in place	51 00	42 00
Tearing out old lumber per M. BM.	4 86	6 57
Replacing old lumber per M. BM.	8 26	5 45
Fir Floor complete in place per lin. ft. of br.	....	....
Creosoted block floor complete per sq. yd.	3 45	....
Overhaul per ton per mile	31	
Fabricated steel not otherwise bid per lb. in pl.	052	....

All other labor or material, cost plus 11.2 per cent.

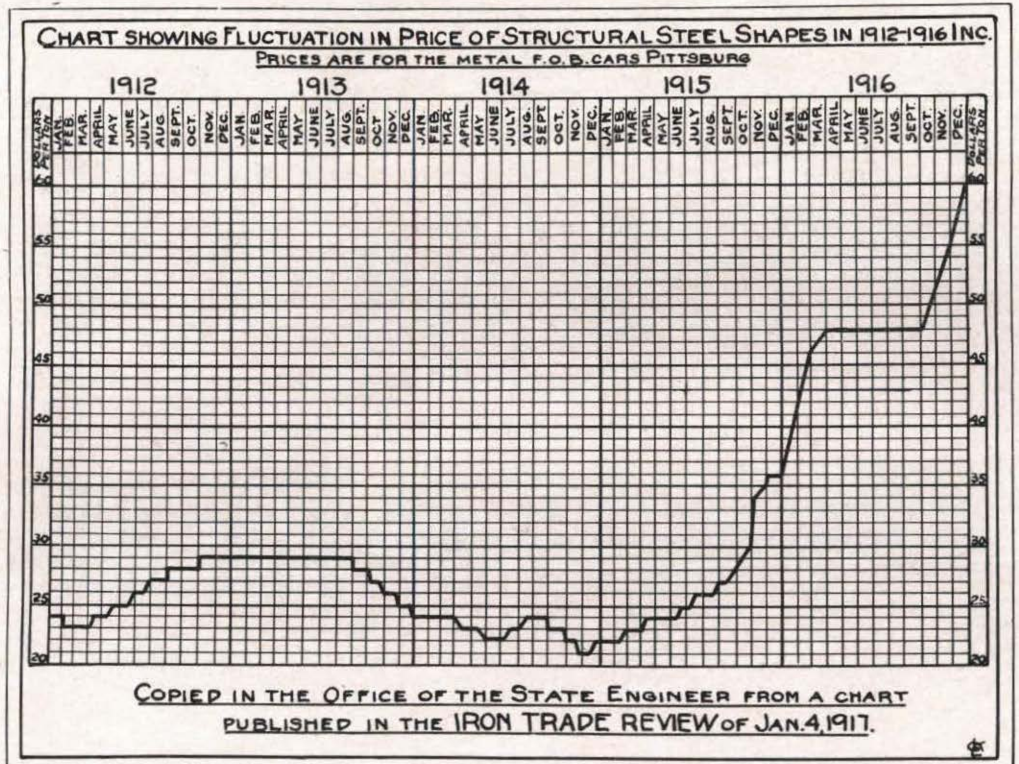


CHART SHOWING FLUCTUATION IN PRICE OF STRUCTURAL STEEL SHAPES IN 1912-1916 INC.
PRICES ARE FOR THE METAL F.O.B. CARS PITTSBURG
1912
1913
1914
1915
1916
DOLLARS PER TON
JAN. FEB. MAR. APRIL MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
60
55
50
45
40
35
30
25
20
COPIED IN THE OFFICE OF THE STATE ENGINEER FROM A CHART
PUBLISHED IN THE IRON TRADE REVIEW OF JAN. 4, 1917.

PROPOSAL FOR BRIDGES, BRIDGE MATERIALS AND BRIDGE WORK.

TO THE HONORABLE BOARD OF................................of.......................County

STATE OF NEBRASKA

Gentlemen:

The Undersigned,..of ....having carefully studied the plans, specifications and instructions to bidders, and the form of Contract and Bond attached to and made a part of said plans and specifications, copies of which are on file in the office of the County Clerk, all of which................ fully understand and hereby agree to, propose to furnish all material and labor, necessary to erect and complete such bridges, bridge material and bridge work as you may require during the year beginning............................ ....for the unit prices as set forth in price sheets hereto attached and made a part of this proposal.

Very respectfully submitted,

Date ....

....

....

PRICES PER LINEAL FOOT FOR PIN CONNECTED SUPERSTRUCTURE WITH 16 FOOT ROADWAY COMPLETE IN PLACE EXCEPT FLOOR

For 20-Ton Engine Load

Panels	Length	Type	For Wood Floor	For Concrete Floor
3	35 feet	Low Truss	....	....
3	40 feet	Low Truss	....	....
3	45 feet	Low Truss	....	....
3	50 feet	Low Truss	....	....
3	55 feet	Low Truss	....	....
3	60 feet	Low Truss	....	....
4	60 feet	Low Truss	....	....
4	65 feet	Low Truss	....	....
4	70 feet	Low Truss	....	....
4	75 feet	Low Truss	....	....
4	80 feet	Low Truss	....	....
5	80 feet	Low Truss	....	....
5	85 feet	Low Truss	....	....
5	90 feet	Low Truss	....	....
5	95 feet	Low Truss	....	....
5	100 feet	Low Truss	....	....
6	100 feet	High Truss	....	....
6	110 feet	High Truss	....	....
6	120 feet	High Truss	....	....
7	120 feet	High Truss	....	....
7	130 feet	High Truss	....	....
7	140 feet	High Truss	....	....
8	140 feet	High Truss	....	....
8	150 feet	High Truss	....	....

PRICES PER LINEAL FOOT FOR PIN CONNECTED SUPERSTRUCTURE WITH 16 FOOT ROADWAY COMPLETE IN PLACE EXCEPT FLOOR

For 15-Ton Engine Load

Panels	Length	Type	For Wood Floor	For Concrete Floor
3	35 feet	Low Truss	....	....
3	40 feet	Low Truss	....	....
3	45 feet	Low Truss	....	....
3	50 feet	Low Truss	....	....
3	55 feet	Low Truss	....	....
3	60 feet	Low Truss	....	....
4	60 feet	Low Truss	....	....
4	65 feet	Low Truss	....	....
4	70 feet	Low Truss	....	....
4	75 feet	Low Truss	....	....
4	80 feet	Low Truss	....	....
5	80 feet	Low Truss	....	....
5	85 feet	Low Truss	....	....
5	90 feet	Low Truss	....	....
5	95 feet	Low Truss	....	....
5	100 feet	Low Truss	....	....
6	100 feet	High Truss	....	....
6	110 feet	High Truss	....	....
6	120 feet	High Truss	....	....
7	120 feet	High Truss	....	....
7	130 feet	High Truss	....	....
7	140 feet	High Truss	....	....
8	140 feet	High Truss	....	....
8	150 feet	High Truss	....	....

PRICES PER LINEAL FOOT FOR RIVETED SUPERSTRUCTURE WITH 16 FOOT ROADWAY COMPLETE IN PLACE EXCEPT FLOOR

For 20-Ton Engine Load

Panels	Length	Length	For Wood Floor	For Concrete Floor
3	35 feet	Low Truss	....	....
3	40 feet	Low Truss	....	....
3	45 feet	Low Truss	....	....
3	50 feet	Low Truss	....	....
3	55 feet	Low Truss	....	....
3	60 feet	Low Truss	....	....
4	60 feet	Low Truss	....	....
4	65 feet	Low Truss	....	....
4	70 feet	Low Truss	....	....
4	75 feet	Low Truss	....	....
4	80 feet	Low Truss	....	....
5	80 feet	Low Truss	....	....
5	85 feet	Low Truss	....	....
5	90 feet	Low Truss	....	....
5	95 feet	Low Truss	....	....
5	100 feet	Low Truss	....	....
6	100 feet	Low Truss	....	....

PRICES PER LINEAL FOOT FOR RIVETED SUPERSTRUCTURE WITH 16 FOOT ROADWAY COMPLETE IN PLACE EXCEPT FLOOR

For 15-Ton Engine Load

Panels	Type	Type	For Wood Floor	For Concrete Floor
3	35 feet	Low Truss	....	....
3	40 feet	Low Truss	....	....
3	45 feet	Low Truss	....	....
3	50 feet	Low Truss	....	....
3	55 feet	Low Truss	....	....
3	60 feet	Low Truss	....	....
4	60 feet	Low Truss	....	....
4	65 feet	Low Truss	....	....
4	70 feet	Low Truss	....	....
4	75 feet	Low Truss	....	....
4	80 feet	Low Truss	....	....
5	80 feet	Low Truss	....	....
5	85 feet	Low Truss	....	....
5	90 feet	Low Truss	....	....
5	95 feet	Low Truss	....	....
5	100 feet	Low Truss	....	....
6	100 feet	Low Truss	....	....

PRICES PER LINEAL FOOT FOR I BEAM SUPERSTRUCTURES COMPLETE IN PLACE EXCEPT FLOOR FOR 20-TON ENGINE LOAD

Panels	Length	14 Ft. Roadway		16 Ft. Roadway		18 Ft. Roadway	
		Wood Floor	Conc'te Floor	Wood Floor	Conc'te Floor	Wood Floor	Conc'te Floor
1	12 ft.						
1	14 ft.						
1	16 ft.						
1	18 ft.						
1	20 ft.						
1	22 ft.						
1	24 ft.						
1	26 ft.						
1	28 ft.						
1	30 ft.						
1	32 ft.						

PRICES PER LINEAL FOOT FOR STEEL GIRDER SUPERSTRUCTURES COMPLETE IN PLACE EXCEPT FLOOR FOR 20-TON ENGINE LOAD

Panels	Length	14 Ft. Roadway		16 Ft. Roadway		18 Ft. Roadway	
		Wood Floor	Conc'te Floor	Wood Floor	Conc'te Floor	Wood Floor	Conc'te Floor
3	30 ft.						
3	32 ft.						
3	34 ft.						
3	36 ft.						
3	38 ft.						
3	40 ft.						

PRICES PER LINEAL FOOT FOR WOOD SUPERSTRUCTURES COMPLETE IN PLACE EXCEPT FLOOR FOR 20-TON ENGINE LOAD

Panels	Length	Width of Roadway		
		14 Ft.	16 Ft.	18 Ft.
1	12 ft.			
1	14 ft.			
1	16 ft.			
1	18 ft.			
1	20 ft.			
1	22 ft.			
1	24 ft.			
1	26 ft.			
1	28 ft.			
1	30 ft.			
1	32 ft.			

PRICES FOR CONCRETE BOX CULVERTS, SLAB BRIDGES, GIRDER BRIDGES, ARCH BRIDGES, WINGS, BACKING, PIERS, ABUTMENTS, CONCRETE FLOORS OR CONCRETE IN ANY OTHER CONDITION FOR THE VARIOUS UNITS AS GIVEN BELOW AND AS SPECIFIED AND DEFINED IN SPECIFICATIONS

Wakefield sheet piling for cofferdams, in place, per M. feet B. M.		
Wakefield sheet piling for permanent use, in place, per M. feet B. M.		
Round piling 9 in. tops, driven in place, per lineal foot		
Reinforcing, any condition, in place, per pound		
Mass Concrete in place per cubic foot		
Architectural Concrete in place per cubic foot		
Dry Excavation per cubic foot		
Wet Excavation per cubic foot		
Rock Excavation per cubic foot		
Forms—For Architectural concrete, in place, per M. feet B. M.		
Forms—For Mass concrete, in place, per M. feet B. M.		

PRICES PER LINEAL FOOT FOR I BEAM SUPERSTRUCTURES COMPLETE IN PLACE EXCEPT FLOOR FOR 15-TON ENGINE LOAD

Panels	Length	14 Ft. Roadway		16 Ft. Roadway		18 Ft. Roadway	
		Wood Floor	Conc'te Floor	Wood Floor	Conc'te Floor	Wood Floor	Conc'te Floor
1	12 ft.						
1	14 ft.						
1	16 ft.						
1	18 ft.						
1	20 ft.						
1	22 ft.						
1	24 ft.						
1	26 ft.						
1	28 ft.						
1	30 ft.						
1	32 ft.						

PRICES PER LINEAL FOOT FOR STEEL GIRDER SUPERSTRUCTURES COMPLETE IN PLACE EXCEPT FLOOR FOR 15-TON ENGINE LOAD

Panels	Length	14 Ft. Roadway		16 Ft. Roadway		18 Ft. Roadway	
		Wood Floor	Conc'te Floor	Wood Floor	Conc'te Floor	Wood Floor	Conc'te Floor
3	30 ft.						
3	32 ft.						
3	34 ft.						
3	36 ft.						
3	38 ft.						
3	40 ft.						

PRICES PER LINEAL FOOT FOR WOOD SUPERSTRUCTURES COMPLETE IN PLACE INCLUDING FLOOR FOR 15-TON ENGINE LOAD

Panels	Length	Width of Roadway		
		14 Ft.	16 Ft.	18 Ft.
1	12 ft.			
1	14 ft.			
1	16 ft.			
1	18 ft.			
1	20 ft.			
1	22 ft.			
1	24 ft.			
1	26 ft.			
1	28 ft.			
1	30 ft.			
1	32 ft.			

PRICES FOR CONCRETE BOX CULVERTS, SLAB BRIDGES, GIRDER BRIDGES, ARCH BRIDGES, WINGS, BACKING, PIERS, ABUTMENTS, CONCRETE FLOORS OR CONCRETE IN ANY OTHER CONDITION FOR THE VARIOUS UNITS AS GIVEN BELOW AND AS SPECIFIED AND DEFINED IN SPECIFICATIONS

Wakefield sheet piling for cofferdams, in place, per M. feet B. M.		
Wakefield sheet piling for permanent use, in place, per M. feet B. M.		
Round piling 9 in. tops, driven in place, per lineal foot		
Reinforcing, any condition, in place, per pound		
Mass Concrete in place per cubic foot		
Architectural Concrete in place per cubic foot		
Dry Excavation per cubic foot		
Wet Excavation per cubic foot		
Rock Excavation per cubic foot		
Forms—For Architectural concrete, in place, per M. feet B. M.		
Forms—For Mass concrete, in place, per M. feet B. M.		

PRICES FOR STEEL SUBSTRUCTURES, WOOD OR WOOD BLOCK FLOORS AND MISCELLANEOUS ITEMS AND REPAIRS. UNITS AS GIVEN BELOW AND ALL AS DEFINED AND SPECIFIED IN THE SPECIFICATIONS

STEEL TUBE SHELLS IN PLACE

Type	Dia.	Per Vertical Foot of Each Shell in Place	Price			
			1-4 in. Metal	5-16 in. Metal	3-8 in. Metal	1-2 in. Metal
A	36 in.					
B	42 in.					
C	48 in.					
D	54 in.					
E	60 in.					

STEEL PILING

Type	Size		
A	8 in. I at 18 ft.	Per foot of each pile in place	
B	Built "H" 8 in. [s-33¾ ft.		
C	Bethlehem "H" 8 in.-32 ft.		
D	Bethlehem Girder 8 in.-32.5 ft.		

STEEL CAPS

Type	Size		
A	2- 6 in. [s........	Per foot of each cap in place	....
B	2- 7 in. [s........		....
C	2- 8 in. [s........	....	....
D	2-10 in. [s........	....	....
E	2-12 in. [s........	....	....

For any Fabricated Steel not otherwise bid on per pound in place

WOOD PILING DRIVEN IN PLACE

Except in connection with concrete work

Kind of Piling	Per Lineal Foot in Place for Purpose Stated	For New Work	For Repair W'k
Red Cedar under 24 feet long....	....	....	....
Red Cedar 24 feet long and over	....	....	....
White Oak under 24 feet long....	....	....	....
White Oak 24 feet long and over	....	....	....
Fir Piling untreated, any length	....	....	....
Fir Piling creosoted, any length	....	....	....

LUMBER

Except in connection with concrete work

	For New Work	For Repair W'k
Fir lumber, untreated, in place, per M. feet B. M............	....	....
Fir lumber, creosoted, in place, per M. feet B. M............	....	....
Pine lumber, untreated, in place, per M. feet B. M..........	....	....
Pine lumber, creosoted, in place, per M. feet B. M..........	....	....
White Oak lumber, untreated, in place, per M. feet B. M.	....	....
For handling old lumber—tearing out—per M. feet B. M.	....	....
For replacing old lumber, per M. feet B. M..................	....	....

For creosoted block floor, in place, per square yard........................

For any overhaul per ton per mile........................

For any other work, materials or labor, cost plus a profit of———per cent................

CONTRACT.

This CONTRACT, made in duplicate and entered into this.................... day of ....19........ by and between the Board of ....for the County of.. State of Nebraska party of the first part and...of ....County, State of .... party of the second part.

WITNESSETH: That for and in consideration of the unit prices for bridges, bridge work and bridge materials, as set forth in the attached proposals and sheets attached thereto, and which unit prices the party of the first part hereby agrees to pay the party of the second part, the party of the second part agrees to construct, furnish and complete in a good and workmanlike manner and in full and exact compliance with the plans and specifications including general printed stipulations and specifications which are hereto attached and hereby made a part of this contract, and to the full satisfaction of the party of the first part, such bridges, bridge work and bridge materials as the party of the first part may require during the year beginning..., 19........

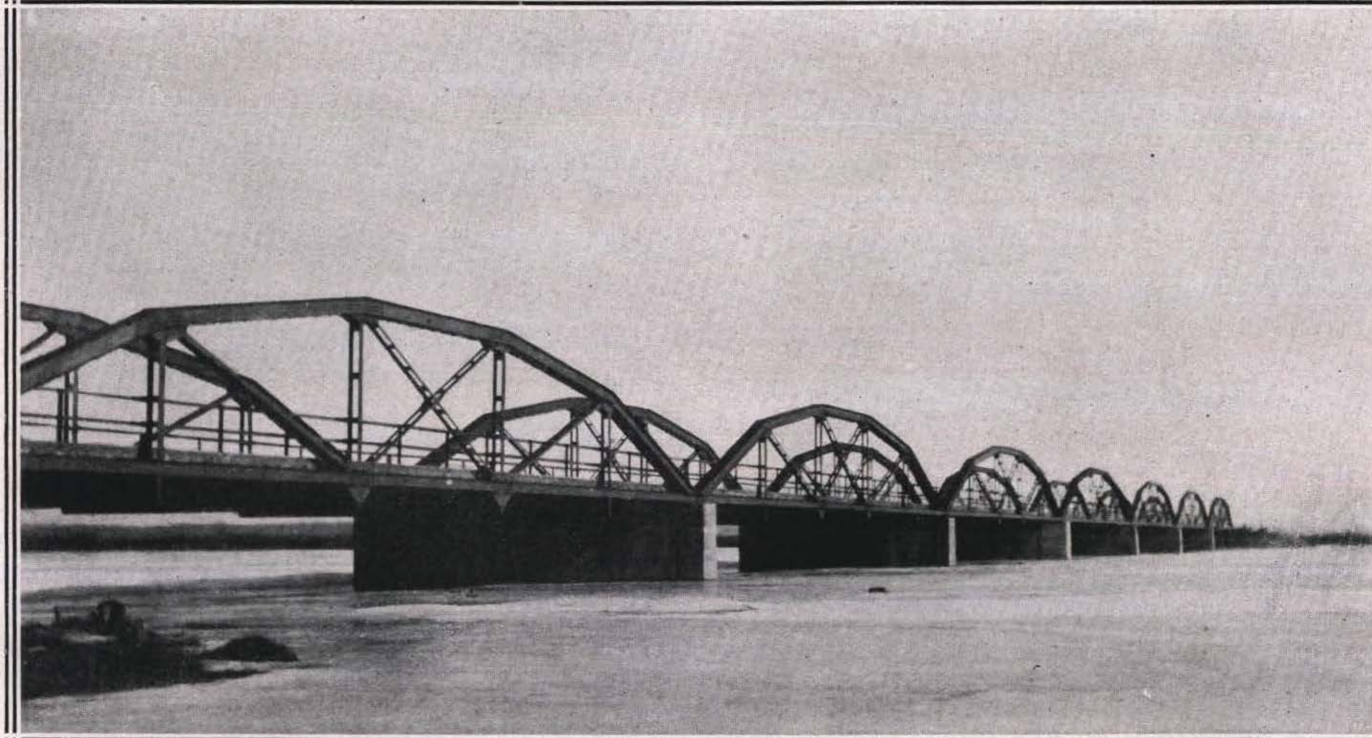
It is further agreed between the parties hereto that from time to time estimates shall be paid to the party of the second part by the party of the first part upon materials furnished and labor performed, as in the judgment of the party of the first part may be right and proper.

It is further agreed between the parties hereto that such bridges, bridge work and bridge materials ordered by the party of the first part shall be furnished and completed by the party of the second part within ....days from the date of such order.

Provided further, that due notice shall be given to the party of the first part by the party of the second part when about to commence the building of any bridges in order that the party of the first part may provide for the inspection of materials and labor to be performed, and unless otherwise specifically provided..of the District in which the work is to be performed is hereby designated by the party of the first part to act for and in behalf of the party of the first part at all times when such Board of..is not in official session.

It is further agreed between the parties hereto that the said party of the second part shall protect and hold the party of the first part free

ARLINGTON STATE AID BRIDGE, ELKHORN RIVER, 1913
ONE 180-FT TRUSS



NORTH PLATTE STATE AID BRIDGE, NORTH PLATTE RIVER, 1916
SEVEN 100-FT. TRUSSES

and harmless from any and all claims for royalties on account of the infringement of any patents.

The party of the second part hereby agrees to furnish within thirty days from the date hereof, a good and sufficient surety bond acceptable to the party of the first part in the sum of..Dollars, conditioned for the faithful performance and full completion of the agreement of the party of the second part under and in accordance with the terms of this contract.

This contract shall be binding upon the heirs, executors, administrators, successors and assigns of the respective parties hereto.

IN WITNESS WHEREOF the parties hereto have set their hands the day and year above written.

....

....

....

....

Party of the First Part

....

....

Party of the Second Part

ATTEST:

I hereby certify that the foregoing contract has this day been duly signed by the Board of County..of.................................. County, Nebraska, and by the contractor, and is now hereby countersigned by me, as County Clerk, ex-officio clerk of said County Board.

(SEAL) ....19........ ....

BOND OF PUBLIC CONTRACTOR

KNOW ALL MEN BY THESE PRESENTS: That we..............................
..............................as principal, and..............................
..............................as sureties, are held and firmly bound unto the County of.............................., State of Nebraska, in the penal sum of $.............................., and for the payment of which we do hereby bind ourselves, our heirs, executors, and administrators, jointly, severally, and firmly by these presents.

Dated ....A. D. 19........

The condition of this obligation is such that whereas the above bounden..............................has been awarded by the County Board of..............................of.............................. County, of the State of Nebraska, the contract for

....

....

according to certain plans, specifications, proposals and contract on file in the office of the County Clerk of said county,

Now if the said..............................shall faithfully keep and perform each and every one of the stipulations and agreements contained in the said contract, plans, specifications and proposals at the time and in the manner therein specified, and pay off and settle in full with the person or persons entitled thereto all accounts and claims that may become due by reason of laborers' or mechanics' wages, or for materials furnished, or services rendered to said party of the first part in executing or performing the obligations of said contract, so that each of such persons may receive his just dues in that behalf, then this obligation to be void; otherwise to be and remain in full force and effect in law.

In Presence of

....

....

....

NEBRASKA HYDROGRAPHIC REPORT

1916

Lincoln, Nebraska, Nov. 18, 1916.

George E. Johnson, State Engineer,
Lincoln, Nebraska.

Dear Sir:

I take pleasure in submitting to you herewith a report of the work done by me in the investigation of the surface water supply over the state in general and in the North Platte Valley in particular, during the seasons of 1915 and 1916.

Yours truly,

D. P. WEEKS Jr.,
State Hydrographer.

DPW/N

STATE OF NEBRASKA HYDROGRAPHS SHOWING NORTH-PLATTE AND PLATTE RIVER DISCHARGE 1916.
D.P. WEEKS JR. STATE HYDROGRAPHER
GEO. E. JOHNSON STATE ENGINEER
STATE OF NEBRASKA HYDROGRAPHS SHOWING NORTH-PLATTE AND PLATTE RIVER DISCHARGE 1916.
D.P. WEEKS JR. STATE HYDROGRAPHER
HENRY
MITCHEL
MINATARE
BRIDGEPORT
BROADWATER
LISCO
OSHKOSH
KEYSTONE
NORTH PLATTE
GOTHENBURG
LEXINGTON
ELM CREEK
APR
MAY
JUN
JUL
AUG
SEPT
DISCHARGE IN CU.FT.-SEC.
DIVERSIONS
INCREASE BY SEEPAGE

NEBRASKA HYDROGRAPHIC REPORT, 1916

The work in hydrographic investigations during 1915 was confined to a general study of the flow of Nebraska streams at scattered gaging stations throughout the state, these stations having been maintained through a number of years for the purpose of water power determinations, and to some extent, in the western portion of the state for irrigation purposes.

In 1916 an attempt was made to continue the stations maintained in the past throughout the state, and to carry on, also, a special investigation of the flow in the North Platte river between the Wyoming state line and Kearney, and to determine as far as possible the amount of diversion and incrassation occurring between these points.

The amount of funds available, however, proved insufficient for carrying on both the general investigations as in the past and the special investigations on the North Platte river, which seems at this time to be very important both from the standpoint of pending litigation with adjoining states and also from the standpoint of the water superintendent apportioning water among the various users in the valley. The general work was abandoned therefore on May first, and a concentrated effort was made to make the greatest use of the funds available for hydrographic work between Henry and Kearney.

Gaging stations discontinued on May first over the state in general are as follows:

Big Blue at Beatrice, Republican at Bostwick, Platte at Fremont, Loup at Columbus, Little Blue at Fairbury, Birdwood Creek at Sutherland, Platte at Elm Creek, Platte at Columbus, Elkhorn at Arlington.

Gaging stations established at this time in connection with the North Platte river investigations are as follows:

North Platte river at Henry, Morrill, Mitchell, Scott's Bluff, Minatare, Bayard, Bridgeport, Broadwater, Lisco, Oshkosh, Lewellen, Keystone, Sutherland, and North Platte.

South Platte river at North Platte.

Platte river at Gothenburg, Lexington and Elm Creek.

After establishing these stations the following were found to be impracticable because of poor conditions at the station:

North Platte river at Morrill, Scott's Bluff, Bayard, Lewellen, and Sutherland.

Gaging stations with their estimate of daily discharge herewith presented are:

North Platte river at Henry, Mitchell, Minatare, Bridgeport, Broadwater, Lisco, Oshkosh, Keystone, and North Platte.

Platte river at Gothenburg, Lexington, and Elm Creek.

The following may be said regarding future work that may be done along this line:

More frequent gagings are necessary at each station to obtain the best results.

More than a mere comparative value of discharge can be expected and with proper care, equipment, and organization, a very close estimate can be made of the actual flow of the river at each of the gaging stations which were maintained throughout the entire season.

The following problems are to be met which do not occur in such extremes in ordinary hydrographic work:

The river at most of the stations is very broad and very shallow at the times when most careful observations are needed, thereby making actual measurements very difficult.

The shifting sand of the river bed affects greatly the relation of gage height to discharge.

Back water from a number of the irrigation headworks produces a condition unfavorable to accurate results.

Wind blowing from one side of the river toward the other will produce a gage height different than would be exhibited with the same flow on a calm day.

The low salary which has been available for observers has made it impossible to get the most reliable service in the matter of reading gage heights.

By reference to the accompanying chart showing hydrographs for each of the gaging stations at which estimates of daily discharge were made, it may be readily seen that certain inconsistencies present themselves in comparing one hydrograph with another, but the hydrographs here presented represent the discharge as computed for that particular station independent of any reference to the other gaging stations. Keeping this in mind it is fair to assume that these inconsistencies might well be reduced to a minimum by a more intensive survey of the station.

In addition to river measurements it was attempted to obtain as nearly as possible an estimate of all water flowing into the river between the points under consideration as well as an estimate of the diversions.

An attempt was made to have each water user make daily observation of gage height in his rating flume and submit a record of these gage heights to the State Engineer. Gagings were made in the rating flume and referred to the gage height read by the water user.

Many difficulties presented themselves in this respect. Many of the rating flumes were in poor shape and conditions for reading were very bad. Several of the water users were indifferent in their co-operation with the office of the State Engineer in spite of the fact of the law requiring them to furnish gage heights and efforts of the Board of Irrigation and the Irrigation Association to bring about an efficient system of co-operation. However, on the larger enterprises where the value of water and of co-operative work with the state were apparent, more evidence of better co-operation was experienced. Many promises were obtained for reading gage heights that were not fulfilled, but the data that has been supplied will be of considerable value and is contained herewith.

RECOMMENDATIONS FOR FUTURE INVESTIGATIONS.

An automatic gage should be installed on North Platte, at Bridgeport, and one either at Mitchell or Henry.

Two hydrographers with small cars can cover the territory from Henry to Kearney in a very efficient manner, reducing the results of the investigation from one of comparative value to one of absolute value.

The headquarters of one hydrographer might be North Platte, while the other could headquarter at Bridgeport or Scott's Bluff.

Due consideration should be given to blank forms, observers' field books, observers' report cards, and other forms upon which the data is to finally be recorded.

Observers should be paid a higher salary than was prevalent in the past, and insistence made upon their diligent and accurate work.

A report of each observer should be made to the office of the State Engineer, and to the water superintendent of Division No. 1, from the principal gaging stations daily and from the less important stations each week.

It should be the duty of some person in the office to keep these reports platted up to date both for the detection of poor work on the part of the observers and for the purpose of giving information of stream flow at any time it may be needed.

Actual measurements should be platted in the office as soon as computed, each hydrographer computing his own notes and sending in a report of same to the general office and to the water superintendent or Division No. 1

Water users should be instructed to get their rating flumes in good order before the irrigation season.

Legislation is urged to compel water users to co-operate more thoroughly in furnishing gage heights to the State Board.

Each station should be carefully referred to permanent bench marks for future reference.

For the purpose of future comparison stations should be maintained from the first of April to the thirtieth of September. This means that the hydrographers should be in their respective territories by at least the fifteenth of March. If the ice has not left the river at that time the organization of the work may be considered and the territory familiarized before the actual season of irrigation is started.

SEEPAGE RETURN IN THE NORTH PLATTE VALLEY.

The complications which beset us in estimating the seepage return of the North Platte river are many, and a series of observations extending over a period of more than one season would be necessary to even approximate a satisfactory idea of the amount of water returning to the river from the different irrigation projects.

Among the difficulties encountered may be mentioned problems of obtaining accurate estimates of diversions, inaccuracies entering into river discharge measurements and estimates, and greatest of all the constant change in proportion between surface flow and underflow.

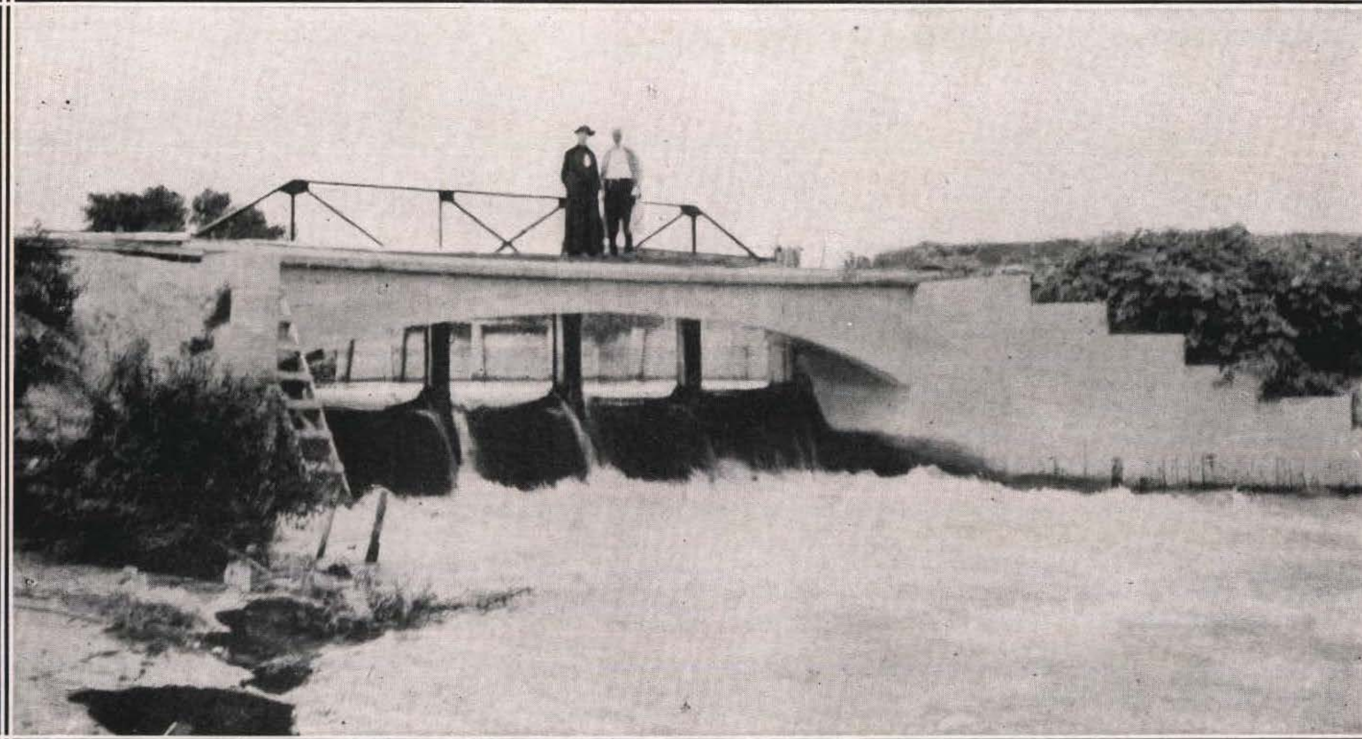
Our investigations were organized last spring primarily to make a general study of the flow of the river between Henry and Elm Creek and to obtain as accurately as possible, an estimate of all diversions from the flow of the river. No special return flow investigations were made, but it was hoped that an analysis of the data collected would be a means of a fair determination of this return flow.

The only way in which it is possible to get a figure on the amount of diversion is by conscientious co-operation on the part of the water users. Some of the water users during the past season were very good about this. Others were good in their promises only, and a few were antagonistic toward any plan of co-operation, whatever.

The accuracy of stream gagings in connection with an estimate of seepage return bears much more importance than a mere estimate of the amount of water available for use.

Under ordinary conditions of measurement the Platte and North Platte river present very aggrevating problems. Where the water is spread out over nearly a half a mile of width with a depth of small fractions of a foot little hope of obtaining a measurement within 10% may be entertained. However, by selecting more favorable sites and adopting special methods and precautions, error may be reduced to a minimum.

Whatever the accuracy of measurements and estimates may be, great inconsistencies will present themselves because of the indefinite proportion which is maintained between surface and under flow. The North Platte and Platte rivers may be considered as a general movement of water down the valley, part in the form of surface flow and a large portion in the form of under flow. Though this under flow is very slow, yet the large area through which it moves makes possible a large total flow. It is reasonable to believe that wherever the cross section area of the porous sub-strata is reduced by reason of a shallower depth of sand or encroachment of the bench or bluffs upon the river, more of the total



HEAD GATES OF THE FRENCHMAN VALLEY IRRIGATION DISTRICT PROJECT flow will be in the form of surface runoff. It is predicted that a more or less definite relation may be found to exist between the losses or gains from one gaging station to another and the product of the depth of the sand multiplied by the width of the valley. Information as to depth of sand may be obtained from soundings made for State Bridges.

Differences in topography of the country through which the river flows hinders the use of comparative methods over the different portions of the stream. The accretions of the river through Scottsbluff and Morrill counties will consist of principally of seepage return. Between Bridgeport and North Platte large quantities of rainfall have been stored in the sand hills to the north and will form a source of considerable accretion. Below North Platte a still different condition exists which will present further problems.

As to results of the past seasons work in estimating return seepage the total acre feet passing each gaging station during the month of July has been tabulated together with estimated diversions in acre feet. The month of July is taken because in that month the stream in its upper stretches at no time varied beyond the limits of our measurements of discharge, nor was the flow as great at any time as to introduce other complications. For instance, a flow of 1,000 second feet with a possible error of 5% would introduce a possible error in estimating loss or gain in the flow of the river of 50 second feet, while a flow of 4,000 second feet with the same possible error would introduce a possible error of 200 second feet in the loss or gain between gaging stations.

It has been taken into account that ditches dating later than January 1, 1894, were closed to natural flow from July 9th to 17th.

Seepage in any form whether entering the river in streams or by underflow was left out of the table. By tabulating discharge in acre feet at one gaging station together with accretions and discharge of the river at the next station down the river together with intervening diversions, the difference will indicate unaccountable losses or gains in the flow, which as set forth above will consist of losses in the form of evaporation or the disappearance of surface waters into the sub-strata, or gains consisting of seepage return from irrigation projects, accretion from springs, or the return of underflow to the surface.

The results shown by this tabular representation are consistent with the theory that the river changes back and forth from surface flow to underflow, and vice versa. The principal gains are between Mitchell and Minatare, and Bridgeport and Lisco. In each of these river stretches the bluffs come in close to the river. The other stretches show losses of varying magnitudes consistent in each case with the topographic and geologic features.

With the foregoing in mind and noticing the tabular record of loss and gain in the river from the accompanying sheet, the following conclusions may be made.

1st. Field work in connection with seepage return investigations must be reduced to precision, for an error of 10% in any one gaging station might introduce an error of 100% in seepage return results.

2d. A study of underflow and ground water will necessarily accompany a study of seepage return.

3d. A series of winter measurements would be valuable in connection with this study as during that time no diversions are made and evaporation is a minimum, while seepage return, though affected by temperature, would stand out more plainly.

TABLE SHOWING UNACCOUNTABLE GAIN OR LOSS IN FLOW BETWEEN GAGING STATIONS ON THE NORTH PLATTE RIVER.

NAME OF STATION	July Discharge in Acre Feet	July Discharge in Acre Feet	Loss	Gain
North Platte at Henry	199600	....	....	....
Diversions between Henry and Mitchell	....	70060	....	....
North Platte at Mitchell	....	129000	....	....
	199600	199060	540	....
North Platte at Mitchell	129000	....	....	....
Mitchell Wasteway	6200	....	....	....
Diversions between Mitchell and Minatare	....	12400	....	....
North Platte at Minatare	....	143800	....	....
	135200	156200	....	21000
North Platte at Minatare	143800	....	....	....
Diversions between Minatare and Bridgeport	....	25890	....	....
North Platte at Bridgeport	....	107200	....	....
	143800	133090	10710	....
North Platte at Bridgeport	107200	....	....	....
Diversions between Bridgeport and Lisco	....	3200	....	....
North Platte at Lisco	....	114400	....	....
	107200	117600	....	10400
North Platte at Lisco	114400	....	....	....
Diversions between Lisco and Oshkosh	....	380	....	....
North Platte at Oshkosh	....	95200	....	....
	114400	95580	18820	....
North Platte at Oshkosh	95200	....	....	....
Blue Creek	1800	....	....	....
Birdwood Creek	6000	....	....	....
Diversions	....	21340	....	....
North Platte at North Platte	....	62150	....	....
	103000	83490	19510	....

TABLE SHOWING UNACCOUNTABLE GAIN OR LOSS IN FLOW BETWEEN GAGING STATIONS ON THE NORTH PLATTE RIVER

(Continued)

NAME OF STATION	July Discharge in Acre Feet	July Discharge in Acre Feet	Loss	Gain
North Platte at North Platte	62150	....	....	....
Diversions	....	1200	....	....
Platte at Gothenburg	....	51336	....	....
	62150	52536	9614	....
Platte at Gothenburg	51336	....	....	....
Diversions	....	8680	....	....
Platte at Lexington	....	28800	....	....
	51336	37480	24670	....
Platte at Lexington	28800	....	....	....
Platte at Elm Creek	....	19270	....	....
	28800	19270	9530	....

TABLE SHOWING EVAPORATION AT THE NORTH PLATTE EXPERIMENT STATION.

Months	Bench	Table
April	4.014	4.514
May	6.011	6.830
June	5.144	6.694
July	9.977	10.590
August	7.017	7.518

SEEPAGE STREAMS FROM NORTH PLATTE PROJECT—RUN OFF, IN ACRE FEET, BY MONTHS*

1913	Sheep Creek	Akers Draw	Stew-art Draw	Dry Spotted Tail Creek	Wet Spotted Tail Creek	(2) Sun-flower Drain	(2) McAl-lister Drain	(1) Banner Drain	(1) Hier-sche Drain	Tub Springs	Dun-ham Drain	Win-ters Creek	(2) Alli-ance Drain	Total by month
January	1409	251	142	74	265	....	....	....	....	698	....	1106	....	3945
February	1660	286	147	42	255	....	....	....	....	564	....	961	....	3915
March	2487	454	183	16	308	....	....	....	....	600	....	1178	....	5226
April	1949	235	174	109	240	....	....	....	....	502	....	990	....	4199
May	1318	204	184	92	228	....	....	....	....	454	....	987	....	3467
June	1101	300	220	268	214	....	....	....	....	616	....	972	....	3691
July	1162	381	280	528	253	....	....	....	....	935	....	1375	....	4914
August	1485	469	297	936	1100	....	....	....	....	1592	....	1516	....	7395
September	1837	522	371	1130	687	....	....	275	738	1650	145	1370	....	7712
October	2150	537	366	850	730	....	....	256	672	1753	196	1443	....	8025
November	2180	512	312	520	580	....	....	228	540	1348	238	1377	....	7067
December	2557	500	349	473	444	....	....	217	275	1366	246	1240	....	7175
Total, by year	21295	4651	3025	5038	5304	....	....	976	2225	12078	825	14515	....	66731

(1) Included in Tub Springs.
(2) Estimated.

*Supplied by U. S. Reclamation Service.

SEEPAGE STREAMS FROM NORTH PLATTE PROJECT—RUN OFF, IN ACRE FEET, BY MONTHS*

1914	Sheep Creek	Akers Draw	Stew-art Draw	Dry Spotted Tail Creek	Wet Spotted Tail Creek	(2) Sun-flower Drain	(2) McAl-lister Drain	(1) Banner Drain	(1) Hier-sche Drain	Tub Springs	Dun-ham Drain	Win-ters Creek	(2) Alli-ance Drain	Total by month
January	2601	526	294	349	422	....	....	132	193	1098	220	1154	....	6664
February	2115	485	278	222	365	....	....	16	48	760	156	1010	....	5391
March	2194	530	526	246	278	....	....	....	77	595	141	1192	....	5702
April	2060	493	276	244	242	....	....	15	101	582	174	1106	....	5177
May	2117	477	232	161	212	....	....	68	193	772	216	1252	....	5439
June	1369	505	343	289	153	....	....	164	309	816	189	1469	....	5133
July	968	347	326	462	178	3	20	274	415	1118	235	1606	....	5263
August	1397	495	370	720	465	6	30	388	688	1014	287	1826	....	6610
September	1836	448	436	740	896	8	45	439	1022	1342	297	2111	....	8159
October	2163	540	463	562	885	10	35	379	900	1420	310	2118	....	8506
November	1994	586	425	488	726	12	20	251	584	1418	266	1722	50	7707
December	2153	606	440	502	573	12	10	165	456	1241	224	1650	120	7531
Total, by year	22967	6038	4409	4985	5395	51	160	2291	4986	12176	2715	18216	170	77282

(1) Included in Tub Springs.
(2) Estimated.

*Supplied by U. S. Reclamation Service.

SEEPAGE STREAMS FROM NORTH PLATTE PROJECT—RUN OFF, IN ACRE FEET, BY MONTHS*

1915	Sheep Creek	Akers Draw	Stewart Draw	Dry Spotted Tail Creek	Wet Spotted Tail Creek	(2) Sunflower Drain	(2) McAllister Drain	(1) Banner Drain	(1) Hiersche Drain	Tub Springs	Dunham Drain	Winters Creek	(2) Alliance Drain	Total by month
January	2154	675	464	400	408	12	....	143	288	910	158	1530	180	6891
February	2079	641	352	292	413	12	....	121	193	795	99	1458	220	6361
March	3020	743	336	248	465	12	....	123	197	955	108	1519	250	7656
April	2589	543	334	249	396	12	....	107	334	1005	113	1303	300	6844
May	2421	490	388	355	480	12	....	93	495	1121	250	1432	300	7249
June	2148	364	398	358	417	12	....	74	412	735	318	1626	350	6726
July	2010	414	448	460	412	12	5	181	610	914	228	1693	400	6996
August	2525	480	555	770	466	30	22	255	872	1105	268	1840	627	8688
September	3110	422	526	887	690	39	38	302	713	1226	294	2075	877	10184
October	3530	432	543	650	625	30	30	235	639	1467	261	1940	707	10215
November	3780	390	540	480	530	30	25	150	565	1320	185	1770	730	9780
December	3480	380	500	415	420	30	10	125	475	775	130	1695	750	8585
Total, by year	32846	5974	5384	5564	5722	243	130	1909	5792	12328	2412	19881	5691	96175

(1) Included in Tub Springs.
(2) Estimated.

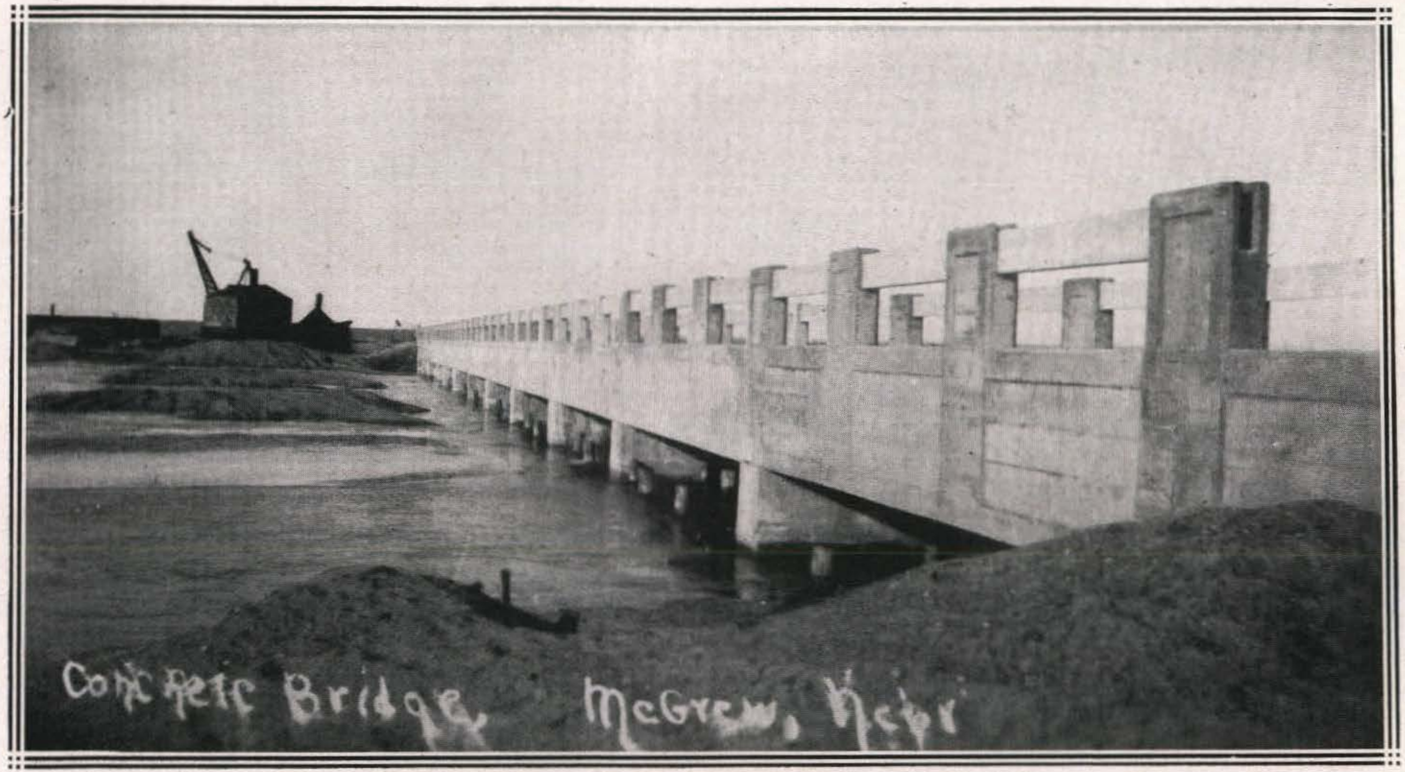
*Supplied by U. S. Reclamation Service.

SEEPAGE STREAMS FROM NORTH PLATTE PROJECT—RUN OFF, IN ACRE FEET, BY MONTHS*

1916	Sheep Creek	Akers Draw	Stew-art Draw	Dry Spotted Tail Creek	Wet Spotted Tail Creek	Sun-flower Drain	McAl-lister Drain	(1) Banner Drain	(1) Hier-sche Drain	Tub Springs	Dun-ham Drain	Win-ters Creek	Alli-ance Drain	Nine Mile Creek	Total by month
Jan.	2875	353	493	343	315	31	....	123	290	576	73	1380	582	....	7434
Feb.	3575	388	455	250	293	29	....	113	217	670	58	1264	530	....	7842
Mar.	3776	598	450	213	312	30	....	68	193	794	62	1353	526	....	8375
Apr.	2688	621	476	145	266	24	....	40	135	482	61	1208	482	....	6628
May	2760	538	575	410	430	25	....	74	218	480	116	1330	507	....	7463
June	2130	425	532	420	418	30	27	110	422	647	195	1492	602	....	7450
July	2095	540	584	597	420	23	102	155	510	917	204	1712	1008	15	8882
Aug.	2617	657	648	886	743	30	160	220	512	1013	226	2043	962	60	10777
Sept.	3158	676	744	1000	800	42	180	300	700	1185	228	2048	900	200	12161
Oct.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Nov.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Dec.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Total, by year	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....

(1) Included in Tub Springs.

*Supplied by U. S. Reclamation Service.



McGREW STATE AID BRIDGE, NORTH PLATTE RIVER, 1914
TWENTY-THREE 33-FT. CONCRETE GIRDERS

AVERAGE SEEPAGE RETURN

	Cu. Ft. Per Sec.
Intercepted by Tri State	63
Intercepted by Enterprise	18
Intercepted by Nine Mile Ditch	7
Uninterrupted flow of river	165
Total	253

DISCHARGE OF SEEPAGE STREAMS

Name	Locality	Date 1916	Discharge sec. ft.
Sheep Creek	Into Tri-State	7-15	30.0
Sheep Creek	Into Tri-State	8- 1	50.6
Sheep Creek	Into Tri-State	8-19	40.0
Sheep Creek	Below Tri-State	5-18	46.0
Sheep Creek	Below Tri-State	6- 8	27.5
Sheep Creek	Below Tri-State	6-23	30.5
Sheep Creek	Below Tri-State	7-15	0.5
Sheep Creek	Below Tri-State	8- 1	4.89
Sheep Creek	Below Tri-State	8-19	1.24
Akers Draw	Into Tri-State	5-18	14.6
Akers Draw	Into Tri-State	6- 8	9.3
Akers Draw	Into Tri-State	6-23	6.9
Akers Draw	Into Tri-State	7-15	8.7
Akers Draw	Into Tri-State	8- 1	10.7
Akers Draw	Into Enterprise	5-18	2.0
Akers Draw	Into Enterprise	6- 8	2.0
Akers Draw	Into Enterprise	6-23	2.06
Akers Draw	Into Enterprise	7-15	3.88
Akers Draw	Into Enterprise	8- 1	3.46
Akers Draw	Into Enterprise	8-19	3.66
Dry Spotted Tail	Into Tri-State	6-23	5.6
Dry Spotted Tail	Into Tri-State	7-15	7.8
Dry Spotted Tail	Into Tri-State	8- 2	7.82
Dry Spotted Tail	Into Enterprise	5-18	11.9
Dry Spotted Tail	Into Enterprise	6- 8	7.9
Dry Spotted Tail	Into Enterprise	6-23	7.5
Dry Spotted Tail	Into Enterprise	7-15	6.6
Dry Spotted Tail	Into Enterprise	8- 2	14.7
Dry Spotted Tail	Into Enterprise	8-19	13.0
Wet Spotted Tail	Into Tri-State	5-18	6.7
Wet Spotted Tail	Into Tri-State	6- 8	7.49
Wet Spotted Tail	Into Tri-State	6-23	2.26
Wet Spotted Tail	Into Tri-State	7-15	3.14
Wet Spotted Tail	Into Tri-State	8- 2	7.26
Wet Spotted Tail	Into Enterprise	7-15	7.41
Wet Spotted Tail	Into Enterprise	8- 2	7.83
Tub Springs	Into Enterprise	6- 8	0.0
Tub Springs	Into Enterprise	6-26	2.0
Tub Springs	Into Enterprise	7-16	16.8
Tub Springs	Into Enterprise	8- 2	0.5
Tub Springs	Below Enterprise	6- 8	24.1
Tub Springs	Below Enterprise	6-26	36.6
Tub Springs	Below Enterprise	7-16	1.11
Tub Springs	Below Enterprise	8- 2	20.3
Winters Creek	Below Tri-State	5- 8	17.8
Winters Creek	Below Tri-State	6- 9	26.0
Winters Creek	Below Tri-State	6-27	26.1
Winters Creek	Below Tri-State	7-16	17.6
Winters Creek	Sugar Factory	8- 3	72.3**

DISCHARGE OF SEEPAGE STREAMS—(Continued.)

Name	Locality	Date 1916	Discharge sec. ft.
Minatare Drain	Above Nine Mile	7-16	65.4
Minatare Drain	Above Nine Mile	8- 4	83.79
Minatare Drain	(2 mi. East of Minatare, below Nine Mile)	5- 8	32.09
Minatare Drain		6-10	48.0
Minatare Drain		6-28	50.45
Minatare Drain	Nine Mile	7-16	67.6
Minatare Drain	Nine Mile	8- 4	71.37
Nine Mile Drain		6-10	5.6
Nine Mile Drain		6-28	2.83
Nine Mile Drain		7-16	6.12
Nine Mile Drain		8- 4	7.45
Drain	East of Gering, South side of river	6-27	2.1
Seepage	South of Bayard	8- 4	21.82
Seepage	South of Bayard	7-16	18.63
Drain	(200 yds. W. Bayard (Wagon Bridge	6-10	3.37
Drain		7-14	5.22
Drain		8- 4	9.60
Red Willow	33-21-51	5-12	33.66
Red Willow		7-16	28.78

**Contains waste water.

DAILY DISCHARGE, IN SECOND-FEET, OF DRY SPOTTED TAIL SEEP INTO TRI-STATE CANAL, FOR 1914.*

Day	May Discharge	June Discharge	July Discharge	August Discharge	September Discharge	October Discharge
1	....	....	5.18	10.84	14.25	12.08
2	....	....	5.18	10.84	....	....
3	....	....	5.18	10.84	....	....
4	....	....	5.18	10.84	....	....
5	....	....	Closed	10.84	....	9.74
6	....	....	Closed	10.84	....	....
7	....	....	Closed	10.84	....	....
8	....	....	Closed	10.84	11.66	....
9	....	....	Closed	10.84	....	....
10	....	....	7.04	10.84	....	....
11	....	....	7.04	10.84	12.93	9.25
12	....	....	7.04	10.84	12.93	....
13	....	....	7.04	10.84	12.93	....
14	....	....	7.04	10.84	12.93	....
15	....	....	7.04	10.84	12.93	....
16	....	....	7.04	Closed	12.93	8.87
17	....	....	7.04	Closed	12.93	....
18	....	....	Closed	Closed	12.93	....
19	....	....	Closed	Closed	12.93	....
20	....	....	Closed	Closed	12.93	....
21	....	....	Closed	Closed	12.93	....
22	....	....	Closed	Closed	12.93	....
23	....	....	Closed	Closed	12.93	....
24	....	....	Closed	12.93	12.93	....
25	....	....	Closed	12.93	12.93	....
26	....	**6.00	Closed	12.93	12.93	....
27	....	....	7.00	12.93	12.93	....
28	....	....	7.00	14.95	12.93	....
29	....	5.78	7.00	14.95	12.93	....
30	....	....	7.00	14.95	12.93	....
31	....	....	10.84	14.95	....	Closed
Total	....	....	....	....	....	....
Acre-ft.	....	....	....	....	....	....

*Flow was measured over a 4.5 ft. Cippoletti Weir.
Data furnished by U. S. Reclamation Service.

**Commenced June 26th.

DAILY DISCHARGE, IN SECOND-FEET, OF DRY SPOTTED TAIL SEEP INTO TRI-STATE CANAL, FOR 1915.*

Day	May Discharge	June Discharge	July Discharge	August Discharge	September Discharge	October Discharge
1	....	....	6.01	11.65	....	....
2	....	....	....	....	....	....
3	....	....	5.35	....	....	....
4	....	....	....	....	....	....
5	....	†6.01	....	11.65	....	....
6	....	....	....	@	....	....
7	....	....	....	....	....	....
8	....	....	....	....	....	....
9	....	....	....	....	....	....
10	....	†6.01	....	....	....	....
11	....	....	....	....	....	....
12	....	....	....	....	....	....
13	....	....	....	....	....	....
14	....	....	....	....	....	....
15	....	†6.01	....	....	....	....
16	....	....	....	....	....	....
17	....	....	7.82	....	....	....
18	....	....	....	....	....	....
19	....	....	....	....	....	....
20	....	†6.01	....	....	....	....
21	....	....	....	....	....	....
22	....	....	....	....	....	....
23	....	....	....	....	....	....
24	....	....	....	....	....	....
25	....	†6.01	....	....	....	....
26	....	....	Closed	....	....	....
27	....	....	Closed	....	....	....
28	....	....	11.65	....	....	....
29	....	....	11.65	....	....	....
30	....	†6.01	11.65	....	....	....
31	....	....	11.65	....	....	....
Total	....	....	....	....	....	....
Acre-ft.	....	....	....	....	....	....

*Flow was measured over a 4.5 ft. Cippoletti Weir.
Data furnished by U. S. Reclamation Service.

†Water turned into canal on June 5th.

@Closed—break in ditch.

DAILY DISCHARGE, IN SECOND-FEET, OF WET SPOTTED TAIL SEEP INTO TRI-STATE CANAL, FOR 1914.*

Day	May Discharge	June Discharge	July Discharge	August Discharge	September Discharge	October Discharge
1	....	....	....	....	....	....
2	....	....	....	....	....	....
3	....	....	....	....	....	....
4	....	....	....	....	....	....
5	....	....	....	....	....	....
6	....	....	....	....	....	....
7	....	....	....	....	....	....
8	....	....	....	....	....	....
9	....	....	....	....	....	....
10	....	....	....	....	....	....
11	....	....	....	....	....	....
12	....	....	....	....	....	....
13	....	....	....	....	....	....
14	....	....	....	....	....	....
15	Av. 3.4	Av. 2.6	Av. 2.9	Av. 7.5	Av. 14.4	Av. 14.4
16	....	....	....	....	....	....
17	....	....	....	....	....	....
18	....	....	....	....	....	....
19	....	....	....	....	....	....
20	....	....	....	....	....	....
21	....	....	....	....	....	....
22	....	....	....	....	....	....
23	....	....	....	....	....	....
24	....	....	....	....	....	....
25	....	....	....	....	....	....
26	....	....	....	....	....	....
27	....	....	....	....	....	....
28	....	....	....	....	....	....
29	....	....	....	....	....	....
30	....	....	....	....	....	....
31	....	....	....	....	....	....
Total	....	....	....	....	....	....
Acre-ft.	....	....	....	....	....	....

*Data furnished by U. S. Reclamation Service.

DAILY DISCHARGE, IN SECOND-FEET, OF WET SPOTTED TAIL SEEP INTO TRI-STATE CANAL, FOR 1915.*

Day	May Discharge	June Discharge	July Discharge	August Discharge	September Discharge	October Discharge
1	....	5.95	6.31	9.44	14.37	....
2	....	....	....	9.86	....	....
3	....	....	6.68	....	14.85	....
4	....	....	....	10.28	....	....
5	....	....	6.68	....	15.34	....
6	....	5.95	....	11.60	....	....
7	....	....	6.68	....	15.83	....
8	....	....	....	11.60	16.33	....
9	....	....	6.68	....	....	....
10	....	....	....	12.70	....	....
11	....	....	6.68	....	....	....
12	....	....	....	12.00	16.33	....
13	....	....	6.68	....	....	....
14	....	....	....	12.00	16.83	....
15	Av. 6.0	....	6.68	....	....	Av. 11
16	....	....	....	12.00	14.37	....
17	....	....	6.68	....	14.85	....
18	....	....	....	12.50	14.37	....
19	....	....	6.68	....	14.37	....
20	....	....	....	13.90	13.39	....
21	....	....	6.68	....	13.39	....
22	....	....	....	13.43	13.90	....
23	....	....	6.68	....	13.39	....
24	....	....	....	13.43	13.90	....
25	....	....	7.03	....	14.37	....
26	....	....	....	12.96	14.85	....
27	....	....	7.44	....	....	....
28	....	....	....	12.50	....	....
29	....	6.31	7.44	....	....	....
30	....	....	....	12.00	....	....
31	....	....	....	14.37	....	....
Total	....	....	....	....	....	....
Acre-ft.	....	....	....	....	....	....

*Flow was measured over a 5 ft. Cippoletti Weir.

Data furnished by U. S. Reclamation Service.

DAILY DISCHARGE, IN SECOND-FEET, OF TUB SPRING SEEP INTO TRI-STATE CANAL, FOR 1914.*

Day	May Discharge	June Discharge	July Discharge	August Discharge	September Discharge	October Discharge
1	....	....	†	....	17.25	....
2	....	....	....	....	....	....
3	....	....	....	....	....	....
4	....	....	....	16.68	17.25	....
5	....	....	....	....	19.00	....
6	....	....	....	16.11	....	....
7	....	....	....	....	20.20	....
8	....	....	....	16.65	....	....
9	....	....	....	....	....	....
10	....	....	....	16.68	....	....
11	....	....	....	....	20.20	....
12	....	....	....	16.68	....	....
13	....	....	....	....	....	....
14	....	....	....	17.25	....	23.30
15	....	....	....	....	....	....
16	....	....	....	16.11	22.05	....
17	....	....	....	....	....	....
18	....	....	....	16.11	25.24	....
19	....	....	....	....	....	....
20	....	....	....	16.11	....	....
21	....	....	....	....	26.55	....
22	....	....	....	17.25	....	....
23	....	....	....	....	27.22	....
24	....	....	....	17.25	....	....
25	....	....	....	....	27.22	....
26	....	....	....	17.25	....	....
27	....	13.00	....	....	....	....
28	....	13.00	....	....	26.55	....
29	....	13.00	....	....	....	20.80
30	....	13.00	....	....	25.24	Closed
31	....	....	....	....	....	....
Total	....	....	....	....	....	....
Acre-ft.	....	....	....	....	....	....

*Data furnished by U. S. Reclamation Service.

†Approximately 16 sec. ft. all month.

DAILY DISCHARGE, IN SECOND-FEET, OF TUB SPRING SEEP INTO TRI-STATE CANAL, FOR 1915.*

Day	May Discharge	June Discharge	July Discharge	August Discharge	September Discharge	October Discharge
1	%	....	13.38	....	....	@
2	....	....	13.38	17.25	....	....
3	....	....	....	....	....	....
4	....	....	....	20.20	....	....
5	....	†	....	....	20.81	....
6	....	11.83	....	....	....	....
7	....	....	....	....	....	....
8	....	11.83	....	....	21.42	....
9	....	....	....	23.30	....	....
10	....	....	14.41	....	....	....
11	....	....	....	22.05	....	....
12	....	....	....	....	22.05	....
13	....	....	....	....	....	....
14	....	11.83	13.92	....	....	....
15	....	....	....	20.81	....	....
16	....	....	15.00	....	19.60	....
17	....	....	....	20.81	....	....
18	....	....	....	....	....	....
19	....	....	....	....	....	....
20	....	....	....	....	....	....
21	....	11.83	....	....	....	....
22	....	....	....	....	19.60	....
23	....	....	14.41	20.81	....	....
24	....	....	....	....	....	....
25	....	....	....	....	....	....
26	....	....	....	....	....	....
27	....	13.38	....	....	....	....
28	....	....	15.55	....	....	....
29	....	....	....	21.42	....	....
30	....	....	....	....	....	....
31	....	....	....	....	....	....
Total	....	....	....	....	....	....
Acre-ft.	....	....	....	....	....	....

*Flow was measured over a 6 ft. Cippoletti Weir.

Data furnished by U. S. Reclamation Service.

%None in May.

@None in October.

†Water first turned into canal on June 5, 1915.

DAILY DISCHARGE, IN SECOND-FEET, OF SHEEP CREEK SEEP INTO TRI-STATE CANAL, FOR 1914.*

Day	May Discharge	June Discharge	July Discharge	August Discharge	September Discharge	October Discharge
1	....	....	13.80	23.57	23.57	34.93
2	....	....	....	....	....	....
3	....	....	16.23	....	....	....
4	....	....	....	....	....	....
5	....	....	....	20.12	....	....
6	....	....	....	....	30.98	....
7	....	....	....	....	....	....
8	....	....	....	....	....	....
9	....	....	....	22.17	32.54	....
10	....	....	15.00	....	....	....
11	....	....	....	....	30.98	....
12	....	....	....	....	....	....
13	....	....	....	....	....	....
14	....	....	....	....	34.93	....
15	....	....	....	....	....	....
16	....	....	....	....	....	Closed
17	....	....	....	....	30.98	....
18	....	....	....	....	....	....
19	....	....	....	....	....	....
20	....	....	....	....	....	....
21	....	....	....	....	....	....
22	....	....	....	23.57	....	....
23	....	....	....	....	....	....
24	....	....	....	25.00	....	....
25	....	....	....	....	....	....
26	....	....	....	....	....	....
27	....	@	19.45	....	34.93	....
28	....	13.80	....	....	....	....
29	....	....	....	23.57	....	....
30	....	....	....	....	....	....
31	....	....	....	....	....	....
Total	....	....	....	....	....	....
Acre-ft.	....	....	....	....	....	....

*Flow was measured over a 7 ft. Cippoletti Weir.
Data furnished by U. S. Reclamation Service.
@Water turned into canal June 28th.

DAILY DISCHARGE, IN SECOND-FEET, OF SHEEP CREEK SEEP INTO TRI-STATE CANAL, FOR 1915*

Day	May Discharge	June Discharge	July Discharge	August Discharge	September Discharge	October Discharge
1	....	....	26.45	33.33	30.98	....
2	....	....	....	....	....	....
3	....	....	30.98	....	....	....
4	....	@	....	....	....	....
5	....	47.70	....	27.19	47.70	....
6	....	....	....	....	....	....
7	....	....	....	....	....	....
8	....	....	....	....	....	....
9	....	....	....	36.56	34.13	....
10	....	....	....	....	....	....
11	....	....	....	....	....	....
12	....	....	....	....	....	....
13	....	....	....	....	....	....
14	....	30.98	....	....	....	....
15	....	....	....	....	....	....
16	....	....	....	....	....	....
17	....	....	33.33	....	....	....
18	....	....	....	....	....	....
19	....	....	....	....	....	....
20	....	....	....	....	....	....
21	....	....	....	41.57	....	....
22	....	27.19	19.45	....	34.93	....
23	....	....	....	....	....	....
24	....	....	....	....	....	....
25	....	....	....	36.56	....	....
26	....	....	....	....	....	....
27	....	26.45	34.93	....	....	....
28	....	....	....	....	....	....
29	....	....	....	....	....	....
30	....	....	....	30.98	Closed	....
31	....	....	33.33	....	....	....
Total	....	....	....	....	....	....
Acre-ft.	....	....	....	....	....	....

*Data furnished by U. S. Reclamation Service.

@Water turned into canal on June 5th.

DAILY DISCHARGE, IN SECOND-FEET, OF AKER'S DRAW SEEP INTO TRI-STATE CANAL, FOR 1914.*

Day	May Discharge	June Discharge	July Discharge	August Discharge	September Discharge	October Discharge
1	....	....	5.47	6.03	6.90	9.07
2	....	....	....	....	....	....
3	....	....	....	....	....	....
4	....	....	....	....	7.20	....
5	....	....	....	....	....	....
6	....	....	....	9.40	....	....
7	....	....	....	....	....	....
8	....	....	....	....	6.90	....
9	....	....	....	....	....	....
10	....	....	....	....	....	....
11	....	....	....	....	....	....
12	....	....	....	....	....	....
13	....	....	....	....	....	....
14	....	....	....	....	....	....
15	....	....	....	....	....	....
16	....	....	....	8.43	....	....
17	....	....	6.03	....	....	....
18	....	....	....	....	....	....
19	....	....	....	....	....	....
20	....	....	....	....	....	....
21	....	....	....	....	....	8.43
22	....	....	....	....	....	....
23	....	....	....	....	....	....
24	....	....	....	7.20	7.75	....
25	....	....	....	....	....	....
26	....	....	....	....	....	....
27	....	....	5.47	....	....	....
28	....	....	....	6.90	9.07	....
29	....	@	....	....	....	....
30	....	5.47	....	....	....	....
31	....	....	....	....	....	Closed
Total	....	....	....	....	....	....
Acre-ft.	....	....	....	....	....	....

*Flow was measured over a 3.5 ft. Cippoletti Weir.

Data furnished by U. S. Reclamation Service.

@Water turned into canal on June 30th.

DAILY DISCHARGE, IN SECOND-FEET, OF AKER'S DRAW SEEP INTO TRI-STATE CANAL, FOR 1915.*

Day	May Discharge	June Discharge	July Discharge	August Discharge	September Discharge	October Discharge
1	....	....	6.03	7.20	8.75	....
2	....	Opened	....	....	....	....
3	....	4.93	....	....	....	....
4	....	....	....	....	....	....
5	....	....	....	8.43	....	....
6	....	....	....	....	....	....
7	5.47	6.03	....	....	....	....
8	....	....	....	....	....	....
9	....	....	....	....	....	....
10	....	....	....	9.40	8.43	....
11	....	....	....	....	....	....
12	....	....	....	....	....	....
13	....	....	....	....	....	....
14	....	....	....	9.40	....	....
15	....	....	....	....	....	....
16	....	....	....	....	....	....
17	....	....	6.90	....	7.80	....
18	5.47	....	....	....	....	....
19	Closed	....	....	....	....	....
20	Snow Storm	....	....	8.75	....	....
21	....	....	....	....	6.90	....
22	....	5.47	....	....	....	....
23	....	....	....	....	....	....
24	....	....	....	....	....	....
25	....	....	....	....	....	....
26	....	....	....	....	....	....
27	....	....	....	....	....	....
28	....	....	7.20	....	....	....
29	....	....	....	....	6.90	....
30	....	....	....	....	Closed	....
31	....	....	....	....	....	....
Total	....	....	....	....	....	....
Acre-ft.	....	....	....	....	....	....

*Data furnished by U. S. Reclamation Service.

PATHFINDER OUTFLOW, IN CUBIC FEET, PER SECOND, FOR THE YEAR 1914.

Day	October	November	December
1	4555	985	5
2	2655	985	5
3	2525	985	5
4	2530	985	5
5	2525	5	5
6	2525	5	5
7	2050	5	5
8	2030	5	5
9	2030	5	5
10	2030	5	5
11	2030	5	5
12	2030	5	5
13	2030	5	5
14	2030	5	5
15	2030	5	5
16	2030	5	5
17	2030	5	5
18	2030	5	5
19	1330	5	5
20	1815	5	5
21	1815	5	5
22	1815	5	5
23	1815	5	5
24	1020	5	5
25	985	5	5
26	970	5	5
27	985	5	5
28	985	5	5
29	985	5	5
30	985	5	5
31	985	5	5

PATHFINDER OUTFLOW, IN CUBIC FEET, PER SECOND, FOR THE YEAR 1915.

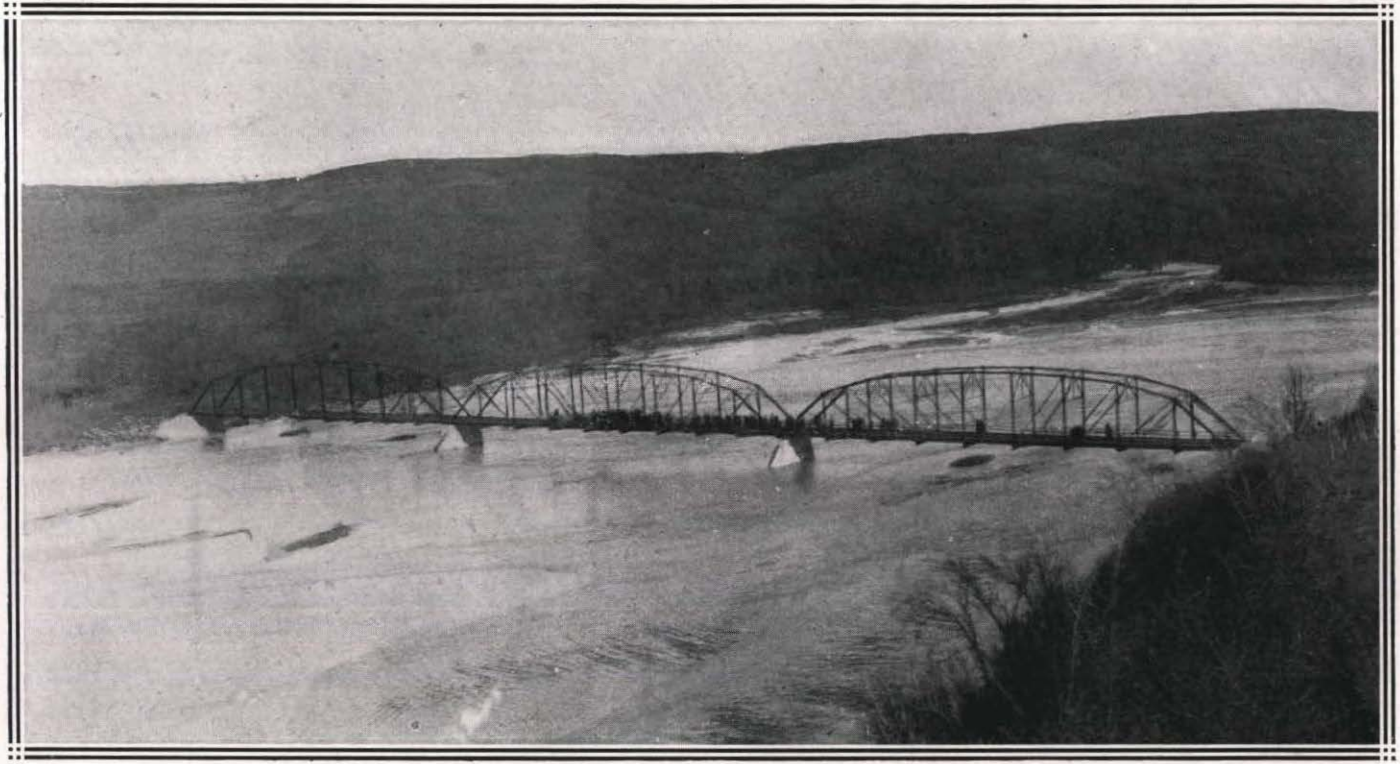
Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	5	10	10	10	1490	1880	4990	3505	2000	5	5	5
2	5	10	10	10	1650	2660	5015	3505	2000	5	5	5
3	5	10	10	10	985	3510	5015	3525	2000	5	5	5
4	5	10	10	10	1000	3505	5000	3525	2000	5	5	5
5	5	10	10	10	1000	3505	5015	3240	2050	5	5	5
6	5	10	10	10	1000	3505	5015	3200	2000	5	5	5
7	5	10	10	10	1000	3505	5015	3200	2000	5	5	5
8	5	10	10	10	1000	2000	5015	3200	2015	5	5	5
9	5	10	10	10	1000	2085	5000	3200	2000	5	5	5
10	5	10	10	10	1000	2085	4630	3200	2000	5	5	5
11	5	10	10	10	1000	2085	4510	3200	2000	5	5	5
12	5	10	10	10	1000	2040	4510	3200	2000	5	5	5
13	5	10	10	10	1560	2055	4510	3200	2000	5	5	5
14	5	10	10	10	2030	2085	4510	3200	2000	5	5	5
15	5	10	10	10	2000	2085	4250	3200	2000	5	5	5
16	5	10	10	10	2000	2085	4490	3200	2000	5	5	5
17	5	10	10	1540	2000	2640	4700	3200	1540	5	5	5
18	5	10	10	1840	2500	3040	4950	3200	1500	5	5	5
19	5	10	10	1970	1360	3050	4750	3200	1530	5	5	5
20	5	10	10	1970	1020	3090	4075	3200	1525	5	5	5
21	5	10	10	1970	330	3070	4200	3200	1500	5	5	5
22	5	10	10	1970	5	3055	4015	3200	1500	5	5	5
23	5	10	10	1970	5	3055	3730	3200	1500	5	5	5
24	5	10	10	1630	5	3055	3720	3200	1500	5	5	5
25	5	10	10	980	5	3055	3750	2530	1500	5	5	5
26	5	10	10	1000	5	3055	3715	2700	1500	5	5	5
27	5	10	10	985	5	3055	3585	2500	1500	5	5	5
28	5	10	10	985	470	3070	3505	2500	1700	5	5	5
29	5	....	10	985	950	3930	3505	2160	330	5	5	5
30	5	....	10	985	1055	4015	3570	2030	5	5	5	5
31	10	....	10	....	1055	....	3505	2000	....	90		5

PATHFINDER OUTFLOW, IN CUBIC FEET, PER SECOND, FOR THE YEAR 1916.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	5	10	10	10	1000	4300	5015	4550	2125
2	10	10	10	10	1000	4340	4980	4460	2750
3	10	10	10	10	2000	3330	5015	4570	2970
4	10	10	10	10	2000	4490	5340	4430	2540
5	10	10	10	10	2000	4300	5410	4350	2205
6	10	10	10	10	2000	4300	5410	4595	2170
7	10	10	10	10	2000	4300	5410	4800	2260
8	10	10	10	10	2030	4300	5410	4555	2370
9	10	10	10	10	2060	4350	5700	4725	2260
10	10	10	10	10	2440	4300	5725	4595	2205
11	10	10	10	10	2420	4885	5725	4860	2205
12	10	10	10	10	3090	5015	5725	4430	2205
13	10	10	10	10	2910	5060	5490	4595	1790
14	10	10	10	10	4260	5640	5410	4595	1640
15	10	10	10	10	4260	5120	5455	4010	1905
16	10	10	10	10	4260	5015	5470	3400	2015
17	10	10	10	10	4260	5015	5470	3465	1905
18	10	10	10	10	4140	5015	5470	3575	1845
19	10	10	10	10	3780	5015	5470	3660	1665
20	10	10	10	10	4340	5015	4790	3370	1765
21	10	10	10	10	4340	4985	4550	3350	1850
22	10	10	10	10	4340	4355	4515	3320	1665
23	10	10	10	10	4555	3610	4645	3600	1615
24	10	10	10	10	4300	4055	4430	3360	1690
25	10	10	10	10	4300	4055	4470	3400	1665
26	10	10	10	690	4300	4055	4470	3300	1665
27	10	10	10	1000	4300	4775	4290	3300	1765
28	10	10	10	1000	4300	5015	3970	3135	1765
29	10	10	10	1000	4300	5065	4020	3200	1200
30	10	....	10	1000	4300	5065	3950	2140	750
31	10	....	10	....	4300	....	3910	2065	....

Total	60900
Mean	2030

LOUP CITY STATE AID BRIDGE, MIDDLE LOUP RIVER. BUILT 1912, FOUR 120-FT. TRUSSES



PARSHALL STATE AID BRIDGE, NIOBRARA RIVER NEAR BUTTE, 1917
THREE 170-FT. TRUSSES

PATHFINDER INFLOW, IN CUBIC FEET PER SECOND, FOR THE YEAR 1914.

Day	October	November	December
1	600	810	360
2	470	840	310
3	340	830	400
4	240	740	450
5	250	680	450
6	1370	600	450
7	890	630	450
8	960	510	360
9	980	510	280
10	910	510	270
11	800	510	270
12	920	560	280
13	920	550	270
14	730	510	320
15	700	520	280
16	670	350	240
17	780	260	140
18	760	260	100
19	740	260	240
20	780	310	230
21	750	310	260
22	720	440	200
23	790	440	240
24	850	480	230
25	1010	890	240
26	970	440	230
27	1020	400	240
28	1020	400	230
29	1010	440	240
30	810	440	230
31	830	.....	240

PATHFINDER INFLOW, IN CUBIC FEET PER SECOND, FOR THE YEAR 1915.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	230	240	480	770	2980	3220	2750	620	550	1050	590	500
2	240	240	390	1020	3420	3150	2520	440	450	1040	620	500
3	260	240	480	1020	3720	4570	2430	480	240	860	680	500
4	640	280	480	1280	3110	4970	2030	480	1060	840	570	550
5	630	290	350	1750	2680	4980	1940	540	1920	830	480	600
6	460	240	390	1860	2700	4600	2040	530	1270	680	530	600
7	370	240	490	1890	1900	4850	1990	490	1500	800	640	640
8	190	190	340	1830	2060	3740	1840	2230	1680	610	580	670
9	460	240	440	2180	2110	4390	1610	940	1400	810	570	610
10	380	190	440	2380	2300	4290	1540	670	670	700	530	600
11	910	290	400	2300	1820	4080	1400	580	760	660	670	370
12	280	290	350	2250	1380	4610	1400	440	500	650	670	330
13	370	240	440	2000	1850	4810	1140	490	510	640	450	410
14	730	240	400	1970	2220	5490	990	850	840	680	230	420
15	550	240	400	2080	2160	4480	1120	1040	1060	660	230	420
16	550	240	490	2790	2840	4140	1520	900	1280	830	360	420
17	460	240	500	2980	3390	3790	1130	890	620	600	360	420
18	370	380	500	3060	3600	3210	920	810	770	900	400	460
19	370	470	400	3060	3340	3600	900	660	860	920	450	370
20	550	380	350	3080	3730	3840	790	460	660	930	450	330
21	830	390	500	2940	3600	4060	730	650	580	800	580	330
22	740	290	500	2540	3280	4280	640	430	580	820	640	330
23	370	380	500	2840	2560	4300	600	450	460	930	580	330
24	240	480	500	2720	2640	4190	410	1200	390	720	630	330
25	230	380	500	2740	2590	3890	440	1930	730	730	580	330
26	230	340	650	3040	2430	3840	790	1800	830	690	630	420
27	230	440	660	2560	2500	3560	810	1410	1700	710	630	420
28	240	390	950	2410	2520	3110	850	810	1590	610	410	470
29	230	....	760	2500	2420	3550	1040	780	930	580	370	470
30	230	....	760	2560	2620	3250	1050	700	1000	730	370	430
31	280	....	760	....	2640	....	670	570	....	830	....	380

PATHFINDER INFLOW, IN CUBIC FEET PER SECOND, FOR THE YEAR 1916.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	330	310	530	1860	4560	4600	3450	1140	1140
2	290	310	530	2000	4830	5300	2960	1260	1350
3	340	350	480	1740	3980	5230	3840	1110	1000
4	440	410	540	1480	4060	5540	2170	1040	570
5	430	410	640	1620	3860	5380	2700	1300	560
6	440	360	750	1780	3300	5630	2570	1480	680
7	340	310	860	1510	4240	5780	2450	1270	790
8	390	360	760	1640	4390	5560	2270	1400	650
9	390	410	810	1650	5100	5640	2170	1290	570
10	480	360	1080	1520	6030	5300	2390	1520	530
11	440	410	1840	1500	6220	5720	1920	1120	470
12	440	560	1860	1760	6740	6140	2080	1300	580
13	390	460	2800	1710	6700	7080	2050	1320	450
14	390	510	3880	1730	6460	7560	2260	1160	660
15	300	510	3140	1780	5780	6690	1830	800	800
16	250	510	2600	1760	5270	6530	1880	840	720
17	300	460	2570	1760	4910	7000	1650	1010	660
18	300	510	1670	2980	4650	6420	1540	1020	420
19	300	510	1970	2840	4250	6300	1450	730	650
20	350	620	2390	2910	3940	6520	1280	790	560
21	350	680	3250	2780	3640	6640	1260	680	440
22	350	720	3300	2790	4220	5540	1340	1050	360
23	350	730	5420	1800	4390	5840	1150	770	470
24	350	730	4470	2360	4640	4910	1160	730	440
25	350	730	4030	2580	4920	4590	1130	600	470
26	450	740	2530	2830	4780	3720	930	640	520
27	500	740	3200	3400	4100	3840	640	540	600
28	450	690	2250	3840	4090	3750	700	620	600
29	460	640	2270	4470	3960	3640	660	410	750
30	450	....	2040	4470	4300	3140	610	460	760
31	400	....	2580	....	4300	....	1220	530	....

PATHFINDER STORAGE, IN ACRE-FEET, FOR THE YEAR 1914.

Day	October	November	December
1	369870	309250	331720
2	365300	308840	332330
3	360750	308420	333120
4	365210	307870	334000
5	351710	309080	334880
6	249280	310330	335760
7	347040	311570	336640
8	344960	312570	337340
9	342680	313570	337880
10	340730	314580	338410
11	338050	315580	338940
12	335940	316680	339480
13	333740	317770	340010
14	331110	318780	340640
15	328410	319800	341080
16	325630	320480	341530
17	322960	320990	341790
18	320310	321500	341970
19	318950	322010	342420
20	316840	322610	342860
21	314740	323220	343360
22	312570	324080	343750
23	310910	324940	344200
24	310580	325890	344640
25	310580	326850	345090
26	310500	327720	345530
27	310500	328500	345980
28	310500	329290	346420
29	310500	330160	346870
30	310080	331020	347310
31	309670	....	347760

PATHFINDER STORAGE, IN ACRE-FEET, FOR THE YEAR 1915.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	348200	363390	380370	411280	504480	602880	663790	461900	321420	278790	321160	350540
2	349100	363840	381120	413280	507830	603570	658450	455660	318100	280720	322270	351530
3	349100	364300	382000	415280	513500	605640	653130	449380	314740	282260	323390	352520
4	349730	364840	383000	417800	517580	608550	646950	442940	313570	283810	324420	353600
5	350450	365390	383680	421140	520850	611610	640560	437220	313230	285370	325280	354770
6	350900	365840	384430	424710	524160	614940	634330	431660	311740	286540	326150	355940
7	351260	366300	385380	428330	525800	617460	628150	426150	310580	288110	327190	357200
8	351440	366660	386040	431870	527790	620570	621570	424090	309750	289300	328330	358470
9	351890	367120	386900	436900	529790	624860	614530	419410	308420	290900	329460	359660
10	352250	367480	387760	441560	532040	628860	608130	414080	305600	292100	330500	360840
11	353150	368030	388530	445940	533290	632600	601500	408480	303030	293300	331810	361570
12	353420	368580	389200	450240	533790	637370	594930	402910	300160	294500	333120	362210
13	353780	369040	390060	454020	534040	642590	587980	397320	297310	295700	334000	363020
14	354700	369500	390830	457730	534040	649010	580560	392460	294900	296900	334440	363840
15	355040	369560	391600	461680	534040	653420	573880	387950	292000	298120	334880	364660
16	355580	370420	392560	467200	535290	657110	566490	383190	291300	299750	335580	365480
17	356030	371070	393530	469870	537670	659040	558910	378390	289300	300980	336290	366300
18	356390	371800	394500	472220	539690	659040	550360	373460	287720	302620	337080	367210
19	356750	372720	395280	474120	543490	660070	542340	368120	286150	304270	337970	367940
20	257290	373450	395960	476140	548820	661262	535540	362480	284200	305930	338860	368580
21	358110	374200	396930	477830	555270	662740	528290	357380	282260	307340	340010	369220
22	358840	374760	397910	478740	561770	664830	521220	351710	280330	308840	341260	369870
23	259200	375500	398890	480430	566620	667080	514600	346060	278020	310500	342420	370510
24	359660	376430	399870	483050	571500	669030	507950	341970	275710	311740	343660	371160
25	360110	377170	400850	486360	576270	670390	501260	340640	274170	312990	344820	371800
26	360570	377830	402120	490260	581910	671290	495270	339210	273400	314240	346060	372630
27	361020	378680	403410	493280	587040	671750	489460	336900	273790	315500	347310	373460
28	361480	379430	405290	495850	590970	671290	484190	333380	273790	316570	348110	374380
29	361930	....	406780	498550	593970	670390	478970	330410	274940	317600	342230	375310
30	361390	....	408280	501500	597120	668680	473680	327540	276870	318870	340550	376150
31	360230	....	409780	....	600270	....	467870	324510	....	320140	....	376900

PATHFINDER STORAGE, IN ACRE-FEET, FOR THE YEAR 1916.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	377550	400360	430100	564790	690860	760090	795700	579080	396340
2	378110	400950	431140	568730	696670	761600	791000	572300	393240
3	378770	401630	432080	572160	700590	764980	787890	565050	389010
4	379620	402420	433140	575070	704210	766670	780820	558000	384620
5	380460	403210	434380	578270	707530	768370	774830	551650	381030
6	381310	403900	435850	581770	709750	770230	768530	545140	377830
7	381970	404500	437540	584740	713570	772780	762110	537800	374570
8	382720	405190	439020	587980	717570	774830	755230	531170	370880
9	383480	405980	440610	591240	723030	776880	747740	524310	367210
10	384420	406680	442730	593970	730140	778590	740630	517650	363570
11	385280	407480	446360	596710	737680	779620	732770	509870	359930
12	386140	408580	450020	599860	744920	781340	725130	503400	356570
13	386900	409480	455550	603020	752220	785120	717730	496440	353690
14	387660	410480	463220	606330	756580	788410	710860	489340	351530
15	388240	411480	469420	609660	759590	791000	703260	482600	349190
16	388720	412480	474570	613000	761600	799370	695890	477160	346420
17	389300	413380	479640	616340	762540	801470	687810	472110	343750
18	389870	414380	482940	622000	763290	803920	679500	466530	340720
19	390450	415380	486820	627430	763970	806740	670840	460250	338500
20	391120	416580	491540	633180	762950	803920	663340	454780	335940
21	391790	417900	497960	638670	762280	806740	656230	449380	332940
22	392460	419310	504480	643890	761600	808500	649450	444650	330160
23	393140	420730	515210	647250	761270	812230	641860	438700	327720
24	393820	422160	524060	651660	761940	813470	634900	433120	325190
25	394500	423580	532040	656520	762620	814010	627860	427290	322610
26	395370	425020	537040	660370	763290	812940	620430	421750	320140
27	396340	426460	543360	664830	762620	810630	612720	416080	317600
28	397220	427810	547810	670240	761600	807440	605780	410880	315250
29	398110	429060	552290	676900	760600	803920	598760	405090	314240
30	398990	....	556310	683800	760260	799370	591920	401630	314070
31	399770	....	561120	....	759020	....	586230	398500	....

NORTH PLATTE RIVER AT MORRILL, NEBR., 1916.

Location. About two miles south of Morrill.

Gages. Two wooden staffs, one nailed to a square pile about 15 feet upstream from the north end of the highway bridge across the north channel. The other is nailed to a square pile about the same distance upstream from the south end of the bridge across the south channel.

Bench Marks. No bench mark data is at hand concerning these gages. However, they have been referred to bench marks and information concerning their location and datum will be on file in the office of the State Engineer.

Observer. F. Erwin Powell, Morrill, Nebr. Salary, $5.00 per month.

General. Because of the collapsible dam of the Enterprise Irrigation Ditch the relation between gage height and discharge has been found to be so inconsistent that no records of data discharge are herewith published.

NORTH PLATTE RIVER AT SCOTT'S BLUFF, NEBR., 1916.

Location. At the highway bridge between Scottsbluff and Gering.

Gage. Enameled staff nailed to a pile about 15 feet upstream from the north end of the bridge.

Bench Marks. No bench mark data is at hand concerning these gates. However, they have been referred to bench marks and information concerning their location and datum will be on file in the office of the State Engineer.

Observer. Mrs. C. A. Liljenstolpe. Salary, $5.00 per month.

General. Because of the extreme width of the river at this point in comparison to the depth a very small variation in height gives a large variation in discharge. This, together with the shifting conditions of the sandy bed, has rendered it impossible to compute daily discharge.

NORTH PLATTE RIVER AT MINATARE, NEBR., 1916.

Location. On highway bridge between Melbeta and Minatare.

Gage. Enameled staff nailed to wooden abutment on upstream side of bridge at south end.

Bench Mark. No bench mark data is at hand concerning this gage. However, it has been referred to bench marks and information concerning its location and datum will be on file in the office of the State Engineer.

Observer. C. Harry Darnall, Melbeta, Nebr. Salary, $5.00 per month.

General. The conditions at this station are very good, considering the conditions at the other stations as a whole. However, there is some tendency towards shifting sand preventing the best results.

NORTH PLATTE RIVER AT BAYARD, NEBR., 1916.

Location. At State Aid Bridge about two miles south of Bayard.

Gage. Enameled staff nailed to a pile on the upstream side of the old highway bridge about a half mile upstream from the State Aid Bridge.

Bench Marks. No bench mark data is at hand concerning this gage. However, it has been referred to bench marks and information concerning its location and datum will be on file in the office of the State Engineer.

General. It is difficult to obtain satisfactory discharge measurements at this station especially during higher stages because of the swirling water about the piers of the bridge. No measurements have been made since May, 1916, except of gage height and no estimates of daily discharge have been made.

NORTH PLATTE RIVER AT BRIDGEPORT.

Observer. L. B. Allen.

Location. One-half mile north of town on the public road in Section 28, Township 20 North, Range 50 West.

Records Available. From May 4, 1902, to November 10, 1906.

Gage. Painted rod fastened in a concrete well on downstream side at north end of concrete bridge.

Bench Marks. No. 1. A six-inch by six-inch stone marked U. S. & G. S. located in the northeast quarter of Section 32, Township 20 North, Range 50 West of the 6th P. M., thirty feet east of east gate of stock yards and three hundred feet northwest of northwest corner of public school building. Elevation, 9.94 feet. No. 2. The regular aluminum U. S. G. S. B. M. Cap set in a 28-inch by 12-inch stone, top of which is filled with concrete to form a truncated pyramid, located about fifty feet south and a little east of the northeast corner of lot four, block two Riverside addition to Bridgeport. Elevation 11.32 feet.

Channel. Straight for about a mile above and about a half mile below the gaging section. Somewhat wider at the section.

Accuracy. It is difficult to obtain satisfactory results at this station because of the swirling currents about the concrete piers of the bridge.

NORTH PLATTE RIVER AT BROADWATER, NEBR., 1916.

Location. At highway bridge about three-quarters of a mile south of Broadwater.

Gage. Wooden staff nailed to a pile in the abutment on the upstream side of the bridge at the north end.

Observer. Geo. N. Sheldon, Broadwater, Nebr., until June 30, 1916. Ward Gibson, July 1 to Sept. 30, 1916. Salary, $5.00 per month.

General. Because of the width of the river at this point and shifting conditions of the sandy bed and infrequent measurements no estimates of daily discharge were made.

NORTH PLATTE RIVER AT LISCO, NEBR., 1916.

Location. At highway bridge about one-half mile south of Lisco.

Gage. Wooden staff nailed to pile on downstream side of the fifth bent from the south end of the bridge.

Observer. D. J. Colyer, Lisco, Nebr., April until July 15, 1916. J. A. Ray, July 15 until Sept. 30. Salary, $5.00 per month.

General. The river is narrow at this point, making actual measurements fairly accurate, and conditions are good comparatively for making daily estimates from gage heights.

NORTH PLATTE RIVER AT OSHKOSH, NEBR., 1916.

Location. At highway bridge about two miles south of Oshkosh.

Gage. Wooden staff nailed to the downstream pile of the first bent south of the first turn-out from the north end of the bridge.

Observer. Harold Bentz, Oshkosh, Nebr. Salary, $5.00 per month.

General. The river is wide at this point and a small variation in gage height indicates a large variation of discharge. This with shifting conditions make it somewhat difficult to get accurate results. However, estimates have been made for 1916.

NORTH PLATTE RIVER AT LEWELLEN, NEBR., 1916.

Location. At highway bridge about one mile south of Lewellen.

Gage. Wooden staff nailed to downstream pile about the fifth bent from the south end of the bridge.

Observer. A. S. Woodyard, Lewellen, Nebr. Salary, $5.00 per month.

General. Because of the extreme width of the river and the shallowness of the water no actual measurements of discharge were made at this station.

NORTH PLATTE RIVER AT KEYSTONE, NEBR., 1916.

Location. At highway bridge about three-quarters of a mile southwest of Keystone.

Gage. Enameled staff nailed to the downstream pile of the south abutment.

Observer. Eugene Feltz, Keystone, Nebr. Salary, $5.00 per month.

General. The river is very wide at this point and very shallow. During a large part of the summer construction work in repairing the bridge prevented the measurement of actual discharge. However, estimates have been made for 1916. These are shown to be somewhat inaccurate in the drawing of hydrographs in comparison with other stations.

NORTH PLATTE RIVER AT NORTH PLATTE.

Location. At highway bridge one-half mile north of North Platte at Section 28, Township 14 North, Range 30 West, one mile below mouth of Scout Creek and four and one-half miles above the junction with the South Platte.

Record Available. From February 25, 1895, to Sept. 30, 1914.

Drainage Area. 28,500 square miles.

Gage. A staff gage installed October 15, 1910. From October 5, 1894, to May 31, 1910, the gage was a vertical staff at the railroad bridge two miles east of North Platte. On March 25, 1910, the station was moved two miles upstream to its present site and a chain gage reading to this datum was installed. This gage was stolen July 1, 1910, and the records interrupted until October 15, 1910, when the present staff gage was placed in position.

Datum. For 1916, .35 feet above previous gage.

Bench Mark. No. 1. The top of the southwest corner of the east concrete abutment of the U. P. bridge. Elevation, 8.20 feet above zero of the gage at that section. No. 2. Two square wrought iron nails in the east side of a telephone pole on the west side of the road at the south end of the bridge. Elevation, 10.00 feet above zero of the chain gage at the highway bridge. No. 3. Two nails in each side of a telephone pole on the west side of the road at the south end of the bridge one foot above the ground. Elevation, 7.55 feet above zero of the staff gage at the highway bridge.

Channel. Straight for about five hundred feet above and below the section at the highway bridge. Very shifting.

Accuracy. Only fair because of the shifting nature of the river bed.

PLATTE RIVER AT GOTHENBURG, NEBR., 1916.

Location. At highway bridge about one-half mile south of Gothenburg.

Gages. Gages in channels Nos. 1 and 2 are nailed to piles a little south of the center of each channel on the downstream side of the bridge. The gage in channel No. 3 is nailed to an ice breaker about one-third the distance across the channel from the north on the upstream side of the bridge.

Observer. August Sornow, mail carrier, Gothenburg. Salary, $5.00 per month.

General. Between the limits for which actual measurements for discharge have been taken the results from this station are good. However, gage heights ran below and above the range of actual measurements.

PLATTE RIVER AT LEXINGTON, NEBRASKA.

Location. Highway bridge 2 miles south of Lexington, Section 20, Township 9 North, Range 21 West.

Gage. Vertical staff nailed to pile on revetment north end of bridge and upstream side of bridge.

Bench Marks. The datum used during 1916 bears no relation to the datum used in former years.

Observer. Ray V. Duryea.

Channel. Straight at gaging station, reduced from a width of about 2,000 feet to a little over 800 feet.

Accuracy. Affected by shifting bed. The building of protection works in May, 1916, changed the control.

PLATTE AT ELM CREEK, NEBR., 1916.

Location. Two miles south of Elm Creek.

Gage. Standard chain and weight. Pulley is riveted to upstream hand rail of the first span from the north end of the bridge. The scale of the gage is painted on the hand rail. The chain and weight is secured in a box fastened to the panel post beneath the scale. Length of chain, 13.30.

Bench Mark. Standard U. S. G. S. Bronze tablet 2 feet north of the north end of bridge, and 10 feet west of the center line of the bridge.

Elevation. 8.58.

Bench Mark. Datum equals zero of the gage.

Observer. C. E. Clark. Salary, $5.00 per month.

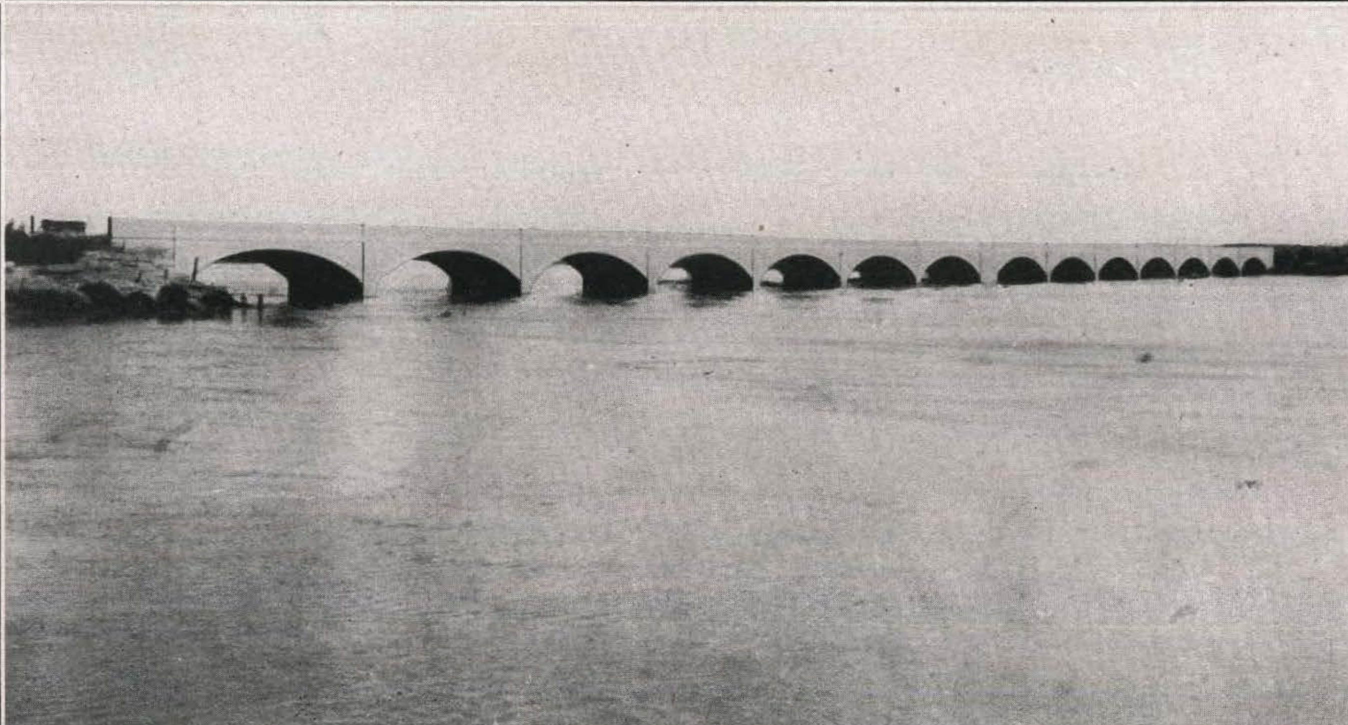
General. This station is on a bridge which narrows the Platte river from over 2,000 feet down to less than 1,000 feet. High water causes a discrepancy in the relation between gage height and discharge. When the syphon of Kearney Light & Power Co. is in operation the relation between gage height and discharge is affected. No change from datum given in 1915 records.

DAILY DISCHARGE, IN SECOND FEET, OF NORTH PLATTE RIVER BELOW WHALEN, FOR YEAR ENDING SEPT. 30, 1915.

Day	Apr.	May	June	July	Aug.	Sept.
1	....	1328	462	2294	3042	1043
2	....	2672	1319	2540	3410	919
3	....	2506	1986	3170	2381	977
4	....	1895	2673	3170	2381	1681
5	....	1895	4278	3225	2209	2442
6	....	1635	4405	3335	2127	4540
7	....	1635	5460	3280	1924	3365
8	....	1472	6098	3225	1859	2179
9	....	1394	4856	3225	2209	2027
10	....	1394	4102	3117	1891	1833
11	....	1394	3440	3149	1969	2027
12	....	1355	2996	2897	1969	1702
13	....	1261	2770	2757	1967	1859
14	....	1191	2322	2757	2007	2412
15	....	1127	2080	2618	1891	2412
16	821	1320	2080	2517	1891	2008
17	879	1515	1988	2407	1967	1908
18	937	1899	1988	2489	2429	1842
19	1090	2625	1555	2852	2207	1842
20	1256	2888	2371	2680	2080	1842
21	2548	3107	2323	2680	2122	1377
22	2652	1821	1926	2407	2920	1281
23	2986	1895	1944	2362	2477	1281
24	3100	1720	5054	2362	2250	1269
25	2829	1434	2676	2400	2294	1204
26	2406	1188	2091	3310	2602	1726
27	1807	1061	1681	3024	2080	4836
28	1279	1124	1756	4252	2044	5790
29	1045	1041	1756	3407	1939	4163
30	1005	610	1756	2355	1684	3119
31	....	520	....	2199	1563	....
Total	26640	49922	82192	88462	67785	66906
Mean	1976	1610	2739	2853	2186	2230
Maximum	3100	3107	5460	4252	3410	5790
Minimum	821	520	462	2199	1563	919
Acre-ft.	52800	99000	163000	175000	134000	133000

DAILY DISCHARGE, IN SECOND FEET, OF NORTH PLATTE RIVER BELOW WHALEN, FOR YEAR ENDING SEPT. 30, 1916.

Date	Apr.	May	June	July	Aug.	Sept.
1	822	1319	3220	2978	2703	1627
2	703	1332	2976	3020	2513	1160
3	725	1239	3081	3020	2841	1062
4	775	1104	2997	3104	2781	1270
5	972	1774	2405	3083	2940	1601
6	820	1708	2917	3330	2900	1554
7	804	1612	2799	3329	3043	1280
8	758	1574	2760	3339	3085	988
9	673	1549	2661	2448	3190	890
10	690	1458	2661	3448	2898	928
11	658	1388	2661	3713	3064	917
12	703	1481	2661	3803	2980	872
13	959	1705	3446	4127	3148	862
14	1365	2284	3556	3313	3064	715
15	1412	2375	3512	3547	3106	1101
16	1403	3121	4007	3580	2980	676
17	1385	3165	3524	3613	2465	535
18	1502	3189	3524	3580	2077	859
19	1568	3256	3556	3459	1962	987
20	1568	3155	3622	3404	1946	886
21	1554	3051	3556	3494	2011	831
22	1548	3568	3446	2980	1897	626
23	1510	4100	3426	2801	1897	665
24	1547	4066	2779	4614	1897	778
25	1585	4066	2396	4614	2089	626
26	1228	3819	2509	4513	2038	544
27	952	2729	2432	4249	2700	577
28	806	3665	2432	4249	2060	810
29	752	3512	2799	3738	1995	1065
30	1178	3444	2978	3327	1897	1403
31	....	3270	....	2962	1962	....
Total	32925	79078	91299	109779	78129	28695
Mean	1097	2550	3043	3541	2520	956
Maximum	1585	4100	4007	4614	3190	1627
Minimum	658	1104	2396	2801	1897	535
Acre-ft.	65300	156600	180700	217000	154700	56800



SUTHERLAND STATE AID BRIDGE, NORTH PLATTE RIVER, 1915
FOURTEEN 50-FT. CONCERETE ARCHES

ACTUAL DISCHARGE MEASUREMENTS NORTH PLATTE RIVER AT HENRY, 1916.

Channel 1.

Date	Hydrographer	Area	Velocity	Gage Ht.	Dis-charge	Meter No.
4-22	D. P. Weeks, Jr.	66	1.72	3.33	114	1390
5-6	D. P. Weeks, Jr.	56	1.68	3.30	94	1390
5-17	D. P. Weeks, Jr.	149	1.99	3.77	285	1390
5-28	D. P. Weeks, Jr.	227	2.06	4.23	464	1390
6-7	D. P. Weeks, Jr.	141	1.96	3.96	277	1390
6-11	L. E. Timbers	172	1.83	3.88	316	1484
6-23	D. P. Weeks, Jr.	220	1.99	4.30	439	1390
6-25	L. E. Timbers	173.5	2.20	4.10	383	1484
7-9	L. E. Timbers	245	2.08	4.35	511	1484
7-15	D. P. Weeks, Jr.	230	1.77	4.50	470	1390
8-1	D. P. Weeks, Jr.	233	1.97	4.59	460	1390
8-10	L. E. Timbers	258	2.05	4.78	530	370
8-17	D. P. Weeks, Jr.	231	2.15	4.67	498	1390
8-22	D. P. Weeks, Jr.	165	2.09	4.30	346	1390
8-30	L. E. Timbers	181.4	1.90	4.28	346	370
9-2	L. E. Timbers	196	1.93	4.36	380	370

ACTUAL DISCHARGE MEASUREMENTS NORTH PLATTE RIVER AT HENRY, 1916.

Channel 2.

Date	Hydrographer	Area	Velocity	Gage Ht.	Dis-charge	Meter No.
4-22	D. P. Weeks, Jr.	422	2.30	3.39	974	1390
5-6	D. P. Weeks, Jr.	454	2.44	3.50	1111	1390
5-17	D. P. Weeks, Jr.	760	2.66	4.42	2024	1390
5-28	D. P. Weeks, Jr.	917	3.28	4.79	3010	1390
6-7	D. P. Weeks, Jr.	579	3.01	4.09	1750	1390
6-11	L. E. Timbers	675	2.92	3.90	1970	1484
6-23	D. P. Weeks, Jr.	896	2.73	4.79	2450	1390
6-25	L. E. Timbers	850	2.55	4.32	2170	1484
7-9	L. E. Timbers	840	2.87	4.85	2420	1484
7-15	D. P. Weeks, Jr.	950	2.67	5.05	2540	1390
8-1	D. P. Weeks, Jr.	739	2.88	4.62	2130	1390
8-10	L. E. Timbers	793	2.86	4.80	2270	370
8-17	D. P. Weeks, Jr.	784	2.50	4.76	1960	1390
8-22	D. P. Weeks, Jr.	508	2.84	4.26	1440	1390
8-30	L. E. Timbers	528	2.54	4.20	1460	370
9-2	L. E. Timbers	552	2.66	4.28	1470	370

ACTUAL DISCHARGE MEASUREMENTS NORTH PLATTE RIVER AT HENRY, 1916.

Channel 3.

Date	Hydrographer	Area	Velocity	Gage Ht.	Dis-charge	Meter No.
4-22	D. P. Weeks, Jr.	122	2.83	0.82	347	1390
5-6	D. P. Weeks, Jr.	120	2.52	0.68	303	1390
5-17	D. P. Weeks, Jr.	98.3	3.45	0.99	340	1390
5-28	D. P. Weeks, Jr.	146	3.65	1.28	529	1390
6-7	D. P. Weeks, Jr.	146	3.40	1.40	495	1390
6-11	L. E. Timbers	186	3.60	1.40	671	1484
6-23	D. P. Weeks, Jr.	140	3.26	1.07	457	1390
6-25	L. E. Timbers	98.8	3.04	.95	301	1484
7-9	L. E. Timbers	81.0	2.68	.65	217	1484
7-15	D. P. Weeks, Jr.	78.0	2.71	.90	212	1390
8-1	D. P. Weeks, Jr.	84.0	2.50	.95	210	1390
8-10	L. E. Timbers	129.3	3.24	1.20	419	370
8-17	D. P. Weeks, Jr.	100	3.04	1.28	303	1390
8-22	D. P. Weeks, Jr.	42	2.94	.75	124	1390
8-30	L. E. Timbers	72.3	2.28	.80	165	370
9-2	L. E. Timbers	80.2	1.87	.76	150	370

ACTUAL DISCHARGE MEASUREMENTS NORTH PLATTE RIVER AT HENRY, 1916.

Spring Creek Channel.

Date	Hydrographer	Area	Velocity	Gage Ht.	Dis-charge	Meter No.
4-22	Weeks-Timbers	8.5	1.31	3.12	11.2	1390
5-6	D. P. Weeks, Jr.	8.5	1.16	3.14	9.9	1390
5-17	D. P. Weeks, Jr.	20.5	.56	3.74	11.4	1390
5-28	Weeks-Timbers	40.0	1.14	4.12	46.7	1390
6-7	D. P. Weeks, Jr.	22.0	1.62	3.79	35.79	1390
6-11	L. E. Timbers	23.9	1.16	3.68	27.90	1484
6-23	D. P. Weeks, Jr.	36.0	.89	4.15	31.9	1390
6-25	L. E. Timbers	29.5	1.30	4.0	38.55	1484
7-9	L. E. Timbers	38.5	1.30	4.15	50.3	1484
7-15	D. P. Weeks, Jr.	38.0	1.05	4.40	40.03	1484
8-1	D. P. Weeks, Jr.	29.3	1.19	4.34	34.83	1390
8-10	L. E. Timbers	51.5	1.31	4.62	67.9	370
8-17	D. P. Weeks, Jr.	36.0	1.32	4.55	47.5	1390
8-22	D. P. Weeks, Jr.	22.0	1.56	4.22	34.4	1390
8-33	L. E. Timbers	26.7	1.40	4.20	37.6	370
9-2	L. E. Timbers	27.5	1.34	4.24	37.1	370

DAILY DISCHARGE, IN SECOND FEET, OF NORTH PLATTE RIVER NEAR HENRY, NEBRASKA, 1915.

Day	Apr.	May	June	July	Aug.	Sept.
1	....	1400	858	1610	3540	1580
2	....	2080	668	1880	4280	1300
3	....	2880	2010	2230	3280	1150
4	....	2290	1750	2670	2780	1420
5	....	2200	3330	2780	2460	1640
6	....	2100	4440	2890	2370	5150
7	....	1770	4990	3040	2440	4580
8	....	1740	5840	2920	2280	3440
9	....	1600	5650	3080	2110	2680
10	....	1540	4730	3000	2390	2530
11	....	1530	3750	2980	2150	2240
12	....	1380	3080	2960	2050	2170
13	486	1370	2850	2630	2000	2240
14	568	1120	2490	2610	2240	2460
15	712	1140	2390	2470	2200	2530
16	779	1310	2340	2510	2150	2760
17	711	1400	1850	2500	2150	2240
18	823	1630	1860	2520	2660	1930
19	949	2160	1820	2540	2660	1830
20	1020	2340	2050	2260	2400	1640
21	1380	2660	2220	2580	2360	1520
22	1880	2600	2090	2330	2640	1350
23	2260	1990	2050	2040	2930	1240
24	2500	1960	4120	2050	2890	1240
25	2780	1750	3630	2360	2970	1300
26	2500	1400	2470	3830	2900	1520
27	2260	1340	1930	4480	2850	4040
28	1680	1090	2000	4730	2380	4690
29	1310	1220	1750	4420	2130	4260
30	1310	1040	1690	3170	1880	3260
31	....	909	....	2800	1790	....
Total	25908	52939	82696	86870	78300	71930
Mean	1440	1710	2760	2800	2530	2400
Maximum	2780	2880	5840	4730	4280	5150
Minimum	486	909	668	1610	1790	1150
Acre-ft.	51400	105000	164000	172000	156000	143000

DAILY DISCHARGE, IN CUBIC FEET PER SECOND, FOR NORTH PLATTE RIVER AT HENRY, 1916.

Day	Apr.	May	June	July	Aug.
1	1196	1089	3271	1308	2907
2	1174	1222	3044	1307	2617
3	1174	1292	3296	2537	2631
4	1179	1292	2950	....	2914
5	1179	1252	2914	2564	3153
6	1179	1212	2897	2630	3080
7	1179	1240	2889	2932	3188
8	1200	1185	2825	2863	3356
9	1179	1130	2801	2803	3232
10	1147	1078	2714	3026	3243
11	1135	1011	2591	3095	3130
12	1092	887	3588	3382	3161
13	1122	969	4213	4203	3396
14	1221	1172	4331	3167	3191
15	1175	1683	4093	4400	3494
16	1373	3835	3963	3769	3230
17	1403	2500	3451	3138	3041
18	1368	2062	4095	3341	2294
19	1482	2825	4037	3114	2003
20	1530	3161	4206	3114	2059
21	1567	3617	4405	2922	1884
22	1526	3663	3692	2722	1966
23	1526	4248	3369	2537	1967
24	1501	4496	3746	3020	1716
25	1482	4600	2529	4277	1823
26	1522	4302	2245	4536	2027
27	1231	4118	2245	4560	2788
28	1324	3147	2185	4447	2069
29	1090	3716	2119	4538	1839
30	1085	3654	2524	3497	1938
31	....	3452	....	2891	1865
Total	38550	75710	97128	96640	81202
Mean	1285	2444	3235	3220	2620
Maximum	1567	4600	4405	4560	3494
Minimum	1085	887	2119	1307	1716
Acre-ft.	77100	151500	194100	199600	162500

NORTH PLATTE RIVER AT MITCHELL, NEBR., 1916.

Location. At highway bridge about one-half mile south of Mitchell.

Gage. A wooden staff nailed to a square pile about 40 feet upstream from the south end of the bridge.

Bench Mark. No bench mark data is at hand concerning this gage. However, it is believed that it has been referred to the original datum used in maintaining the same station when a chain gage was used. Information regarding this datum will be on file in the office of the State Engineer.

Observer. C. G. Waldo, mail carrier. Salary, $5.00 per month.

General. The information from this station is quite reliable between the stages of 2.81 and 3.36. Below and above these stages the curve has been produced to get an approximation as to the flow from daily gage heights. Shifting conditions of the bed of the stream have made it necessary to compute the discharge by a special method for shifting channels.

DAILY DISCHARGE, IN SECOND FEET, OF NORTH PLATTE RIVER AT MITCHELL, NEBR., 1916.

Day	Apr.	May	June	July	Aug.	Sept.
1	....	526	2610	1210	1880	1490
2	....	928	2220	1350	1520	1070
3	....	956	1770	1290	1520	750
4	....	650	1960	1360	1740	750
5	....	633	2160	1460	1770	440
6	....	788	1350	1520	1920	672
7	....	710	1660	1800	2050	870
8	....	633	1600	1880	2190	738
9	....	694	1550	1820	2270	650
10	....	788	1570	1770	2500	575
11	....	526	1430	1710	1800	500
12	....	470	1430	2050	2300	430
13	....	420	2390	2130	2380	470
14	....	1150	2890	2390	2470	470
15	....	1150	2720	2300	2270	460
16	....	1100	2720	2230	2470	470
17	....	1880	3110	2160	2390	455
18	1270	2050	2800	2300	1740	440
19	1490	1710	2500	2050	1550	430
20	1410	2270	2690	2160	1450	430
21	1350	2245	2780	2220	1350	460
22	1300	2220	2810	2360	1430	460
23	1300	2830	2550	1630	1350	430
24	1210	3340	2580	1460	1410	425
25	1180	2770	1930	3420	1210	420
26	1270	3250	1430	3310	1320	420
27	1100	3200	1130	3140	1670	430
28	760	3225	930	2890	2050	405
29	760	3250	694	2830	1350	420
30	760	430	870	2200	1350	430
31	....	410	....	1740	1430	....
Total	15160	47202	60831	64748	56100	16860
Mean	1165	1520	2200	2088	1810	560
Maximum	1490	3340	3110	3420	2500	1490
Minimum	760	410	694	1210	1210	405
Acre-ft.	32750	94250	132000	129456	112300	33600

DAILY DISCHARGE, IN SECOND FEET, OF NORTH PLATTE RIVER AT MINATARE FOR 1916.

Day	May	June	July	August
1	1170	2820	940	3360
2	1370	2040	990	3000
3	1530	2170	1370	2170
4	1110	2460	1300	2170
5	1050	2310	1370	2310
6	1050	1810	1170	2460
7	1370	1810	1240	2460
8	1170	2040	1810	2460
9	1240	2040	1370	3270
10	1170	2040	1450	3360
11	850	2170	1710	3540
12	750	2310	1810	3360
13	750	4080	3000	3180
14	1050	4260	1810	3360
15	1050	2170	1710	3180
16	1370	2040	5070	3000
17	1300	4260	2820	2820
18	1735	3360	2820	2460
19	2170	3360	2385	2310
20	3900	3540	1975	2170
21	4260	3360	1910	2040
22	2820	3360	1810	1300
23	3540	3360	1710	1300
24	4620	3360	1615	1300
25	4260	3180	3180	1300
26	4620	1370	4260	1050
27	3900	1370	4260	1300
28	3900	1335	3360	1300
29	3720	1662	3360	1300
30	3540	990	4260	1300
31	2820	......	4080	1370
Total	69155	76437	71915	71260
Mean	2230	2550	2318	2298
Maximum	4620	4260	5070	3540
Minimum	750	990	940	1050
Acre-ft.	138000	153000	143800	142500

DAILY DISCHARGE, IN SECOND FEET, OF NORTH PLATTE RIVER AT BRIDGEPORT, NEBRASKA, 1915

Day	Apr.	May	June	July	Aug.	Sept.
1	....	....	....	1610	2820	2000
2	....	....	....	1580	2570	1800
3	....	....	....	1440	3770	....
4	....	....	....	1480	4480	1480
5	....	....	2410	1830	3250	1270
6	....	....	2490	2680	2730	....
7	....	....	3960	2490	3870	1780
8	....	....	4480	2280	3490	....
9	....	....	5360	2140	3020	....
10	....	....	5950	2680	2620	....
11	....	....	5250	2360	2840	....
12	....	....	4800	2360	2900	....
13	....	....	4360	2310	4780	....
14	....	....	3920	1670	6650	2790
15	....	....	3480	1750	6930	2960
16	....	....	3040	1610	4790	....
17	....	....	2600	1630	2650	....
18	....	....	2160	1610	2900	....
19	....	....	2060	1630	3160	....
20	....	....	2020	1880	3130	....
21	....	....	2000	2210	3070	....
22	....	....	2140	1930	2900	....
23	....	....	2240	1970	2790	....
24	....	....	2360	1690	3460	....
25	....	....	2160	1710	3310	....
26	....	....	4410	1880	3190	3190
27	....	....	3220	2790	3490	2790
28	....	....	2760	3220	3310	....
29	....	....	1930	3800	3190	....
30	....	....	1710	4200	2490	6160
31	....	....	....	3640	2160	....
Total	....	....	83270	68060	106710	*75870
Mean	....	....	3200	2200	3440	2529
Maximum	....	....	5950	4200	6930	3190
Minimum	....	....	1710	1440	2160	1270
Acre-ft.	....	....	165000	136000	212000	150450

*Estimated.

GENOA STATE AID BRIDGE, LOUP RIVER. BUILT 1913, FIVE 136.5-FT. TRUSSES

DAILY DISCHARGE, IN SECOND FEET, OF NORTH PLATTE RIVER AT BRIDGEPORT FOR 1916.

Day	Apr.	May	June	July	Aug.	Sept.
1	....	1370	2760	1050	2760	1450
2	....	1150	2650	1055	2220	1670
3	....	1110	2650	1060	1855	1150
4	....	1260	2500	1060	1670	1150
5	....	1260	2680	1155	2580	1000
6	....	1150	2140	1060	2310	910
7	....	1370	2360	1210	1855	1060
8	....	1500	1855	1155	2660	1210
9	....	1060	1855	1110	2610	1060
10	....	1030	1825	1060	2940	1060
11	....	1070	1760	1110	3120	1060
12	....	1150	1710	1210	2580	1105
13	1380	850	2110	1520	2580	1060
14	1260	970	3150	1855	2500	1020
15	1260	1020	3335	2220	2580	990
16	1370	1260	4020	1855	2460	960
17	1670	1270	3300	1670	2580	1020
18	1590	1910	3300	1855	1260	1060
19	1670	2360	3370	2076	1260	1020
20	1660	3260	3335	2220	1855	960
21	1855	3550	3220	2040	1265	1020
22	1880	3840	3940	1855	1260	1040
23	1670	2760	3730	1670	2580	1000
24	1760	2940	2790	1590	1520	970
25	1660	3660	2610	1390	1060	940
26	1760	3840	2400	1450	1060	910
27	1850	3770	1670	2940	1670	1060
28	1855	3400	1400	2670	2580	1040
29	1520	3450	1143	2540	1855	1020
30	1520	3190	940	3560	2580	1020
31	....	3300	....	3480	1265	....
Total	29190	65080	76508	53751	64925	31995
Mean	1620	2100	2550	1730	2094	1066
Maximum	1880	3840	4020	3560	3120	1670
Minimum	1260	850	940	1050	1060	910
Acre-ft.	58350	130200	153000	107200	129820	63960

DAILY DISCHARGE, IN SECOND FEET, OF NORTH PLATTE RIVER AT LISCO FOR 1916.

Day	Apr.	May	June	July	Aug.	Sept.
1	....	1550	2930	1065	3910	1835
2	....	1472	2730	1000	4110	1715
3	....	1510	2350	1185	950	1715
4	....	1530	1920	1250	2350	1715
5	....	1530	1920	1250	990	1715
6	....	1510	1760	1415	950	1835
7	....	1510	1715	1415	970	1250
8	....	1510	1510	1415	980	1185
9	....	1430	1360	1415	2930	1250
10	1760	1510	1360	1415	3420	1185
11	1670	1360	1460	1510	2580	1250
12	1550	1140	1550	1510	2930	1330
13	1550	1170	1550	1510	2580	1250
14	1510	1177	1920	1610	3420	1250
15	1415	1185	2790	1715	2930	1185
16	1480	1266	2930	1835	2930	1185
17	1550	1430	1944	1975	2350	1185
18	1810	1550	2930	1835	2580	1250
19	1863	1835	3910	1835	2350	1415
20	1975	3130	3420	1835	1975	1330
21	1760	4000	3420	1975	1835	1250
22	1810	5480	3420	1715	1610	1250
23	1810	5090	2930	1715	1610	1330
24	1810	2830	2580	1715	1510	1415
25	1920	3520	2150	1610	1330	1250
26	1890	5090	2150	1415	1330	1250
27	1860	4700	1835	2930	1330	1330
28	1690	4500	1510	2930	1330	1415
29	1715	4300	1330	2350	1415	1415
30	1715	3910	1250	3910	1715	1415
31	....	3130	....	4890	1715	....
Total	36110	76855	66534	57150	64915	41350
Mean	1720	2480	2218	1845	2040	1375
Maximum	1975	5480	3910	4890	4110	1835
Minimum	1415	1140	1250	1000	950	1185
Acre-ft.	72250	153800	133000	114400	126500	82500

DAILY DISCHARGE, IN SECOND FEET, OF NORTH PLATTE RIVER AT OSHKOSH FOR 1916.

Day	Apr.	May	June	July	Aug.	Sept.
1	....	1060	5500	1060	3400	1350
2	....	1255	3000	750	4500	1350
3	....	1255	2615	750	2420	1640
4	....	1255	2320	750	2125	1640
5	....	1550	2125	760	1930	1640
6	....	1450	2030	880	1835	1640
7	1550	1350	1835	880	2030	1640
8	1160	1300	1450	880	2615	1060
9	1260	1255	1450	880	2615	1060
10	1550	1350	1550	870	2615	1060
11	1550	1060	2030	1060	2520	1060
12	1550	1060	1640	1255	2320	1350
13	1350	1160	2125	1450	2520	1160
14	1550	1350	1835	1255	2420	1060
15	1350	1160	2615	1640	2615	1160
16	1255	1060	4500	1835	2615	1255
17	1450	1255	3000	2125	2615	1060
18	1640	1450	4500	2030	3600	1060
19	1835	1740	3000	1835	2320	1060
20	1640	2600	3000	1835	2030	1060
21	1640	3600	2615	1930	2420	1060
22	1640	3200	3600	1835	2420	1255
23	1930	3200	3600	1835	1640	1060
24	1740	4500	2615	1835	1255	1060
25	1640	5500	2615	1640	1350	1060
26	1550	3500	2420	1550	1350	1255
27	1640	3400	2030	1550	1450	1060
28	1450	3200	1640	2420	1450	1060
29	1550	3400	1255	2615	1450	1060
30	1350	4500	1255	2615	1450	1060
31	....	4500	....	3000	1350	....
Total	36820	69475	75765	47605	69235	36355
Mean	1535	2240	2625	1535	2233	1210
Maximum	1930	5500	5500	3000	4500	1640
Minimum	1160	1060	1255	750	1255	1060
Acre-ft.	73650	138000	157500	95200	138500	72600

DAILY DISCHARGE, IN SECOND FEET, OF NORTH PLATTE RIVER AT NORTH PLATTE, NEBRASKA, FOR 1915.

Day	Apr.	May	June	July	Aug.	Sept.
1	7240	5030	2630	3160	6220	3540
2	7240	4150	2300	3160	9060	3350
3	7240	3740	3350	3160	6720	3540
4	7240	3740	3350	2300	3940	3540
5	6980	3740	4150	1990	3350	3160
6	5500	3540	3740	1560	2630	3160
7	5500	3540	3940	1300	4800	3350
8	6720	3940	3540	1560	4800	2460
9	7240	3940	3740	2800	4800	1840
10	5980	3940	5030	3540	3940	1700
11	3940	3540	6470	2800	3940	3740
12	2300	3160	7240	3540	3540	4580
13	1560	2980	7240	3540	3350	3540
14	1430	2800	5260	2980	3160	2980
15	1430	2630	4800	2630	3160	2980
16	1180	2140	4360	2800	2800	2980
17	1180	1840	4150	2630	3160	3160
18	1180	2630	3940	2300	2800	3160
19	1430	2800	3740	1840	3160	3160
20	1430	2980	3740	1840	3540	3160
21	1560	3740	2980	1700	3160	3160
22	2300	4150	2630	1560	3350	2980
23	4360	4150	2630	1560	3540	2800
24	3740	4580	2630	1560	3540	2800
25	6220	4580	3160	1560	3740	2980
26	6720	5260	3350	1840	3940	2980
27	6720	9840	3940	1840	4300	2980
28	6220	6800	3350	1840	4800	2980
29	5740	5740	3740	1700	3350	2980
30	5260	3540	3940	1840	3350	2980
31	....	2460	....	2630	3540	....
Total	132780	123640	119060	71060	123540	92700
Mean	4430	3990	3970	2290	3990	3090
Maximum	7240	9840	7240	3540	9060	4580
Minimum	1180	1840	2300	1300	2630	1700
Acre-ft.	264000	245000	236000	141000	245000	184000

DAILY DISCHARGE, IN SECOND FEET, OF NORTH PLATTE RIVER AT NORTH PLATTE FOR 1916.

Day	Apr.	May	June	July	Aug.	Sept.
1	....	2075	3030	2210	4272	1500
2	....	2030	3168	1100	2580	1542
3	....	1698	2900	932	2660	1521
4	....	1620	2890	675	2282	1500
5	....	1308	2620	980	1980	1500
6	....	1220	2710	610	1672	1548
7	....	1220	2080	574	1620	1428
8	....	1220	1920	490	1646	1308
9	....	1140	2030	550	1952	1308
10	....	930	2075	514	1890	1144
11	....	1030	1980	514	2390	980
12	2210	1200	1750	574	2660	1065
13	1890	1220	2430	780	2525	1108
14	1750	1180	2850	980	2525	1065
15	1620	1160	2580	1065	2390	1065
16	1890	1280	1700	1031	2210	1014
17	2045	1160	2460	932	2045	957
18	2175	1180	2660	1200	2045	900
19	2375	1160	2800	1500	1952	900
20	2315	1700	3260	1200	2421	900
21	2045	2465	4500	1065	2800	900
22	1985	4840	4180	1065	4410	980
23	2045	3950	3260	1200	2282	1014
24	2080	4410	4410	1100	1890	957
25	2315	4410	3120	1750	1380	900
26	2245	2800	2800	1014	1308	900
27	2045	3030	2846	948	1254	900
28	1920	3625	2390	825	1200	900
29	1890	3950	2210	750	1500	900
30	2045	3168	1750	1260	1548	900
31	....	3030	....	1750	1548	....
Total	38885	66409	81499	31138	66927	33504
Mean	2030	2140	2715	1003	2156	1116
Maximum	2375	4840	4500	2210	4410	1548
Minimum	1620	930	1700	490	1200	900
Acre-ft.	77170	132750	162900	62150	133500	66960

DAILY DISCHARGE, IN SECOND FEET, FOR NORTH PLATTE RIVER AT GOTHENBURG, 1916.

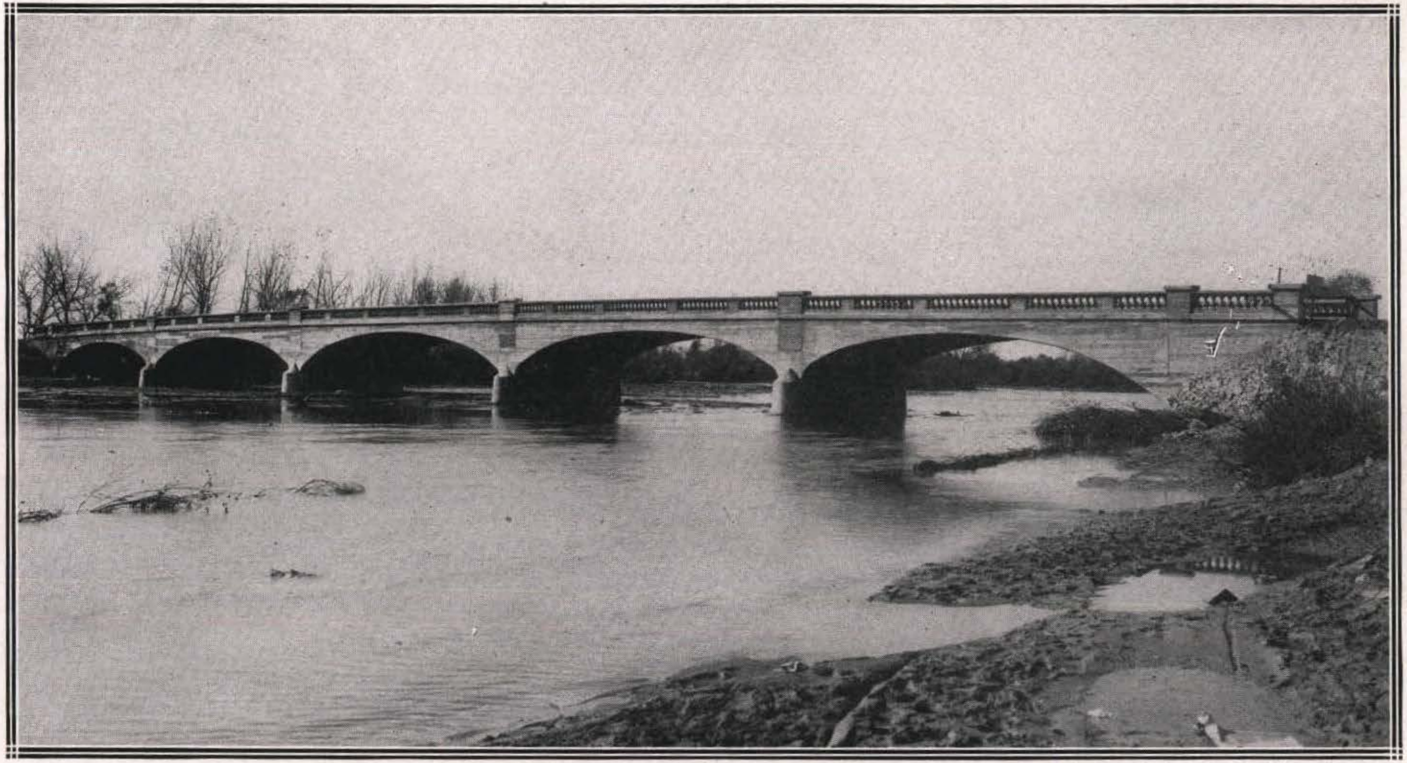
Day	Apr.	May	June	July	Aug.	Sept.
1	....	1555	2327	2000	1360	2900
2	....	1605	2492	1555	2390	1300
3	....	1740	2562	1085	2070	1235
4	....	1660	2335	950	2225	2480
5	....	1635	2100	830	2015	1545
6	....	1520	2580	485	1685	1465
7	....	1350	2492	440	1635	1305
8	....	1175	1930	520	1160	1440
9	....	1175	1565	775	1040	1330
10	....	1175	1565	775	1230	1255
11	....	1169	1675	420	1645	1185
12	....	935	1790	400	1825	2490
13	....	1185	2130	360	1940	1185
14	....	1210	2480	454	2052	1167
15	....	1440	2685	640	2310	1085
16	....	1185	2685	747	2145	987
17	....	1085	2040	855	1965	930
18	....	1055	2210	685	2170	880
19	....	1185	2402	1015	2015	880
20	....	1409	2685	1185	2015	855
21	....	1960	3060	932	2015	830
22	....	2637	2685	943	3060	830
23	....	1157	3060	925	3440	950
24	....	4200	3060	910	2015	950
25	1750	4850	2685	955	1775	950
26	1815	3018	2625	1359	1465	858
27	1785	2462	2625	875	1500	910
28	1760	2600	2625	760	1422	885
29	1359	2715	2195	707	1341	980
30	....	3492	2085	757	2700	900
31	....	3440	....	810	1570	....
Total	9778	57802	71135	26109	58462	36942
Mean	1627	1860	2365	843	1885	1230
Maximum	1815	4850	2890	2000	2960	2900
Minimum	1359	935	1565	360	1040	830
Acre-ft.	19550	115200	141900	52250	116850	73800

DAILY DISCHARGE, IN CUBIC FEET PER SECOND, FOR NORTH PLATTE RIVER AT LEXINGTON, 1916.

Day	Apr.	May	June	July	Aug.	Sept.
1	....	1430	1970	1160	1430	1430
2	....	910	1970	1160	1160	1160
3	....	1160	2500	910	2260	1260
4	....	910	1900	650	1700	1360
5	....	1430	1700	400	1970	1430
6	....	910	2500	265	1560	1430
7	....	790	1700	210	1160	690
8	....	690	1430	165	1160	1160
9	....	1160	1430	165	910	1430
10	....	265	1430	165	910	1680
11	....	690	520	135	1430	1700
12	....	520	1700	135	1430	1160
13	910	690	1970	175	165	690
14	1160	690	1700	400	400	325
15	1160	690	1970	165	1700	910
16	1160	910	1970	205	1700	910
17	1160	910	1700	325	1980	1000
18	910	910	1800	520	2500	1160
19	910	1160	1970	400	1700	910
20	910	1700	2500	690	1580	690
21	910	1900	2000	910	1430	690
22	910	2500	3150	690	1430	690
23	1300	3150	3150	550	3150	1160
24	1700	4800	2500	400	2500	1160
25	910	3150	2000	690	1430	1160
26	910	3150	1970	690	1160	910
27	1700	2500	2500	1160	1160	690
28	2500	1970	2500	520	1160	520
29	690	1270	1970	325	690	1160
30	520	3150	1430	295	1160	1160
31	....	2500	....	265	1160	....
Total	20370	49495	60000	14895	45235	31785
Mean	1130	1595	2000	465	1460	1060
Maximum	2105	4800	3150	1160	3150	1700
Minimum	520	265	520	135	165	325
Acre-ft.	40700	99000	120000	28800	90500	63600

DAILY DISCHARGE, IN SECOND FEET, AT PLATTE RIVER NEAR ELM CREEK, NEBRASKA, 1915.

Day	Apr.	May	June	July	Aug.	Sept.
1	....	8960	6880	6140	10200	4510
2	....	8740	5800	7280	12400	3930
3	....	8510	6140	6510	14500	4510
4	....	8510	9220	5740	15600	3930
5	....	8960	10500	4980	9400	3750
6	....	8340	9170	4210	5800	3570
7	....	7200	7840	2640	4510	3390
8	....	6440	6140	3130	5510	2640
9	....	6660	6730	3390	6510	2180
10	....	6880	8960	3650	6510	1140
11	....	5860	7670	4080	5800	1140
12	....	5190	10300	4510	5450	1230
13	....	4810	11400	4810	5800	1320
14	....	4630	12400	4510	6140	4210
15	....	3870	12900	4510	5320	3650
16	2880	3820	10300	3930	4510	3390
17	2590	3760	12900	3930	6140	2880
18	2280	3490	11300	3660	4510	2880
19	1960	6000	12400	3390	3650	2310
20	1780	5450	13400	3930	3650	1740
21	1780	6140	14500	2880	4810	2180
22	2180	5930	9400	3390	4810	2640
23	3490	7310	6880	2880	4810	1960
24	4510	8090	7280	2410	4510	2640
25	5200	9400	5130	....	4210	2640
26	6700	9960	4510	3930	8090	3420
27	8000	13100	5900	3650	6880	4210
28	7200	15200	7280	3930	5450	3130
29	8700	19300	8960	3930	4830	3130
30	10000	14800	7670	4810	4210	3670
31	....	10300	....	8090	4510	....
Total	69050	246210	269860	132100	199030	87900
Mean	4060	7940	9000	4260	6420	2930
Maximum	10000	19300	14500	8090	15600	4510
Minimum	1780	3490	4510	2410	3650	1140
Acre-ft.	121000	488000	536000	262000	395000	174000



CAMBRIDGE STATE AID BRIDGE, REPUBLICAN RIVER. BUILT 1914,
TWO 50-FT., TWO 55-FT., ONE 60-FT. CONCRETE ARCHES

BRIDGEPORT STATE AID BRIDGE, NORTH PLATTE RIVER. BUILT 1914, TWENTY-THREE 33-FT. CONCRETE GIRDERS

DAILY DISCHARGE, IN SECOND FEET, OF NORTH PLATTE RIVER AT ELM CREEK FOR 1916.

Day	Apr.	May	June	July	Aug.	Sept.
1	....	....	3028	950	2520	1100
2	....	....	2964	781	530	1220
3	....	....	2964	612	1280	1106
4	....	....	2900	499	1940	992
5	....	....	2836	386	1700	878
6	....	....	3156	266	1313	1880
7	....	....	3220	202	926	830
8	....	....	2514	138	1280	830
9	....	....	1525	134	612	1498
10	....	....	1704	130	1010	1547
11	....	....	1822	130	1040	1596
12	....	....	1940	142	950	1645
13	....	845	2900	125	1445	830
14	....	810	2812	130	1940	400
15	....	775	2706	125	2100	530
16	....	845	2610	120	2260	625
17	....	660	2514	163	4500	652
18	....	648	2514	297	3220	680
19	....	980	2514	297	2260	600
20	....	1940	3157	436	....	480
21	....	2420	3800	472	....	490
22	....	2900	4500	422	....	500
23	....	3220	4050	372	....	600
24	....	4820	3668	400	....	600
25	....	4500	3091	218	....	600
26	....	3220	2514	740	....	636
27	....	2900	2836	379	....	540
28	....	2277	2772	186	....	400
29	....	1645	2388	158	....	600
30	....	967	1220	130	....	660
31	....	290	....	130	....	....
Total	....	36662	83139	9670	32826	25545
Mean	....	1930	2769	311	1728	850
Maximum	....	4820	4500	950	4500	1880
Minimum	....	290	1220	120	530	400
Acre-ft.	....	73300	166140	19270	65500	51000

WINTER DISCHARGE OF THE LOUP RIVER AT COLUMBUS, NEBRASKA.

The principal object of the hydrographic studies on the Loup river is for power development. It is evident therefore that some knowledge of the flow during the frozen season is desirable to fill the gap in the records from November 30th to about the middle of March. No studies of winter flow have been made by this office previous to the past winter. Engineers in private practice have at different times made investigations of more or less thoroughness as to the probable winter run-off.

Open season measurements have been made on the Loup river at Columbus since 1895. Since that year there have been four seasons during which there were not enough gagings made to make it practicable to compute estimates of daily flow. There is a hydrograph accompanying this report showing the mean flow for five-day periods based on the sixteen years of data available.

The unstable character of the bed and banks of the streams in Nebraska has made estimates of flow very difficult, and reliable only when frequent gagings have been made. The Loup river is an extreme example of this type of stream as may be seen by platting gage heights and discharge. It is therefore to be expected that additional complications resulting from the freezing of the river in the winter will give still further trouble in obtaining accurate records.

Besides the varying relation of gage heights to discharge due to shifting sand, the direction of flow with respect to the gaging section is continually changing. It has been the practice in making open season measurements to determine the angle which the stream makes with the gaging section and to take as the actual discharge that component at right angles to the section. When the stream is covered by ice these varying angles cannot be seen, thus giving additional sources of error. In late fall and in the spring after the ice has broken up great quantities of frazil ice have been most troublesome in making meter measurements. At these times frequent gagings are most desirable because the stage and bed of the river are undergoing pronounced changes. When low temperatures have finally given the river a covering of ice, it is usually imperfect, a channel of varying widths usually being left where the swiftest water flows. This makes it impossible to select the most desirable section. Other features such as alternate layers of ice, sand and flowing water; bridge piers, brush, etc., obstructing the channel; and the personal discomfort of the hydrographer during bad weather, all affect to a greater or less extent the accuracy of winter measurements. These are given as local conditions for the station under consideration. Different streams in various localities and conditions are affected by other controlling factors.

For a general discussion of the effects of ice on stream flow reference may be made to United States Geological Survey Water Supply Paper No. 337, by William Glenn Hoyt.

FIELD WORK.

The general procedure on the Loup River during the winter of 1914-15 is as follows:

On November 28th, before any frazil ice had appeared in the river, a special test was made in an effort to discover some means of measurement which would not be influenced by the flowing ice. Two parallel lines were established, one above and the other below the Union Pacific Railroad bridge, at a distance of fifty-five feet apart. On the east bank these lines were determined by crosses chiseled into the stone abutment of the bridge and on the west bank by stakes driven into the sand. Two transits were used in the tests, one on each line. Weighted floats were made with varying draught for use in water of different depths. The floats were calibrated in the Hydraulic Laboratory at the University of Nebraska. The depth of flotation was marked on each float. The measurement was made with one man on the bridge to throw the floats upstream while another with a stop watch recorded the time required for them to pass the two transit lines. A cross section of the stream was made first, which made it possible to select floats which would just clear the bed of the stream. When one would chance to drag on the sand the test was repeated. Difficulty was found at first in locating the float with the transit, but it was found that by making the observation from the sand bar on the west side of the river which is much lower than the abutment, where the first set-up was made, the field of view was larger and the difficulty was thus avoided.

A meter measurement was made immediately before this test and was corrected for the angle of the current with the bridge, but was slightly larger than the result of the float measurement. It is evident that the velocity obtained by the floats is the desired component without correction for angle. The result of the tests are as follows:

Meter measurement, 2,459 second feet.
Float measurement, 2,390 second feet.
Difference, 2.8 per cent.

The period of frazil ice was of shorter duration in the winter of 1914-1915, than usual, and it was necessary to make only one measurement between the time the river was clear and when it was covered with solid ice. This measurement was made on December 12th, being the lowest actual discharge measurement on record, for this station. The discharge on this day was 1,012 second feet with a gage height of 2.5. Two days later the observer reported a gage height of 1.5.

On December 23rd, the ice had formed to an average thickness of .8 feet with the exception of an open channel of about twenty-five feet. In order to meter the open channel the section was selected directly under the bridge. The river had started to freeze when at the low stage noted and when it rose again due to increased flow and to back water, alternate layers of ice and flowing water resulted which for two consecutive gagings caused some trouble in making measurements. An ice chisel made from a buggy axle was used in cutting the holes in the ice and as the surface ice was cut through it was possible to cut the submerged layers which were not more than two or three feet below the surface. This submerged ice extended from twenty to fifty feet from the banks and piers of the bridge and was from two to four inches in thickness.

Across the main channel holes were cut every ten feet up to within five feet of the open water. On the west side where the depth and velocity are small, intervals of fifteen and twenty feet were used. It was considered that although this increased the per cent of error for that section, the gaging as a whole was little affected. In metering the open channel, the cable and weight were used from the bridge. Rods were used for the most part on the ice. Observations were made at depths recommended by Mr. Hoyt in water supply paper No. 337. A few vertical velocity curves revealed the same conditions which open season curves have shown, that is that in certain parts of the channel the regularity of flow is greatly disturbed and a smooth curve is impossible while in other parts of the stream very good curves are obtainable. Where the submerged layers of ice were encountered velocity readings were made, treating each layer of water as a separate section.

After January 2nd, most of the submerged ice had been melted by the flowing water, which is always above 32 degrees in temperature. During the early part of the winter the form of notes kept was that recommended by Mr. Hoyt, making observations of the thickness of ice, distance from water surface to bottom of ice, and total depth, and from these the effective depth and depth of observation were computed. It was considered later that inasmuch as care, speed and the personal comfort of the hydrographer are important factors governing accuracy of stream measurements, that many of these items were unnecessary and that the effective depth could be obtained in one operation. To do this two eight foot rods made up in standard two foot sections were provided, one with an ordinary sounding shoe and the other with a right angle bolted to one end. As the rods were graduated to feet and tenths, effective depths were indicated immediately by the difference in elevation of the tops of the rods when the sounding shoe was on the bed of the river, and the right angle was against the lower surface of the ice. After depths were taken the sounding shoe was replaced by the meter and depths of observations were made by placing the top of the meter rod the desired distance below the top of the rod equipped with the right angle. Both rods were then grasped and held firmly together and the right angle brought tightly against the bottom of the ice on the upstream edge of the hole. The hydrographer placed his foot on the ice chisel which had previously been thrown across the hole parallel to the current and in this way held the rods in place. This method, it is believed, reduced the possibility of error, both in computation and in manipulating the instruments besides making one operation take the place of three. An added advantage is found in the fact readings are taken from the rod above the point where the water has congealed after several wettings, which makes readings at the waters surface very difficult. Average thickness of ice was usually recorded in case it might be desired for future reference.

The open channel at the bridge slowly narrowed down to about five feet and then, following a warm spell, broke open to nearly eighty feet. Soon after, however, the channel about three hundred feet above the bridge had been completely frozen and the section was changed to this point where it could be extended across the stream at right angles to the flow unobstructed by bridge piers. During the latter part of the winter the ice was blasted away from the bridge by railroad employees and measurements were made as during the open season.

While the section was maintained at the bridge, correction was made for the angle which the flow in the open channel made with the bridge. This probably was not the direction which extended throughout the width but it is safe to assume that the variation was not great and that the importance of exactness in this coefficient in the point of greatest discharge justified the above procedure. It is recommended that an instrument be devised for obtaining the direction of flow at the point of each observation under the ice.

RESULTS.

The results of the test are shown graphically by the accompanying set of diagrams. The method of computation is a combination of the graphic system used to some extent by the United States Geological Survey and Stout's method of computation, of the flow of rivers with shifting, sandy beds. In fact the use of the latter alone has been considered somewhat more satisfactory since changes of relationship between gage height and discharge have evidently taken place as gradually since the winter regimen was established as during the open season. Plotted daily gage heights show nearly as smooth a curve for the winter months as during the months of October and November, when the river was free from ice. Even during the transition from the period of frazil ice to the solid, there seems to have been a consistent though rapid daily increase in gage heights. In seeking an explanation for the above, it might be well to consider that the station has a gravity section, that is, the heights on the gage represent the head assumed by the water in maintaining its velocity against friction along the whole course of the river, in contradistinction to the control section where the flow over a shoal or natural or artificial obstruction determines the gage height. It seems reasonable to suppose that a temporary obstruction due to ice at this point of control would produce a much greater effect than such an obstruction at any point along the Loup at Columbus. Owing to the freezing of the shallow water clear to the sand the winter channel of the stream was confined to a width of about three hundred feet, tending to reduce the shifting which ordinarily takes place across a width of six hundred feet. The effect of the submerged ice during the latter part of December is clearly shown on the gage height correction curve and as it left the channel slowly the effect was gradual. Conditions do not seem favorable to the existence of anchor ice which forms on the bottom of many streams causing sudden fluctuation in gage height.

A rating curve was constructed based on measurements made in 1914, and for the sake of convenience in making a rating table was built up from a scale of second differences. A correction curve was drawn through points with distances of plotted gagings from this curve as ordinates and time as abscissa. The general behavior of the curve between these points was determined by a study of the critical points on a curve of actual daily gage heights plotted with time as abscissa. A curve of daily mean temperatures served principally to aid the judgment in the above operation, and also made an interesting comparison with the discharge curve. Corrected gage heights were found by subtracting the ordinate of the correction curve from the ordinate of the gage height curve for the same date. It was then only a simple step to the computation of the discharge from a rating table. No attempt was made to compute the daily discharge between December 11th and December 14th, as the gage heights fell below a point for which measurements have been made. The possible discharge for this period is shown on the hydrograph of a dotted line. A hydrograph based on all previous open season measurements giving a mean discharge for five day periods is also given for comparison.

LOUP RIVER AT COLUMBUS.

Location. The original location of this station was a little over two hundred feet above the Union Pacific Railroad Bridge which is about a mile west of town. Measurements were made from a car and cable at this place. In 1904 the cable station was abandoned and measurements were made at the highway bridge, which is a little more than a mile below the railroad bridge, until the fall of 1913. Conditions for measuring the flow here, which have never been the best, were made still worse by certain improvements on the scuth bank and thereupon the station was moved to the railroad bridge where gagings are made at present from the lower chord of the bridge. Passing trains in no way interfere with the work.

Drainage Area. 13,540 square miles.

Gage. The original gage was a staff spiked to a pile at the cable station. When the station was moved to the highway bridge a standard weight and chain was installed, set to read the same height as the first, but this relation was not permanent. The gage used at present is a staff nailed to a pile near the original staff gage but with an entirely different datum.

Bench Marks. No. 1. Standard U. S. G. S., bench mark, seventy-two feet east of the east bank of the river and a little more than two hundred feet north from the Union Pacific tracks. Elevation, 13.27 feet above zero of the original gage; 21.83 feet above zero of the chain gage at the highway bridge; and 12.69 feet over zero of the staff gage in present use. No. 2. A cross cut on the upstream end of the cap of the first pier from the north end of the highway bridge approach. Elevation, 10.91 feet above zero of the chain gage. No. 3. A spot of red paint on the south corner of east abutment on ledge on which the girder of the railroad bridge rests. Elevation 14.07 feet above zero of the staff gage in present use. (September, 1914.)

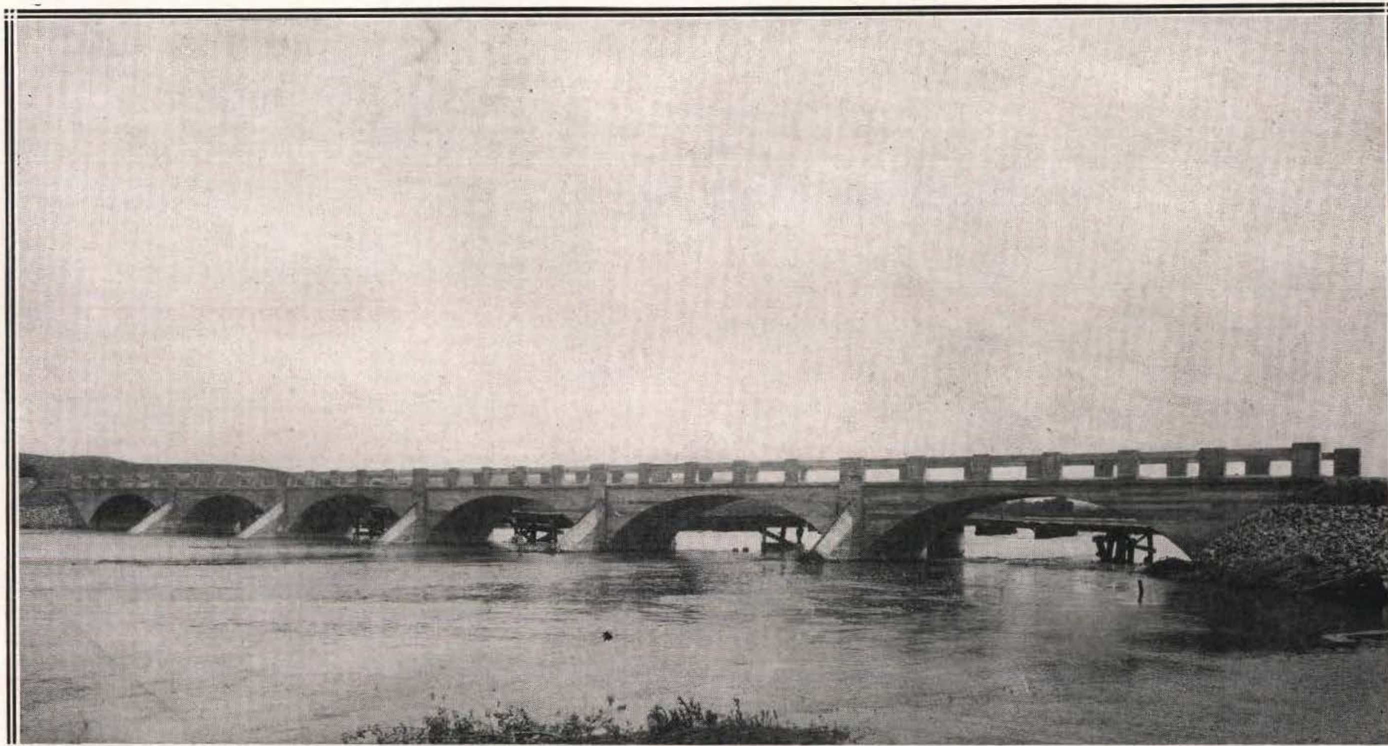
Channel. The channel is comparatively straight at the point where measurements are made, but curves at a short distance above and below the bridge. It is probably the best example of a shifting, sandy river bed in the state.

Accuracy. So variable is the bed of the river at this point that no permanent relation exists between gage height and discharge and ordinary methods cannot be used in making estimates of daily discharge. A chart showing the change which took place in the cross section in less than fourteen days is printed herewith. Also a chart showing the futility of applying ordinary methods of computation. Frequent actual measurements of discharge together with special methods described in various United States Geological Survey Water Supply Papers have made it possible to make daily estimates which are fair.

DISCHARGE MEASUREMENTS LOUP RIVER AT COLUMBUS

Date	Hydrographer	Width Feet	Area of Section Sq.-ft.	Mean Velocity Ft. per sec.	Gage Height Feet	Dis-charge Sec.-ft.
10- 5-14	D. P. Weeks, Jr.	....	858	2.38	3.45	2040
10-18-14	D. P. Weeks, Jr.	....	928	1.99	3.60	1847
11- 1-14	D. P. Weeks, Jr.	....	940	2.32	3.61	2176
11-15-14	D. P. Weeks, Jr.	....	823	2.64	3.75	2170
11-27-14	D. P. Weeks, Jr.	....	754	....	3.65	2170
11-28-14	D. P. Weeks, Jr.	....	....	....	3.73	2459
12-12-14	D. P. Weeks, Jr.	....	350	2.90	2.50	1012
12-23-14	D. P. Weeks, Jr.	....	619	2.04	4.76	1260
1- 2-15	D. P. Weeks, Jr.	....	810	2.54	5.00	2060
1-25-15	D. P. Weeks, Jr.	....	908	2.43	5.02	2215
1-10-15	D. P. Weeks, Jr.	....	1026	2.40	5.17	2470
2- 7-15	D. P. Weeks, Jr.	....	783	2.18	5.27	1710
2-18-15	D. P. Weeks, Jr.	....	....	....	5.98	2660
2-27-15	D. P. Weeks, Jr.	....	....	....	5.84	2780
3-13-15	D. P. Weeks, Jr.	....	988	2.47	5.64	2440
3-27-15	D. P. Weeks, Jr.	....	902	3.63	5.00	3258
4- 8-15	D. P. Weeks, Jr.	....	1575	6.00	3.28	9600
4-17-15	D. P. Weeks, Jr.	....	750	4.56	3.67	3420
4-25-15	D. P. Weeks, Jr.	....	1520	4.76	3.95	7230
5- 9-15	D. P. Weeks, Jr.	....	868	3.04	3.66	2640
5-21-15	D. P. Weeks, Jr.	....	1050	3.88	4.30	4070
6-10-15	D. P. Weeks, Jr.	....	1010	4.74	4.25	4790
6-24-15	D. P. Weeks, Jr.	....	1220	3.63	3.82	4430
7- 7-15	D. P. Weeks, Jr	....	1450	5.58	4.52	8120
7-26-15	D. P. Weeks, Jr.	....	1590	4.38	5.09	6980
8- 7-15	D. P. Weeks, Jr.	....	930	3.91	4.00	3640
8-13-15	D. P. Weeks, Jr.	....	903	3.45	4.10	3120
9- 3-15	D. P. Weeks, Jr.	....	690	3.50	3.80	2480
9-22-15	D. P. Weeks, Jr.	....	760	4.12	3.84	3130
10- 7-15	D. P. Weeks, Jr.	....	815	4.56	3.73	3710
10-22-15	D. P. Weeks, Jr.	....	668	5.53	3.83	3700

Note: See description of measurements during winter season 1914-15.



CARNS STATE AID BRIDGE, NIOBRARA RIVER. BUILT 1912—SIX 50-FT. CONCRETE ARCHES.

DAILY DISCHARGE, IN SECOND FEET, OF LOUP RIVER AT COLUMBUS, NEBR., 1915

Day	Apr.	May	June	July	Aug.	Sept.
1	3880	5050	4160	6080	10700	2840
2	4600	5680	4300	5640	12600	2420
3	6680	5200	4300	5200	10300	2520
4	8760	4540	15000	4600	6860	2630
5	8950	3880	9520	4750	6340	2630
6	8300	3610	8760	5840	5380	2630
7	7920	3220	8110	10300	4430	2740
8	9900	3100	7200	8950	3480	2740
9	9710	2740	6180	7200	3100	4600
10	8480	2740	4750	6510	3100	3480
11	6680	2360	4600	6510	2860	3540
12	5840	2740	4750	6510	3100	3610
13	5000	2480	4900	6680	2980	4750
14	4160	2230	5050	5640	2860	4450
15	3480	2140	5200	4600	3220	4300
16	3520	2230	5360	3670	5840	5050
17	3560	2230	5840	2740	5520	4160
18	3610	2420	6010	2630	4450	8720
19	3480	1960	6680	2630	3740	5360
20	3740	3610	11500	2630	2980	4020
21	3880	3880	10100	2980	2980	3880
22	4300	3480	7560	2860	3100	3600
23	4750	3220	4300	3220	3290	3320
24	5360	3400	4500	2860	3480	3350
25	6010	3740	4700	10500	3610	3220
26	4300	2810	4900	7030	3100	13000
27	4750	3960	4300	8760	2860	11200
28	6010	4750	4450	5840	10700	6340
29	5520	4960	5840	5050	3740	4750
30	5420	4450	5840	4220	2980	4570
31	....	4160	....	7920	2910	....
Total	17550	106970	188660	170550	146590	134420
Mean	5680	3450	6290	5500	4730	4480
Maximum	9900	5680	15000	10500	12600	13000
Minimum	3480	1960	4160	2630	2860	2420
Acre-ft.	338000	212000	374000	338000	291000	267000

PLATTE AT FREMONT, NEBR., MARCH 17, 1916

Location. Mile and three-quarters south of U. P. depot.

Gage. Vertical staff fastened to pile 12 feet west and south of abutment.

Bench Mark. Standard U. S. G. S. bronze tablet in concrete abutment at south end of the bridge, 4 feet from south end of west wing wall.

Elevation. 17.93.

Bench Mark Datum equals three of the gage intervals painted on downstream hand rail starting with 00 at face of south abutment. The face of the first pier, north of the south abutment equals 177. The first interval from 00 is 10 feet. Thereafter intervals are 20 feet to 170 feet, with an interval of 7 feet between this and the first pier. Each span is 177 feet from face of pier to face of pier and each is treated as a separate channel. Total discharges being the sum of the discharges on each span.

Observer. Geo. Keeler, mailman. Observation twice a day, excepting Sunday. Salary, $5.00 per month. Mr. Keeler's note book is examined as he crosses the bridge about noon on his way out, or about 5 o'clock on his return.

PLATTE AT FREMONT, NEBR., MARCH 17, 1916

General. Gages are made at this station every two weeks. Liveryman, Mr. Nelson. No change in datum given in 1915 records. No observations during winter months, nor after May 1, 1916.

DISCHARGE MEASUREMENTS OF PLATTE RIVER AT FREMONT, NEBR.

Date	Made by	Width Feet	Area of Section Sq.-ft.	Mean Velocity Ft. per sec.	Gage Height Feet	Discharge Sec.-ft.
10- 5-14	D. P. Weeks, Jr.		1480	2.20	1.90	3260
10-31-14	D. P. Weeks, Jr.		1675	2.35	2.18	3938
4- 2-15	D. P. Weeks, Jr.		4037	4.33	3.38	17480
4-26-15	D. P. Weeks, Jr.		3510	2.65	2.95	9360
6- 4-15	D. P. Weeks, Jr.		4570	3.14	3.95	14670
6-29-15	D. P. Weeks, Jr.		3570	3.24	3.55	11600
8- 6-15	D. P. Weeks, Jr.		5010	4.28	4.28	20980
9- 2-15	D. P. Weeks, Jr.		2128	3.42	2.74	7270
10- 5-15	D. P. Weeks, Jr.		3150	2.73	2.96	8600

DISCHARGE, IN SECOND FEET, OF PLATTE RIVER NEAR FREMONT, NEBRASKA, FOR 1915

Day	Apr.	May	June	July	Aug.	Sept.
1	....	11800	16400	13400	17300	8090
2	....	13000	15400	12300	25200	7230
3	....	14100	14400	11400	24200	6600
4	....	12800	15000	11600	21800	5950
5	....	12800	26300	11900	20800	6120
6	....	12300	23800	10100	19900	6300
7	....	12100	21300	10900	18200	6480
8	....	12500	20200	17600	16500	6010
9	22500	11400	17600	14400	14800	5600
10	23000	10200	17200	11000	13000	6790
11	21200	9350	16200	11000	10800	5300
12	19400	8230	16600	11100	9700	5170
13	17400	8640	15200	10000	10000	5040
14	15400	8090	13800	10200	9490	4780
15	13200	7560	14100	9140	9760	4690
16	10600	6780	13200	11900	10000	4330
17	10000	6010	14200	10600	15400	4780
18	9430	6010	16900	9420	12500	10800
19	8860	6480	16600	8230	9560	16400
20	8090	7620	21600	7560	9140	10500
21	7160	9360	26700	7230	8160	9140
22	6480	11000	25700	6540	8020	6980
23	6360	10300	22300	6130	7750	6000
24	6600	9580	19200	6540	7100	5830
25	6480	11000	17400	10300	7100	5300
26	11900	11000	14600	14100	7100	13600
27	9840	12100	13200	10600	7100	21800
28	10800	16400	11900	15700	11300	15700
29	11300	20100	11000	16400	11000	14100
30	10800	19000	10900	16700	10600	13000
31	....	17900	....	14500	9070	....
Total	269800	345510	518900	348490	392350	249010
Mean	12300	11100	17300	11200	12700	8300
Maximum	25500	20100	26700	17600	25200	21800
Minimum	6360	6010	10900	6130	7100	4330
Acre-ft.	537000	682000	1030000	689000	781000	494000

ELKHORN AT ARLINGTON, NEBRASKA, MARCH 17, 1916

Location. One mile southeast of Arlington.

Gage. Standard chain and weight, and secured to down stream hand rail. Length of chain

Bench Mark. Standard U. S. G. S. Bronze tablet in concrete abutment at northeast end of bridge, four feet from the end of the east wing wall.

Elevation. 15.00

Bench Mark Datum equals zero of the gage.

Observer. O. J. Mastick, Northwestern Railroad pump man. Two observations daily. Book may be seen when observer is at the pump house, near the end of the Northwestern railroad bridge just above the gaging station.

General. Gages are made at this station once a month. High water observation is very unsatisfactory. No change in datum given in 1915 records. No records during winter months nor after May 1, 1916.

DISCHARGE MEASUREMENTS ELKHORN RIVER AT ARLINGTON

Date	Hydrographer	Width Feet	Area of Section Sq.-ft.	Mean Velocity Ft. per sec.	Gage Height Feet	Discharge Sec.-ft.
10- 4-14	D. P. Weeks, Jr.		184	1.68	2.09	310
10-31-14	D. P. Weeks, Jr.		221	1.94	2.30	429
6- 1-15	D. P. Weeks, Jr.		1600	2.55	5.15	4080
6-30-15	D. P. Weeks, Jr.		507	3.92	3.74	1990
8- 5-15	D. P. Weeks, Jr.		550	4.60	4.02	2540
9- 4-15	D. P. Weeks, Jr.		500	3.16	3.94	1580

DAILY DISCHARGE, IN SECOND FEET, OF ELKHORN RIVER AT ARLINGTON, NEBR., 1915

Day	Apr.	May	June	July	Aug.	Sept.
1	1820	1550	4180	2280	2600	1680
2	1750	1550	3440	2440	2440	1550
3	2040	1550	2750	2760	2760	1550
4	2260	1680	3090	2600	2200	1620
5	3090	1550	4180	2440	2360	1620
6	4370	1370	6000	2060	2580	1370
7	4180	1260	6000	2200	2580	1430
8	5130	1200	6000	3630	2920	1430
9	5900	1200	5800	4180	3090	1490
10	6100	1200	6600	3990	3090	1430
11	6300	1260	7100	3810	2920	1200
12	6500	1200	7100	3990	2920	1200
13	6300	1200	6700	3990	3260	1140
14	6500	1140	5700	6300	3090	1090
15	6300	1040	5130	9900	2920	1310
16	5700	945	3710	11900	2750	1750
17	4560	858	3350	12500	2920	1200
18	4560	815	3000	10900	2580	1200
19	4940	815	3000	9500	2110	1490
20	....	858	3350	8300	1960	2500
21	....	990	3530	6500	1820	2500
22	....	1040	....	5320	1680	2500
23	....	1090	....	4940	1750	2660
24	....	1090	....	4560	1680	2660
25	....	5900	....	3990	1820	3180
26	....	9100	....	2930	1430	7400
27	....	9700	....	2760	1430	10400
28	1620	9300	....	4180	1430	10200
29	1490	8900	....	4560	1490	9600
30	1430	6900	2060	3450	945	9800
31	....	5320	....	2930	900	....
Total	92840	83571	101770	155790	70425	90150
Mean	4220	2700	4630	5030	2270	3000
Maximum	6500	9700	7100	12500	3260	10400
Minimum	1430	815	2060	2060	900	1090
Acre-ft.	184000	166000	202000	309000	140000	179000

BIG BLUE AT BEATRICE, NEBRASKA, 1916

Location. At Sixth street bridge, Beatrice, Neb.

Gage. Standard U. S. G. S. chain, weight and box fastened to upstream hand rail 100 feet from north end of bridge. Length of chain 30.62.

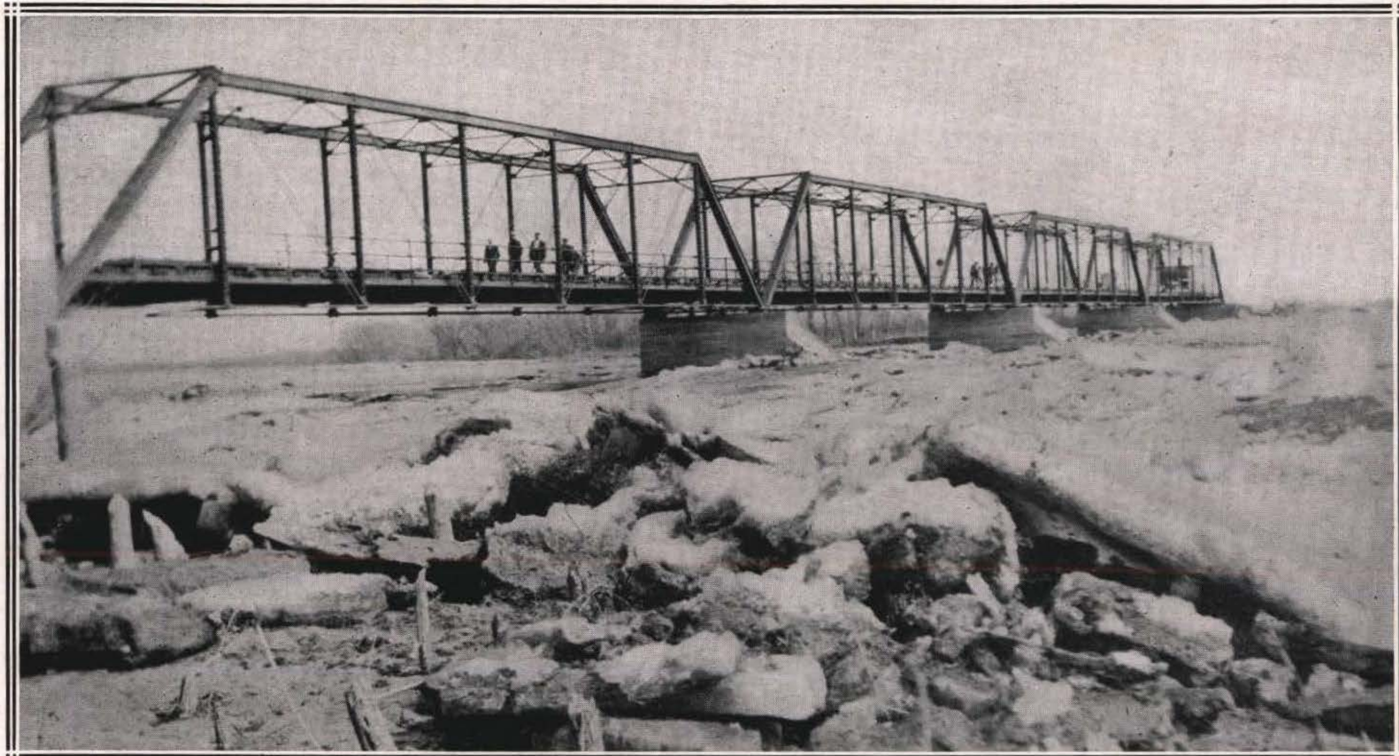
Bench Mark. Standard U. S. G. S. Bronze tablet set in northwest concrete wing wall 4 feet from northwest end.

Bench Mark Datum equals zero of the gage.

Observer. Charles Tumbleson. Salary, $5.00 per month. Residence, adjoining south end of bridge.

Coefficient. The discharge as measured at this station is multiplied at .90 to correct for the angle which the stream makes with the bridge.

Intervals of 10 feet are painted on the hand rail, measurements being made at each interval. No change in datum given in 1915 records. No records during winter months nor after May 1, 1916.



MONROE STATE AID BRIDGE, LOUP RIVER. SHOWING ICE GORGE IN SPRING OF 1913
SIX 136.5-FT. AND ONE 80-FT. TRUSSES. BUILT 1913

DISCHARGE MEASUREMENTS BIG BLUE RIVER AT BEATRICE IN 1914-1915

Date	Hydrographer	Width Feet	Area of Section Sq.-ft.	Mean Velocity Ft. per sec.	Gage Height Feet	Discharge Sec.-ft.
1914						
Oct. 30	D. P. Weeks, Jr.		206	1.29	2.35	266
Dec. 5	D. P. Weeks, Jr.		193	1.26	2.32	244
1915						
Mar. 20	D. P. Weeks, Jr.		259	1.90	3.00	491
Apr. 24	D. P. Weeks, Jr.		223	1.71	2.72	386
May 25	D. P. Weeks, Jr.		219	1.58	2.68	347
June 23	D. P. Weeks, Jr.		365	2.62	3.80	955
Aug. 13	D. P. Weeks, Jr.		520	3.12	4.73	1620
Sept. 9	D. P. Weeks, Jr.		253	1.99	2.99	503
Oct. 19	D. P. Weeks, Jr.		306	2.29	3.40	706

DAILY DISCHARGE, IN SECOND FEET, OF BIG BLUE RIVER AT BEATRICE, NEBRASKA, FOR 1915

Day	Apr.	May	June	July	Aug.	Sept.
1	765	525	665	1300	2320	982
2	738	435	682	1490	2050	765
3	795	358	600	1190	3440	628
4	918	358	1160	1220	3900	525
5	1160	375	1490	1380	3200	478
6	1260	322	1160	1160	3740	478
7	1380	305	1520	738	3400	525
8	1750	358	1410	795	2740	358
9	1790	358	1680	1050	1560	550
10	1790	322	2550	1160	1300	525
11	1380	322	3200	1160	1020	455
12	1120	322	2360	1080	950	395
13	795	358	2120	825	1640	435
14	682	305	1450	4550	2280	340
15	600	358	1340	2470	1980	435
16	550	322	1160	7210	1600	375
17	478	305	2010	4440	4860	340
18	478	305	1560	3740	5280	600
19	435	322	1410	3470	3280	950
20	415	305	1050	3360	3090	1160
21	435	340	1120	2660	2360	1220
22	435	340	885	1980	1490	1640
23	375	375	950	1260	1220	1340
24	375	395	1080	855	950	1080
25	395	358	1640	655	825	738
26	435	575	2200	682	855	795
27	795	738	2050	655	825	765
28	682	982	1410	738	1560	825
29	550	1190	1020	682	2590	1020
30	550	855	1260	5160	1680	1450
31	....	628	....	2630	1260	....
Total	24306	13716	44192	61745	69245	22172
Mean	810	442	1470	1990	2230	739
Maximum	1790	1190	3200	7210	5280	1640
Minimum	375	305	600	655	825	340
Acre-ft.	48200	27200	87500	122000	137000	44000

DAILY DISCHARGE, IN SECOND FEET, OF BIG BLUE RIVER, BEATRICE, NEBR., 1914

Day	Apr.	May	June	July	Aug.	Sept.
1	1350	340	400	440	470	322
2	945	312	525	530	380	322
3	700	240	525	500	350	273
4	560	263	430	670	322	297
5	525	240	560	565	322	297
6	490	218	945	565	273	207
7	400	240	1830	470	297	565
8	370	287	4750	470	297	273
9	340	240	5700	470	228	273
10	340	240	2930	410	207	273
11	287	263	1710	380	322	273
12	263	263	1300	322	350	410
13	287	240	2520	322	273	530
14	287	263	4340	350	250	750
15	312	218	7700	297	273	1160
16	312	263	12300	322	228	1680
17	240	218	5270	297	250	1970
18	240	263	2300	322	273	1680
19	197	240	2300	297	273	1450
20	240	263	2370	297	322	880
21	240	263	1440	250	350	755
22	218	263	990	273	410	570
23	287	263	790	297	350	500
24	287	240	670	322	297	470
25	340	263	565	297	322	410
26	240	263	830	273	273	410
27	240	218	830	322	322	410
28	400	370	710	322	297	380
29	287	430	500	350	322	353
30	340	630	440	440	228	328
31	....	370	....	500	322	....
Total	11564	8687	68470	11942	9453	18471
Mean	385	280	2280	385	305	616
Maximum	1350	630	12300	670	470	1970
Minimum	197	218	400	250	207	207
Acre-ft.	22900	17200	136000	23700	18800	36700

REPUBLICAN RIVER AT BOSTWICK, NEBRASKA

Location. One mile southwest of Bostwick.

Gage. Standard chain and weight in the old type of gage box, fastened to the downstream hand rail. Length of chain 20.80.

Bench Mark. Standard bronze tablet 10 feet north from the north end of the bridge, and 40 feet west of the center line of the bridge.

Elevation. 70.32.

Bench Mark Datum equals zero of the gage.

Intervals. Ten-foot intervals are stenciled on lower hand rail, beginning at the north end of the bridge. Gages at low water, are made at each 10-foot interval, but with gage height of 4.0, gages are made 20 feet across the stream.

Observer. J. W. Keifer. Salary, $7.00 per month. Residence, one mile south of gaging station.

General. This station is usually made from Superior, because of poor train and hotel facilities at Bostwick. It will be noticed that the length of chain, and the gage datum at this station is different than that recorded in various reports. This is due both to a lengthening of the chain not having been corrected in previous years, and to the settling of the bridge during the higher water of 1915. Frequent measurements were made during 1915, and this new datum is established on a basis of the present condition of the old gage and referred in this way to the permanent bench mark. No change in datum given in 1915 records. No records during winter months nor after May 1, 1916.

DISCHARGE MEASUREMENTS OF REPUBLICAN RIVER AT BOSTWICK, NEBR.

Date	Made by	Width Feet	Area of Section Sq.-ft.	Mean Velocity Ft. per sec.	Gage Height Feet	Discharge Sec.-ft.
10-25-14	D. P. Weeks, Jr.		83	1.05	1.00	87.1
4- 1-15	D. P. Weeks, Jr.		405	1.93	2.42	782
5-12-15	D. P. Weeks, Jr.		396	1.62	2.44	642
8-12-15	D. P. Weeks, Jr.		807	2.13	3.71	1720
9-10-15	Weeks-Swanson		535	2.23	3.10	1190
9-20-15	S. A. Swanson		500	2.17	3.2	1000
10- 9-15	S. A. Swanson		375	1.80	2.55	676

DISCHARGE MEASUREMENTS OF REPUBLICAN RIVER AT CULBERTSON

Date	Made by	Width Feet	Area of Section Sq.-ft.	Mean Velocity Ft. per sec.	Gage Height Feet	Discharge Sec.-ft.
10-24-14	D. P. Weeks, Jr.		21.0	1.27	.25	26.7
11-21-14	D. P. Weeks, Jr.		38.5	1.88	.65	72.4
3-31-15	D. P. Weeks, Jr.		63	1.93	1.16	122.0
5-11-15	D. P. Weeks, Jr.		78	1.96	1.05	153
6-17-15	D. P. Weeks, Jr.		1085	5.09	3.60	5500
6-18-15	D. P. Weeks, Jr.		241	2.57	1.12	620
7-12-15	D. P. Weeks, Jr.		118	1.74	0.82	206
8-11-15	D. P. Weeks, Jr.		225	2.48	1.23	559

DISCHARGE MEASUREMENTS OF REPUBLICAN RIVER AT COLORADO-NEBRASKA STATE LINE

Date	Made by	Width Feet	Area of Section Sq.-ft.	Mean Velocity Ft. per sec.	Gage Height Feet	Dis-charge Sec.-ft.
10-24-14	D. P. Weeks, Jr.		29.5	1.72	1.37	50.8
10-21-14	D. P. Weeks, Jr.		32.1	1.73	1.40	55.5
5-11-15	D. P. Weeks, Jr.		27.4	1.91	2.12	52.5
6-15-15	D. P. Weeks, Jr.		31.6	1.92	2.18	60.6
7-10-15	D. P. Weeks, Jr.		17.2	1.41	1.85	24.3
8-11-15	D. P. Weeks, Jr.		34.0	2.01	2.20	68.4

NOTE: Measurements previous to 5-11-15, use Colorado gage. Measurements on this date and subsequent, use Nebraska gage.

DAILY DISCHARGE, IN SECOND FEET, OF REPUBLICAN RIVER AT COLORADO-NEBRASKA STATE LINE 1915

Day	May	June
1	....	81
2	....	81
3	....	140
4	....	119
5	....	99
6	....	99
7	....	99
8	....	119
9	....	99
10	....	81
11	....	81
12	....	65
13	....	65
14	....	65
15	....	65
16	39	65
17	39	51
18	45	51
19	51	51
20	65	....
21	81	....
22	81	....
23	81	....
24	81	....
25	81	....
26	81	....
27	81	....
28	99	....
29	119	....
30	99	....
31	81	....
Total	1204	1576
Mean	75.2	82.9
Maximum	119	140
Minimum	39	51
Acre-ft.	2390	3120

LITTLE BLUE AT FAIRBURY, NEBRASKA, MARCH 7, 1916

Location. About one and one-half miles southeast of the city of Fairbury, being the lower of three bridges in the vicinity of Fairbury, and the first bridge below the mill dam at Fairbury.

Gage. Standard U. S. G. S. chain, weight, box and enamel scale fastened to two-panel posts on the downstream side of the bridge. Length of chain, 30.62.

Bench Mark. Standard U. S. G. S. Bronze tablet set in concrete and iron pipe three feet east of pier on west side of road about 30 feet south from south end of the bridge.

Elevation. 13.69.

Bench Mark Datum equals zero of the gage.

Observer. Clark Hulbert. Salary, $5.00 per month. Residence, about 80 rods south of the bridge on the west side of the highway.

Coefficient. .90 This co-efficient is multiplied to correct for the angle which the stream connects with the bridge.

Intervals of 10 feet are painted on downstream hand rail, beginning at the north end of the bridge across the north channel.

General. The gaging at this station is satisfactory during low water, but during high stages there is considerable difficulty in getting good results. Drift wood clogging in the north channel causes eddies, giving danger of entangling the current meter. On this account great care should be exercised in gaging the north channel.

No change from datum given in 1915 records. No records during winter months nor after May 1, 1916.

DISCHARGE MEASUREMENTS OF LITTLE BLUE RIVER AT FAIRBURY, NEBR.

Date	Made by	Width Feet	Area of Section Sq.-ft.	Mean Velocity Ft. per sec.	Gage Height Feet	Dis-charge Sec.-ft.
10-25-14	D. P. Weeks, Jr.				2.35	142
12- 5-14	D. P. Weeks, Jr.				2.34	162
3-20-15	D. P. Weeks, Jr.				2.67	232
4-24-15	D. P. Weeks, Jr.				2.55	207
5-25-15	D. P. Weeks, Jr.				2.62	246
6-21-15	D. P. Weeks, Jr.				9.78	3980
7-15-15	D. P. Weeks, Jr.				6.99	2070
7-16-15	D. P. Weeks, Jr.				9.83	4160
8-13-15	D. P. Weeks, Jr.				4.19	5290
9- 9-15	D. P. Weeks, Jr.				3.35	323
10-19-15	D. P. Weeks, Jr.				3.65	406

NOTE: Measurement of July 16, river rising rapidly; July 15, river steady.

DAILY DISCHARGE, IN SECOND FEET, OF LITTLE BLUE RIVER AT FAIRBURY, NEBRASKA 1915

Day	Apr.	May	June	July	Aug.	Sept.
1	284	264	377	1990	1540	480
2	294	244	334	1220	1490	432
3	294	225	421	2040	6390	388
4	334	225	902	1350	7610	345
5	377	207	972	1140	5910	345
6	377	216	1240	1020	4460	345
7	377	207	2660	1180	1710	324
8	356	207	4990	955	1100	324
9	334	198	3560	780	885	345
10	334	207	5350	690	750	324
11	294	198	10100	920	605	304
12	274	207	9320	334	580	304
13	254	198	6880	1490	550	284
14	244	198	5170	5300	480	304
15	234	198	2690	2690	456	284
16	234	189	1350	3320	555	284
17	225	198	990	4700	6880	284
18	216	207	1350	7490	1880	630
19	216	216	1440	5780	3420	555
20	198	234	5170	2620	1220	885
21	216	284	4250	1300	955	1020
22	198	284	3800	990	750	1260
23	207	264	4250	780	580	955
24	198	264	2320	690	530	690
25	216	244	1260	630	555	530
26	798	284	990	605	580	555
27	518	304	815	1880	505	580
28	294	505	750	850	505	690
29	264	690	690	720	885	690
30	254	555	1650	2540	660	580
31	....	456	....	2940	580	....
Total	8913	8377	86041	60934	55561	15320
Mean	297	270	2870	1970	1790	511
Maximum	798	690	10100	7490	7610	1260
Minimum	198	189	334	334	456	284
Acre-ft.	17700	16600	171000	121000	110000	30400

BIRDWOOD CREEK NEAR SUTHERLAND, NEBRASKA

Location. Section 2, Township 14 North, Range 33 West of Sixth P. M.

Drainage Area. Not measured.

Gage. The gage is a ⅞-inch board, 4 inches wide and 6 feet long graduated to feet and tenths. It is located about 15 feet east of the west end of the bridge and 3 feet north on a wooden wall built to protect the west bank of the creek.

Bench Mark. One Bench mark has been established at the northwest corner of the bridge on the floor of the bridge. Elevation, 8.41 feet. above zero of the gage.

Channel. The bed of the creek is covered with fine sand. There is one channel at low water and two at high water. Most of the stream flows under the bridge near the west bank.

Discharge Measurements. Made from highway bridge.

DISCHARGE MEASUREMENTS BIRDWOOD CREEK NEAR SUTHERLAND IN 1915

Date	Hydrographer	Width Feet	Area of Section Sq.-ft.	Mean Velocity Ft. per sec.	Gage Height Feet	Discharge Sec.-ft.
10-11-14	C. J. McNamara		85.3	1.80	2.95	154.1
11-10-14	C. J. McNamara		84.9	1.85	2.93	157.5
5- 8-15	C. J. McNamara		79.5	1.82	2.89	144.8
6-11-15	C. J. McNamara		85.2	1.94	2.90	165.8
8-25-15	D. P. Weeks, Jr.		78.9	1.89	2.92	149.7

NIOBRARA RIVER NEAR LYNCH

Location. Six miles south of Lynch in Section 2, Township 32 North, Range 10 West.

Channel. Very shifting.

Gage. The gage No. 1, is a staff nailed to a pile which is part of a pier of an old highway bridge. This pile is about twenty feet from the south bank and under the present highway bridge. Gage No. 2, is a chain and weight which is kept at the house of the observer and used over a pulley riveted to the hand rail which is graduated to read the same as the staff gage.

Bench Mark. The point of the ice breaker on the south abutment. Elevation, 13.25 feet above zero of the gage.

Accuracy. The shifting bed and also piles of an old bridge will be sources of error. After proper deductions are made for the piles they will cause little trouble.

DISCHARGE MEASUREMENTS NIOBRARA RIVER AT LYNCH

Date	Hydrographer	Width Feet	Area of Section Sq.-ft.	Mean Velocity Ft. per sec.	Gage Height Feet	Discharge Sec.-ft.
4-6-14	D. P. Weeks, Jr.		442	3.22	2.25	1425
5-2-15	D. P. Weeks, Jr.		862	3.71	2.5	3200
6-5-15	D. P. Weeks, Jr.		960	6.86	2.35	6600
7-1-15	D. P. Weeks, Jr.		591	3.36	2.56	1990
8-4-15	D. P. Weeks, Jr.		760	4.70	3.05	3570
10-9-15	D. P. Weeks, Jr.		600	3.27	3.06	1970

SOUTH PLATTE RIVER AT NORTH PLATTE

Location. Section 4 and 9, Township 13 North, Range 30 West, about four miles above its junction with the North Platte.

Record Available. From June 1, 1914, to September 20, 1914.

Gage. Vertical staff nailed to the west pile on the nineteenth pier from the south abutment on the upstream side of the bridge.

Bench Mark. U. S. Bench mark located on top of floor of the bridge on the west side at a distance of one hundred thirty-two feet north of the south abutment. Elevation, 2,808.46 feet above mean sea level. Elevation of zero of the gage is 2,796.47 feet.

Channel. Two channels, 920 feet apart.

Accuracy. Affected by shifting sand.

DAILY DISCHARGE, IN SECOND FEET, OF SOUTH PLATTE RIVER AT NORTH PLATTE, NEBRASKA, FOR 1915

Day	Apr.	May	June	July	Aug.	Sept.
1	11400	4740	3360	518	508	518
2	10400	3940	2520	685	985	518
3	10400	3140	2520	685	775	375
4	9360	6140	2520	602	595	375
5	8330	5400	2920	518	400	342
6	7390	5050	3140	518	255	310
7	5750	3860	3360	518	375	310
8	4420	3860	2920	518	375	310
9	3360	3860	2920	375	375	310
10	2520	3860	3360	375	375	310
11	2340	3360	3140	375	685	310
12	2150	3860	3140	375	518	255
13	1500	3860	3940	255	255	200
14	1220	3860	4740	255	255	200
15	1220	3860	4740	255	282	200
16	1220	3290	5050	255	310	200
17	1220	2720	5050	152	440	200
18	1100	3140	5050	110	440	200
19	985	3610	5050	68	310	200
20	775	3610	3700	15	310	200
21	880	3610	2340	15	310	200
22	1360	3610	1980	15	310	200
23	2720	4500	1660	68	310	200
24	2930	5400	1660	15	310	105
25	3140	4740	1360	22	310	200
26	3360	4420	1220	30	518	288
27	3360	7390	1000	30	375	375
28	3360	11400	775	30	685	518
29	2920	8330	775	30	602	518
30	2920	7040	775	200	518	375
31	....	5750	....	30	518	....
Total	114010	145210	86085	7912	13629	8822
Mean	3800	4680	2890	255	440	294
Maximum	11400	11400	5050	685	985	518
Minimum	775	2720	775	15	255	105
Acre-ft.	226000	288000	172000	15700	27100	17500

DISCHARGE MEASUREMENTS OF SOUTH PLATTE RIVER AT NORTH PLATTE

Date	Made by	Width Feet	Area of Section Sq.-ft.	Mean Velocity Ft. per sec	Gage Height Feet	Dis-charge Sec.-ft.
4-19-15	C. J. McNamara		698	1.78	3.90	1250
5- 7-15	C. J. McNamara		1760	2.14	4.40	3770
6- 9-15	C. J. McNamara		1380	2.21	4.35	3060
6-26-15	D. P. Weeks, Jr.		730	1.65	3.98	1200
7- 9-15	D. P. Weeks, Jr.		206	1.45	3.55	288
7-23-15	D. P. Weeks, Jr.		83	1.00	3.30	83
8- 9-15	D. P. Weeks, Jr.		269	1.44	3.70	388
9- 7-15	M. M. Garrett		187	1.13	3.40	211
10- 3-15	R. L. Cochran		248	1.44	3.50	355
10-19-15	R. L. Cochran		716	1.61	3.95	1150
10-30-15	R. L. Cochran		680	1.59	3.90	1080

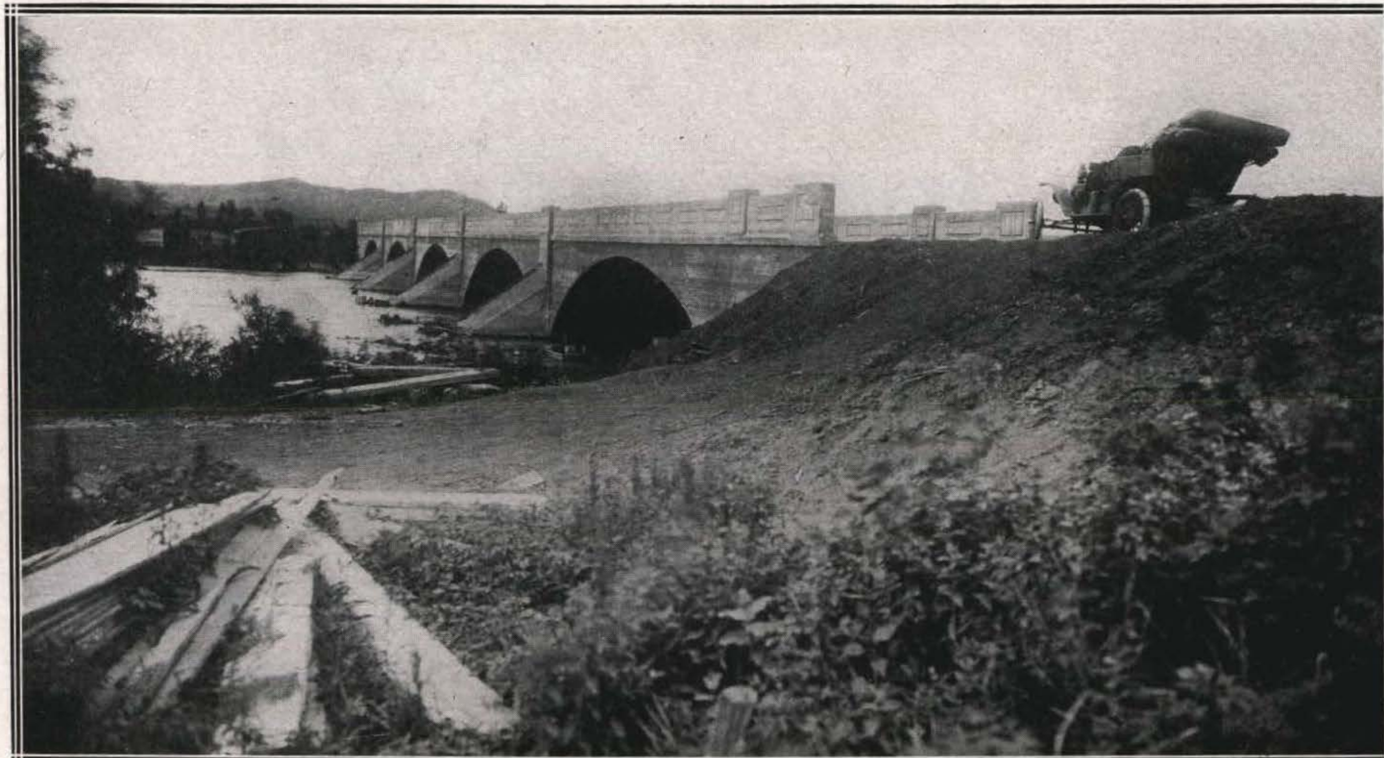
ACTUAL DISCHARGE MEASUREMENTS SOUTH PLATTE RIVER AT NORTH PLATTE 1916

Date	Hydrographer	Area	Velocity	Gage Ht.	Dis-charge	Meter No.
10-19-15	R. L. C. & C. J. McN.	224	1.91		428	1698

DAILY GAGE HEIGHT, IN FEET, OF SOUTH PLATTE RIVER AT NORTH PLATTE FOR 1916

Day	Apr.	May	June	July	Aug.	Sept.
1	....	2.9	Dry	Dry	Dry	....
2	....	2.9	Dry	Dry	Dry	....
3	....	2.9	Dry	Dry	Dry	....
4	....	2.85	Dry	Dry	Dry	....
5	....	2.85	Dry	Dry	Dry	....
6	....	2.8	Dry	Dry	Dry	....
7	....	....	Dry	Dry	Dry	....
8	....	2.75	Dry	Dry	Dry	....
9	....	....	Dry	Dry	Dry	....
10	....	....	Dry	Dry	Dry	....
11	....	....	Dry	Dry	Dry	....
12	....	....	Dry	Dry	Dry	....
13	....	2.8	Dry	Dry	Dry	....
14	3.1	....	Dry	Dry	Dry	....
15	....	....	3.2	Dry	Dry	....
16	....	....	3.1	Dry	Dry	....
17	....	Dry	3.0	Dry	Dry	....
18	3.1	Dry	....	Dry	Dry	....
19	3.05	Dry	3.0	Dry	Dry	....
20	3.05	3.2	....	Dry	Dry	....
21	3.00	....	3.1	Dry	Dry	....
22	3.00	3.4	....	Dry	Dry	....
23	2.95	3.3	....	Dry	Dry	....
24	....	3.2	....	Dry	Dry	....
25	2.95	3.1	....	Dry	Dry	....
26	2.95	3.0	....	Dry	Dry	....
27	....	3.0	....	Dry	Dry	....
28	2.95	2.8	....	Dry	Dry	....
29	2.9	....	....	Dry	Dry	....
30	....	....	....	Dry	Dry	....
31	....	Dry	....	Dry	Dry	....

BAYARD STATE AID BRIDGE, NORTH PLATTE RIVER. BUILT 1914, TWENTY-THREE 33-FT. CONCRETE GIRDERS



McCULLY STATE AID BRIDGE, NIOBRARA RIVER. BUILT 1912. FIVE 50-FT. CONCRETE ARCHES

DISCHARGE, IN SECOND FEET, OF INTERSTATE CANAL, AT WHALEN, WYO., FOR YEAR ENDING SEPTEMBER 30, 1915.

Date	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	815							880	440	1400	1350	1140
2	790							880	590	1405	1320	1140
3	620							880	790	1415	1320	1200
4	625							880	765	1415	1320	1200
5	620							880	787	1415	1320	1200
6	610							775	787	1415	1365	1200
7	610							775	595	1415	1365	1060
8	610							775	630	1415	1300	1060
9	610							775	630	1415	1256	975
10	605							775	630	1415	1190	900
11	605							814	630	1415	1140	800
12	605							840	678	1415	1120	800
13	605							905	750	1415	1120	800
14	605							920	812	1415	1120	725
15	605							879	812	1415	1110	725
16	605							930	800	1415	1110	621
17	605							970	800	1415	1120	621
18	605							735	800	1415	1100	621
19	605								912	1415	1100	621
20	605								1050	1415	1100	621
21	605								1110	1415	1100	621
22	605								1140	1415	1100	621
23	605								1200	1415	1100	621
24	605						200		1175	1415	1100	621
25	605						570		1280	1415	1100	621
26	605						666		1340	1415	1025	620
27	605						655		1350	930	970	620
28	605						681		1380		970	620
29	605						840	100	1395	250	1013	
30	625						880	445	1395	1087	1090	
31	625							500		1275	1090	

DISCHARGE, IN SECOND FEET, OF INTERSTATE CANAL, AT WHALEN, WYO., FOR YEAR ENDING SEPTEMBER 30, 1916.

Date	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	....	....	....	....	....	....	....	672	1250	1435	1330	1210
2	....	....	....	....	....	....	....	709	1320	1435	1410	1200
3	....	....	....	....	....	....	....	684	1285	1435	1450	1200
4	....	....	....	....	....	....	....	810	1285	1435	1500	1200
5	....	....	....	....	....	....	....	850	1285	1440	1500	1200
6	....	....	....	....	....	....	....	900	1335	1440	1425	1200
7	....	....	....	....	....	....	....	955	1350	1440	1490	1200
8	....	....	....	....	....	....	....	1095	1390	1445	1520	1200
9	....	....	....	....	....	....	....	1155	1390	1450	1535	1200
10	....	....	....	....	....	....	....	1235	1390	1450	1535	1200
11	....	....	....	....	....	....	....	1330	1400	1450	1535	1200
12	....	....	....	....	....	....	....	1330	1400	1450	1535	1200
13	....	....	....	....	....	....	....	1330	1150	1450	1535	1200
14	....	....	....	....	....	....	....	1205	1120	1535	1535	1145
15	....	....	....	....	....	....	....	1150	1120	1535	1535	1140
16	....	....	....	....	....	....	....	1275	1120	1535	1535	1135
17	....	....	....	....	....	....	....	1275	1120	1535	1500	1135
18	....	....	....	....	....	....	....	1275	1120	1535	1525	1135
19	....	....	....	....	....	....	....	1275	1120	1535	1525	1135
20	....	....	....	....	....	....	....	1275	1120	1535	1525	1135
21	....	....	....	....	....	....	....	1100	1135	1535	1530	1135
22	....	....	....	....	....	....	....	1040	1190	1535	1535	1135
23	....	....	....	....	....	....	....	1040	1240	1535	1525	1150
24	....	....	....	....	....	....	....	....	1285	250	1475	1150
25	....	....	....	....	....	....	....	1040	1300	....	1415	1150
26	....	....	....	....	....	....	268	1040	1390	....	1450	1150
27	....	....	....	....	....	....	528	1040	1405	380	1430	1150
28	....	....	....	....	....	....	580	1040	1410	700	1340	985
29	....	....	....	....	....	....	592	1100	1425	975	1340	808
30	....	....	....	....	....	....	599	1160	1435	1250	1340	510
31	....	....	....	....	....	....	....	1230	....	1275	1280	....

DAILY DISCHARGE, IN SECOND FEET, OF GERING IRRIGATION DITCH AT HENRY FOR 1916

Day	Apr.	May	June	July	Aug.	Sept.
1	....	....	81	186	80	....
2	....	....	105	186	96	....
3	....	....	105	163	152	....
4	....	....	105	....	152	....
5	....	....	105	186	152	....
6	....	....	105	163	152	....
7	....	....	123	163	152	....
8	....	....	123	198	152	....
9	....	123	123	210	152	....
10	....	96	123	142	157	....
11	....	105	123	142	152	....
12	....	105	123	142	152	....
13	....	105	57	142	152	....
14	....	80	57	142	157	....
15	....	80	57	152	157	....
16	....	80	57	....	168	....
17	....	80	57	152	210	....
18	....	....	57	142	210	....
19	....	80	57	152	210	....
20	....	....	57	123	210	....
21	....	....	57	123	210	....
22	....	....	57	123	210	....
23	....	88	57	123	210	....
24	....	80	....	113	205	....
25	....	80	84	113	210	....
26	....	80	132	113	210	....
27	....	87	132	113	210	....
28	....	81	152	152	210	....
29	....	81	152	152	210	....
30	....	81	163	152	186	....
31	....	81	....	....	186	....
Total	....	1673	2786	4163	5246	....

DAILY DISCHARGE, IN SECOND FEET, OF TRI-STATE CANAL AT RATING BRIDGE FOR 1916

Day	Apr.	May	June	July	Aug.	Sept.
1			600	950	1020	597
2			640	963	980	597
3			680	950	980	597
4			680	1014	980	597
5			720		980	597
6			760	1057	840	579
7			760	1078	840	562
8		407	800	1095	840	562
9		439	828	1095	720	562
10		512	828		720	562
11		562	948		720	562
12		634	660	1078	720	562
13		672	660		720	562
14		672	660		740	537
15		672	660		660	537
16		710			660	537
17		710	612	1057	660	537
18		734	612		660	537
19		734	616	1035	660	537
20		672	560	1035	660	537
21		634	600	1035	660	470
22		634	600	1035	660	470
23		634		1035	670	470
24		562	680	1035	660	470
25		592	720	1035	660	470
26		512	760	1057	660	470
27		512	800	1078	660	470
28		512	820	1078	660	445
29		512	860	1035	660	445
30		512	920	1078	660	445
31		562			660	
Total		14309	20044	22888	23030	15931

DAILY DISCHARGE, IN SECOND FEET, OF MITCHELL IRRIGATION DITCH FOR 1916

Day	Apr.	May	June	July	Aug.	Sept.
1		43	133	205	220	160
2		71	191	205	220	153
3		123	191	205	132	153
4		123	191	205	132	153
5		132	191	205	132	153
6		142	191	205	132	153
7		142	196	205	142	153
8		142	196	220	142	153
9		99	191	227	142	153
10		153	191	212	132	153
11		153	191	212	165	153
12		153	191	212	165	153
13		153	132	220	177	153
14		123	132	220	191	153
15		123	132		191	153
16		123	99		190	153
17		123	132	205	191	153
18			132	205	191	153
19		142	132	205	191	153
20		114	132	205	191	153
21		123	142	205	220	153
22	42	123	137	205	220	153
23	45	123	137	205	220	62
24	42	123	132	165	220	62
25	42	114	159	191	220	62
26	40	114	137	220	220	62
27	40	114	137	220	220	62
28	40	123	198	228	220	62
29	40	153	198	228	75	62
30	40	153	205	228	177	62
31		153		142	153	
Total	371	3793	4849	6015	5527	3869
Mean	41	126	161	207	178	129
Maximum	45					
Minimum	40					
Acre-ft.	736					

DAILY DISCHARGE, IN SECOND FEET, OF ENTERPRISE IRRIGATION DITCH AT RATING FLUME FOR 1916

Day	Apr.	May	June	July	Aug.	Sept.
1					76	35
2					76	21
3					90	21
4					90	21
5				3	90	21
6				3	90	9
7				48	105	9
8					105	9
9					115	9
10					115	9
11					105	9
12					105	9
13					105	9
14				90	105	9
15				90	105	9
16				90	90	9
17				90	90	9
18				90	76	
19				90	76	
20				76	76	
21				62	62	
22				62	62	
23				62	62	
24			21	62	62	
25			105	90	62	
26			105	90	62	
27				90	62	
28				90	35	
29				76	35	
30				76	35	
31				76	35	

DAILY DISCHARGE, IN SECOND FEET, FOR 1916

SHORTLINE IRRIGATION DITCH AT RATING FLUME			CASTLE ROCK IRRIGATION DITCH BELOW WASTEWAY		
Day	June	July	Day	July	August
1	......	12	1	61	39
2	9	12	2	101	31
3	9	12	3	111	28
4	9	12	4	121	28
5	9	12	5	121	28
6	6	12	6	112	29
7	6	27	7	141	29
8	6	27	8	141	30
9	9	23	9	151	29
10	9	23	10	121	29
11	9	23	11	131	29
12	6	19	12	131	29
13	6	19	13	126	30
14	9	27	14	130	30
15	9	27	15	136	28
16	6	27	16	141	30
17	9	16	17	141	35
18	9	16	18	130	57
19	6	16	19	141	51
20	6	23	20	121	51
21	6	23	21	103	51
22	9	23	22	101	44
23	9	19	23	65	39
24	9	19	24	67	35
25	9	23	25	101	44
26	9	16	26	97	39
27	12	12	27	81	44
28	12	9	28	73	39
29	12	12	29	81	37
30	9	16	30	101	36
31	......	19	31	81	36

DAILY DISCHARGE IN SECOND FEET, 1916

BELMONT CANAL AT RATING FLUME

Date 1916	Discharge in Sec. Ft.
May 16	Season opened
May 16	48
May 17	57
May 18	67
May 19	76
June 9	57
July 14	239
July 15	177
July 16	177
August average	200

WINTERS CREEK IRRIGATION DITCH AT RATING FLUME

Date 1916	Discharge in Sec. Ft.
May 23	41
May 24	41
May 25	42
May 26	44
May 27	44
May 28	44
May 29	44
May 30	44
May 31	44
June 1	53
June 2	53
June 3	63
June 4	83
June 5	83
June 6	83
June 7	83
June 8	63
June 9	63
June 16	63
June 17	63
June 18	63
June 19	63
June 20	63
June 21	63
June 22	63
June 23	63
June 24	63
June 25	63
June 26	63
June 27	63
June 28	63
June 29	83
June 30	83

DAILY DISCHARGE IN SECOND FEET, 1916

BROWN'S CREEK CANAL

Date 1916	Gage Height in Feet	Discharge in Second Feet
May 8	Water turned in for the season	
June 30	1.67	82
July 8	2.23	114
July 9	2.20	112.4
July 10	2.20	112.4
July 11	2.00	99.6
July 12	1.70	83.6
July 13	1.70	83.6
July 14	1.70	83.6
July 15	1.70	83.6
July 16	1.70	83.6
July 17	1.70	83.6
July 18	1.70	83.6

August: Average discharge estimated at 85 sec. ft.

CHIMNEY ROCK CANAL

1916	
June 19	Season opened
July 11	2.65
July 12	2.65
July 13	2.50
July 14	2.40
July 15	2.25
July 16	2.30
July 17	2.30
July 18 to 31	2.30 average gage height
Aug. 25	2.00
Aug. 31	1.50

SCHERMERHORN CANAL

This canal used very little.
Closed from July 9th to July 17th.

EMPIRE CANAL

1916		
July 14	1.35	14.5
July 15	1.00	8.7
July 16	1.00	8.7
July 17	1.00	8.7

DAILY DISCHARGE, IN SECOND FEET, OF SUTHERLAND AND PAXTON IRRIGATION DITCH AT WASTEWAY FOR 1916

Day	Apr.	May	June	July	Aug.	Sept.
1				80	65	60
2				70	90	51
3				65	100	42
4				51	95	70
5				90	110	42
6				110	125	42
7			90	110	120	71
8			100	125	130	71
9			80	140	125	43
10			42	150	120	43
11			2	145	120	52
12			110	150	120	52
13			2	*	80	52
14			7			52
15			10		110	61
16			15		110	61
17			15		90	43
18			19	150	80	43
19			19	150	115	43
20			24	150	90	43
21			15	155	24	65
22			15	135	33	80
23			7	150	70	110
24			24	145	51	95
25			42	145	51	80
26			42	155	51	75
27			42	150	70	75
28			85	80	90	80
29			75	150	70	85
30			86	150	80	65
31				165	80	

*Closed.

DAILY DISCHARGE, IN SECOND FEET, OF PAXTON AND HERSHEY IRRIGATION DITCH AT RATING FLUME FOR 1916

Day	Apr.	May	June	July	Aug.	Sept.
1		61	61		67	
2						
3						
4		64	77		51	
5						
6						
7		67	67		56	
8						
9						
10		61	46	74	61	
11				80		
12				93		
13		61	61	99	67	
14				99		
15						
16		56	74		61	
17		51	74		61	
18				67		
19				51		
20		61	74	61	80	
21		*		56		
22				67		
23			56			
24						
25				61		
26			80		34	
27						
28				74		
29		**80	74		67	
30			67			
31		74		74	67	

*Shut water out.
**Turned water on.

DAILY DISCHARGE, IN SECOND FEET, OF GOTHENBURG LIGHT AND POWER DITCH BELOW WASTEWAY FOR 1916

Day	Apr.	May	June	July	Aug.	Sept.
1	....	61	....	30	123	69
2	....	61	....	30	131	76
3	....	61	....	30	131	80
4	....	61	....	30	131	80
5	....	65	....	30	131	80
6	....	57	....	30	131	80
7	....	53	....	30	131	80
8	....	45	....	30	131	96
9	....	65	....	16	131	96
10	....	54	....	2	131	80
11	....	57	....	2	131	80
12	....	65	....	2	127	80
13	....	72	....	2	131	96
14	....	69	....	2	131	80
15	....	69	....	2	119	80
16	....	61	....	96	123	80
17	....	65	....	96	123	....
18	....	65	....	104	123	....
19	....	65	....	104	111	....
20	....	65	....	111	100	....
21	....	65	....	123	96	....
22	....	65	....	123	96	....
23	....	72	....	135	76	....
24	....	69	....	143	76	....
25	....	72	....	143	76	....
26	....	72	....	143	69	....
27	....	72	....	143	69	....
28	....	65	....	123	69	....
29	....	69	....	123	69	....
30	....	69	....	123	69	....
31	....	71	....	123	69	....

ACTUAL DISCHARGE MEASUREMENTS. DITCHES DIVERTING WATER FROM NORTH PLATTE AND PLATTE RIVERS, 1916

Name of Ditch	Locality of Gaging	Date	Discharge Sec. Ft.
Mitchell	Henry Rating Flume	4/22	43
Mitchell	Henry Rating Flume	5/ 6	140
Mitchell	Henry Rating Flume	5/28	130
Mitchell	Henry Rating Flume	6/ 7	202
Mitchell	Henry Rating Flume	6/11	195
Mitchell	Henry Rating Flume	6/22	144
Mitchell	Henry Rating Flume	6/26	131
Mitchell	Henry Rating Flume	7/ 9	227
Mitchell	Henry Rating Flume	8/ 1	120
Mitchell	Henry Rating Flume	8/11	147
Mit hell	Henry Rating Flume	8/29	152
Mitchell	Henry Rating Flume	7/15	208
Mitchell	"Badlands"	5/29	146
Mitchell	"Badlands"	8/17	179
Mitchell	"Badlands"	8/ 2	142
Gering	Henry Rating Flume	5/17	103
Gering	Henry Rating Flume	5/28	91
Gering	Henry Rating Flume	6/ 7	127
Gering	Henry Rating Flume	6/11	128
Gering	Henry Rating Flume	6/23	55
Gering	Henry Rating Flume	7/ 9	210
Gering	Henry Rating Flume	7/15	143
Gering	Henry Rating Flume	8/ 1	159
Gering	Henry Rating Flume	8/11	168
Gering	Henry Rating Flume	8/17	154
Gering	Henry Rating Flume	8/29	209
Gering	"Badlands"	5/29	78
Gering	"Badlands"	6/26	69
Gering	"Badlands"	8/ 2	56
Tri-State	Rating Bridge	5/ 6	277
Tri-State	Rating Bridge	5/17	702
Tri-State	Rating Bridge	6/18	617
Tri-State	Rating Bridge	7/15	1058
Tri-State	Rating Bridge	8/ 1	974
Tri-State	Rating Bridge	8/19	704
Tri-State	Rating Bridge	8/23	692
Ramshorn	Rating Flume	6/ 8	5
Ramshorn	Rating Flume	6/23	9
Ramshorn	Rating Flume	7/15	11
Ramshorn	Rating Flume	8/ 1	Dry
Ramshorn	Rating Flume	8/19	Est. 1
Enterprise	Rating Flume	5/18	71
Enterprise	Rating Flume	6/ 8	72
Enterprise	Rating Flume	6/23	Est. 2
Enterprise	Rating Flume	7/15	92
Enterprise	Rating Flume	8/19	59
Enterprise	Rating Flume	5/18	713
Winters Creek	Rating Flume	5/20	47
Winters Creek	Rating Flume	6/ 8	91
Winters Creek	Rating Flume	6/26	67

Name of Ditch	Locality of Gaging	Date	Discharge Sec. Ft.
Winters Creek	Rating Flume	7/16	72
Winters Creek	Rating Flume	8/ 2	66
Central	Below Power Site	6/27	20
Central	Below Power Site	8/ 3	Dry
Central	Below Power Site	8/21	22
Central	Old Rating Flume	6/ 9	29
Steamboat	Head Gate	6/ 9	Dry
Steamboat	Head Gate	6/28	Dry
Steamboat	Head Gate	8/ 3	Dry
Steamboat	Head Gate	8/21	Dry
Castle Rock	Below Wasteway	6/ 9	72
Castle Rock	Below Wasteway	6/28	63
Castle Rock	Below Wasteway	8/ 3	29
Castle Rock	Below Wasteway	8/21	51
Minatare	Wasteway	6/ 9	59
Minatare	Wasteway	6/27	69
Minatare	Wasteway	8/ 3	11
Nine Mile	Rating Flume	6/10	39
Nine Mile	Rating Flume	6/28	27
Nine Mile	Rating Flume	7/16	51
Nine Mile	Rating Flume	8/ 3	9
Nine Mile	Rating Flume	8/21	.....
Short Line	Head Gate	6/10	6
Short Line	Head Gate	6/28	0
Short Line	Head Gate	7/16	23
Short Line	Head Gate	8/ 4	12
Short Line	Head Gate	8/21	.....
Alliance	Wasteway	6/10	4
Alliance	Wasteway	7/14	18
Alliance	Wasteway	8/ 4	3
Alliance	Rating Flume	7/14	24
Brown's Creek	Rating Flume	6/30	81
Brown's Creek	Rating Flume	5/ 9	46
Court House Rock	Rating Flume	5/25	45
Court House Rock	Rating Flume	7/13	10
Empire	Rating Flume	6/ 9	6
Empire	Rating Flume	7/13	13
Belmont	Rating Flume	6/ 9	57
Belmont	Rating Flume	7/13	201
Beerline	Head Gate	5/31	13
Beerline	Head Gate	7/13	13
Beerline	Head Gate	8/ 5	9
Beerline	Head Gate	8/23	4
Lamore	Rating Flume	7/13	2
Lamore	Rating Flume	8/ 5	.....
Lisco	Rating Flume	5/25	32
Lisco	Rating Flume	6/15	43
Lisco	Rating Flume	7/ 6	28
Lisco	Rating Flume	7/13	44
Lisco	Rating Flume	8/23	2
Rush Creek	Rating Flume	5/25	7
Rush Creek	Rating Flume	7/ 7	2
Rush Creek	Rating Flume	7/12	2
Spohn	Head Gate	5/30	2

Name of Ditch	Locality of Gaging	Date	Discharge Sec. Ft.
Spohn	Head Gate	7/ 7	3
Spohn	Head Gate	8/ 7	12
Spohn	Head Gate	8/23	Est. ......
Oshkosh	Head Gate	5/30	Est. ......
Oshkosh	Head Gate	7/ 7	Dry
Oshkosh	Head Gate	8/ 7	Dry
Oshkosh	Head Gate	8/23	Dry
Robert's	Head Gate	5/30	5
Robert's	Head Gate	7/ 7	7
Robert's	Head Gate	8/ 7	23
Alfalfa	Below Wasteway	7/ 7	18
Alfalfa	Below Wasteway	8/ 8	10
Meyers & Phelps	Near Diversion	7/28	3
Sutherland & Paxton	Below Wasteway	6/19	14
Sutherland & Paxton	Below Wasteway	7/11	151
Sutherland & Paxton	Below Wasteway	7/27	126
Sutherland & Paxton	Below Wasteway	8/ 9	121
Sheridan & Wilson	Diversion	7/27	5
Sheridan & Wilson	Diversion	8/ 9	Est. ......
Platte Valley	Rating Flume	6/ 2	108
Platte Valley	Rating Flume	6/19	94
Platte Valley	Rating Flume	7/11	196
Platte Valley	Rating Flume	7/27	96
Platte Valley	Rating Flume	8/ 9	179
Paxton & Hershey	Rating Flume	6/ 2	47
Paxton & Hershey	Rating Flume	6/19	31
Paxton & Hershey	Rating Flume	7/11	63
Paxton & Hershey	Rating Flume	7/27	71
Paxton & Hershey	Rating Flume	8/ 9	65
Suburban	Rating Flume	7/11	27
Suburban	Rating Flume	7/26	29
Suburban	Rating Flume	8/ 9	46
Gothenburg	Below Wasteway	5/10	52
Gothenburg	Below Wasteway	6/ 6	71
Gothenburg	Below Wasteway	5/16	68
Gothenburg	Below Wasteway	7/26	127
Gothenburg	Outlet Lake Helen	5/10	10
Gothenburg	Outlet Lake Helen	7/26	83
Gothenburg	Outlet Lake Helen	8/11	68
Gothenburg	Outlet Lake Helen	8/25	41
Gothenburg Tail Race	Near Power House	5/10	77
Gothenburg Tail Race	Near Power House	5/14	20
Six Mile	Head Gate	6/ 6	Est. 2
Six Mile	Head Gate	7/25	Dry
Dawson County	Wagon Bridge South of Cozad	7/24	65
Dawson County	Wagon Bridge South of Cozad	8/11	......
Cozad	Bridge South of Gothenburg	7/26	80
Cozad	Bridge South of Gothenburg	8/10	78
Cozad	Bridge South of Gothenburg	8/25	70
Kearney	Rating Bridge	7/24	99
Kearney	Rating Bridge	8/11	154

REPORT OF THE ASSISTANT STATE ENGINEER, ON STATE FARM PAVING

In the year of 1915, for the first time in its history, the State of Nebraska engaged in real road building, using convict labor, and I think it would be appropriate to give at least a short history of the work at this time:

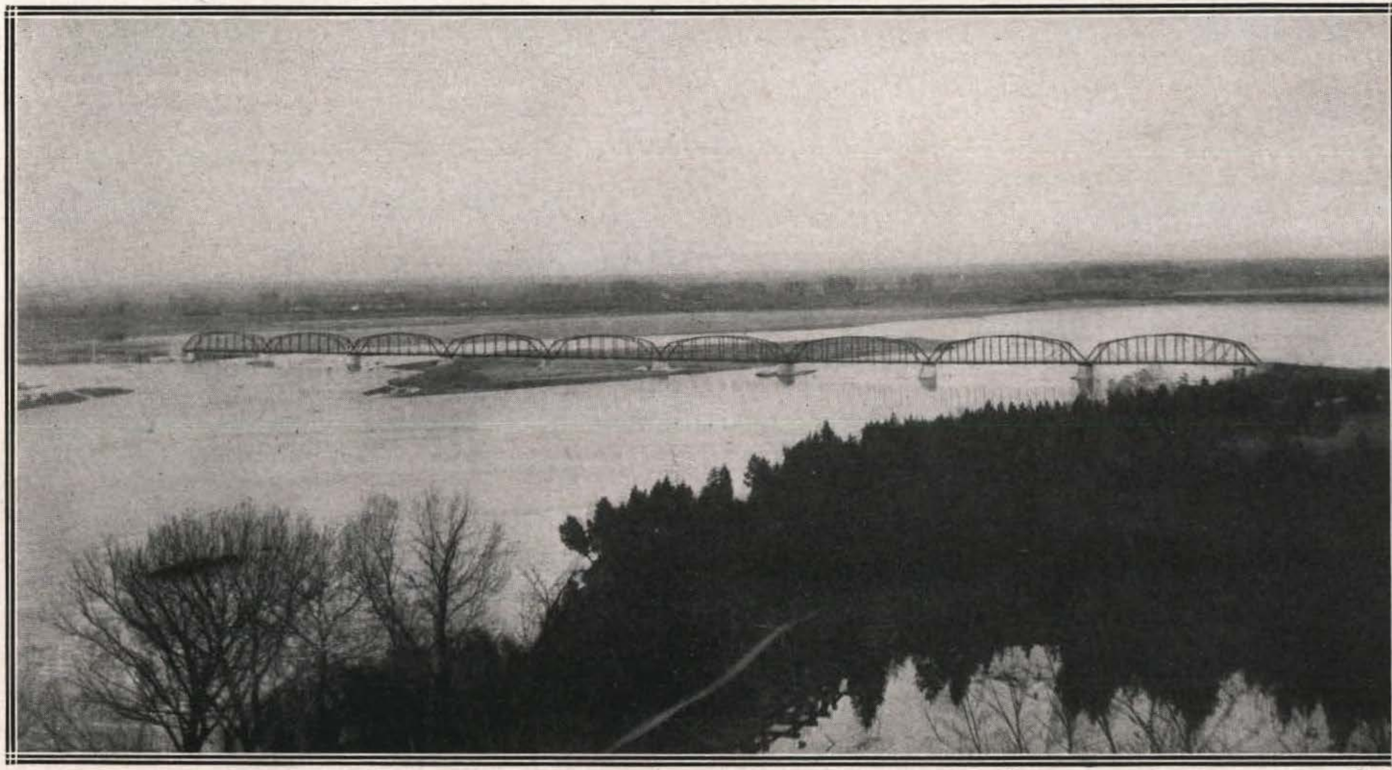
Two years ago, a paving district was created on that part of the road extending along the south and east sides of the State Agricultural School at Lincoln. The Legislature of 1914 realizing the advantage of the improvement, appropriated the sum of $35,000 to pay for its share of the work and stipulated that the Governor, at his discretion, might let the work by contract, or build the state's portion by the use of convict labor. After careful consideration, the Governor, Mr. John H. Morehead, decided on the latter course. He designated George E. Johnson, State Engineer, to arrange for the buying of the material, and gave W. D. J. Steckelberg, Assistant State Engineer, the position of actual supervisor of the work.

By arrangement with the contractor, the work was evenly divided, the State taking the west end of the street and the contractor the other portion.

The contracts for supplying the material were finally completed by the middle of August, and also arrangements were made to house the men in the "Stock Judging Pavilion" of the State Farm. The first men to arrive on the work from the penitentiary, or the "Stir" as they called it, came on the 27th day of August. There were but six men. I will never forget the look of joy and hope on those boys' faces. Ten minutes after their arrival work was started. First a barn, which was loaned to the State by Woods Bros. Kelley Co. had to be floored, as it was to be used as a cement store house. That finished, five cars of cement were unloaded and stored for future use. At the same time, three men were busily engaged making the forms to be used in building the curb. The concrete mixer was next set up and a temporary water main laid up to it.

The Superintendent decided that the work could be more economically handled by mixing all the concrete at one plant, and hauling it to the point desired in wagons. This scheme had the disadvantage of requiring the use of more teams and wagons, but to offset this, the material required less handling and time was saved by not having to move the mixer every two hundred yards or so.

The curbing was finished on the 2nd of October, and the concrete base was started exactly one week later, but was not finished until



FREMONT STATE AID BRIDGE, PLATTE RIVER. BUILT 1913, NINE 180-FT. TRUSSES

November 6. This delay was due to the amount of grading to be done, and the inability to obtain teams. In view of this, the superintendent attempted to sublet the grading, as is the common practice on this kind of work, to some grading outfit, with the proper equipment, arguing that the saving in time and money would more than justify the saving if nothing else, but this was over-ruled, and so all of this work had to be done by hand.

Before the concrete base was finished, the brick was being hauled and piled on each side of the street. Sand was next hauled and dumped at proper intervals in sufficient quantities for the cushion. The actual finishing began on November 9. This consisted in spreading the sand, shaping it true and the laying, rolling and filling the interstices of the brick with pitch. The first afternoon, 950 square yards of street were laid in four hours. This average could not be maintained on account of the weather and the inability of the contractor, who did the hauling, to handle the brick fast enough. However, the road was opened to traffic at nine o'clock on Thanksgiving day, November 25, 1916. I would like to say a word about these last two days.

On the afternoon of the 24th, the last bricks were laid and the pitch gang with two heating kettles, figured that they could finish the remainder by working a couple of hours overtime in the evening. Several newspaper reporters who came out to see the finish were told, by the Superintendent, that the street would be opened to traffic the next morning. As luck would have it, the last reporter had hardly disappeared when one of the tar kettles sprung a leak and was rendered useless. This meant that the road could not be opened for another day at least. After debating among themselves, these men of the pitch gang, convicts if you will, volunteered to work all night in order to keep the word of the superintendent. This they did, cheerfully and faithfully, for twenty-six hours continuously without sleep or rest. Consequently the 25th of November was after all a day of thanksgiving.

The following Saturday, all the rented equipment was either returned, or on its way. the men packed up their belongings and returned once again to complete paying their debt to society.

The superintendent is pleased to state that he is more than pleased with the results and has nothing but praise for the way in which the men responded to the demands of the work.

Statement of the cost of grading, paving, curbing, and guttering that part of Holdrege Street and Warren Avenue abutting on the State Farm, incidental to the carrying out of the provisions of H. R. 761, by employing convict labor:

Material	$20,870.85
Labor and teams	9,144.01
Equipment rental	809.06
Freight on equipment	152.16
Lumber	256.47
Coal	118.73
Oil	27.20
Engineering	268.11
Miscellaneous	92.79
Total	$31,739.38

Of the above amount, there was paid to the Warden at the Penitentiary for the use of the convicts $ 6,761.55

Of which amount the convicts received	$1,850.88	
Cost of maintaining camp	1,099.80	
Profit returned to state for labor	3,810.87	
	$6,761.55	$6,761.55

Itemized cost of paving—

13,096.12 square yards of paving at $2.04 per square yard	$26,736.07
6,970.4 lineal feet curbing, at 50c per foot	3,485.20
2,500 cubic yards grading at 50c per cubic yard	1,250.00
Engineering	268.11
	$31,739.38
Profit on convict labor returned to State	3,810.81
Net cost of paving to State	$27,928.57

Had the above work been done by a contractor, at the same unit prices as paid for the adjoining paving, the cost would have been $33,552.85.

Cost if had been done by contractor	$33,552.85
Net cost of paving to State	27,928.57
Net saving to State by using convict labor	$ 5,624.28

In addition to the above, Abel & Roberts, paving contractors for the City of University Place, were employed to pave:

263.36 square yards of paving at $2.18 per square yard	$574.13
145.3 lineal feet curb at 50c per foot	72.65
	$646.78

It was necessary to contract this work in order that the City of University Place could have an outlet, and be able to use the paving they had constructed for six weeks prior to the completion of the State's portion. The prices were the same as paid by the City of University Place for the same and adjoining work.

In addition, the contractor has filed a bill with this office for $994.51, being one-half the cost of drainage and bridge work on Holdrege Street and on Warren Avenue. I have refused to approve this claim and recommend that it be disallowed as I find no provision in the appropriation bill covering this class of work, and the county has an annual levy for the payment of same.

ROAD MATERIALS OF NEBRASKA

PART ONE

STONE

By G. E. CONDRA,
Director of the State Conservation and Soil Survey.

There is widespread interest in the improvement of public roads in Nebraska, both state and national. Nebraska in co-operation with the federal government is to embark upon an extensive plan of road development.

One of the first considerations in road building is the material available for construction. The Nebraska Legislature of 1913 with this in view, enacted a statute covering the survey of the state's road building materials and placed the work under the State Conservation and Soil Survey with instructions to proceed as rapidly as possible consistent with good work. Later, the State Advisory Highway Commission urged the Survey to complete the work on road materials.

This survey of road materials has been carried on as fast as possible with the limited funds available for its support, and we present herewith a preliminary report which, it is hoped, may be of some use to those engaged in road building. The survey is far from completion, hence a detailed report cannot be made at this time.

It is not the purpose here to discuss the different phases of engineering involved in road making, or the engineering of road materials. Each of these subjects will require a special bulletin in the future.

The author has received assistance in the preparation of this report from Professors N. A. Bengtson, George R. Chatburn, and C. E. Mickey of the State University, from Mr. George Johnson, State Engineer, Mr. Leslie Nichols and from Mr. J. G. McIntosh, H. F. Wetherbee, Edgar Kiddoo, John J. Lyons and others of the Conservation and Soil Survey.

It is sometimes said that Nebraska is without road materials. Persons claiming as much are not fully conversant with the facts for there are several road building materials within the state. The chief ones of these are sand, gravel, limestone, sandstone, shale, and several kinds of soil and subsoil. Our reports treat these materials under the headings "Stone," "Sand," and "Soil."

Field Studies.—The writer and assistants have visited and studied many of the stone outcrops in Nebraska. This work has continued over a period of several years. Though the field investigations are far from complete, and should be extended with great detail, it seems that enough data are at hand to warrant publication.

Field work on structure was done under difficult conditions. It was not easy to do accurate structure work because of the presence at most places of a thick overburden, which obscures the outcrops. This made the determination and mapping of constants especially difficult. By persistent effort the distribution of the leading stone members has been determined and it is thought that a description of these will be of value to road builders.

Samples of stone from all the leading members or ledges, as they are sometimes called, were collected for testing at the University.

Laboratory Tests.—The University of Nebraska is well supplied with standard equipment for testing the physical properties of road materials. Professor C. E. Mickey of the Department of Applied Mechanics of the Engineering College directed the testing of the samples supplied by the State Conservation and Soil Survey. The principal specifications in testing road materials are hardness, toughness, and cementing value. The tests of Nebraska stone made under Professor Mickey's direction were on weight per cubic foot, water asorption, abrasion, hardness, toughness, and cementing value. The following brief review of the qualities tested in stone, is taken mostly from U. S. Department of Agriculture Bulletin 347, "Methods for the Determination of the Physical Properties of Road Building Rock," March 17, 1916.

Weight per cubic foot.—The object is to determine the weight of a cubic foot of the solid material. The weight of the cubic foot is of value in estimating the weight of any given volume, as a cubic yard or car load of the crushed rock.

Percentage of water absorption.—This test determines the amount of water absorbed by one cubic foot of stone in 96 hours. The value of the test is in judging the probable lasting qualities of the rock and the action of frost, since the presence of water in the rock is liable to promote disintegration. The higher the water absorption the greater the disintegrating effect of frost.

Abrasion test.—The object of the test is to determine the percent of wear. The abrasion test determines the hardness and toughness of rock simultaneously and probably is the best indicator of the wearing qualities of a material. The per cent of wear runs from as low as 1 in rare cases to as high as 30 or 40 for some sandstones and limestones. This is important because of the general use of roads by autos and the wear caused by such traffic.

Hardness.—"Hardness is the property which a rock should possess in order to successfully resist the abrasive action of traffic especially iron tires of vehicles which tend to grind to dust the individual fragments of rock forming the wearing surface of macadam roads." The object of the hardness test is to determine the resistance a rock offers to the displacement of surface particles by friction. The test is of value in determining the resistance of a rock to the grinding action of traffic. The co-efficient of hardness for various types of rock runs from 0 for very soft limestones and sandstones to 19.7 for the hardest varieties of quartzite. The terms used to denote hardness have the following values: 14 or lower, soft; 14 to 17, medium; above 17, hard.

Toughness.—"Toughness is the property a rock should possess to successfully resist fracture under the impact of traffic." The object of this test is to determine the resistance the material offers to fractures due to impact. The value of the test is in determining the comparative resistance of rock to the impact of traffic produced by the action of horses' hoofs, etc., on the stone forming the wearing course of a macadam road. Toughness in rock varies through a wide range of value from as low as 2 or 3 in the case of some limestones and sandstones to as high as 60 in rare instances. Below 13 is low; 13 to 19 is medium; and 19+ is high.

Cementing value.—"Binding or cementing value, as it is more frequently known, is the ability which the dust of a rock should possess or develop by contact with water, so as to bind or cement the larger rock fragments together and prevent their displacement under the shearing action of traffic. This property is especially valuable in water-bound macadam construction since it is depended on to maintain the integrity of the wearing course as the road surface is worn off by traffic." The object of this test is to determine the ability which the rock powder when wet possesses of binding the larger fragments together. The test gives a very good preliminary idea of the binding power of the materials. The results vary enormously, running from 0 for pure quartz to very high in the case of clays. They are used as follows: Below 10, low; 10 to 25, fair; 26 to 75, good; 76 to 100, very good; above 100, excellent.

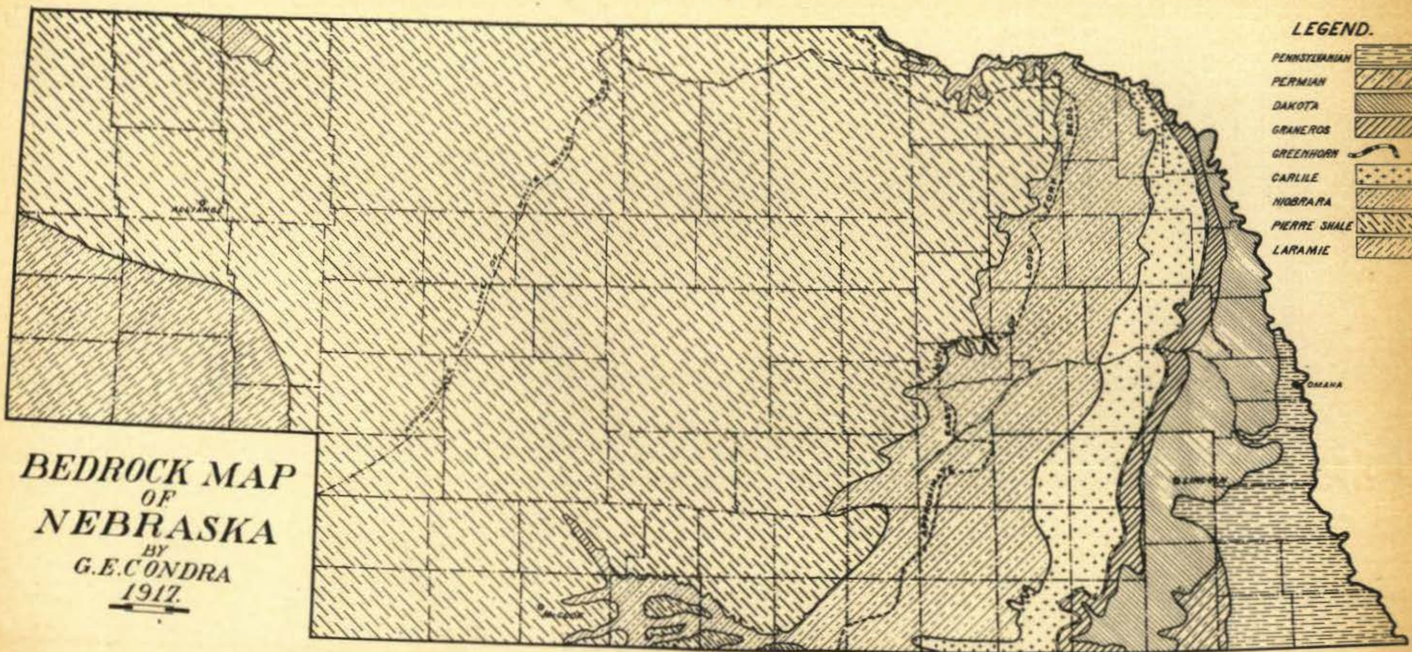
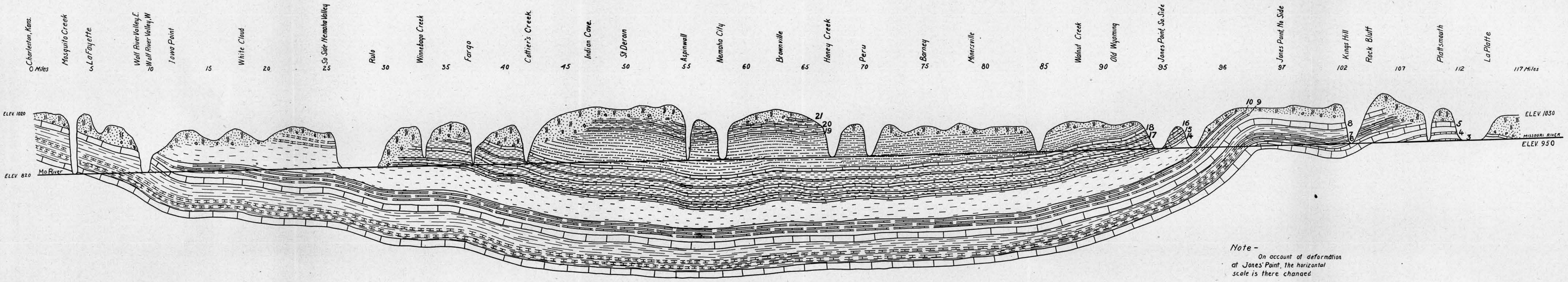

BEDROCK MAP
OF
NEBRASKA
BY
G.E.CONDRA
1917.
LEGEND.
PENNSYLVANIAN
PERMIAN
DAKOTA
GRANEROS
GREENHORN
CARLILE
NIOBRARA
PIERRE SHALE
LARAMIE
OMAHA
LINCOLN

FIGURE 1

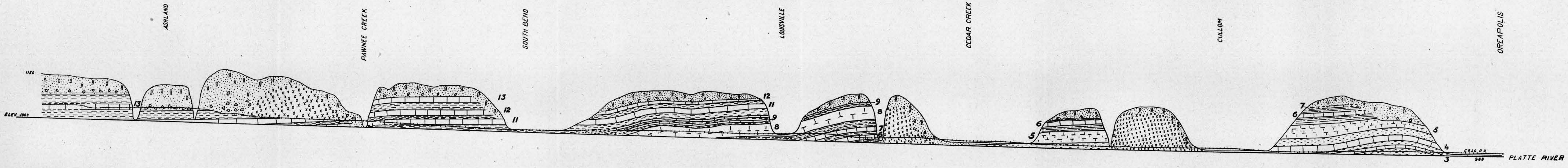


STRUCTURE PROFILE, PENNSYLVANIAN FORMATIONS

LA PLATTE, NEBRASKA CHARLESTON CREEK, KANSAS.

[TOPOGRAPHY GENERALIZED]

FIGURE 2



STRUCTURE PROFILE, LOWER PLATTE VALLEY

ASHLAND — OREAPOLIS

[Topography Generalized]

LEGEND

3 Oreapolis Limestone
4 Weeping Water ..
5 Plattsmouth ..
6 Cullom ..
7 Cedar Creek ..
8 Forbes ..

LEGEND

9 Meadow Limestone
11 Louisville ..
12 South Bend ..
13 Ashland ..
Dakota Sandstone
Drift and Loess

FIGURE 3

GENERAL STRUCTURE OF NEBRASKA

If the deep subsoils were removed from the state, the divisions of bed rock would be observed to outcrop in belts, about as shown by Figure 1. These divisions are thought to be present in the structure as shown by Figures 2 to 8.

Four systems of bed rock formations outcrop in Nebraska and produce stone for road building. They are the Pennsylvanian, Permian, Cretaceous and Tertiary.

Pennsylvanian Formations

The oldest formations exposed in Nebraska, the Pennsylvanian, outcrop in the southeastern counties. They consist principally of limestones and shales, as shown by outcrops at or near Louisville, South Bend, Weeping Water, Nehawka, Plattsmouth, Nebraska City, Auburn, Rulo, Falls City, Table Rock and Roca. The total exposed thickness of these formations is between 800 and 900 feet. There are other and lower formation of the system not exposed in our state. The Pennsylvanian divisions are plainly stratified, and, except where modified by deformations, such as folds and small faults, lie nearly horizontal or dip westward under formations of later age.

Deformations.—Among the best defined deformations in the Pennsylvanian beds are those near Table Rock and Nehawka. Figure 2 shows that these strata bend downward along the Missouri between Cass County and the Kansas line. Figure 3, representing the Platte Section, shows also the north end of the Nehawka anticline. Figure 4 is a section along the Weeping Water from east of Union to and beyond Wabash. In this section the Nehawka anticline carries the beds upward by two bends, and the highest point is between Nehawka and Weeping Water. The exact outline of the Nehawka anticline is not known and cannot be worked out without prospecting by drilling because drift and loess cover the bed rock in much of the upland. The Nehawka anticline extends in a northeast, southwest course, but its exact form and area are not known.

The Table Rock anticline (see Figure 5) rises more than 400 feet above what would be the normal position of the strata. Its axis as shown by exposures, extends from north of Tecumseh, past Elk Creek, Table Rock and DuBois. Though the strata along the little Nemaha, between the Table Rock and Nehawka anticlines, are much higher than in the Missouri River section, they are lower than in the anticlines. Between Bennett and Roca, the strata are nearly level, but are thought to form what appears to be a low broad anticline extending in a north-south direction.

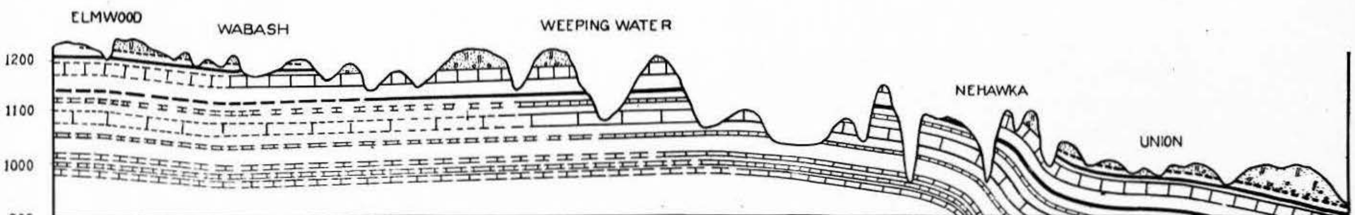

ELMWOOD
WABASH
WEEPING WATER
NEHAWKA
UNION
1200
1100
1000
800

FIGURE 4

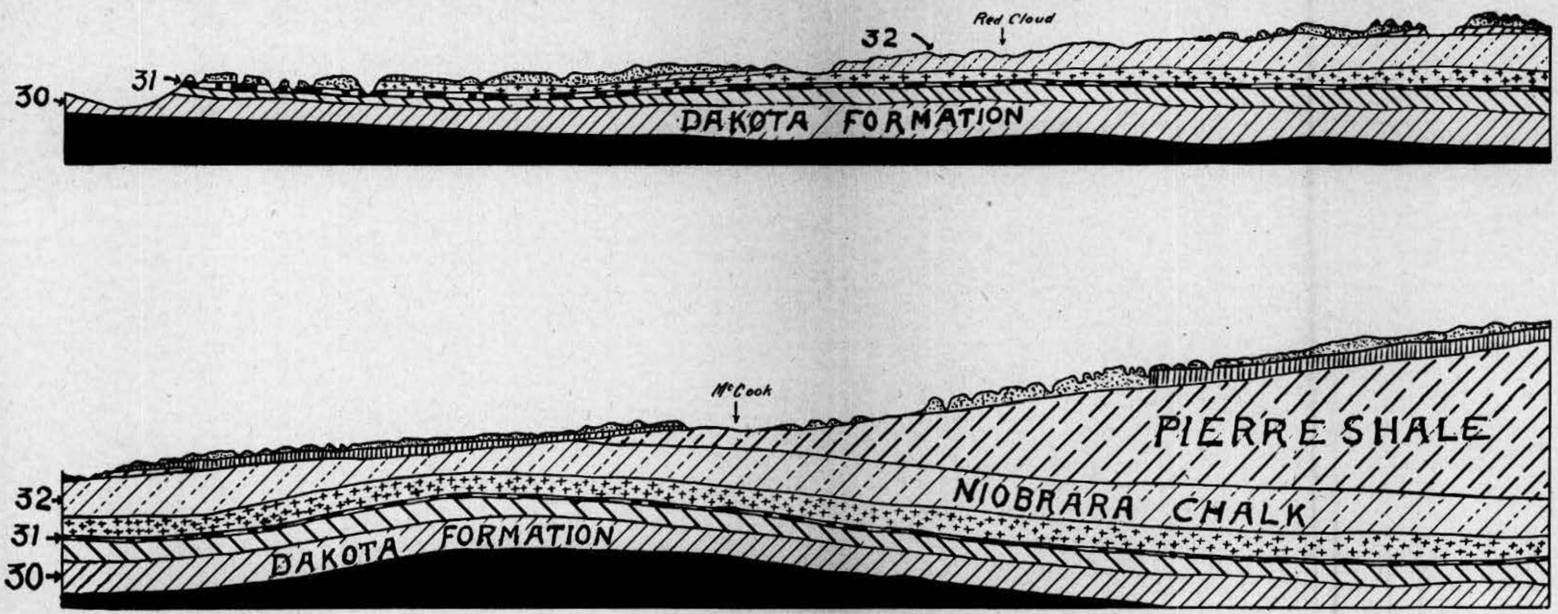


FIGURE 7

REPUBLICAN VALLEY SECTION

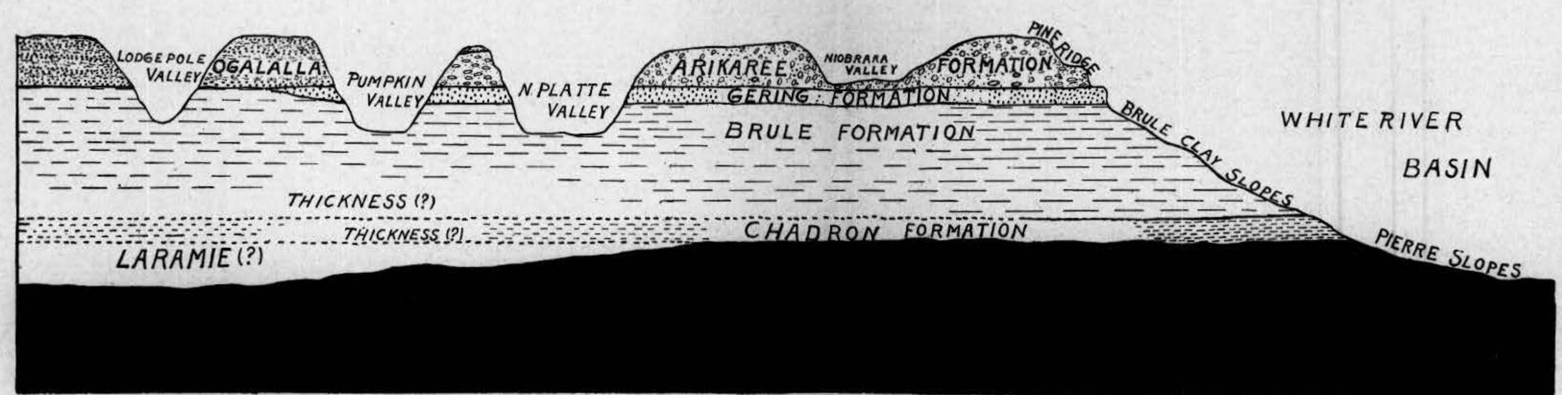


FIGURE 8

SECTION ACROSS WESTERN NEBRASKA

There are several small faults in the Pennsylvanian beds as near Humboldt, Union and Wabash.

***Generalized Section of the Pennsylvanian Beds.**—The divisions are here arranged from the oldest exposed, upward in the order of their superposition and age. Though most members of this generalized section, both limestone and shale, extend throughout the Pennsylvanian area of Nebraska, it should be understood that certain ones of them do not. The sequence of formations is shown by Roman numerals and their limestone members by Arabic numbers. The shales separate the limestones and practically all we give for them is their thickness. The generalized section follows:

I. **Lawrence (Andrew) Shales,** thickness 80 to 90 feet exposed in the Weeping Water Valley, lower Platte and at Plattsmouth. These are the Lawrence shales of Kansas and the Andrew of Iowa.

The Lawrence shales of Nebraska contain four limestones, numbered 1 to 4 in our section. They are as follows:

1. Nehawka Limestone, thickness 10 feet.
   Shale, 4 to 6 feet.
2. Sturm Limestone, about 6 feet.
   Shale, 6 to 9 feet.
3. Oreapolis Limestone, 6 to 9 feet.
   Shale, 7 to 18 feet.
4. Weeping Water Limestone, 6 to 12 feet.
   Shale and thin Limestones, 14 to 20 feet.

II. **Plattsmouth (Oread) Limestone,** thickness 24 to 30 feet.

This is Limestone member No. 5 in the Nebraska section.

It was described and named in pioneer days by Meek and Hayden.

III. **Platte Shales,** thickness about 50 feet.

Shale, 13 to 30 feet.

6. Cullom Limestone, 4 to 8 feet.
   Shale, 6 to 8 feet.
7. Cedar Creek Limestone, 2 to 7 feet.
   Shale, 13 to 30 feet.

Division III, the Platte Shales, was described and named by Meek and Hayden.

IV. **Deer Creek (Forbes) Limestone,** thickness 20 to 28 feet.

This is Limestone member No. 8 in the Nebraska section.

V. **Braddyville Formation,** thickness 90 feet or more.

This formation contains heavy limestones in the Platte section, but more shale and less limestone to the south. The members are as follows:

Shale, 5 to 10 feet.

9. Meadow Limestone, 2½ to 4 feet.
   Shale, 5 to 6 feet.
10. Union Limestone, thickness in the Missouri River section, 6 to 8 feet.

---

*"The Pennsylvanian Formations of Southeastern Nebraska," Condra and Bengtson.

Shale and thin limestones, 20 to 25 feet.
11. Louisville Limestone, 10 to 12 feet.
Shale, 5 to 9 feet.
12. South Bend Limestone, 8 to 9 feet.
Shale, 16 to 18 feet.
13. Ashland Limestone, 10 to 12 feet

VI. **Scranton (City Bluffs) Shales,** thickness, 90 to 125 feet. Exposed east of Union, at Table Rock, and DuBois, in southeastern Richardson county and across Kansas. Known as City Bluffs Shale in Iowa and as Scranton Shales in Kansas. An important source of brick clay.

The Howard Limestone of Kansas and the shale below are included in this division for Nebraska. The Howard Limestone is exposed in the creek south of DuBois and in the bluffs near the southeastern corner of the state, but has practically no value for building purposes.

VII. **Nemaha Formation,** thickness, 110 to 130 feet.

This formation includes 5 workable limestones and 4 shale members. It is best developed in the Big Nemaha Valley with exposures between Tecumseh and DuBois, and between Falls City and Rulo. There are outcrops north of Rulo, between Union and Nebraska City. The name for this formation was proposed by the writer and Professor Bengtson. The divisions of the formation are as follows:

14. Rulo Limestone, 1 to 2 feet.
Shale, 7 to 9 feet.
15. Burlingame Limestone, 5 to 6 feet. The name Burlingame appears to have been used for three different ledges in Kansas, all of which extend into Nebraska. Just what is the correct usage is not known.
Shale, 28 to 30 feet.
16. Fargo Limestone, 3 to 5 feet.
Shale, 30 to 34 feet.
17. Preston Limestone, 6 to 11 feet.
Shale, 30 to 45 feet..
18. Tarkio Limestone, 5 to 6 feet. This ledge is often confused with the well known Cottonwood Limestone.

VIII. **McKissock Grove Shales,** thickness 95 to 120 feet. This division is known as the McKissock Grove shales in Iowa and is part of the Admire formation of Kansas. It is well shown in the Nemaha section where it contains much arenaceous shale and several thin seams of coal. The division is prominently exposed in the vicinity of Falls City and along the Missouri near Nebraska City and Peru. The member has local developments of very hard sandstone which has local use.

IX. **Limestones and shales,** thickness about 150 feet. These represent part of the Admire, and the Elmdale, Neva, Eskridge, and Cottonwood divisions of Kansas, but make a natural formation in Nebraska. The members are as follows:

19. Brownville Limestone, 2 to 5 feet.
Shale, 10 feet.
20. Aspinwall Limestone, 16 inches to 2 feet.
Shale 37 feet.

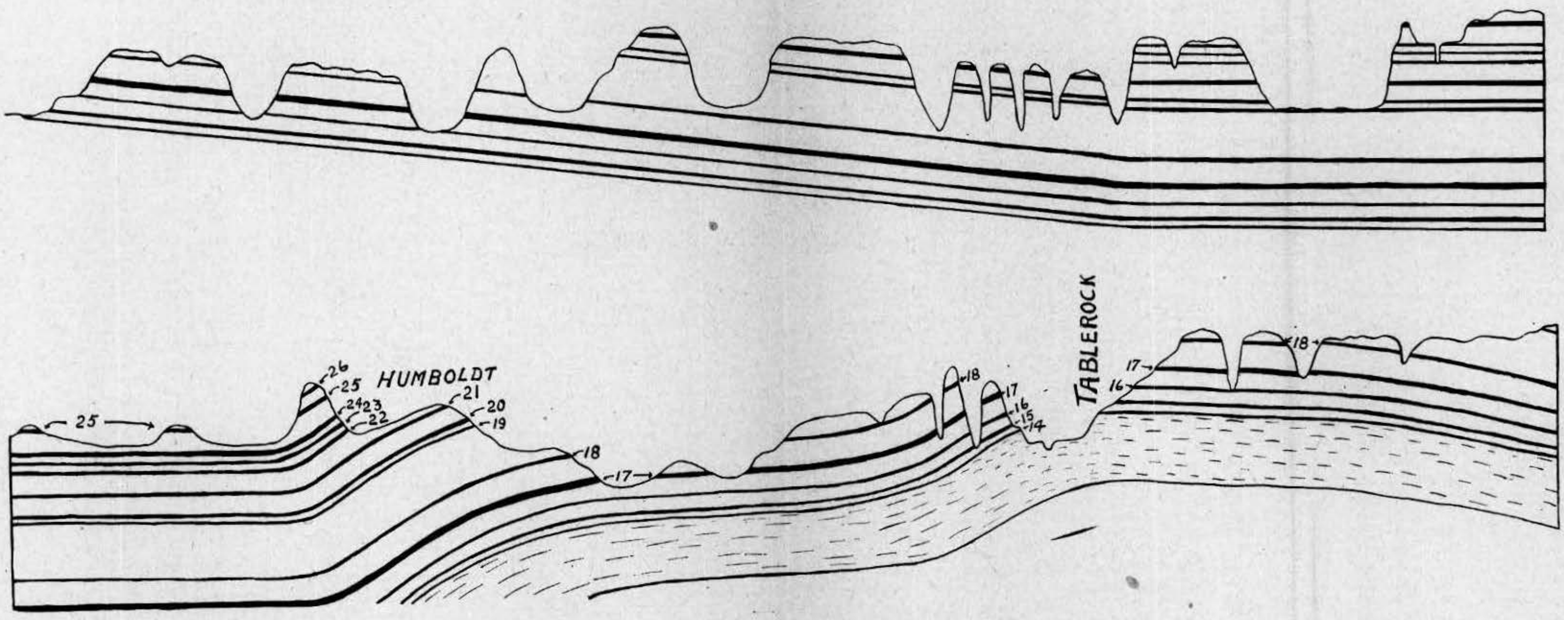


FIGURE 5

BIG NEMAHA SECTION, FROM NEAR RULO TO WEST OF TABLE ROCK

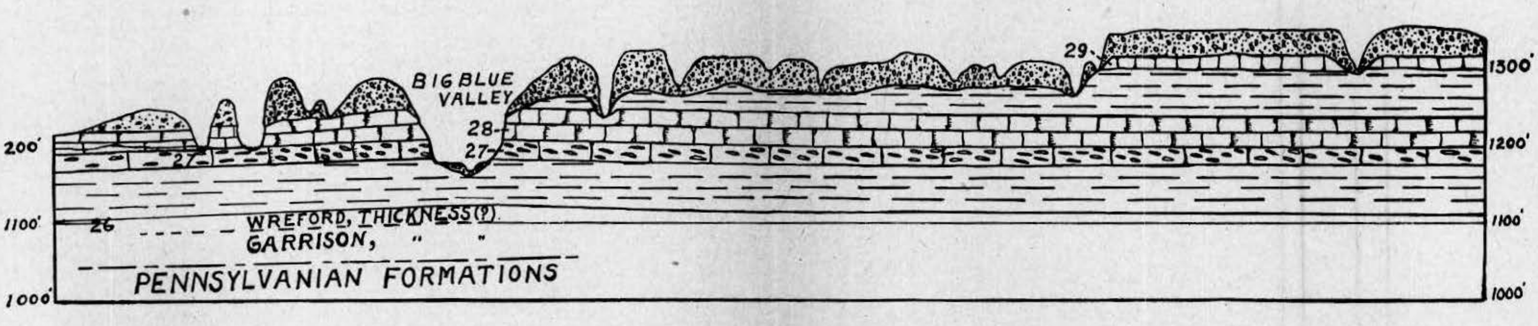


FIGURE 6

BIG BLUE SECTION

21. Falls City Limestone, 4 to 6 feet. This is well exposed at the Lehmer quarry southwest of Falls City, and high in the bluffs in the vicinity of Aspinwall.
    Shale, 40 to 50 feet.
22, 23, 24. Limestones and interbedded shales, thickness 35 feet. This division is well exposed near Salem and Humboldt. The limestones are each two to three feet thick. Members 22 and 23 belong to the Elmdale formation of Kansas and 24 represents the Neva Limestone of Kansas surveys.
25. Cottonwood Limestone, 5 to 6 feet. This is one of the best horizon markers in the state. The stone is light colored and contains myriads of small fossils about the form and size of a rice grain.

X. **The Garrison Formation,** thickness less than 100 feet. This formation contains shales and thin limestones. Nearly all of the members are covered with mantle rock. Only about 20 feet of the base of the formation is exposed east of the Table Rock anticline. To the west of this anticline along the line between Pawnee and Gage counties, but covered by mantle rock, may be a thickness of nearly 100 feet. The thickness reported in Kansas to the south is 140 feet.

Permian Beds.

Overlying the Pennsylvanian beds and exposed principally in the Big Blue Valley are strata of the Permian system. (See Figure 6.) The best defined outcrops of these are in the vicinity of Blue Springs and Wymore. The Permian contains variegated shales, limestones, and flinty limestones. The total thickness here as determined from incomplete exposures is thought to be about 220 feet. The Pennsylvanian beds grade gradually into the Permian without a definite line of demarcation. In fact the divisional line in Nebraska is not marked by either fossil or structure differences.

The members of the Permian system in Nebraska are:

26. **Wreford Limestone,** 1 to 3 feet exposed. This division is 40 or more feet thick in Kansas and would show a greater thickness in Nebraska, if not covered with mantle rock.
    Matfield Shales, 65 feet.
27. **Florence Flint,** 20 to 24½ feet.
28. **Fort Riley Limestone,** 42 to 45 feet.
    Doyle Shales, 60 to 70 feet.
29. **Winfield Formation,** about 20 feet exposed.

The higher members of the Permian do not outcrop in Nebraska. It here, they are covered by mantle rock and may be somewhat thinner than in Kansas. It is thought that there are additional developments of the Permian under western Nebraska, leading up to the "red beds" of later age. There is no need for considering them in this connection.

Cretaceous Beds.

The third system of rocks of importance in Nebraska is of Cretaceous age. (See Figures 1 and 7.) These beds lie unconformably on the Permian on some later beds of central and western Nebraska. Among the best exposures are those along the Missouri from Boyd County, to Dakota County, in Jefferson County, along the Republican from Superior to Indianola, and in Hat Creek and White River basins. The beds dip gently westward except where they lie nearly horizontal or are deformed. Several distinct deformations are shown by small faults and by folds. The two best marked anticlines are in the vicinity of Cambridge and northeast of Chadron. The thickness of the Cretaceous increases from east to west reaching a maximum of what is thought to be between 2,500 and 3,000 feet. The formations are composed principally of shale, sandstone and chalk. The divisions are as follows:

30. **Dakota formation,** 300 to 400 feet.
    Graneros Shale, 50 to 300 feet or more.
31. **Greenhorn Limestone,** 18 to 30 feet.
    Carlile Shales, 100 to 500 feet.
32. **Niobrara chalk rock,** 200 to 400 feet.
    Pierre Shale, 100 or less to about 1,000 feet.
    Laramie formation, thickness ?. This division has limited distribution in the southwestern counties. It is exposed over a very small area in the western part of Scottsbluff county and is thought to underly several hundred square miles of Nebraska. See Figure 1.

There are stone resources in the Dakota, Greenhorn and Niobrara, which are described at another place in this report. Aside from these the Cretaceous stone has little value in Nebraska. The shales and clays have importance.

Tertiary Formations.

Lying on an uneven surface of the various Cretaceous members are two thick groups of Tertiary age. They are exposed as far east as shown by Figure 1. These deposits are separable into two leading divisions, formerly known as the White River group and the Loup Fork beds. The studies of Darton and others published in Professional Papers 17 and 32 of the United States Geological Survey divide the White River beds or lower part of Nebraska's Tertiary into two main divisions, the Chadron beds and the Brule Clay. These formations are distinctly sedimentary, plainly stratified, and mostly of clayey texture. The upper Tertiary deposits (Loup Fork beds) are separable into three main divisions known as the Gering, Arikaree and Ogallala formations. They have wide distribution in central and western Nebraska. Figure 8 shows a cross section of the western counties and the distribution of these formations in that area.

The sequence of Tertiary deposits is as follows:

Chadron Formation, thickness 100 to 200 feet. This consists of sandy clays and greenish gray sandstones. As a rule the stone is too friable and soft for use, but there are places where it has been worked to good advantage for rip rap and for building purposes, as near Henry, Scottsbluff county. The Chadron is prominently exposed in White River Valley.

Brule Clay, thickness 200 to 800 feet or more. This formation is a pink to flesh colored, arenaceous silty clay, but carries some stone grading between limestone and sandstone. This stone has only minor value for local use. The Brule clay reaches a thickness of fully 800 feet at places in the North Platte Valley. It well exposed in Scottsbluff Mountain and outcrops very generally in White River Valley, Hat Creek Basin, North Platte Valley, Pumpkin Creek Valley, and Lodgepole Valley, and at a few points along the Niobrara and upper courses of the Loup rivers.

Gering Formation, thickness 50 to 200 feet. This formation is quite sandy, at most places a friable sandstone. It forms the nearly vertical walls in the Pine Ridge country and in parts of the North Platte and Pumpkin Creek valleys and may be present in the Niobrara Valley in the vicinity of Valentine.

33. **Arikaree Formation,** thickness 50 to 600 feet. The beds of the Arikaree formation are separable into three main divisions as shown by fossils. The Arikaree has a very wide distribution over the northwestern part of the state, but gives way at or near the Pumpkin Creek Valley on the south to the Ogallala formation. The principal content of the Arikaree is light grayish sand, yet it carries large quantities of lime, some clay, pebbles and stone. The sands are cemented at places forming friable stone.

34. **Ogallala Formation,** thickness 50 to 200 feet. This formation occurs in the southwestern part of the state from the Republican Valley westward to Wild Cat Range of the North Platte Valley area. The Ogallala contains a considerable amount of lime and sand and has thin beds of soft limestones at places. The lime binds the sand and pebbles into sand and pebble rock.

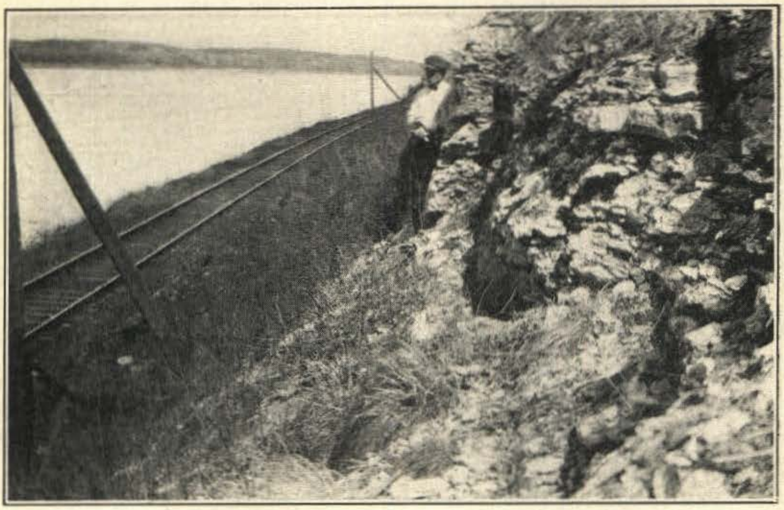


FIGURE 9

OREAPOLIS LIMESTONE, EXPOSED IN VALLEY SIDE, 2¼ MILES WEST OF OREAPOLIS

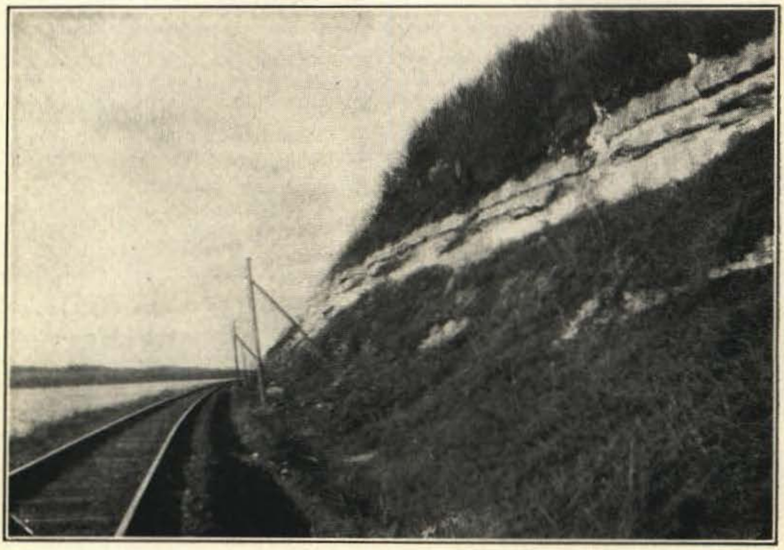


FIGURE 10

WEEPING WATER LIMESTONE, EXPOSED 2 MILES WEST OF OREAPOLIS

CHARACTER AND DISTRIBUTION OF STONE DEPOSITS OF NEBRASKA

There are thirty-four stone producing members and formations of some importance in Nebraska. Twenty-five of these are described in detail in "The Pennsylvanian Formations of Southeastern Nebraska," by the writer and Professor N. A. Bengtson. Numbers 26 to 34 are described in the reports of the Nebraska Geological Survey, in Water Supply Papers 215 to 216, also in Professional Papers 17 and 32 of the United States Geological Survey.

1. Nehawka Limestone:

This, the lowest workable bed in the Nebraska section, is exposed in the North Branch of the Weeping Water Valley about two miles north of Nehawka. The best exposures are in Section 6, Township 10 North, Range 13 East. The thickness at these places is between 6 and 10 feet. The stone is gray, bedded, quite fossiliferous and soft to medium. It is not very accessible, but probably will become important for local use.

2. Sturm Limestone:

This outcrops along the North Branch of Weeping Water Creek between points two and fours miles north of Nehawka, with several good exposures near Sturm's school house, Section 12, Township 10 North, Range 12 east. It is in the bed of Weeping Water Creek two miles west-northwest of Nehawka, where it is marked by a rapids in the creek. Thickness, about 6 feet. The exact thickness is difficult to determine because of incomplete exposures. The stone is light colored, bluish, impure and weathers into nodular, pellet-like forms.

The Sturm Limestone has no value for building except as a binder or base for roads or for the cheaper grades of concrete construction.

3. Oreapolis Limestone:

This member is exposed in the base of the slope 1½ to 2 miles southwest of LaPlatte and above the railroad 2 miles west of Oreapolis. (Figure 9.) The latter exposure is the type locality. The thickness here is 8 to 9 feet. The stone is light bluish gray, partly crystalline and weathers light gray in the upper two or three feet and slightly yellowish in the basal portion. It is quite fossiliferous.

The Oreapolis Limestone is also exposed along the valley sides of Weeping Water Creek in SE¼, Section 11, Township 10 North, Range 12 East, and NE¼ Section 14, Township 10 north, Range 12 East, and along the North Branch valley between points one and two miles north of Nehawka. Thickness, 6 to 9 feet. The stone is bedded with shale parting in places. The color is bluish, weathering light.

This stone may yet have importance for local use, but it is not capable of commercial production.

4. Weeping Water Limestone:

This member is exposed in the valley sides of Weeping Water Creek in Sections 4, 5, 6, 9 and 10, Township 10 North, Range 12 East, and along the west side of the North Branch valley about 1 mile northwest of Nehawka. (Figure 10.) It is the first limestone of any importance below the Plattsmouth. Thickness, 6 feet. The stone is light colored, massive, breaks down in large blocks and shows a tendency to weather into rough, nodular forms.

The Weeping Water ledge outcrops west of La Platte and Oreapolis. Thickness, 11 to 12 feet. The stone here is light colored, and produces a prominent cliff and bench. A typical section 2¼ miles west of Oreapolis shows:

Limestone, 5 feet 4 inches, one bed, blue gray, weathers yellowish and shatters badly, fossiliferous.
Shale, 1 foot, light colored and calcareous.
Limestone, 6 feet 2 inches, one bed unweathered, breaks into thin layers.

The Weeping Water Limestone is suitable for rip rap, base, and the cheaper forms of concrete construction.

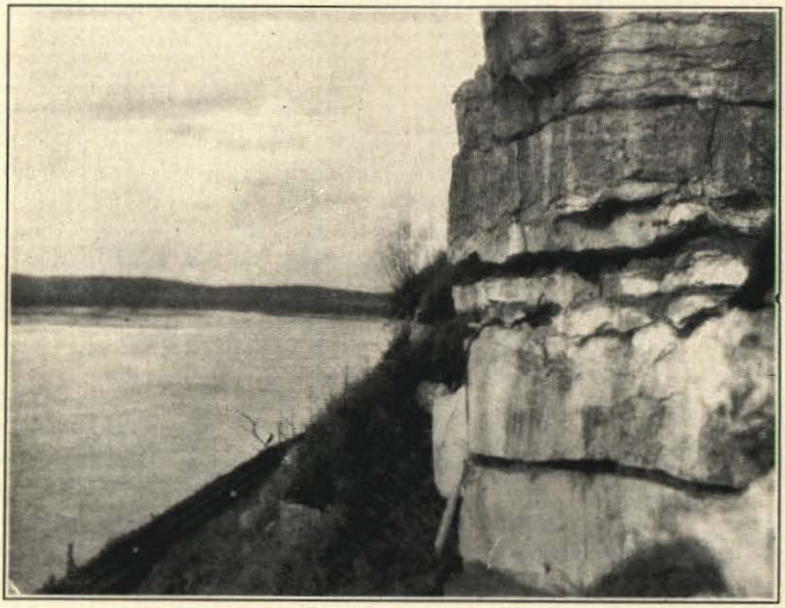


FIGURE 11
PLATTSMOUTH LIMESTONE, HIGH IN VALLEY SIDES, 2 MILES WEST OF OREAPOLIS

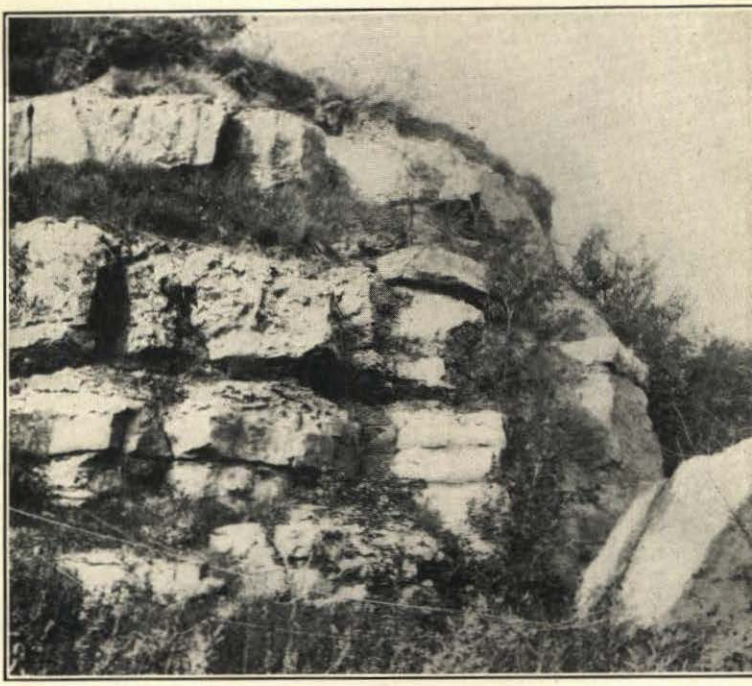


FIGURE 12
PLATTSMOUTH LIMESTONE, NEAR ROCK BLUFF

5. **Plattsmouth Limestone:**

This is one of the principal sources of stone in Nebraska. It is exposed in the lower Platte (Figure 11.) in the Missouri River section in the vicinity of Plattsmouth, and in the middle course of the Weeping Water Valley. In the Missouri River section the exposures are quite high in the valley sides between Plattsmouth and Rock Bluff. (Figure 12.) The formation passes below the river level about one mile south of Rock Bluff. The stone is massive and light gray. The following is a typical section of this division at Rock Bluff:

Limestone, 1 foot 2 inches, in two beds.

Shale, 1 to 3 feet, carbonaceous and often mistaken for coal.

Shale, 3 inches to 1 foot, blue, argillaceous, not distinctly bedded, persistent, though thin.

Limestone, 16 feet 6 inches, in three divisions with shale partings.

Shale, 4 feet 3 inches, yellowish, calcareous.

Limestone, 7 feet. A heavy ledge separated from a thin basal ledge by carbonaceous shale. Contains prominent dark flint nodules.

The section becomes more solid without divisional lines when worked back from the face of an outcrop.

In the Platte section the formation is exposed in the old quarries south of Richfield, in the "point" opposite Cullom, in the lower part of the cliff 1¾ miles northeast of Cedar Creek and in the upper valley side 2 to 3 miles west of Oreapolis. It has two or three main divisions with shale partings of variable thickness. Total thickness, 25 to 30 feet. The stone is light colored, massive, medium hard, and contains flint 10 to 11 feet below the top. In place the basal part consists of a carbonaceous shale 1 to 2 feet thick, underlain by an impure limestone 1 foot 6 inches thick. This carbonaceous basal part is well shown at the level of the railroad at the sharp bend northeast of Cedar Creek where the ledge gives rise to a cliff in the valley side.

In the Weeping Water Valley the Plattsmouth Limestone outcrops in the creek bed at Weeping Water where it causes the cascades. It is in position in the valley sides from Weeping Water to near Nehawka. It is the prominent upper limestone along the east fork of the North Branch of Weeping Water Creek, and along the west valley side of the North Branch. Two miles east of Weeping Water this limestone produces a rock terrace which continues as a prominent feature to near Nehawka. It is the main quarry ledge in the "Old Swede" Quarry about three miles east of Weeping Water and also in the west Van Court quarry three miles northwest of Nehawka. Thickness, 20 to 22 feet. The

FIGURE 13

CULLOM AND CEDAR CREEK LIMESTONE, IN SLOPES EAST OF CULLOM

FIGURE 14
DEER CREEK LIMESTONE DIPS BELOW MISSOURI RIVER NEAR JONES' POINT

stone is light colored, weathers grayish to brownish, and contains dark flint nodules, some more than six inches thick.

It is possible that some of the old quarries here that have produced from the Plattsmouth Limestone may be reopened in the near future and that additional ones may be located along the outcrop areas. A vast quantity of this stone in the Missouri River bluffs is not reached by railroads, but could be loaded on to barges and hauled to railroad shipping points. The qualities of this stone have not been fully determined by laboratory tests. Such tests as have been made show the following averages: Weight, 164 to 167 pounds per cubic foot; absorption, .48 to 0.74; per cent of wear, 1.95 to 3.1; compression strength, 9,500 to 11,815; hardness, 12 to 17; toughness, 4 to 7; cementing value, 65 to 118. The stone differs somewhat in the various outcrop areas and it will require additional field and laboratory work to supply data sufficient for a definite statement. The stone is quite heavy, and comparatively durable. It is extensively produced in the formed of crushed rock. None of this is hard enough for use in the wearing surface of concrete roads. Practically all of the Plattsmouth Limestone would do for the base in streets and roads. Most of it makes good aggregate.

6. Cullom Limestone:

This stone or member is well known in the upper part of the old quarries south of Richfield and in the cliff northeast of Cedar Creek. It is the basal ledge in the high quarries east of Cullom, (Figure 13) the type locality. The ledge is just above the railroad at the National Stone Company crusher 2 miles northeast of Louisville. The stone is massive and quite fossiliferous.

In the Missouri River section the Cullom Limestone is light gray and 4 to 5 feet thick. It shows as follows, in Jones' Point:

Limestone, 1 foot, 7 inches
Shale, 8 inches.
Limestone, 2 feet, 4 inches.

In the Weeping Water valley the ledge is exposed along the south side of Cascade Creek Valley near the junction with the Weeping Water and is found in the slopes from Nehawka westward to about one mile west of Weeping Water. The stone here is about 5 feet thick and of little economic importance.

7. Cedar Creek Limestone:

This is exposed in the slopes east of Meadow, opposite Cedar Creek, and in the National Stone Company quarry where it is the first thick limestone member below the main quarry ledge, which is the Deer Creek. It is the upper ledge in the quarries above Cullom (Figure 13) with a thickness of 7 to 8 feet. Here the stone is light colored and quite massive, except in the upper part.

FIGURE 15
DEER CREEK LIMESTONE IN OLD STOUT QUARRY, NEAR LOUISVILLE

In the Missouri River section, the Cedar Creek outcrops in a single bed from one mile north of Rock Bluff to Jones' Point, producing a faint terrace. The thickness here is 1½ to 2½ feet and the stone is dark gray.

The Cedar Creek Limestone is exposed in the Weeping Water Valley in about the same outcrops as the Cullom Limestone. It is one to two feet thick and usually in two beds. The stone is grayish, producing slabby blocks on slopes, and has little value.

8. **Deer Creek Limestone:**

This is the most important quarry ledge in Nebraska at this time. It is prominently exposed in Jones' Point where it quickly rises from below the river (Figure 14), and forms the cap rock from Jones' Point to Rock Bluff. The thickness here is 24 to 28 feet.

The composite section from Jones' Point to Calumet Point, known as King Hill, is as follows:

Limestone, 5 inches, dark, hard, persistent.
Shale, 4 inches, dark, argillaceous.
Limestone, 1 foot 11 inches, massive.
Shale, 1 foot 7 inches, clay, yellowish.
Limestone, 10 inches, one bed.
Shale, 1 foot 8 inches, calcareous, the upper part dark, the lower lighter.
Limestone, 16 feet to 20 feet, massive, hard, compact, light colored, forms a cliff.
Shale, 2 feet 6 inches. Thickness varies from 1 foot 6 inches to 2 feet 6 inches. Color bluish except the carbonaceous base.
Limestone, 3 to 6 inches, massive, prominently jointed at right angles, weathers yellowish to brownish.

The Deer Creek Limestone is exposed in the Platte Valley as in the lower slopes west of Meadow and Louisville, and high in the valley side east of Louisville until Cedar Creek Valley is reached. It is the main quarry ledge at the Woodworth (West of Meadow), Murphy (East of Louisville), National (Northeast of Louisville), (Figure 15), and Atwood quarries (Cedar Creek Valley). A composite section shows:

Limestone, 8 inches, dark bluish, in one bed, usually not quarried.
Shale, 1 foot to 1 foot 2 inches, with a carbonaceous streak near the middle.
Limestone, 6 inches, dark blue, usually not quarried.
Shale, 2 inches, fairly persistent.
Limestone, 10 inches to 1 foot, bluish, in one bed, usually not quarried.
Shale, 6 inches, fairly persistent.
Limestone, 20 to 22 feet, massive, upper 10 feet (approximately) very pure, light colored and medium hard. Basal portion less pure, darker and softer.
Shale, 6 inches to 2 feet, blue, argillaceous, bedded.
Limestone, 2 feet to 3 feet, blocky, weathers light.
Shale, 6 inches, blue, calcareous.
Limestone, 2 feet 10 inches to 4 feet, bluish, weathers brownish.

The Deer Creek Limestone is the most conspicuous formation in the Weeping Water Valley. The upper part outcrops in the creek bed

FIGURE 16
LARGE BLOCKS OF DEER CREEK LIMESTONE, HIGH IN SLOPES, AT WEEPING WATER

about ½ mile east of Wabash. From here to Weeping Water the formation produces a prominent rock bench in the valley sides. It outcrops at many places. On the north side of the valley this bench extends only about 1 mile east of Weeping Water. The limestone seems then to have been eroded away and is not found until the quarries about ½ mile northeast of Nehawka are reached where it is the main quarry ledge. There this ledge shows a decided dip to the southeast. It is again exposed in the quarry of the Nehawka Stone Company, one mile east of Nehawka, where it also constitutes the main quarry ledge. It is next exposed low in the valley side about 100 yards southeast of the Missouri Pacific station at Union, where the upper part forms the basal ledge in an old quarry.

On the south side of the Weeping Water Valley the bench formed by the Deer Creek can be followed from about one mile east of Wabash to a point six miles southeast of Weeping Water. It is high in the slopes from the vicinity of Weeping Water southeastward. (Figure 16.)

The Deer Creek is prominently exposed in the valley of the South Branch of Weeping Water Creek from the center of Section 28, Township 10 North, Range 12 East, to the west side of Section 28, Township 10 North, Range 13 east.

This formation has a total thickness in the Weeping Water Valley of about 35 feet. The upper 10 feet is composed of an impure brownish

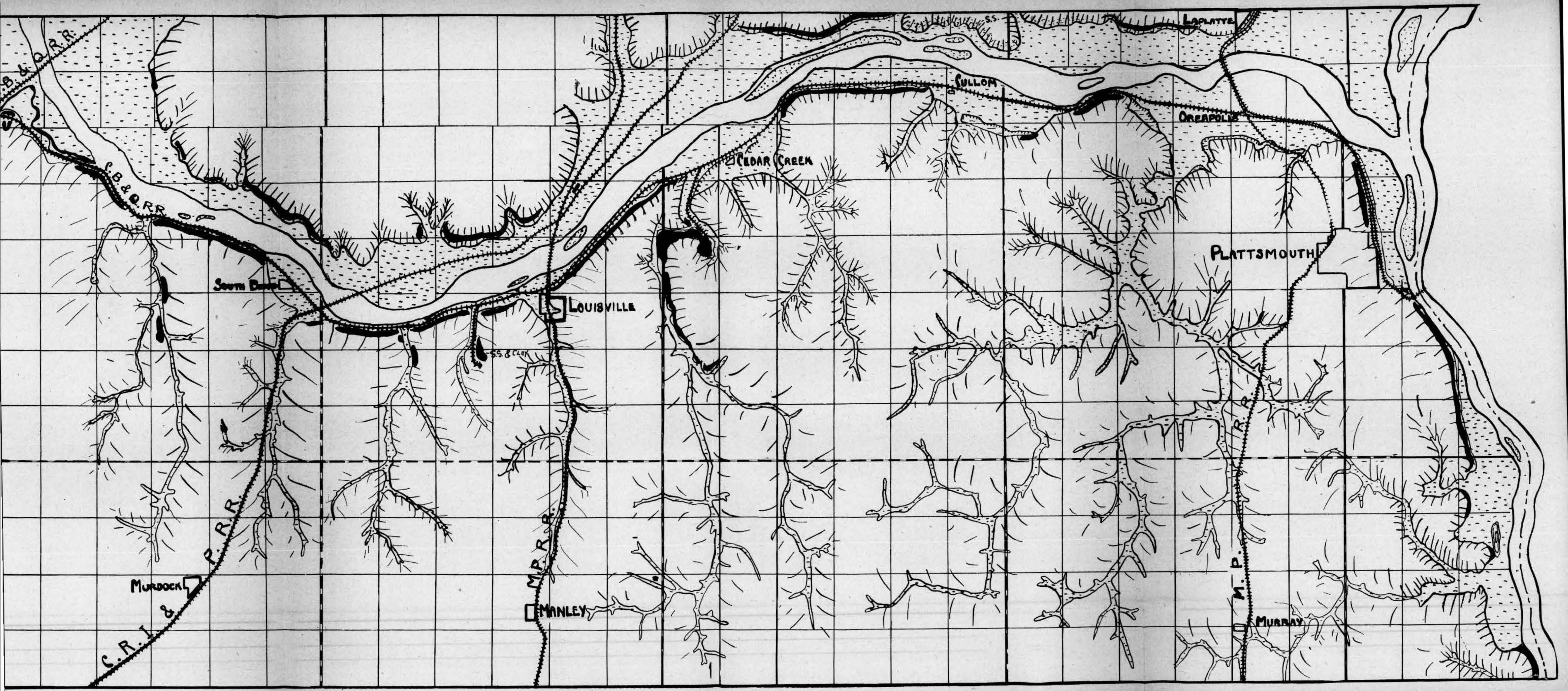


FIGURE 39
DARK AREAS SHOW LOCATIONS OF STONE OUTCROPS

limestone with a shale base. The middle zone, 20 feet thick, is a massive limestone of which the upper 10 to 12 feet is hard and pure, and the basal portion darker. The lower five feet is made up of some thin, impure limestone separated by shale partings. The lowest zone is very persistent and uniform and is popularly known as rubble stone.

Physical tests of Deer Creek limestone collected at the National Stone Company Quarry, show for the lower part of the massive part of the member:

Specific gravity	2.486
Weight in pounds per cubic foot	155.
Absorption in pounds per cubic foot	4.76
Cementing value	52.
Percent of wear	7.4
French coefficient of wear	5.4
Hardness	8.2
Toughness	7.
Compression, pounds per square inch	5600

Sample from middle part of ledge:

Specific gravity	2.645
Weight in pounds per cubic foot	165.
Absorption in pounds per cubic foot	1.84
Cementing value	20.
Percent of wear	7.2
French coefficient of wear	5.6
Hardness	5.3
Toughness	6.
Compression, pounds per square inch	6140

Sample from upper part of ledge:

Specific gravity	2.4941
Weight in pounds per cubic foot	156.
Absorption in pounds per cubic foot	6.75
Cementing value	47.
Percent of wear	7.6
French coefficient of wear	5.3
Hardness	11.3
Toughness	5.
Compression in pounds per square inch	7380

9. Meadow Limestone:

This is named from the type locality near Meadow, a station in the Platte Valley opposite Louisville. The member outcrops west of Meadow and Louisville, in the old Stout quarry northeast of Louisville, and at the Atwood quarries south of Cedar Creek. The stone is 2½ to 4 feet thick, medium hard, semi crystalline and forms massive blocks. It weathers light colored to brownish. Tests of samples from near Meadow show: Specific gravity, 2.64; weight per cubic foot, 165 pounds; absorption in pounds per cubic foot, 1.42; cementing value, 50; hardness, 14.9; toughness, 8; compression in pounds per square inch, 4980.

In the Missouri River section, the Meadow Limestone is the first distinct ledge above the Deer Creek. The stone is usually in one bed and gives rise to large blocks. It is light grayish blue. The upper part weathers light and the basal portion buff colored.

The laboratory tests made on the Meadow Limestone from this district show: Weight, per cubic foot, 167 pounds; absorption, 0.68; compression strength, 11,830; hardness, 15.83; toughness, 5.8.

In the Weeping Water section, this member outcrops in the bed of the creek east of Wabash. It is generally covered in the valley sides eastward from this point, but is well shown in the Western Stone Co. and Nehawka Company quarries east of Nehawka. The Meadow Limestone occurs in the old quarry near the Missouri Pacific Station at Union with a thickness of 2½ feet. The stone here is medium hard, semi crystalline and weathers light.

The Meadow ledge is quarried along with the Deer Creek Limestone, from which it is separated by 6 to 8 feet of shale.

10. **Union Limestone:**

This occurs under conditions which make it of little importance in stone production. Nearly everywhere it is covered with a thick overburden. The member is recognized in the Missouri River section by the rich blue color and light colored fossils, and some dark flint. The most definite exposures are at Jones' Point, which show as follows:

Limestone, 1 foot, in two beds of about equal thickness.
Shale, 1 foot 2 inches, carbonaceous.
Limestone, 8 inches, blue, weathers buff.
Limestone, 4 feet, in five distinct beds. Color bluish, not changing much on weathering.
Shale, 1 inch, a mere parting but quite persistent.
Limestone, 1 foot 3 inches, brittle, weathers rusty. The dark flint nodules are a characteristic feature.

This member appears to thin out away from the type locality. It has been recognized in the Platte section in the vicinity of Louisville where it is only a few inches thick.

11. **Louisville Limestone:**

This member is exposed in the base of the slope west of South Bend (Figure 17), and in the upper slopes eastward to Louisville. It is the main ledge in the upper Atwood quarry in the Cedar Creek Valley, and in the north side of the Platte Valley from the State Fish Hatcheries to Meadow. It is the main quarry ledge in the abandoned Murphy and Green quarries west of Meadow. Thickness, 10 to 12 feet. This member is thin bedded in its upper part, but most of it is massive, medium hard and compact. It is blue gray and weathers light.

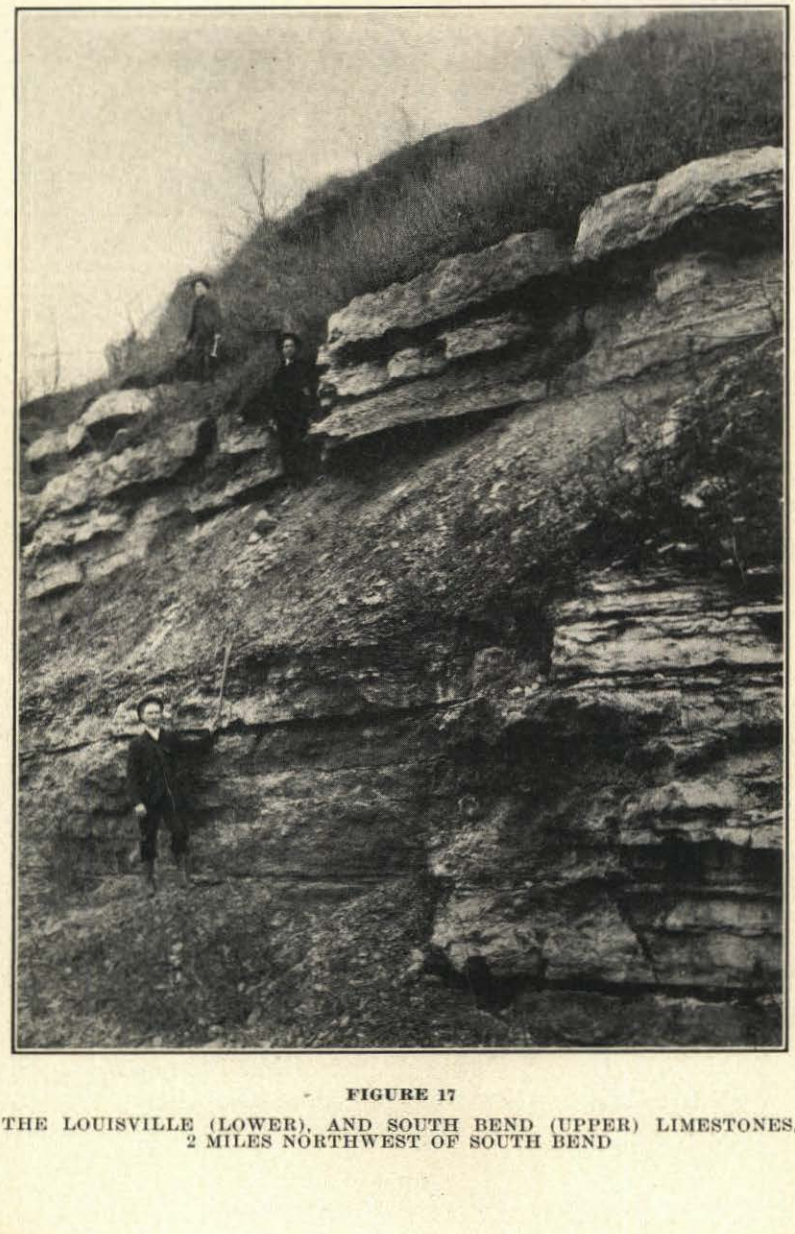


FIGURE 17
THE LOUISVILLE (LOWER), AND SOUTH BEND (UPPER) LIMESTONES, 2 MILES NORTHWEST OF SOUTH BEND

The Louisville Limestone has not been identified in the Missouri River section. In fact it could not be exposed in that section except east of Union where the beds dip below the level of the river. Here the overburden is thick at the horizon where the Louisville and higher beds associated with it should occur. So if the member is present in the Missouri River section at this point it is deeply covered.

The Louisville Limestone has importance in quarrying at a number of Places near Meadow, Louisville and Cedar Creek. It is worked in the higher quarries southwest of Cedar Creek, was produced from several years ago, in the quarries west of Louisville; across the river from South Bend, and in the higher quarries between this point and Meadow. The stone is slabby above, but massive and medium hard in most of the ledge. The composition runs high in lime. This is a source of good stone for concrete.

12. South Bend Limestone:

This member is exposed in the bed of Salt Creek southwest of the C. B. & Q. station at Ashland, at the track level near the mouth of Salt Creek, in the valley sides from Pawnee Creek (Figures 17 and 18) to Louisville, and from the State Fish Hatcheries to Meadow. Thickness, 8 to 9 feet. A section (Figure 18) along the railroad ½ mile east of Pawnee Creek shows:

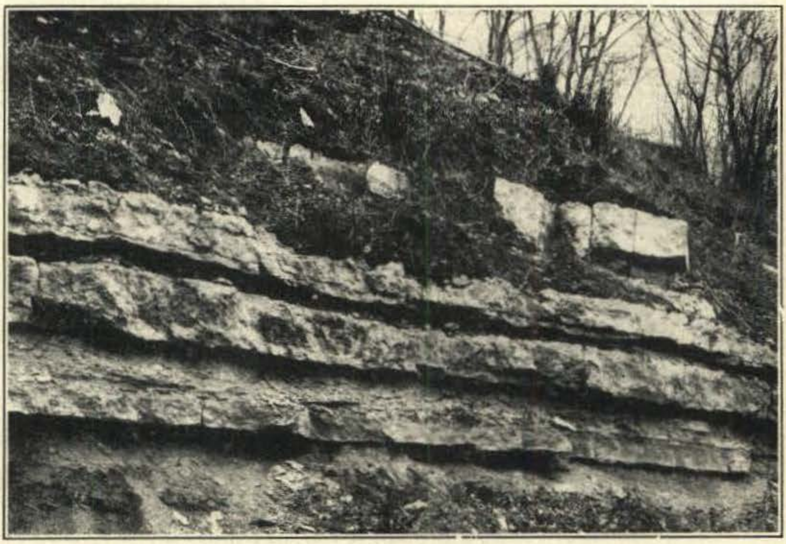


FIGURE 18
THE SOUTH BEND LIMESTONE

FIGURE 19

ASHLAND LIMESTONE IN RAVINE, ONE MILE NORTHEAST OF BURLINGTON STATION, ASHLAND

Limestone, 10 inches, light gray, one bed, medium hard.
Shale, 1 foot 3 inches, light colored, hard calcareous concretions, fossiliferous.
Limestone, 2 feet 10 inches, light gray, a good building stone.
Shale, 1 foot 10 inches, light bluish gray.
Limestone, 2 feet 6 inches, contains large flint nodules. This is the most prominent flint horizon along the lower Platte.

Where worked back into the slopes, the South Bend ledge is more solid, i. e., not so much broken by weathered rock and shale partings. This is particularly so north of South Bend. The division into three beds of stone is more distinct west of Meadow. The middle bed of the South Bend Limestone has been used quite extensively for building purposes. It makes fair dimension stone and was quarried for part of the stone used in building the State Capitol. The Burlington quarry north of the town of South Bend is now producing chiefly from the South Bend Limestone. It is planned later to work out three members at this place, viz: the Louisville, the South Bend, and the Ashland Limestones.

Laboratory tests of the lower ledge of the South Bend lime stone from the type locality show specific gravity, 2 655; weight, 166; absorption, 1.67; cementing value, 18; hardness, 13.9; toughness, 5; Compression, 7150. The middle ledge tests: Specific gravity, 2.55; weight, 166; absorption, 1.28; cementing value, 51; hardness, 14.2; toughness, 7; Compression, 7620. A sample from the top division shows: Weight, 166 pounds; absorption, 0.57; compression strength, 10,180; hardness, 13.75; toughness, 6.0; cementing value, 44.

13. Ashland Limestone:

This member is exposed in the sides of a ravine ⅜ mile southwest of the C. B. & Q. station at Ashland, in the small ravine about one mile northeast of the station at Ashland, in the upper slopes of Pawnee Creek Valley (Figure 19) and in the Platte bluffs to near South Bend. Thickness, 12 feet. This member forms very large blocks. The main body of the stone is light gray, massive and medium hard. The basal portion consists of interbedded limestones and shales to a thickness of 3½ feet.

The Ashland Limestone is of good quality for most road work and could be worked economically by a large plan in which the overburden

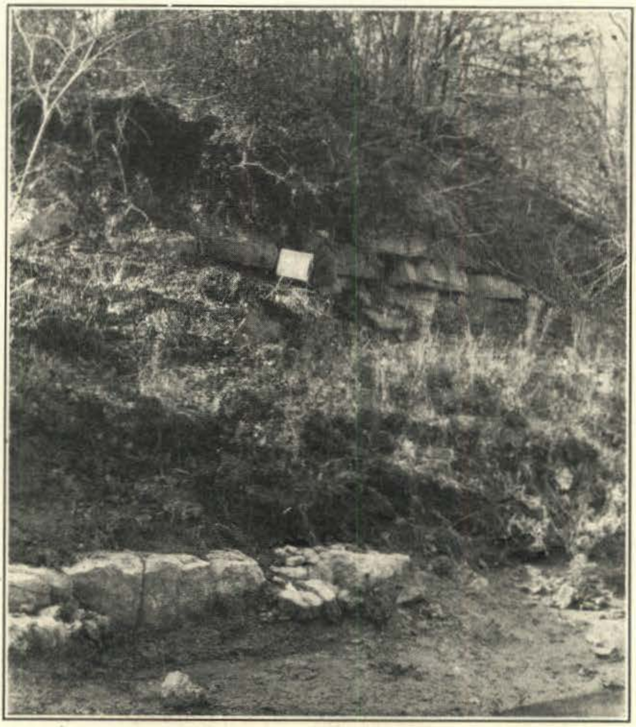


FIGURE 20

EXPOSURES IN WINNEBAGO CREEK VALLEY, 3¾ MILES NORTH OF RULO. THE BASE IS RULO AND THE UPPER BURLINGTON LIMESTONE is removed for the quarrying of the whole section, down to the valley floor. This would include the Ashland, South Bend and part of the Louisville. Such plan might be carried out between Pawnee Creek and the Burlington quarry.

Laboratory tests of the Ashland Limestone give these data: Weight, per cubic foot, 166 pounds; water absorption, 0.57; compression strength, 10,170; hardness, 13.75; toughness, 6.0; cementing value, 44.2.

14. Rulo Limestone:

This member is exposed along the Missouri River north of Rulo (Figure 20), in the spur south of Rulo, at places in the bluffs near the mouth of the Big Nemaha and at a considerable number of places in the Table Rock anticline. It is usually in a single bed 1 to 2 feet thick and bluish where unweathered. The stone is medium to hard, quite brittle and weathers light to brownish. It has been quarried to some extent.

15. Burlingame Limestone:

The Burlingame (Figure 20) outcrops in the Missouri River bluffs for a considerable distance north of Rulo, in the spur south of Rulo, in the upland near the mouth of the Big Nemaha, between Rulo and Preston, and at a number of places in the Table Rock anticline. The stone is usually in one massive ledge 5 to 6 feet thick. It is medium hard and bluish, but weathers yellowish to brownish. The name, Burlingame as has been shown, is in dispute. The ledge here considered is the one first above a thin seam of coal which has been mined in the spur south of Rulo. The Burlingame Limestone has also been quarried in the vicinity of Table Rock.

Laboratory tests of the Burlingame Limestone give the following results: Water absorption, 1.83 to 3.04; compression strength, 11,460 and 13,380; hardness, 12.03 and 13.76; toughness, 5.6 and 6.2; cementing value, 48 and 102.

16. Fargo Limestone:

This was named from the locality, Fargo (Figure 21), which is on the Missouri River a few miles north of Rulo. The stone outcrops in the bluff land between this point and Preston, i. e., along the Missouri bluffs and in the lower part of the Big Nemaha Valley. The Fargo has been quarried to some extent. It is for the most part medium hard and massive.

A sample of the Fargo Limestone from near Rulo shows the following tests: Weight, per cubic foot, 163 pounds; water absorption, 2.02; compression strength, 9,755; hardness, 13.76; toughness, 5.4; cementing value, 92.

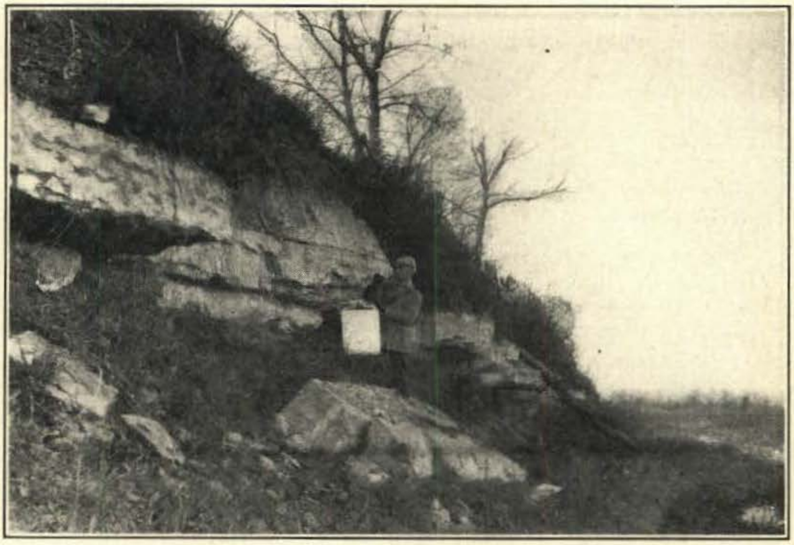


FIGURE 21

FARGO LIMESTONE IN VALLEY SIDE, ONE-FOURTH MILE NORTH OF FARGO, RICHARDSON COUNTY

17. Preston Limestone:

This was named from the small town Preston between Rulo and Falls City. Here the stone occurs in three or four beds, one light, one bluish and the others brownish. The main bed is about 4 feet thick (Figure 22). The member is exposed also in the Table Rock anticline. Among its best outcrops here are those at the John Eiss place 7 miles south of Humboldt. The Preston Limestone has some importance in quarrying. The total thickness, including the interbedded shales, as shown by a very good exposure at Otoe Siding southeast of Table Rock, is about 11 feet:

Limestone, 19 to 20 inches.
Bluish shale, 2 feet.
Massive brownish limestone, 24 to 28 inches.
Shale, 18 to 20 inches.
Hard bluish Limestone in 2 beds, 18 to 20 inches.
Shale, mere seam.
Limestone, hard and light colored, 6 inches.

The Preston Limestone is also exposed between Fargo and Cautier Creek. Thickness of main bed, 2 feet 6 inches to 3 feet. This dips below the flood plain about 4¾ miles northwest of Fargo where it forms a natural riprap along the shores of a cut-off lake. The stone is medium hard, massive, bluish when fresh and breaks into box-like blocks.

Laboratory tests of the Preston Limestone from Otoe Siding show: Weight, per cubic foot, 161 pounds; water absorption, 1.85; compression strength, 14.730; hardness, 16.08; toughness, 8.2; cementing value, 107.

Sample from Pierson's Point show: Weight, per cubic foot, 164 pounds; water absorption, 3.16; hardness, 14.09; toughness, 6.6; cementing value, 90.

18. **Tarkio Limestone:**

This was named several years ago from Tarkio, Iowa, where it outcrops prominently. In Nebraska it is exposed along the Big Nemaha River between Tecumseh (Figure 23), and Table Rock, high in the upland south of Table Rock, at a number of places on the east limb of the Table Rock anticline, as about 2 miles west of Humboldt and 5 miles southwest of Humboldt. It is prominently shown quite high in the slope land above Preston and in the vicinity of Rulo. There is a remnant of this ledge in the upland 3 miles southeast of Union. The stone, though thin, has been extensively quarried. It is often confused with the Cottonwood Limestone which is betwen 300 and 400 feet higher in the geological section. The Tarkio contains fossils similar to those in the Cottonwood,

FIGURE 22
PRESTON LIMESTONE, NEAR TOWN OF PRESTON

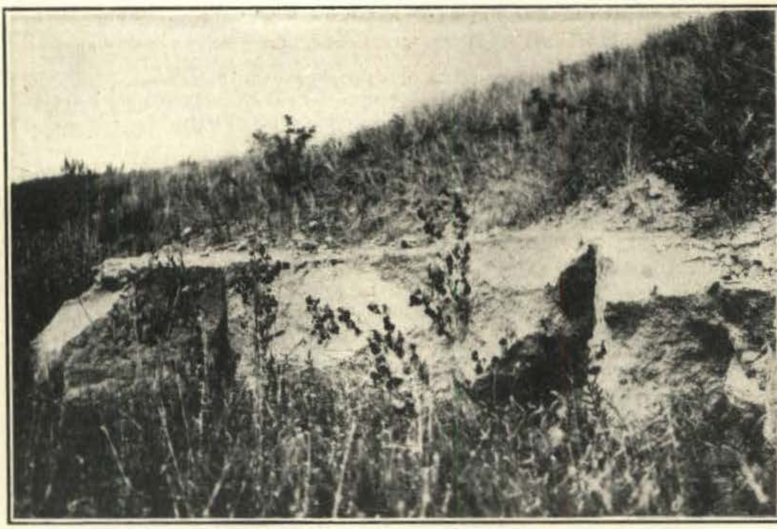


FIGURE 23

TARKIO LIMESTONE IN ABANDONED QUARRY, SOUTHEAST OF TECUMSEH

but much larger. As a rule the Tarkio Limestone weathers brownish instead of light colored. It is soft to comparatively hard, massive and breaks down as large blocks which weather into rounded forms.

The Tarkio Limestone is also exposed between Weeping Water Valley and Nebraska City, and from 4 miles southeast of St. Deroin to near the Big Nemaha Valley. This is a mixed member as shown by the following typical section, 3¾ miles northwest of Fargo:

Limestone, 4 feet, gray, fairly massive. The fossils are a distinguishing feature.
Shale, 3 feet 11 inches, clay texture.
Limestone, 6 inches.
Shale, 6 inches, calcareous, light colored.
Limestone, 6 inches, one bed.
Shale, 16 inches, light colored, calcareous.
Limestone, 6 inches to 11 inches, grayish blue.

Laboratory tests of samples from the Tarkio Limestone show the following results:

Sample from Otoe Siding: Weight, per cubic foot, 152 pounds; water absorption, 5.45; compression strength, 4,055; hardness, 11.11; toughness, 5.8; cementing value, 63.

Sample from near Humboldt: Weight, per cubic foot, 155 pounds; water absorption, 5.56; compression strength, 1,875; hardness, 12.40; toughness, 6.2; cementing value, 72.

The Tarkio Limestone has been quarried at many places along its outcrops in Nebraska and used principally as dimension stone.

19. Brownville Limestone:

This stone is exposed above the shales in the bluffs between Honey Creek Valley near Peru and 4 miles southeast of St. Deroin. Thickness, 2 feet 6 inches to 6 feet. Color, light bluish green, weathering lighter. The upper part of the stone is somewhat nodular, the lower part massive.

The Brownville Limestone is not well exposed at many places in the Big Nemaha Valley. In 1911 a good section was taken in the slopes east of the Lehmer quarry, Section 32, Township 1 North, Range 16 East, or 3 miles south and 2 miles west of Falls City. It is as follows:

Limestone, 2 feet, blue gray, weathering buff, one bed, quite fossiliferous in upper part, medium hard.
Shale and weathered limestone, 7 inches, shale bluish.
Limestone, 8 inches, dark blue, blocky, fossiliferous.

This outcrop is now obscured by talus. The Brownville member outcrops in the South Fork, south of Humboldt, but not in a condition favorable for accurate measurements.

Tests made on the Brownville Limestone resulted as follows: Weight, per cubic foot, 151 pounds; water absorption, 5.95; hardness, 9.76; toughness, 5.2; cementing value, 74.

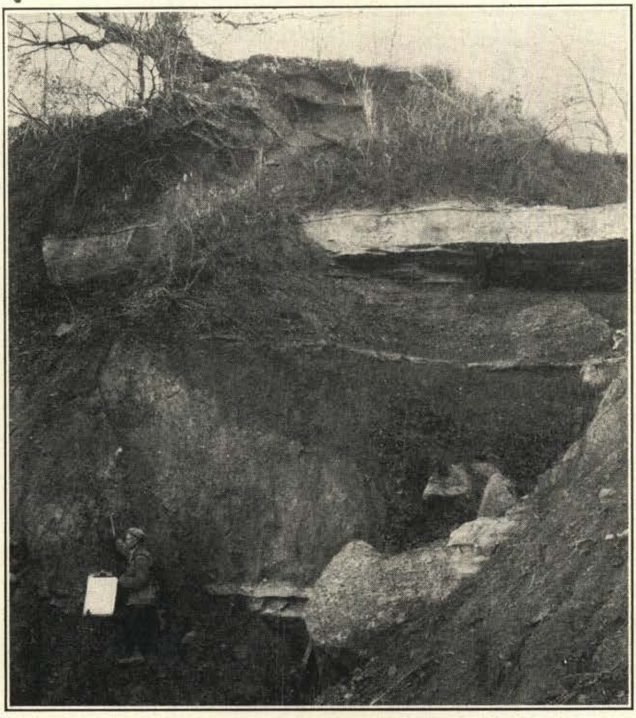


FIGURE 24

ASPINWALL (UPPER LEDGE) NEAR ASPINWALL. LOWER LEDGE IS BROWNVILLE, UPPER PART EXPOSED

FIGURE 25
FALLS CITY LIMESTONE IN LEHMER QUARRY, SOUTHWEST OF FALLS CITY

20. **Aspinwall Limestone:**

This stone is exposed at places from between Peru and Brownville to Nemaha, at Aspinwall, ½ mile west of St. Deroin, and near Indian Cave. The type locality is at Aspinwall (Figure 24). Thickness, 1 to 2 feet. This ledge is massive and light brown mottled, weathering with little change in color. It is usually in one bed. The stone is persistent, soft and easily worked.

Where found in the Nemaha section the Aspinwall Limestone is 16 inches or more thick, persistent, in a single bed, and breaks into large blocks. The stone is soft, but quite well suited for building purposes. It closely resembles the Falls City Limestone. It outcrops in the vicinity of the Lehmer quarry and in the deformation along the South Fork, south of Humboldt.

Laboratory tests of the Aspinwall Limestone show the following: Weight, per cubic foot, 133 pounds; compression strength, 1,008; hardness, 3.07; toughness, 2.8; cementing value, 73.5.

21. **Falls City Limestone:**

This member outcrops 75 feet above the river in the vicinity of Aspinwall and 130 feet above the flood plain at Indian Cave. Thickness, 3 feet 6 inches to 4 feet, usually in one massive bed. The stone has a brownish mottled color, is soft, resonous, and easily worked when freshly exposed, but hardens upon exposure.

The Falls City Limestone also caps the upland in section 19, 20, 29, 32 and 33 of Township 1 North, Range 16 East, southwest of Falls City (Figure 25). The type locality is at the Lehmer quarry in section 32. Westward from this the Falls City lowers, capping a bench-like upland extending part of the way to near the foot of the high land southeast of Salem.

The stone, about 5½ feet thick, forms a massive, persistent ledge not much jointed. It is soft, porous, easily worked, quite fossiliferous, and specked with rusty iron stain. A characteristic feature is its ringing sound when struck with a hammer.

This member is well exposed at points 3 and 7 miles south of Humboldt. The locations are in the southwest corner of Section 32, Township 2 North, Range 13 East, and at the top of the hill between Sections 9 and 10 of Township 1 North, Range 13 East. At these places is a steep eastward dip and probably some faulting.

Laboratory tests of the Falls City Limestone give the following: Weight, per cubic foot, 133 to 148 pounds; water absorption, 10.97 to 11.70; compression strength, 1,004 to 1,136; hardness, 3.07 to 7.06; toughness, 2.8 to 3.4; cementing value, 49 to 73.

FIGURE 26
COTTONWOOD LIMESTONE, IN QUARRY NORTHEAST OF JOHNSON

The Falls City, though soft, is easily quarried as large blocks of dimension stone. This stone has been used for foundations, bridges, fence posts and road surfacing. It is now quarried in limited way near Aspinwall.

22, 23, 24 **Elmdale and Neva Limestones:**

Under these formations are grouped three limestones and the interbedded shales. Thickness, about 35 feet. This division outcrops between Salem and Humboldt and between Salem and the anticline along the South Fork. There are good exposures one mile east of Humboldt and at the bridge south of Humboldt. The limestone beds range between 2 and 3 feet in thickness. The most distinct member, probably the Neva, caps much of the upland in the vicinity of Indian Hill, near Salem. It is medium hard, compact stone and creeps badly on the plastic shales which it overlies. This condition has been confused with deformation proper. It is thought that members 22 and 23 are parts of the Elmdale formation of Kansas.

25. **Cottonwood Limestone:**

The Cottonwood Limestone occurs at many points between Salem and the Table Rock anticline. It extends northward and is the cap rock in the upland of western Nemaha county where the best exposures are between Johnson and Glen Rock (Figure 26). The stone has been quarried at many places. Thickness, 5 to 6 feet.

The Cottonwood is very light colored, massive, and weathers slabby in the upper part. The main body of the ledge, however, breaks into large rough blocks.

The Cottonwood Limestone and the three members below the Eskridge shales form steep valley sides in the vicinity of Salem, between that point and Humboldt, and along the Little Nemaha in the western part of Nemaha county giving a type of surface similar to that developed on the Nemaha formation.

The Cottonwood is distinguished by its massive appearance, myriads of small fossils about the size of a rice grain, its very light color, and the presence at places of geodes and concretions. The geodes are less common than the concretions. The concretions are largely of flint.

The principal areas in which the Cottonwood has been quarried are near Glen Rock, and northeast of Johnson, both in the Little Nemaha Valley, and at a number of points along the Big Nemaha and the South Fork, as between Humboldt and Salem.

The Cottonwood Limestone was at one time the principal source of dimension stone in Nebraska. Some of it was used in the State Capitol Building. It does not make a good quality of aggregate.

FIGURE 27

FLORENCE FLINT BELOW, FT. RILEY ABOVE, EAST OF THE BIG BLUE AT WYMORE AND BLUE SPRINGS

FIGURE 28

FT. RILEY LIMESTONE, CLOSE VIEW

26. **Wreford Limestone:**

This, though an important limestone in Kansas, is represented in Nebraska at only a few poorly defined outcrops where it has a thickness of from 1 to 3 feet. We give the stone a number in the Nebraska section because it must be present under a heavy overburden of mantle rock. It would have value if exposed for quarrying. In Kansas the Wreford is a flinty limestone 40 feet or more thick.

27. **Florence Flint:**

This flinty limestone (Figure 27) is shown along the Big Blue as at Barneston, east of Wymore, and east of Blue Springs. It has considerable importance in quarrying, now producing at the Blue Spring and Davis quarries. It runs as high as 15 to 25 per cent flint and is used in ballast, rip rap and concrete. The limestone content is not very durable. This member has a thickness of 20 to 24½ feet in Nebraska.

28. **Fort Riley Limestone:**

This member (Figure 28) is massive at the base and top, but broken somewhat near the middle by shaley partings and slabby stone. The stone is cream to buff and brownish, and 42 to 45 feet thick in Nebraska. It is quarried for building purposes.

29. **Winfield Limestone:**

Thickness about 20 feet exposed in Nebraska. This is a thin bedded limestone exposed in the vicinity of Odell, and a few miles eastward. It has some but not much importance in building.

30. **Stone in the Dakota Formation:**

This formation contains much massive sandstone (Figure 29) which, though used locally for building purposes, is of poor quality. Much of the stone is very soft, light to brownish, cross bedded and crumbles under pressure, abrasion and weathering. Many houses, walls and some bridges have been built of Dakota sandstone in Nebraska. There are local developments in this sandstone, usually too limited for quarrying, which are hard and durable, resembling quartzite. The Dakota sandstone outcrops prominently at or near Ponca, Jackson, Tekamah, at the mouth of Salt Creek, near Beatrice and in the southern part of Jefferson county. It has produced some stone at these and many other places.

The Dakota contains beds of pebble rock, some of it cemented into a firm conglomerate. Bodies of this (Figure 30) occurring along the Platte in Sarpy and Cass counties, have been quarried and used for crushing and rip rap.

The Dakota sandstone is also quarried southeast of Endicott and Kesterson. It is used mainly for foundation purposes in Fairbury, Endicott, and Steele. There are thin beds of comparatively hard sandstone in the

FIGURE 30
PEBBLE ROCK, IN DAKOTA FORMATION

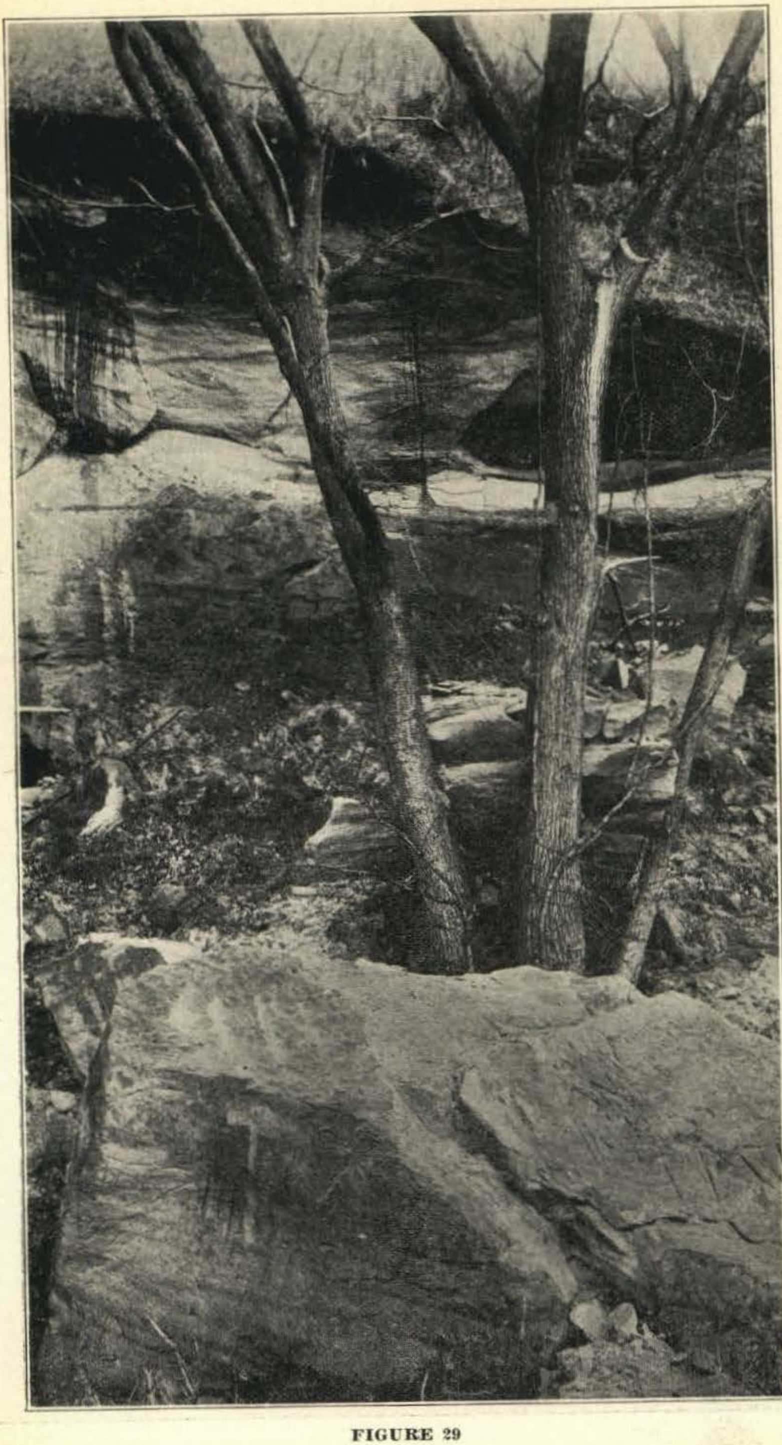


FIGURE 29

MASSIVE DAKOTA SANDSTONE WEST OF CEDAR CREEK

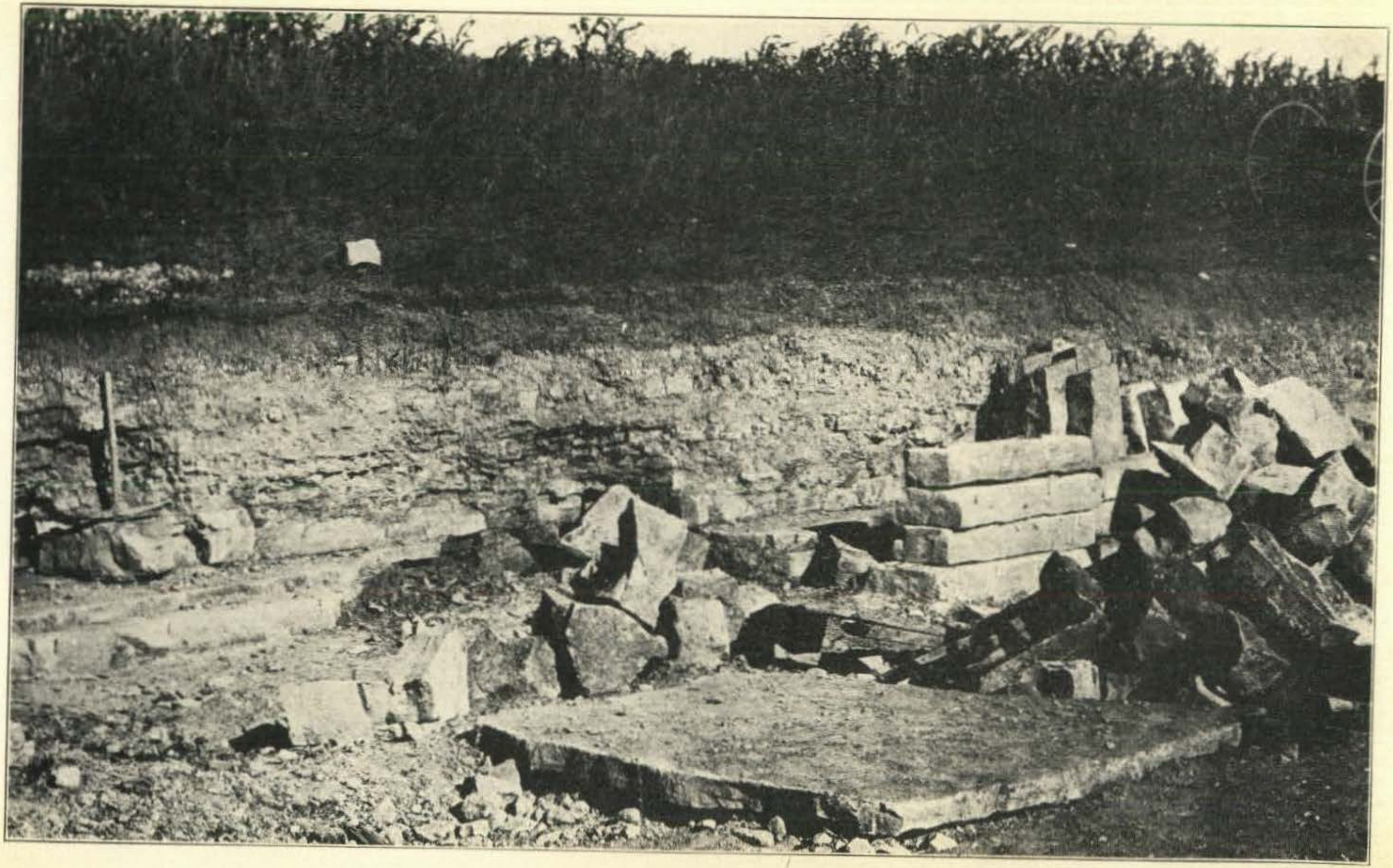


FIGURE 31
QUARRY IN GREENHORN LIMESTONE, THAYER COUNTY

Dakota formation two miles northwest of Fairbury. It closely resembles quartzite, but is not extensive enough to be valuable.

31. **Greenhorn Limestone:**

This member (Figure 31) is broken by shale partings into three or four divisions which differ some in quality and use. The top layer, known as the fence post member, is 5 to 8 inches thick, even grained, chalk like and can be sawed out as large slabs. The second division from the top contains myriads of oyster like fossils. It is irregularly bedded, usually brownish and contains some clay and sand. It is best suited for rip rap. In some exposures the basal divisions of the Greenhorn limestone are soft and massive like the Niobrara chalk rock. This condition is particularly noticeable in exposures near Ponca.

The Greenhorn Limestone outcrops in Dixon, Dakota, Seward, Jefferson and Thayer counties, where it usually forms a light colored streak in the uplands. This condition is particularly noticeable in Jefferson county. The principal quarries in the Greenhorn are located 5 miles northwest of Fairbury, a few miles northeast of Gladstone, north of Gilead, south of Kesterson and in the vicinity of Hubbell. The Greenhorn has been used at many places for walks, buildings, posts and road work, but is not of much commercial importance because of its softness and limited supply.

32. **Niobrara Chalk:**

This is the thickest deposit of stone in Nebraska. (Figure 32.) It is prominently exposed along the Missouri River between Cedar and Boyd counties. Niobrara is the place from which the stone was named. Here the massive chalk rises nearly 100 feet above the river, and less than half its thickness is exposed.

The Niobrara formation has a relatively wide distribution in southern and south-central Nebraska. It first appears under the loess in the valley of the Little Blue above Angus, at Nelson, in central Nuckolls county, and farther south on either side of Smyrna, and near Bostwick. The formation outcrops most extensively along the Republican and its tributaries, and rises high in the slopes south of Guide Rock, gradually lowering westward. It passes below the Pierre shale south of Indianola, and rises quite high in the Cambridge anticline.

The prevailing colors of the Niobrara are lead gray, light gray and yellowish. The chalk is of a porous texture and gives a hollow sound when struck with the hammer. It fractures unevenly and has a tendency to break into splinter-like fragments. The chief impurities are clay, silica and gypsum. The basal member of the Niobrara is a massive chalky limestone (Figure 33), bluish to light gray on freshly broken surfaces. It has a thickness of 40 to 50 feet. The outcrops are marked by prominent ledges capping the softer shales of the Carlile. It is found

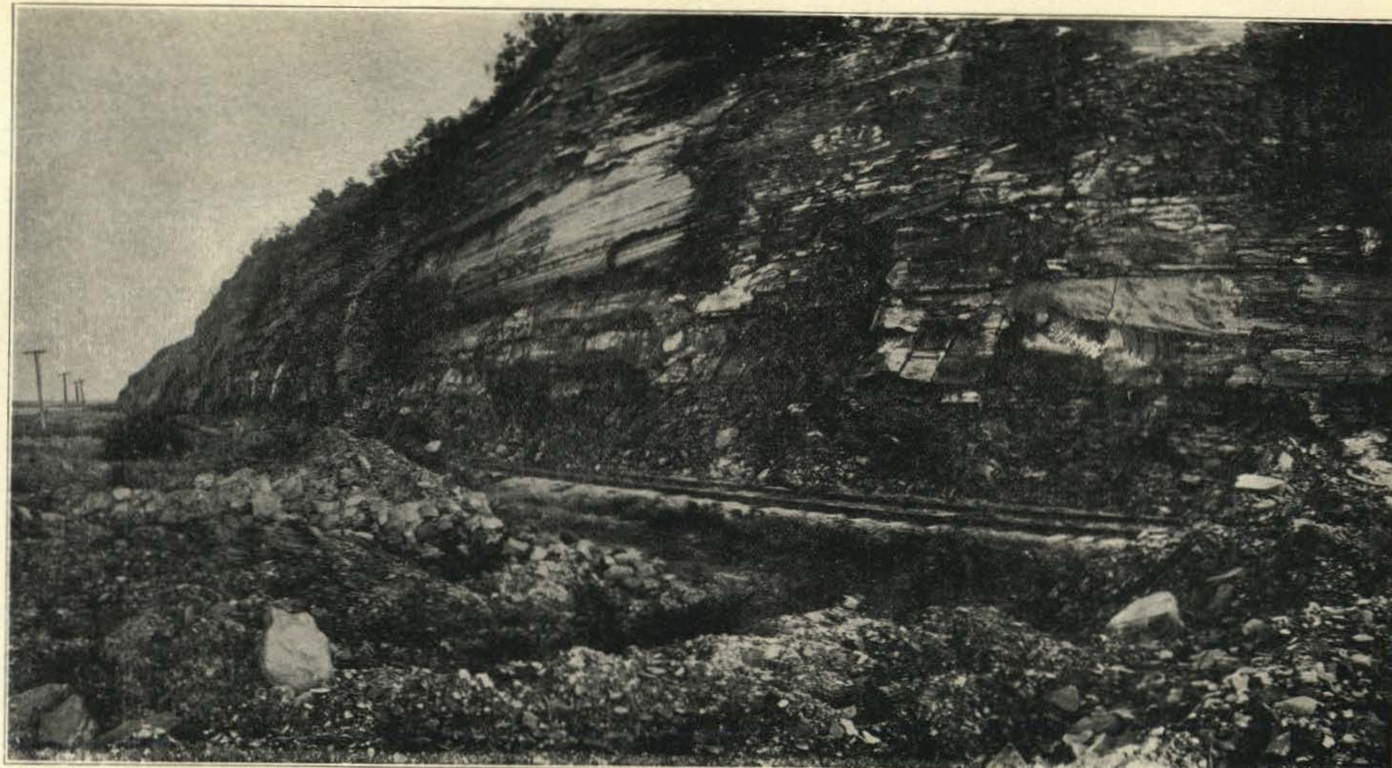


FIGURE 32
NIOBRARA CHALK, NEAR TOWN OF NIOBRARA

FIGURE 33

BASE OF NIOBRARA RESTING ON PIERRE SHALE, ALONG MISSOURI RIVER, NORTHERN CEDAR COUNTY along the south side of the Republican between Superior and Bostwick and along the exposures near the Missouri River in northern Cedar county.

In southern Nebraska the upper part of the Niobrara is 300 feet thick, bluish gray, massive with layers of light colored limestone and calcareous clays throughout. Badly weathered surfaces of the Niobrara are ochreous. In some localities the upper part of the formation contains brownish, reddish or greenish flint. These flint beds vary in thickness from a few inches to 10 feet.

The Niobrara chalk rock is composed largely of very small calcareous shells. It is of light weight, and soft enough to be easily sawed or carved. There are thin seams of gypsum in the ledges and selinite crystals often occur on the weathered slopes. This chalk, though soft, appears to harden somewhat when exposed to the air. It is used in many places for building houses and for road surfacing.

Alma was one of the first places in the state to use this chalk for road surfacing. The results were more favorable than was expected. The stone breaks up into a powder which binds sandy loam soil quite firmly.

The physical tests of unweathered Niobrara chalk show specific gravity 1.301; weight, per cubic foot, 81 pounds; water absorption, 27.19; cementing value, 112. A weathered sample from south of Bostwick shows specific gravity, 1.4762; weight, per cubic foot, 92; absorption in pounds per cubic foot, 25.06; cementing value, 49; per cent of wear, 20.9; coefficient of wear, 1.91; hardness, -15.6; toughness, 6; compression, pounds per square inch, 1,460.

The chemical analyses of Niobrara chalk rock show about as follows:

	Unweathered Specimen	Weathered Specimen
Moisture	0.70	1.11
SiO_2	4.52	6.02
Organic matter	3.14	1.03
SO_3	2.14	0.85
CO_2	37.80	37.11
CaO	49.66	47.98
Fe_2O_3 and Al_2O_3	1.87	5.92
Mg	Trace	Trace

33, 34. **Stone in the Arikaree and Ogallala Formations:**

Each of these formations contains some sandstone, conglomerate, fresh water limestone and what is sometimes called quartzite. The Arikaree (Figure 34), exposed on the valley sides and in the canyons of northwestern Nebraska, contains much friable sandstone, which can be used in very cheap forms of construction. This stone is light gray, massive, and of poor quality, yet it serves well to surface roads leading across sandy loam and dune sand soils. Such use of the Arikaree has been made at many places and with good results.

FIGURE 34
LOUP FORK BEDS EXPOSED IN REPUBLICAN VALLEY, NEAR McCOOK

FIGURE 35
BODY OF CONGLOMERATE, IN ARIKAREE FORMATION

The conglomerate (Figure 35), occurring as irregular bodies in both the Arikaree and the Ogallala, can have no more than local importance. It is covered with heavy overburden and is exposed at inaccessible places, as a rule.

Both formations here grouped contain thin beds of limestone which have more or less sand in their content. Probably the best example of limestone of value is found near Lodgepole and Sidney. Certain quarries to the northwest of Lodgepole have produced a fairly good quality of dimension stone. This has been used very generally in the construction of buildings in that town.

A greenish standstone approaching quartzite in its composition and permanence occurs in most counties along the Republican (Figure 36). This has been marketed under the name "Woodruff Granite." The quartzite is olive green, compact and very hard. It is especially well suited for concrete construction. Some of the best exposures of this are found in the vicinity of Lookout Mountain southeast of Franklin. Here the rough land is strewn with weathered boulders of this rock.

Other deposits of this quartzite are found in workable amounts in the southern part of Harlan county, and south of the river near Indianola. Small bodies of this stone are widely distributed in the Republican Valley and a considerable number of scattered areas occur in Knox, Holt and Boyd counties. Among the best known outcrops in northeastern Nebraska are those near Verdel, southwest of Verdigre, north of Bristow, and southwest of Butte.

Drift Boulders.—These occur in the glaciated area of Nebraska but in smaller numbers than in most glaciated states. The boulders vary in size from a few inches in diameter to more than ten feet. These boulders represent several kinds of rock. Sioux quartzite, found in at least three colors—pink, purplish red and brownish red, constitutes fully half the drift boulders exposed in Nebraska. There are granites of several kinds, and syenites, gneiss, mica and hornblende schists, greenstone and traprock. One or more forms of each of these can be collected at most typical drift exposures in the state. Limestone and sandstone boulders are quite common in the drift.

The largest boulder areas in the state are southeast of Endicott, (Figure 38) southeast of Table Rock, northwest of Tecumseh, about eight miles southeast of Humboldt, northeast of Germantown and west of Denton.

Though the drift boulders of Nebraska have been used for a number of purposes as in marking land corners, and in foundations, walls and general concrete construction, their value is comparatively unimportant.

FIGURE 36

EXPOSURE OF COMPACT SANDSTONE, SOMETIMES CALLED "QUARTZITE," SOUTHEAST OF FRANKLIN

Cement Rock.

Cement is the most important material used in some forms of road construction. It binds sand and aggregate in concrete which is used for markers, culverts, bridges and concrete roads.

Cement is made from several materials. Those most used in Kansas and Oklahoma are impure limestones and limestone and shale. The materials are quarried, crushed, mixed, ground, burned to clinker, and then ground to cement. Nebraska has burned lime at several points. Cement has been made near Beatrice and at Superior.

Some of the Pennsylvanian limestones of Nebraska are suitable for cement making when mixed with shale. Exposures of these limestones and shales occur at or near Weeping Water, Nehawka, Union, Plattsmouth, Cullom, Cedar Creek, Louisville, South Bend, Roca and other places. The limestones that might be used for cement making are the Plattsmouth, Deer Creek, Louisville, South Bend and Ashland ledges. In fact most of the limestone members of the Pennsylvanian section could be used in cement making. The principal difficulty with many of them is that they are too thin for extensive working. Suitable shale is found either above or below each of the limestone members.

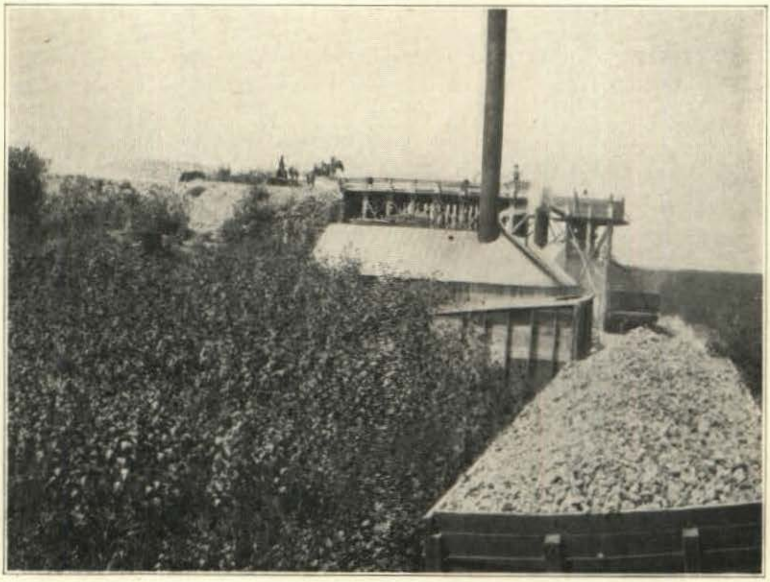


FIGURE 37

"WOODRUFF GRANITE," THE ARIKAREE QUARTZITE, QUARRIED NEAR KANSAS LINE SOUTH OF ALMA

FIGURE 38

DRIFT BOULDER AREA, SOUTHEAST OF ENDICOTT

The Niobrara chalk rock seems to be the principal cement making resource of Nebraska. In fact the use of this stone for cement manufacture may become of importance in the future. The chalk would be mixed with either the Granerose shale below or the Pierre shale above, depending on the condition in which it outcrops with respect to these shales.

There is no question that the Niobrara chalk and Granerose shale, when properly combined, can be made into high grade cement. This has been done at Superior. Several years ago very good cement was made at Yankton, South Dakota, by using the chalk rock and Pierre shale. There are several sites in Nebraska where cement mills could be installed to work the Niobrara and shales. One of these is near the town of Niobrara.

It is reported that the cement plant at Superior will be reopened this year, and it is hoped that road builders will extend it every encouragement possible. One drawback here is fuel. This drawback will be solved if oil and gas are found in the apparently favorable structures which are known to cross the Republican Valley and to occur also in Kansas. The cement materials are available. Good management and cheap fuel, if applied to these materials, would make Nebraska an important cement producing state.

Fortunately, the cement materials of Nebraska are located along or near railroads which lead to practically all parts of the state. Three systems of railroad connect with the plant at Superior. The leading exposures of Pennsylvanian beds in the southeastern part of the state are on or near lines of the Missouri Pacific, Burlington and Rock Island railroads.

One difficulty to overcome in the development of the cement industry in Nebraska will be the competition of large plants located in nearby states and their relation to the cement trade. Most of these plants have cheap fuel and good cement materials.

Nebraska should bend every effort to the manufacture of cement within its borders, especially so if this manufacture can be carried on economically. The movement for the building of more permanent roads will without doubt bring a new and greater demand for cement making in the state.

STONE PRODUCTION IN SOUTHEASTERN NEBRASKA

This part of the state leads in stone production, for the most part from limestone, some from the Dakota sandstone.

The stone is produced in well defined districts, viz.: Lower Platte, Weeping Water, Little Nemaha, Big Nemaha, Missouri River and Big Blue.

This discussion refers to the conditions under which stone is produced in Nebraska and to the quarrying, crushing, shipment and uses of the stone. It does not show the volume of production.

Overburden.—Nebraska stone is exposed principally in valley sides. The quarry faces are worked along outcrops and into the slope land. Working the slopes causes the overburden to become gradually thicker and therefore expensive to remove. This condition has caused the abandonment of many quarries. Most quarries when first opened work along the exposed stone rather than into the upland. This gives lines or strings of small openings along the outcrops of the different stone members. In most cases, a single ledge is worked and the overburden is deposited on or above a more valuable ledge of stone below.

Though the state has thirty-four distinct horizons or stone producing members, the workable area, from which there can be economic production, is quite limited. This is mainly because of heavy overburden. If the stone deposits were thicker, it would require relatively less stripping. In some localities it is necessary to strip overburden greater than the amount of stone. A second unfavorable condition is the large amount of interbedded shale which must be removed if more than one limestone member is quarried in a given exposure.

Weathered Stone.—Quarrying in Nebraska not only fails to reach far into the hill sides, but it also fails to produce the best quality of stone. Mostly weathered rock is worked and the fresh stone remains, except in the largest quarries.

At some places the workable stone does occur near the surface over a considerable area of land. But as a rule, where this condition is found, the stone to be quarried is thin and not of the best quality. I refer here to the Cottonwood Limestone as it occurs northeast of Johnson and in the vicinity of Glen Rock.

Working a Slope.—It is quite evident that stone quarrying in Nebraska must be placed on a different basis if the supplies are to last for a long time. To date the hill sides have been gophered out, many of the more valuable deposits have been covered, and the best stone remains in the slope land. A larger plan of development would call for the working of a whole hill side and the production for some purpose of each limestone and shale member. The limestones, differing in quality, would have various uses. They would become rubble, rip rap, aggregate, etc., and probably cement material. The shales could be used for brick and tile manufacture. This will mean that the soil overburden, unless used in brick making, will be lost and that practically all below it will be recovered. This proceedure will be imperative if our stone and shale resources are to be available during a long period of state development. The importation of stone from other states will delay the time when this practice will be followed in Nebraska.

Local Use Quarries.—There are several hundred local use quarries in the state, some in most counties. Quarrying for purely local use was done more a few years ago than it is at this time. The stone was removed largely by hand, i. e., by hand drilling, simple blasting, pick and crowbar, and breaking with sledge and hammer. Such quarrying resulted in production from each of the 34 horizons and from additional thin unnamed ledges.

Commercial Quarries.—Among the largest commercial quarries in this state are those near South Bend, Meadow, Louisville, Cedar Creek, Nehawka, Weeping Water, Wymore and Blue Springs. At most of these places, a large force of men is employed in the quarry operations. Steam, electricity and compressed air are used in these quarries. Much of the stone is crushed for use in concrete.

Among the leading quarry companies operating in the state are: Burlington Quarry, South Bend; National Stone Company, and Murphy Construction Co., Louisville; Woodworth Quarry, Meadow; Atwood Quarry, Cedar Creek; Western Stone Company, Nehawka; Olson's Quarry, Weeping Water; Davis Quarry, Wymore; Blue Springs Quarry, Blue Springs.

Stone Aggregate.—The question has arisen many times as to whether Nebraska stone is suitable for aggregate in concrete. Some maintain that all our stone is suitable for such purpose. Others hold that Nebraska stone is unsuited for this purpose. The fact is that there are many uses of concrete, some of which require stone of a particular quality, and others of which can use low grade stone. Practically all of the Pennsylvanian members herein described will do for use in ordinary concrete. Parts of the Plattsmouth, about 16 feet of the Deer Creek, the Meadow, 8 feet of the Louisville, about 6 feet of the South Bend, and 10 feet of the Ashland limestone make aggregate suited to a somewhat higher grade of construction, but are not hard enough for the wearing course of concrete roads. The Permian members serve for cheap concrete construction, for road and pavement foundations, and fairly well as railroad ballast. The Greenhorn Limestone and the Niobrara chalk are too soft for aggregate. The quartzite in the Arikaree and Ogallala formations seem to make the best aggregate of any Nebraska stone. Care should be taken, however, to use only solid materials free from cavities and soft impurities.

Shipment and Markets.—A large tonnage of crushed rock is produced in Nebraska. The lines on which most of the shipments originate are the Missouri Pacific and Burlington. The Missouri Pacific hauls all the production from the Weeping Water Valley and some of the production from the Platte Valley. The Burlington hauls the production from the quarries along the south side of the lower Platte Valley, as from the Burlington quarry, South Bend; and the Murphy and National quarries near Louisville. It serves also the Big Blue Valley areas at Blue Springs and Wymore. Both these roads secure the shipments of hundreds of cars of stone from smaller quarries and a large amount of rip rap and ballast for their own use.

The Rock Island railroad hauls stone from the Woodworth quarry on the north side of the lower Platte Valley. The Union Pacific, Manhattan branch, serves the Big Blue Valley at Wymore, taking stone from the Davis Quarry.

The quarry products move to the principal cities such as Omaha, Lincoln, Fremont, Hastings, Grand Island, etc., and generally throughout the state.

THE LOWER PLATTE DISTRICT

Members 3 to 13 of the Nebraska section and a few developments of the Dakota formation suitable for stone production are exposed in this district. (Figures 3 and 39.)

Near Ashland.—The Dakota sandstone and three Pennsylvanian limestones outcrop south of Ashland. The sandstone has been used in a limited way. It is high in the hills southwest of the C. B. & Q. Station. Below this and in the railroad cut is a limestone too thin for quarrying. The Ashland limestone has been quarried in the ravine southwest of the station and in ravines about one mile east of the station. It could be uncovered over a considerable area near the deep cut on the Plattsmouth-Ashland branch of the Burlington. The South Bend limestone forms a rapids in Salt Creek at Ashland.

Pawnee Creek to South Bend.—This is one of the most favorable locations in the state for quarrying on a large scale. The only drawback is the heavy overburden but this could be overcome by working two or three heavy limestones at each quarry site. The Ashland limestone is exposed at a number of places in the tributaries of Pawnee Creek. From the mouth of Pawnee Creek to and below the Burlington Quarry north of South Bend, this and the South Bend limestones are above the track level. A little farther down-valley, beginning near the Burlington quarry, the Louisville limestone outcrops above the railroad. All three members are well suited for crushing and use in concrete.

North of the State Fish Hatcheries.—The Dakota sandstone outcrops prominently in steep bluffs midway between Melia and the State Fish Hatcheries but very little of the stone is suitable for quarrying.

Beginning where the best defined bluffs end and extending southward in the lower slopes for about 1½ miles are workable exposures of limestones. The South Bend and Louisville members outcrop here. Small quarries have been worked three or four places. No doubt the stone would be quarried quite extensively if shipping facilities were available. Immediately north of the Fisheries is a small exposure of limestone below heavy overburden.

Opposite South Bend.—Some of the first quarrying was done in the slopes across the Platte from South Bend, near the east end of the Clarke Bridge. The limestone was hauled to the railroad and shipped out for rip rap, rubble, sugar stone, and dimension stone. Some of the limestone from this locality was used in the State Capitol Building. There are many exposures of limestone and sandstone between the State Fish Hatcheries and one-half mile north of the Rock Island bridge. The limestones best shown here are the Louisville and the South Bend members. The sandstone is high in the slopes and of little value. At a few places just south of the State Fish Hatcheries the Dakota is firm enough for use in cheap forms of construction.

South Bend to Louisville.—The South Bend, Louisville, Meadow and Deer Creek limestone are exposed in the bluffs of this section. The Deer Creek dips below the river level about midway btween the two towns. The Louisville and Ashland members are nearly continuous in the bluffs, but heavily covered with drift and loess.

Several years ago stone was produced from these limestones, but quarrying extended only a short distance into the slopes. There remains a large amount of stone in this section. Its production will be quite expensive and must be done according to a comprehensive plan.

At Louisville.—The Dakota sandstone is quarried about 1½ miles southeast of Louisville. The rock here is of better quality than at most places. It has been used in a number of buildings.

From near Louisville to a point 1½ miles west of Cedar Creek is a nearly continuous exposure in the steep bluffs of the Deer Creek and Meadow limestone. The Cedar Creek and Cullom limestones outcrop in the base of the bluffs at the National Stone Company quarry.

The well known Stout quarry abandoned, is just northeast of Louisville. Part of it was re-opened and extended a few years ago. It is known as the Murphy quarry. The overburden is heavy. Stone is produced from the Meadow and Deer Creek members. Most of it is crushed and shipped to Omaha, Lincoln and other Nebraska towns. Much of it is suitable for smelting and sugar refining.

The National Stone Company operates the state's largest quarry about two miles northeast of Louisville. It works two limestones, but

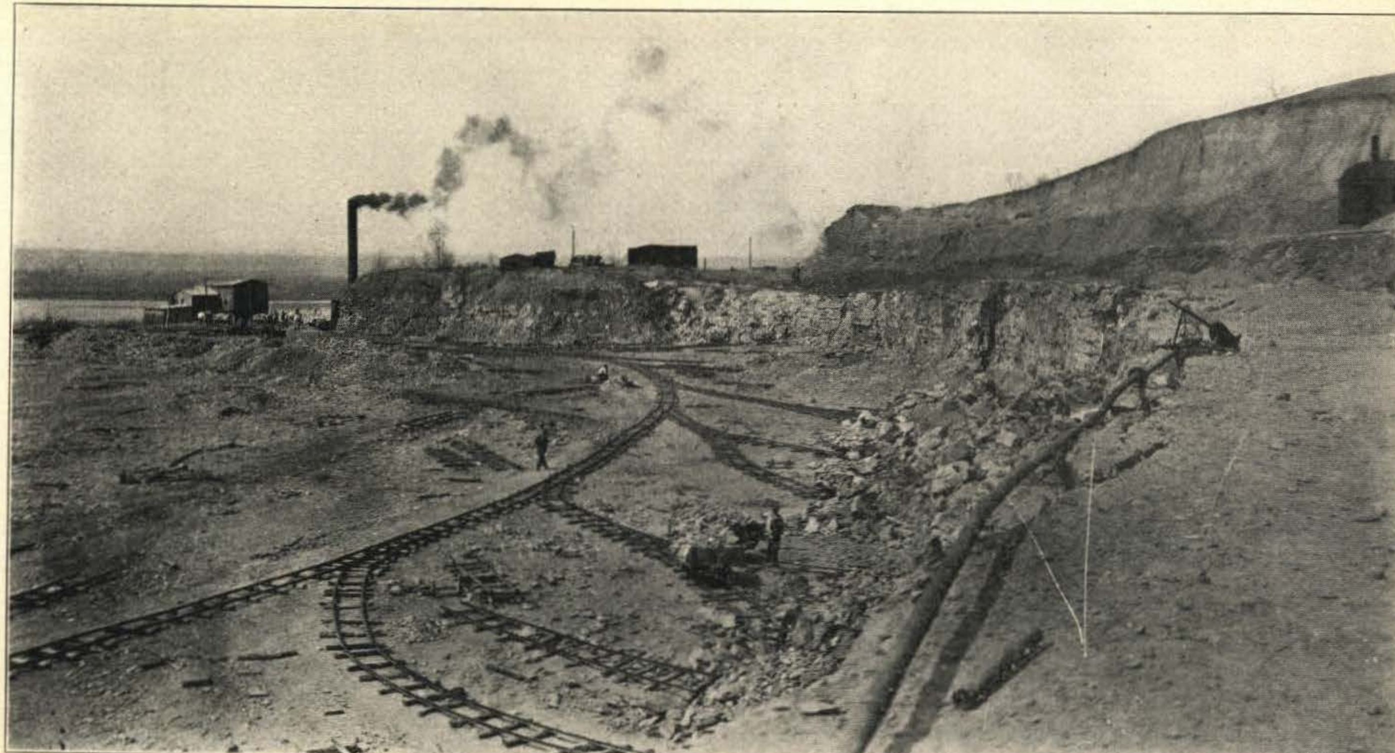
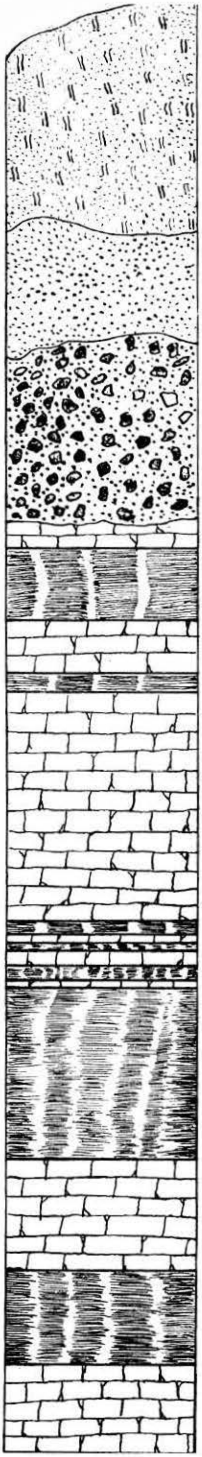


FIGURE 40
GENERAL VIEW NATIONAL STONE COMPANY QUARRY, NEAR LOUISVILLE

FIGURE 40-A

VERTICAL SECTION SHOWING LIMESTONE, SHALE, AND OVERBURDEN AT NATIONAL STONE COMPANY QUARRY.



1. **Loess**
2. **Sand**
3. **Drift**

Overburden

4. **Meadow Limestone**
5. **Shale**
6. **Deer Creek Limestone**
7. **Shale parting**
8. **Deer Creek Limestone**
9. **Shale**
10. **Cedar Creek Limestone**
11. **Shale**
12. **Cullom Limestone**

most stone comes from the Deer Creek (Figure 40). The quarry opening is more than one-half mile long. The overburden is removed with steam shovel any hydraulic pressure. The plant is well equipped for quarrying and crushing. Between 40 and 100 men are employed. Some of the stone is used for smelting and sugar refining. Most of it is crushed for use in street and road work and concrete.

Meadow.—There are several abandoned quarries along the bluffs from 2 to 4 miles southwest of Meadow. The quarries worked the Deer Creek, Meadow, Louisville, and South Bend limestones. The Woodworth quarry is now operating about two miles southwest of Meadow Station.

There is a large amount of available stone in the upland north of the Platte, i. e., in the Meadow area and extending westward to a point where the Dakota formation outcrops in the slopes.

South of Richfield.—The Plattsmouth limestone is well exposed for two miles in the Platte River bluffs south of Richfield. This stone was worked a number of years and abandoned, when the railroad spur was taken up. Much stone remains in these exposures.

Southwest of Cedar Creek.—There are a number of exposures of the Deer Creek, Meadow and Louisville limestones in Cedar Creek Valley. They extend about two miles along this valley, beginning about one and one-half miles from town. A nearly continuous line of quarries was opened on these outcrops. They were abandoned about fifteen years ago when the overburden became heavy. The Atwood quarries now operate quite extensively and ship to many Nebraska points. A large amount of stone remains in the slope land but much of it is deeply covered.

Cedar Creek to Cullom.—The principal stone exposed here is the Plattsmouth limestone. This outcrops for a distance of about three miles, but not in the most favorable condition for quarrying.

Cullom to Oreapolis.—A number of openings known as the Cullom quarries were worked here several years ago. There are three workable members between two and three miles above Oreapolis. They are the Oreapolis, Weeping Water and the Plattsmouth limestones. The latter is high in the slopes. It would seem that these quarries should be re-opened and worked by a plan that would produce from each member.

A good deal of limestone is exposed along the north side of the river, west of LaPlatte. The stripping would be too heavy to permit profitable quarrying at most of these exposures.

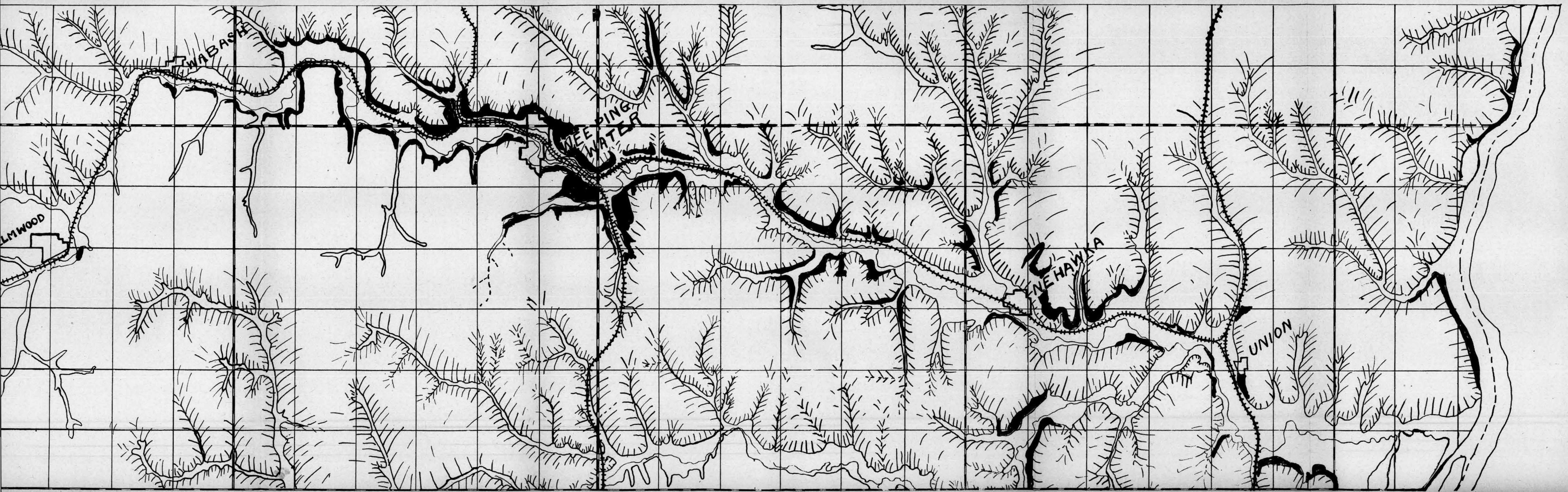


FIGURE 41

WEEPING WATER DISTRICT.

The quarry ledges of the Weeping Water District are Nos. 1 to 8 of the Nebraska section (Figure 4). Most quarrying is in the trunk valley yet there are many outcrops of good stone in the tributaries not served by railroads (Figure 41). The stone resources of the district are located as follows:

Elmwood.—Thin limestone beds heavly covered, outcrop in the creek northeast of town. A small amount of stone has been removed.

Wabash.—The Meadow limestone is exposed south of town and a short distance to the southeast where it is only a few feet above the Deer Creek limestone. Beginning about two miles east of Wabash and exposed on both sides of the valley, the Deer Creek forms a rock benches which can be traced in the valley sides nearly continuously to Weeping Water. Small quarries have been opened on this and much stone is available.

At Weeping Water.—The Plattsmouth limestone outcrops in the creek bed below town. The Cullom and Cedar Creek limestones are in the slope above and the Deer Creek caps the steep valley sides. The Deer Creek limestone forms large blocks on the hill slopes.

Stone has been quarried in the vicinity of Weeping Water for many years. At one time much of the output was used in lime making. Some of the largest quarries were east of the city. One is two miles southeast. This quarry now owned by the Updike Lumber Company, worked until last year. It will be reopened. Most production near Weeping Water is west of town, and from the Olson quarry on the Omaha Branch of the Missouri Pacific near where it leaves the Lincoln Branch.

The quarry is well equipped and running with a large force. The stone is used for a number of purposes and is well suited for concrete. Last year 10,000 tons of limestone was shipped from this place to the Scottsbluff Sugar Factory.

There is a vast amount of unquarried stone in the vicinity of Weeping Water. A nearly continuous line of outcrops of the Plattsmouth Limestone extends between Weeping Water and Nehawka.

Nehawka.—The Plattsmouth limestone is quarried three miles west of Nehawka. This, known as the Hebner quarry, has been taken over by the Western Stone Company. The production is 6 to 8 cars of crushed stone per day (Figure 42). The section here shows: stripping, 8 to 14 feet; hard bluish fossilferous limestone, 2 feet; soft, light colored limestone, 3 feet; chocolate colored shale, 5 feet; limestone (Plattsmouth), 18 feet.

The Nehawka Stone Company quarry about two miles east of Nehawka produces principally from the Deer Creek and Meadow ledges and ships over the Missouri Pacific to a large number of towns and

FIGURE 42
HEBNER QUARRY, NEAR NEHAWKA

cities. This quarry quit work recently, but will start up again. The section here shows stripping, 1 to 12 feet; limestone, 3 feet; shale, 4 feet; limestone (Deer Creek), 20 feet.

The old Van Court quarry, high on the slopes northeast of Nehawka, and now abandoned, was a large producer.

The rock exposures between the Nehawka Stone Company quarry and Union are not very continuous. Rock is exposed in some of the ravines and benches, but not favorably for quarrying except at two or three places.

Union.—The Deer Creek and Meadow limestone have been quarried southeast of the Missouri Pacific Station. A considerable quantity of good stone remains. The same members are exposed about one mile north of town, i. e., along the Missouri Pacific main line, Omaha to Kansas City. Some stone has been produced at small openings high on the slopes three to five miles southeast of Union. The Preston and Fargo members seem to be the ones worked here. They can have no commercial value unless the whole of a slope is worked for clay and stone.

LITTLE NEMAHA DISTRICT

The Falls City Limestone, about three members of the Nemaha Formation, and the Cottonwood Limestone are now quarried in a small way in this district.

Limestones south of Palmyra and at Douglas, have not been definitely located in the Nebraska section. They appear to be of about the same age as the Brownville member, i. e., in that part of the formation. A bed worked at Bennett several years ago is also held in doubt as to its geological position. There are small exposures at a number of places near Syracuse, and Dunbar, but they have practically no importance. Most stone capable of quarrying in the Little Nemaha District is at or near Glen Rock, Johnson, Auburn, Howell and Nemaha. (Figure 43.)

Glen Rock.—The Neva and Cottonwood limestones cap the upland here, the second named being the more important. It has been worked about two miles east of Glen Rock, one and one-half miles northeast and immediately to the west and southwest of the town (Figure 43). The stone is five to six feet thick and not covered by much overburden. It is now quarried for local use and some for shipment from Glen Rock. There are several small quarries two and one-half to three miles south and southwest of Glen Rock.

Johnson.—There is no stone production closer than two and one-fourth miles of this town, yet the quarries northeast of town were known as the Johnson quarries. Several years ago the Johnson quarries were served by a spur from the Burlington Railroad.

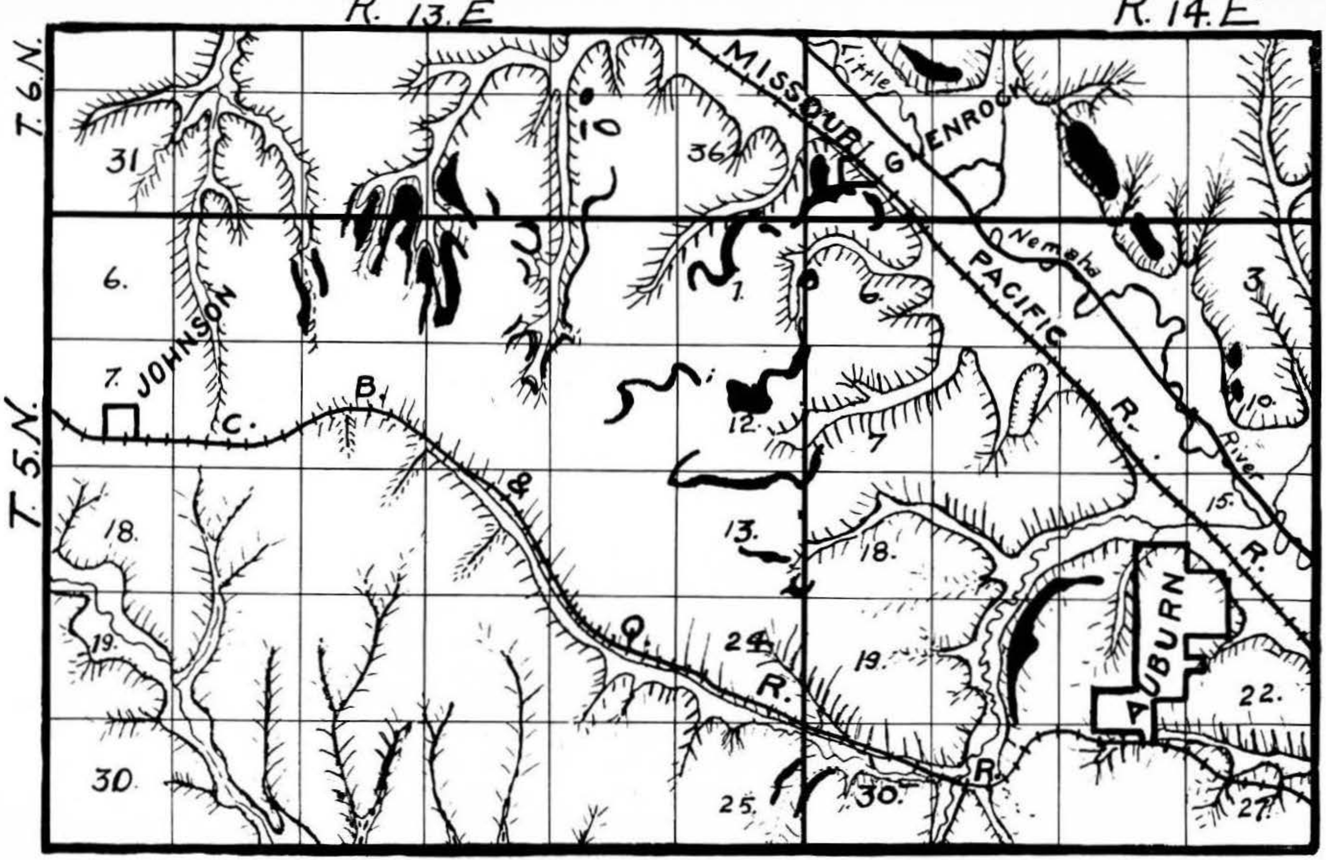


FIGURE 43
STONE OUTCROPS IN LITTLE NEMAHA VALLEY

The stone outcrops in a number of ravines. It is very light colored, contains some flint nodules, and works out in large blocks. Much of it is too soft for concrete. It was used principally for building but could not compete with Berea sandstone and Bedford limestone shipped to Nebraska from Ohio and Indiana. All production has ceased except for local use.

Auburn.—The Neva and Elmdale limestones are exposed about one mile west of the city. The Elmdale beds outcrop east of the city. They are medium hard and suited for concrete. There is a large amount of interbedded shale and the overburden is heavy. Future production here will depend on the success attained in the production of both clay and stone.

Howell.—Limestones probably the Neva and Elmdale are quite well exposed in the slopes above this town. There has been some quarrying.

Bracken Station.—Thin limestones are exposed in the valley slopes immediately southeast of this station. They have been used in a very limited way, but might have some importance in road building.

Nemaha.—The Aspinwall limestone is exposed in the Missouri River bluffs northeast of this place. The Falls City limestone outcrops and is quarried in a ravine on the valley floor about two and one-half miles west. There is some stone in Whiskey Run valley at points two and one-half to four miles south of Nemaha.

MISSOURI RIVER DISTRICT

The drawback in this district is the absence of shipping facilities. Most production thus far has been for local use or for river work.

There are small exposures of limestone north of the Platte, as in ravines a few miles northeast of Florence and near Bellevue. They are heavily covered with mantle rock.

Figure 2 shows the Missouri River section and the members exposed in the bluff land along the river. The Plattsmouth limestone is well exposed as the cap rock high in the valley side from the Platte to Jones' Point. The Deer Creek is the cap rock from Rock Bluff to Jones' Point where it dips below the river level.

The Cullom and Cedar Creek members outcrop at a few places between Rock Bluff and Jones' Point. The Meadow and Union limestones are well shown at Jones' Point.

About eighty-five feet of limestone is exposed in the Missouri River section between Plattsmouth and Union. Nearly all of this would make good aggregate. This area may be drawn upon in the future for road work done by the state. If so, barges could be used to deliver the stone to Plattsmouth and Nebraska City for railroad shipment.

Limestone members of the Nemaha Formation outcrop at a number of places in the bluffs between Weeping Water Valley and the Kansas line. They are quite well shown at Old Wyoming, north of Rulo, and above the railroad south of the mouth of the Big Nemaha River. Each member produces some stone.

The Aspinwall and Falls City limestones outcrop high in the bluffs at several places from south of Nebraska City to Indian Cave. They have been quarried most north of Nemaha and in the vicinity of Aspinwall.

It seems that extensive quarrying, if it is ever done along the Missouri, must be confined to the area where the heavy ledges occur, i e., between Plattsmouth and Union. Similar exposures are found below White Cloud, Kansas, from which stone could be produced for shipment to Nebraska.

THE BIG NEMAHA DISTRICT

There are more rock exposures in the Big Nemaha District than in any other part of southeastern Nebraska. (Figure 44). Most limestones are thin and separated by thick beds of shale. The members exposed in this area are numbers 10 to 25 of the Nebraska Section. (Figure 5). The principal exposures and places of local quarrying are as follows:

1. **Two miles south of Rulo.** The Burlingame, Fargo and Preston limestones outcrop here. Some quarrying has been done in the north half of Section 30. This place could be used for stone and clay production by a plan in which the whole slope would be worked.

2. **Northeast of the Burlington Nemaha Bridge between Preston and Rulo.** Four beds have been quarried here. The topmost of these is the Tarkio. There is a local development of a lime stone here below the Tarkio that has not been numbered in the Nebraska Section. It is exposed for about two miles in the bluff north of the railroads in Sections 22 and 23.

This part of the district could if necessary, be worked for brick clay and some stone. It is close to the railroad.

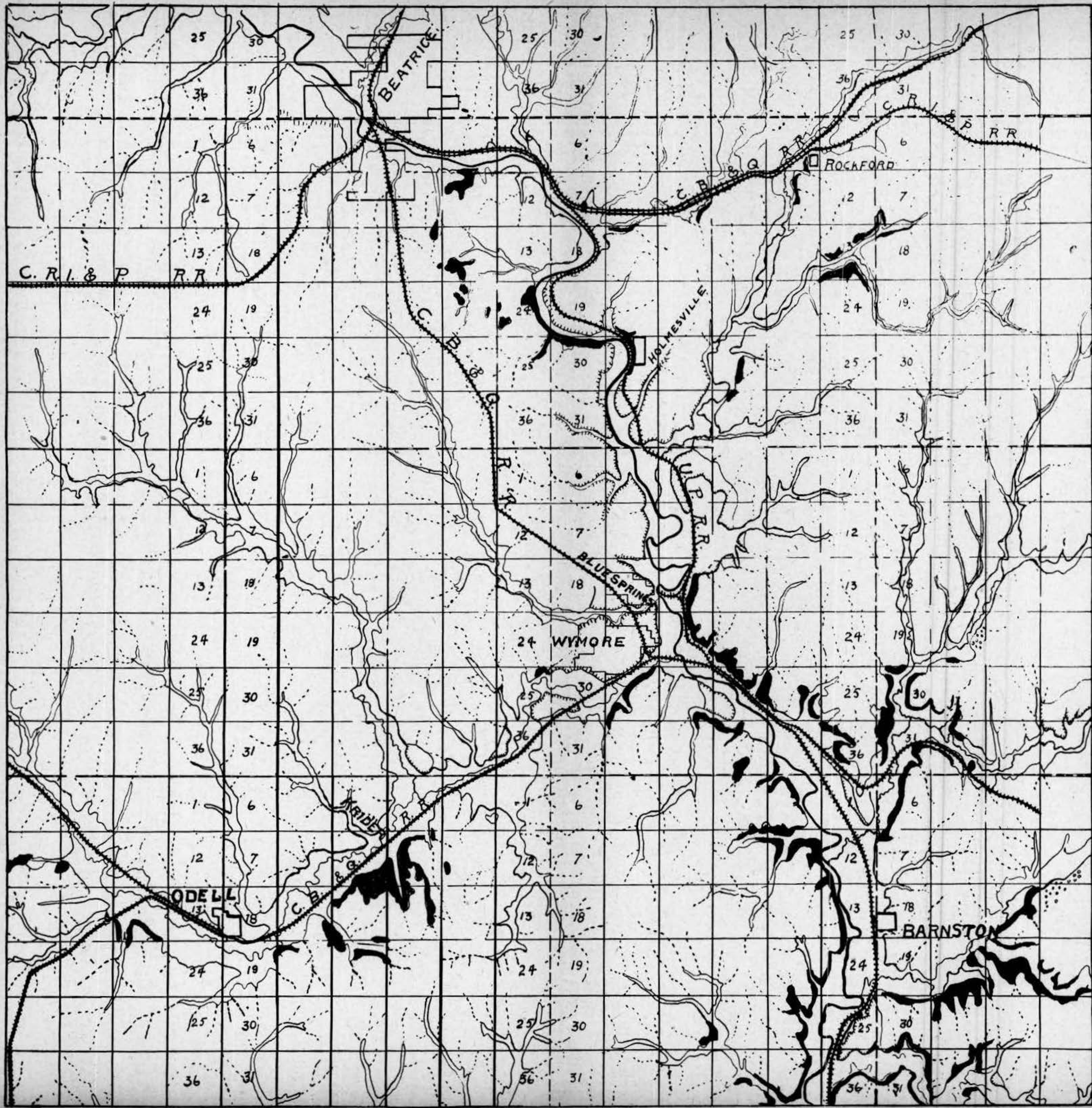
3. **In the vicinity of Preston.** Two members outcrop in an east-west course above the town and westward to the Nemaha Bridge. The little amount of stone produced here comes mostly from the Tarkio in Sections 19, 20 and 21.

4. **In Pierson's Point.** Pierson's Point is in 24-1-16. The Tarkio limestone is exposed at the railroad level. It is massive and might be quarried in a limited way.

5. **Across the valley from Pierson's Point.** Here the Tarkio limestone skirts the bluff. It has been quarried in 35-1N-16E.

6. **At the Nemaha wagon bridge south of Falls City.** The Tarkio

FIGURE 44
STONE OUTCROPS IN BIG NEMAHA VALLEY


BEATRICE
ROCKFORD
HOLMESVILLE
BLUE SPRINGS
WYMORE
ODELL
BARNSTON
C. R. I. & P. R.R.
C. B. & Q. R.R.
U. P. R.R.
KRIDER
C. B. & Q.

and thin limestones associated with it are exposed in the south bank of the river. Quarrying would be quite expensive. The slope above the Tarkio is composed principally of arenaceous shales and friable sandstones.

7. **In the vicinity of Lehmer Quarry.** This quarry is in 32-1N-16E. Here the Aspinwall has been removed from small areas in the hill slopes and the Falls City limestone has been quarried high in the hills. The Brownville limestone, below the Aspinwall, was worked a few years ago. There are remnants of the Falls City and weathered conditions of the Aspinwall in the steep valley side about one mile east of the Lehmer Quarry. The Brownville below the Aspinwall is associated with some quartzite and shales. It might be quarried but production would be expensive.

8. **Southwest of Falls City.** This is in Sections 19 and 20, of Township 1 North, Range 16 East. The Falls City and Aspinwall limestones have been worked at a number of exposures in this locality.

9. **Southeast of Salem.** The high upland here is capped principally by the Neva limestone which is very hard. In the slopes are thin limestones of the Elmdale formation. The limestones are separated by thick shales. The principal outcrops are in Sections 19 and 20 of Township 1 North, Range 16 East. The whole of slopes might be worked for clay and stone, if transportation facilities were available.

10. **Near Salem.** The upland west of Salem presents a table land appearance. It is capped over most of the area by hard limestones the uppermost members of which the Cottonwood and the Neva. The Cottonwood has been quarried at Indian Hill. The Neva and Elmdale members have produced a small amount of stone in this area.

11. **Dawson.** The Cottonwood is exposed in poorly defined outcrops in this area. The cap rock at a number of places is the Neva. Both members and some Elmdale have been quarried near the town and eastward on both sides of the valley for a distance of four or five miles. Practically the same conditions maintain along the South Fork of the Big Nemaha.

12. **East of Humboldt.** The upland about one and one-half miles east of this city is capped with the Cottonwood. Exposures of this member extend several miles eastward. They are worked in a small way. There is some production from the Neva and Elmdale.

13. **South of Humboldt.** A very good section is shown near the Nemaha Bridge south of the city. The topmost member quarried here is a hard layer in the Garrison formation which was not numbered in our sections. The stone most quarried is the Cottonwood. It forms a light colored horizon near the top of the upland. The Cottonwood occurs generally between this place, the Kansas line on the south and Indian Hill near Salem. The Cottonwood, Neva, Elmdale, and Falls City lime-

FIGURE 46
DAVIS QUARRY, NORTHEAST OF WYMORE

stones are well exposed at a number of places south of Humboldt. The Tarkio outcrops about two miles southwest of Humboldt and in Sections 9 and 16 of Township 2 North, Range 13 East. The first named location is in a ravine in which the beds dip eastward and the other is in a spur of the upland extending down to the river.

14. **The vicinity of Emmadale School.** This is about six and one-half miles south of Humboldt. An east-west section in this vicinity shows the Preston, Tarkio, Brownville, Aspinwall, Falls City, thin members of the Elmdale, the Neva and the Cottonwood. The Cottonwood, Preston and Tarkio have been quarried at a few exposures. There are many stony outcrops between this location and DuBois. They would support quarrying for local use.

15. **DuBois.** Members of the Nemaha Formation outcrop generally southeast, southwest and west of DuBois. Small quarries were opened and worked here several years ago. The Howard limestone is exposed in the creek bed south of town.

There are several places near DuBois where good clay or shale could be worked for brick production and the thin limestones between the shales would yield some stone as a by-product.

16. **Otoe Siding.** The beds here slant eastward in the Table Rock anticline. The Tarkio is well exposed along the bluff line from one and one-half miles west of Humboldt to near the crest of the anticline. It has been quarried at four or five places. The lower members of the Nemaha Formation have produced some stone north of Otoe Siding. They are exposed generally on both sides of the valley between this location and Table Rock.

17. **Northwest of Elk Creek.** Here a spur of the upland between the trunk valley and a creek contains the Preston, Fargo and two lower limestones. This site might be used for clay production with stone as a by-product. The limestones were all quarried in a small way a few years ago.

18. **Southeast of Tecumseh.** The Tarkio and Neva limestones outcrop where the Burlington main line strikes against the upland and for about two miles down-valley. The Tarkio has been quarried in several ravines in this vicinity. Some stone has been produced across the valley west of Tecumseh and at points on the west side of the valley between Tecumseh and Elk Creek.

Several small quarries have been worked in parts of Pawnee County west of the Big Nemaha district. They operated principally in the Cottonwood and Tarkio limestones.

THE BIG BLUE DISTRICT

The stone resources of this district are chiefly in the Wreford limestone, the Florence Flint, the Fort Riley limestone and the Winfield limestone, numbers 26 to 29 inclusive of the Nebraska Section. There are many outcrops along the trunk valley and its tributaries (Figure 45). Beginning at the Kansas line and extending to near Wymore is a nearly continuous line of exposures on both sides of the Big Blue. They lie well up on the valley sides. Similar outcrops occur east of the valley between Wymore and Blue Springs. There are many outcrops along Mission Creek, Plum Creek, Wolfe Creek, and Wildcat Creek. The principal stone outcrops in Indian Creek are: one and one-half miles west of Odell, four miles west and one mile north of Odell, two miles east of Odell, south of Krider Station, and immediately south of Wymore. The stone is quite thin except south of Wymore where a large quarry was worked in the Florence Flint, to a point where the overburden became quite thick.

The exposures most favorably located for quarrying in this district are east of Wymore and Blue Springs. The Davis (Figure 46) and Blue Springs quarries are operating here.

The Davis quarry works a face one-eighth mile long, removing 0 to 10 feet of overburden. The sections shows Florence Flint, 23½ feet; Fort Riley limestone, 14¾ feet. All of the lower division is quarried and at present about 8 feet of the upper or Fort Riley. Overburden is removed with scrapers. Steam power is used for drilling, blasting and plug drills. Stone is hauled to the crusher in dump carts. The production is used for ballast, sub grade in roads and streets and to some extent for concrete.

The Atwood quarry was a large producer for several years. It is southeast of the Davis quarry.

There are few outcrops of stone between Blue Springs and Holmesville. Several are found in Bloody Creek about four miles northeast of Holmesville, and along the east valley side at Holmesville, and on the opposite side of the valley about one mile west of town. The Holmesville quarry, now abandoned, was at one time among the largest in the state. Limestone is exposed nearly continuously between Rockford and the Big Blue. This has been quarried for local use and shipment. There are limestone outcrops in the Big Blue Valley at Beatrice and at places near the valley floor between this city and Holmesville. Most of the stony upland south and southeast of Beatrice and north of Holmesville contains the Dakota formation in which only a small amount of stone is suitable for production.

ROAD MATERIALS OF NEBRASKA

PART TWO

SAND

By G. E. CONDRA.
Director of the State Conservation and Soil Survey.

Sand is Nebraska's most important mineral resource. It is widely distributed, and extensively mined for a number of uses including general building and road work.

There are about 800 sand pits in the state, producing principally for local use, and more than thirty large commercial pits, sand pumping stations, and sand dredges. The production of these plants is shipped throughout the state and to parts of Iowa, Missouri and Kansas.

Field Studies.—The writer investigated the sand resources of the state about ten years ago, and prepared a bulletin of 206 pages on that subject for publication by the State Geological Survey. The survey bulletin covers the sand industry quite completely, including distribution, tests, production and uses. The investigations begun in connection with the Geological Survey have been continued to the present time. Though much of the subject matter in the following pages was used in the former bulletin, at least part of it is new, representing some of the progress made in the industry to date.

Acknowledgements.—The writer has received valuable assistance in the study of this subject from Professors E. H. Barbour, George R. Chatburn, George Borrowman, C. E. Mickey and N. A. Bengtson; from J. G. McIntosh, Edgar Kiddoo, John J. Lyons and others of the Conservation and Soil Survey, and from many sand producers and construction companies.

Physical Properties of Sand

Though sand is used extensively, as a rule, it is not tested as it should be to determine its properties and fitness for these uses. The principal properties of sand are cleanness, fineness or size of grain, sharpness, and the mineral content. Certain other qualities deserve consideration in a description. They are color, specific gravity, weight and voids.

Cleanness.—The qualities of sand are essentially those of the grains which compose it but there may be present also, more or less extraneous

FIGURE 1

CLOSE VIEW SHOWING ANGULAR TO ROUND SAND OF THE PLATTE DISTRICT matter. This is regarded as impurities or dirt. The most common impurities are clay and iron stain.

There are simple methods of determining cleanness but they are not much used. It is possible to estimate this property by sight without the use of equipment. Proof that a sand has a low degree of cleanness is shown by placing a sample in a vessel containing water and agitating the mass. A dirty sample will badly discolor the water.

Perfectly clean sand will not soil the hand. Such a degree of cleanness, however, is rarely found. Much of Nebraska sand shows a high degree of cleanness. This is especially true of the production from the Platte district.

Fineness.—This property relates to the size of grains and has more importance than is generally supposed. It deserves careful consideration by builders of roads and pavements. The most common means of testing fineness is by the use of sieves. In laboratory testing, we use several sieves running from coarse to fine, but for most practical purposes the number is three or four..

The grades according to fineness are:

1. Fine, the diameter of grains being .5mm or .02 inch.
2. Medium, the diameter being about 2mm or 0.08 inch.
3. Coarse, the diameter being 5mm or 0.20 inch.
4. Gravel, which does not pass the ¼-inch mesh.
5. Oversize gravel.

Much of Nebraska sand ranges from fine to medium.

Graded Sand.—This is a condition in which the grains have considerable range in size, probably frome fine to coarse. It is the opposite of uniform sand in which the grains are mostly of the same size. Engineers speak of what is called the "uniformity coefficient" which shows the degree of uniformity of grains, i. e. whether they are mainly of the same size.

As a rule Nebraska's sands are graded. This is a favorable condition because it makes them heavy and low in voids.

Sharpness and Form of Grain.—Practically all specifications made a few years since strongly emphasized sharpness and angularity, regardless of the use to be made of a sand. We now know that sharpness has been over estimated, and that there is some virtue in sand with rough, rounded grains, if they are composed of hard, durable minerals.

The qualities sharpness and form can be determined by a low power lens or by pressing the sand between the fingers. Sharp sand has a peculiar grit, in contrast with the sound produced by round sand. Sands are sometimes classed as sharp, angular and round. Most of Nebraska's sand is angular to round, not sharp. (Figure 1.)

Specific Gravity and Weight.—Building sand is composed mostly of minerals having specific gravities from 2.57 to 3.0. Certain minor ingredients are heavier. Most Nebraska sand ranges in specific gravity from 2.6 to 2.66, the average being about 2.64 or 2.65.

Specific gravity does not have much importance, especially so where the sands run evenly as they do in Nebraska. It is of use, however, in determining voids by the specific gravity weight method.

The weight of a sand sample depends on the mineral content, grading and compaction. It is usually given in pounds, the volume considered being a cubic foot. A simple method for determining this property is to weight a cubic foot of sand in a vessel of standard size.

Dry, compact sand weighs from 75 to 100 pounds or more per cubic foot. Dry, compact, graded sand runs much higher. Nebraska sand, being graded, runs between 88 and 125 pounds per cubic foot.

Voids.—The term "void" means unoccupied. It is practically the same as space. Engineers use the term "voids" to denote the percentage of inter-grain space. Voids as a property has most importance in sand used in mortar or concrete. The voids is low in graded sand and high in uniform sand. It is greater in fine than in coarse sand. The range in Nebraska sands is between 26 and 48.

The methods of determining voids are well known, yet it seems that a word of caution should be given in regard to the hydration method. By this test a volume of sand is measured, and water sufficient to fill the spaces is introduced. The water required to fill the sand is, if the test is carefully made, equal to the voids. The difficulty in this test is to drive out all the air in the sand spaces. Hence, the test usually shows too low in voids.

The most common means of testing voids in the laboratory is by the specific gravity weight method. In this, the first step is to find the specific gravity of the sand, which for the most of the samples collected from deposits in Nebraska is 2.64 or 2.65. If the specific gravity is 2.65, 100 cubic centimeters of solid rock would weight about 265 grams, but the weight of 100 cubic centimeters of sand is about 163 grams, making a difference of 102 grams between the solid and the sand, due to voids. The next step is to find what percent 102 is of 265, which gives a result of 38.49, the voids. A larger measure, the cubic foot, is used in field operations. The specific gravity being 2.65 a cubic foot of sand weighs about 110 pounds, whereas an equal volume of a solid composed of the same materials as the sand, would weigh about 165.625 pounds, making a difference of 55.625 pounds per cubic foot. This represents the weight of sand that would fill the voids. The reckoning is finished by finding what percent 55.625 is of 165.625. In practical work the operation of determining voids is about as follows: Weigh a cubic foot of sand moderately compact, subtract the weight from 165.625, divide the difference by 165.625 and the result represents the voids.

The heavy sands of Nebraska are low in voids, and light ones are high in voids.

CHEMICAL COMPOSITION

Sand is finely divided rock. Its composition is determined largely by the material from which it was derived. For example, sand may originate from such as coral rock, iron ore, or granite. Much of Nebraska's sand was derived from quartz and feldspar which came from granite. The largest ingredient is quartz. This, when pure, is composed of silica ($Si0_2$), and contains about 46.6 per cent silicon and 53.33 per cent oxygen. Feldspar, mica, hornblende and other silicate minerals, usually present, make the composition more complex, adding alumina (Al_20_3), potassium oxide (K_20), sodium oxide (Na_20), calcium oxide ($Ca0$), magnesium oxide ($Mg0$), and iron oxide (Fe_20_3). In association with the sand grains may be iron stain, clay filler, and calcium carbonate. Forms of iron oxide are sometimes present as stain on sand grains. Clay impurities are essentially hydrated silicates of alumina. Limestone is mostly calcium carbonate, CaCO3.

Chemical analyses of sands are approximate and ultimate. Approximate analyses determine only the $Si0_2$, Al_20_3 and iron content. This takes little time, whereas ultimate analyses are time-consuming and expensive.

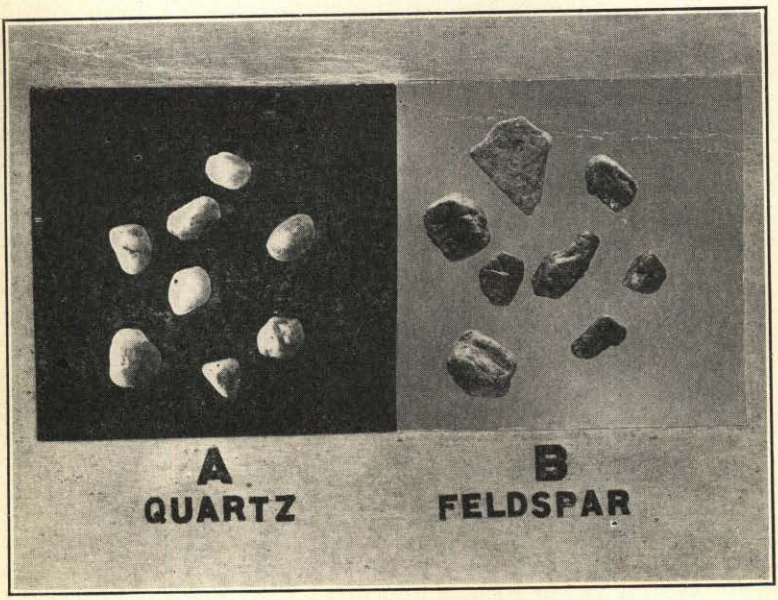


FIGURE 2
QUARTZ AND FELDSPAR GRAINS

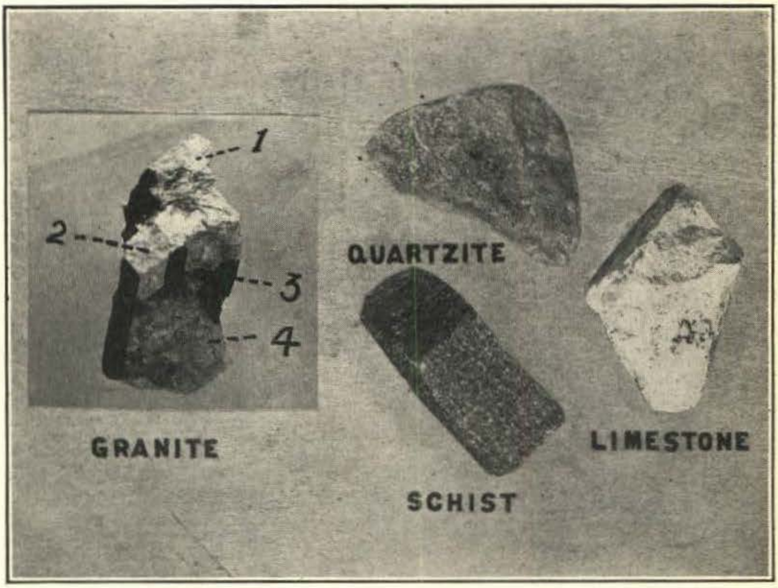


FIGURE 3

ROCK PEBBLES IN THE GRANITE. (1) IS MICA, (2) IS QUARTZ, (3) IS HORNBLENDE AND (4) IS FELDSPAR

MINERAL COMPOSITION

Sand is composed of mineral and rock fragments. The bulk of it in most exposures consists of mineral fragments, mostly quartz, whereas the larger particles usually contain some feldspar. Sometimes a large grain or pebble is composed of one mineral but ordinarily it is rock such as granite, gneiss, schist, or quartzite.

The variegated appearance of sand is due to its mineral and rock composition. The minerals differ considerably in color, hardness, cleavage, fracture and other qualities and are readily determined by one acquainted with these properties.

Quartz.—This (A of Figure 2) constitutes the bulk of silicious sand and sandstone. When pure it is glassy, transparent, very hard, and without cleavage. It resembles glass but is harder than the knife blade or glass. The fragments vary much in form but are as a rule, elongated. (See A in Figure 2.) Freshly fractured grains are very sharp. The specific gravity of quartz is 2.6 and the chemical composition SiO_2. Quartz is nearly insoluble in water and ordinary acids. Grains of pure quartz are not often found in sand. There is present as a rule more or less iron which makes the grains dark to reddish, or yellowish and translucent to opaque.

Among the varieties of quartz found in Nebraska sands are: vitreous quartz, milky quartz, smoky quartz, flint, calcedony and agate.

Feldspar.—This (B of Figure 2) constitutes most of the reddish, pinkish and grayish fragments in sand. It is nearly as hard as quartz but has cleavage, i. e. the ability to break with plane faces. There is cleavage in two directions. The specific gravity is about 2.57 and the chemical composition of orthoclase feldspar, which is the most common, is $K_20.Al_20_3.6\ Si0_2$. The color and cleavage serve to distinguish feldspar from quartz. There is more feldspar in coarse than in fine sand.

Mica.—This mineral has little importance in sand. It is present as small shining plates, often incorrectly called isinglass. The characteristic properties of mica are easy cleavage, softness and the elasticity of its thin plates. As a rule, the mica is found in small pieces of granite or gneiss.

Hornblende.—This is a constituent of granite, syenite and some schists. It becomes a sand forming mineral along with quartz and feldspar, but is present only in small amounts. Usually the mineral is of dark color, with prismatic form of fragments, having quite distinct cleavage. The hardness is five to six and the specific gravity 3.2 to 3.3.

Among the sand forming minerals of minor importance, are calcite, magnetite, limonite and hematite.

FIGURE 4
GRAVEL IN DAKOTA FORMATION

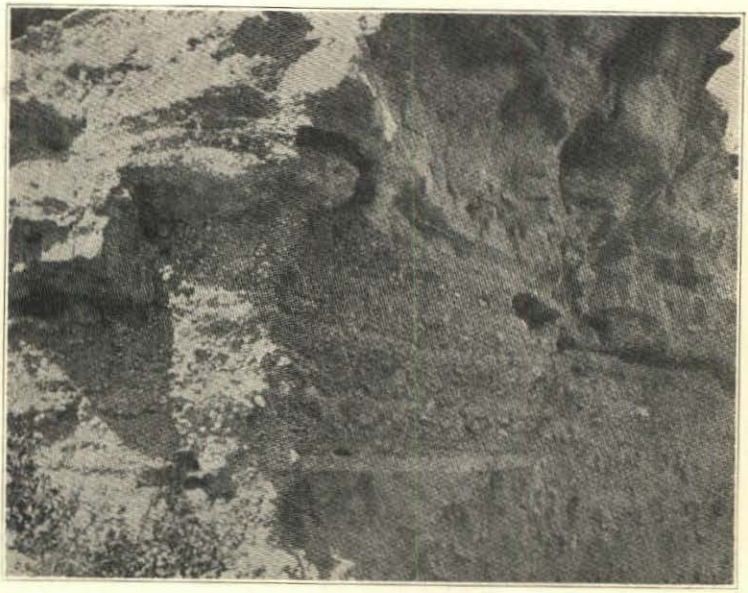


FIGURE 5
GRAVEL IN ARIKAREE FORMATION

Sand Forming Rocks.—The principal sand forming rocks in Nebraska (Figure 3), are granite, syenite, basalt, porphyry, ryolite, andecite, traprock, schist, gneiss, slate, conglomerate, sandstone, quartzite and limestone. As a rule these occur as the larger particles such as gravel and pebbles. They should be of special interest to operators who produce aggregate from sand. There is need for a special study of these coarse parts for they may have value in the future when our state will derive much of its aggregate from sand by washing and screening. If these rocks make a high grade aggregate that can compete with chats and crushed stone shipped in from other states, there will be a big demand for its production.

SAND BEARING FORMATIONS

Most of Nebraska's sand is derived from mantle rock deposits. A small amount is secured from bed rock. The geological sources of sand in Nebraska are the Pennsylvanian beds, Dakota Formation, Arikaree Formation, Ogallala Formation, an unnamed Tertiary Formation, glacial drift and alluvial deposits.

Pennsylvanian Beds.—These outcrop in the southeastern counties and contain in some of the members bodies of sand too fine for most road work. There are a few places, however, where the sand is worked for local uses.

Persons wishing a description of the Pennsylvanian beds and other formations of Nebraska should read Part I of these reports on road materials.

Dakota Formation.—This well known formation consists for the most part of sandstone and shale. It contains irregular bodies of sand, gravel and conglomerate. As a rule, the sand and gravel are heavily stained with iron. The sand is too fine for construction but the gravel has been used quite extensively. The gravel deposits are best exposed along the lower course of the Platte, as southeast of Richfield, (Figure 4) and near Cullom and Cedar Creek. This gravel grades from fine sand to pebble rock. The particles are water worn to a rounded condition. In places the gravel is loose enough to permit quarrying without blasting. In other places it is bound by a weak cement of iron.

Arikaree Formation.—This sandy formation outcrops widely in northwestern Nebraska. Its sands are grayish and as a rule of fine texture. In many places the formation contains deposits of medium to coarse sand and gravel, suitable for building purposes. (Figure 5.)

Ogallala Formation.—This is the rock at or near the surface in much of southwestern Nebraska. It outcrops along the Republican from below

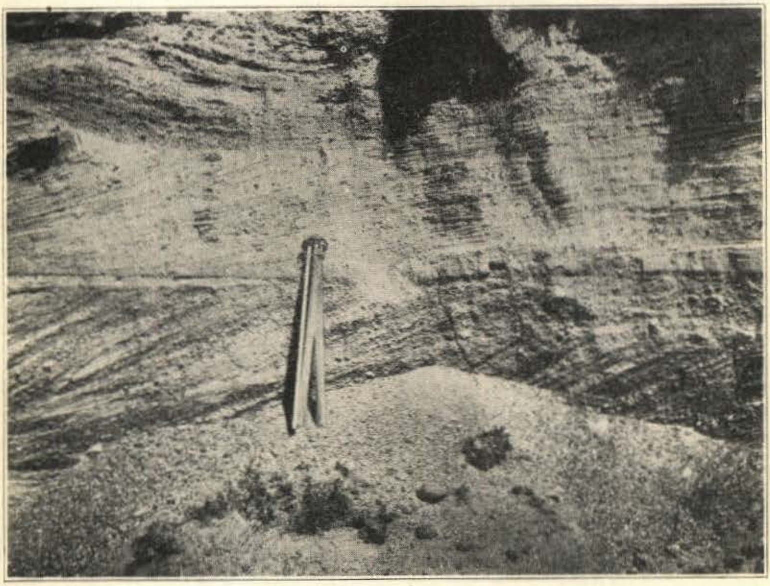


FIGURE 6
SAND AND GRAVEL OF LATE TERTIARY AGE

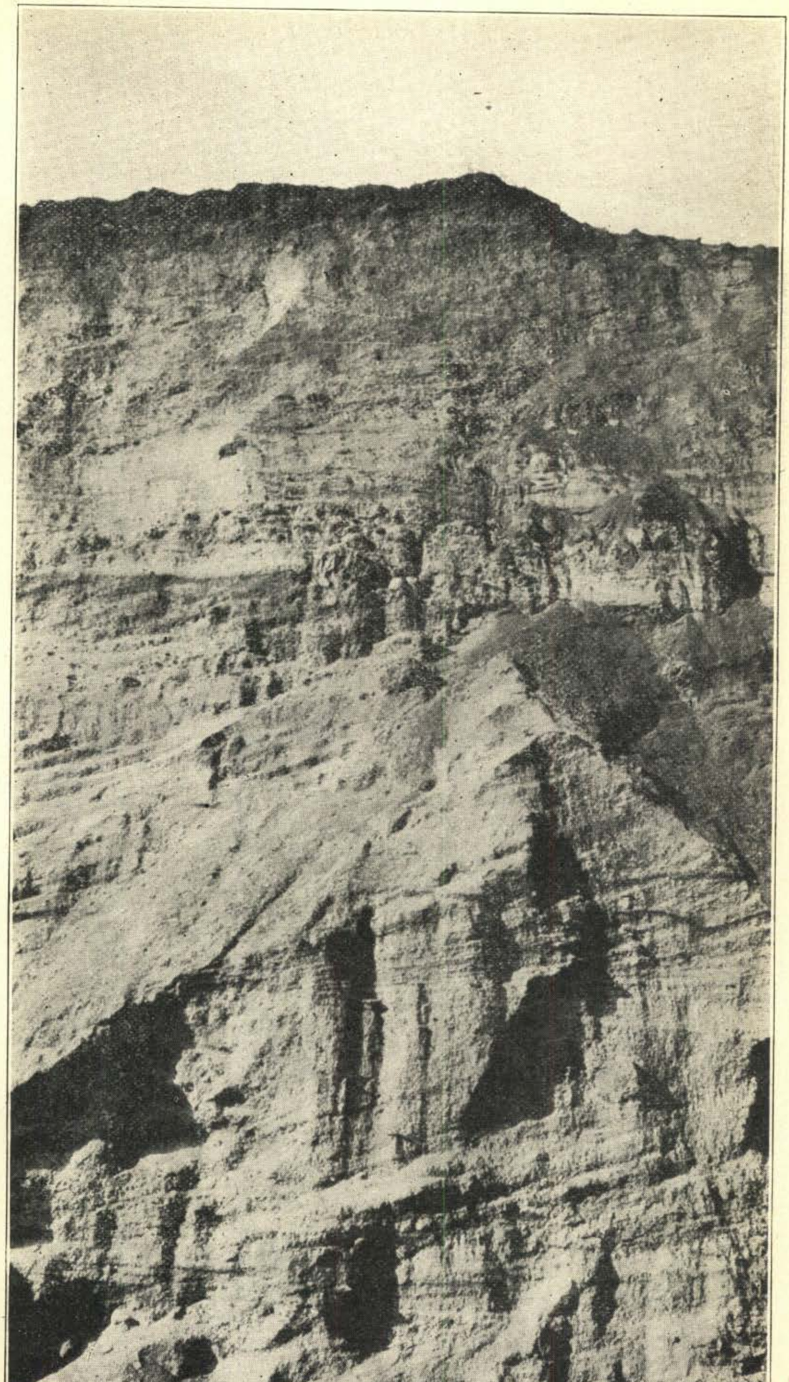


FIGURE 7
AFTONIAN SAND

Franklin westward to the state line, also in the Lodgepole and North Platte valleys.

There is a vast amount of sand and gravel in the Ogallala formation. Some of this is cemented into friable sandstone and conglomerate. At places the sand varies from fine to coarse, and the gravel which grades into coarse pebble rock, is loose enough to permit of working without blasting. The sand and gravel are heavily charged with calcareous matter. Feldspar pebbles are a noticeable feature. Pebbles of quartz, hornblende, granite, basalt, and other minerals and rocks are plentiful.

Sand of Late Tertiary Age.—Beneath the loess in much of central Nebraska and extending eastward under the west edge of the glacial deposits is an unnamed formation which carries vast quantities of sand interstratified with thin layers of clay and silt. (Figure 6.) This is a nearly continuous sand plain 25 to 100 feet or more thick. It outcrops along the Missouri in northeastern Nebraska, as in Knox and Cedar counties, and in the valleys southward and southwestward to and beyond the Republican. The sand is encountered in most upland wells. Just how far west this sand extends and just what its geological relations are to the drift on the east has not been definitely determined.

Though much of the sand in this formation is fine, a large amount is coarse and suitable for production. Much of it is clean, coarse and fit for structure purposes. The sand is composed principally of quartz but enough particles of feldspar are present to give it a mottled, flesh color.

The sand plain in much of its area is covered by loess and drift except where it outcrops in valleys. This restricts most of the present production of sand from this source to valley sides. Future needs may call for more mining from beneath the upland plains.

Glacial Drift Sands.—These occur in approximately the east one-third of the state and in two conditions. The larger amount is in a fairly distinct sand plain known as the Aftonian. (Figure 7.) This lies between the Nebraskan and Kansan drift sheets and has a thickness ranging from a few feet to 50 feet or more. The sand varies from dirty to clean and from fine sand to coarse gravel. The deposit is stratified and cross bedded and contains some clay balls and boulders. This means that it is primarily a stream deposit. The Aftonian sands extend through much of the upland of the Loess Hill and Drift Hill areas of Nebraska and are represented also in southwestern Iowa, northwestern Missouri and northeastern Kansas. Among the best exposures of these glacio-fluvial sands in Nebraska are those near Fairbury, DeWitt, Ulysses, Wahoo, and near Martinsburg, Dixon county.

The sand content of the Kansan drift is of practically no value. Some sand bodies in the Kansan are exposed in banks and deep railroad cuts. They are of too limited extent to serve as a source of economic production. These sand bodies seem to have been plowed up from the

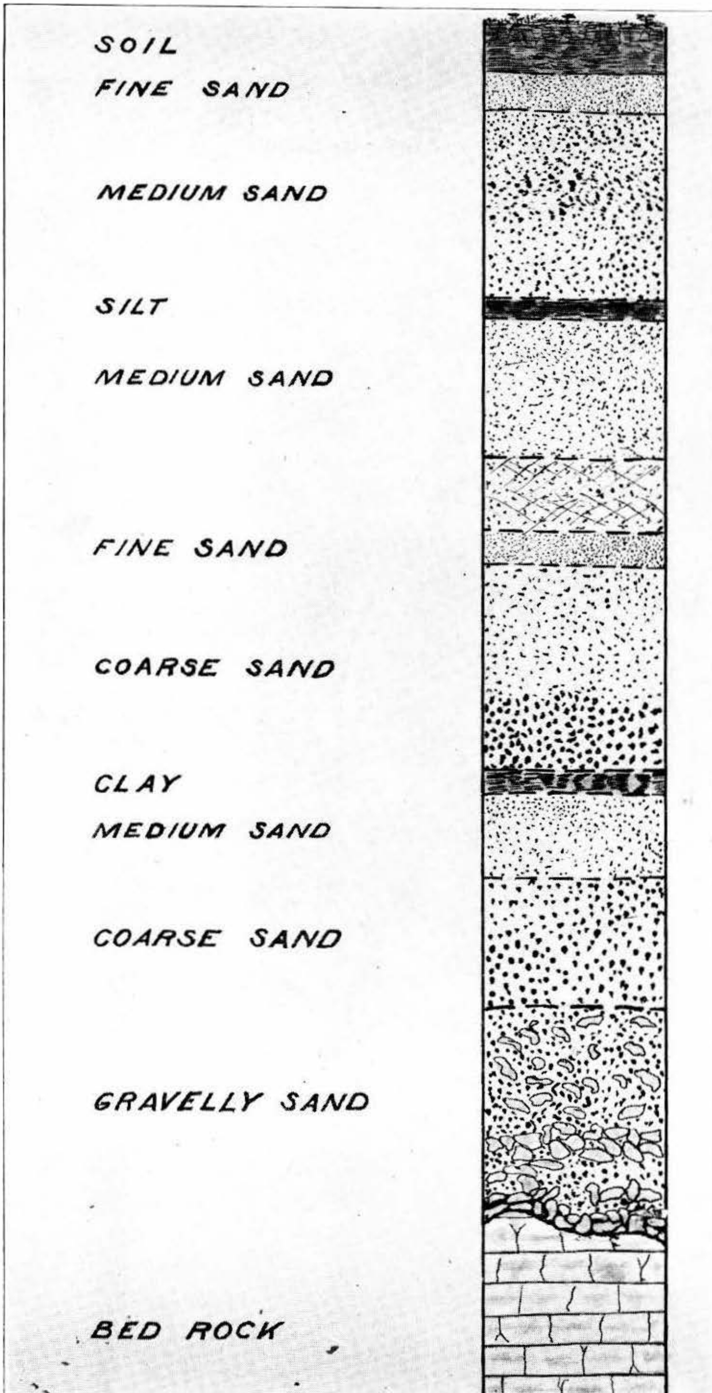


FIGURE 8
SECTION PLATTE ALLUVIUM

Aftonian sand plain by an advance of the glaciers when the sand beds were frozen.

Dune Sand.—This is the prevailing surface formation of the well known sandhill region and of the outlying sandhill areas. The sand is too fine for most road work but has been utilized for some purposes.

Alluvium.—This is a general name for stream deposits made in valleys. The alluvium of Nebraska varies greatly. In some valleys it is largely clay and silt, in others sand and gravel. The Platte alluvium has vast quantities of sand and fine gravel which serve as a source of commercial production. This alluvium is more than 100 feet deep at places, yet there are points where shales and other bed rock reach close to the surface of the valley floor.

The soil and subsoil proper of the Platte Valley vary considerably in texture, structure and thickness, but as a rule are not very thick over the alluvial sand. A typical section of the Platte alluvium representing the conditions in the areas where the dredges operate, is shown by figure 8.

The alluvium of the Missouri is finer than that of the Platte. It grades from clay to medium sand. The alluvial deposits of the Republican, Loup and Elkhorn are somewhat coarser grading from fine to medium sands. The alluvium of the Nemahas ranges from clay to fine sand. It is too fine for sand production.

METHODS OF PRODUCTION

Sand is produced in Nebraska by loading from sand bars, by pit or bank mining, by pumping and by dredging. The first named of these needs no description.

Pit or Bank Mining.—At many places in the state, the sand beds either outcrop or occur near the surface. This makes them accessible for mining, especially so where the sand is above the water level. The sand is in valley sides and on valley floors. Under the first condition, the deposits, being nearly level, extend into the upland, and working makes a bank like opening, hence the name bank pit. On smooth land such as a valley plain the working or mining produces a pit like opening.

The first thing to do in pit or bank mining is to remove the overburden. This, called "stripping," is done with team and scraper. In some small pits little overburden is encountered, and working follows along the sand exposure without forming much of an opening.

The simplest form of loading in bank pits is by hand shoveling to farm wagons, (Figure 9) and haulage to points where the sand is used. The owner of a pit charges the neighbors or persons of the community a small amount per load for sand.

FIGURE 9
HAND SHOVELING FROM BANK PIT

Where there is large production, for commercial uses, both the stripping and loading may be done with teams. Drag or wheel scrapers carry the sand onto bridge-like structures and dump it into wagons or cars. Some of the large pits operate on railroad spurs and men shovel the sand into cars. Steam shovels have been used along the Northwestern Railroad to load sand for use mainly as ballast. Some bank mining of gravel has been done by hydraulic pressure and sluicing.

Pumping.—This method of production (Figure 10) has both advantages and disadvantages. It is employed at a number of places along the Platte and at the large plants near Lincoln. Centrifugal pumps, driven by steam or electricity, draw the sand and water from the bed of a river, or from a water filled pit and force it to cars, or to screening plants and places of storage. The water drains off leaving the sand ready for market or to be prepared for market.

The advantages in sand pumping are a nearly free source of supply, the low cost of machinery, the ease with which the pumping plant can be moved, the low cost of production and the large output. The principal disadvantages, when pumping from an open stream like the Platte, are in the shifting sands and the changing form of the river bed. Often an opening made in the bed of the river will fill at once with fine materials. This is particularly discouraging when coarse material is being secured.

A few years ago sand pumping was thought not to be successful. It is now in greater favor, and most of the large plants along the Platte operate by this method part of the year.

Dredging.—This is done with drawline dredges and clam dredges. Clam dredges are operated either by cranes or on double cables. About twenty dredges load sand in the state, eight months of the year.

Most clam dredges operate along the lower Platte producing from the sandy alluvium where the stripping is thin and the water table is near the surface. They are located on railroad spurs which extend to accessible sand ground near the towns. The cost of a clam dredging plant not including the railroad spur is from $3,000.00 to $5,000.00.

The problem involved in the installation of a dredge is to secure a large amount of desirable sand land, favorably located with respect to transportation facilities and markets. Commercial sand dredging has advantages and limitations. Production by this method is relatively cheap and it enables the producer to secure sand where it could not be reached by shovel or scraper. Rainy weather does not interfere very much with the operation of the plant. One of the principal drawbacks is the inability to obtain sand of different degrees of fineness from the pit. That is, the dredges can not readily load either fine or coarse sand.

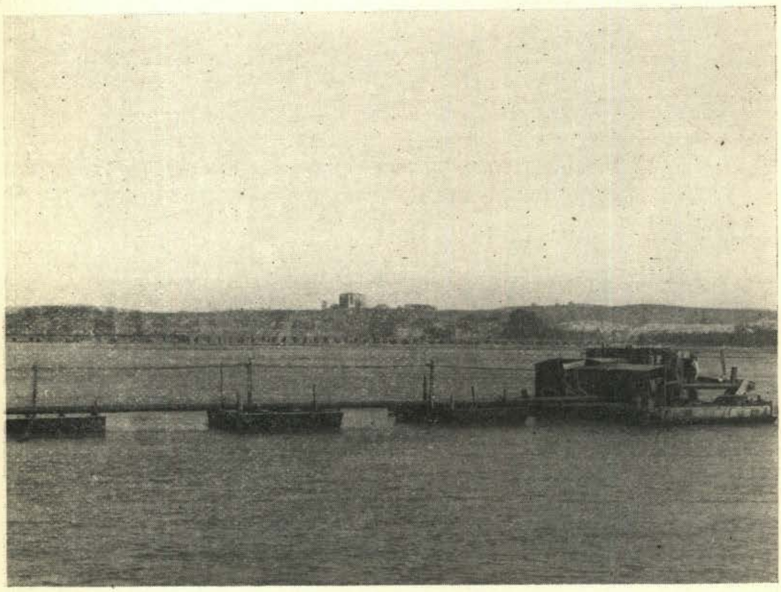


FIGURE 10
KIEWIT PUMPING PLANT NEAR MEADOW

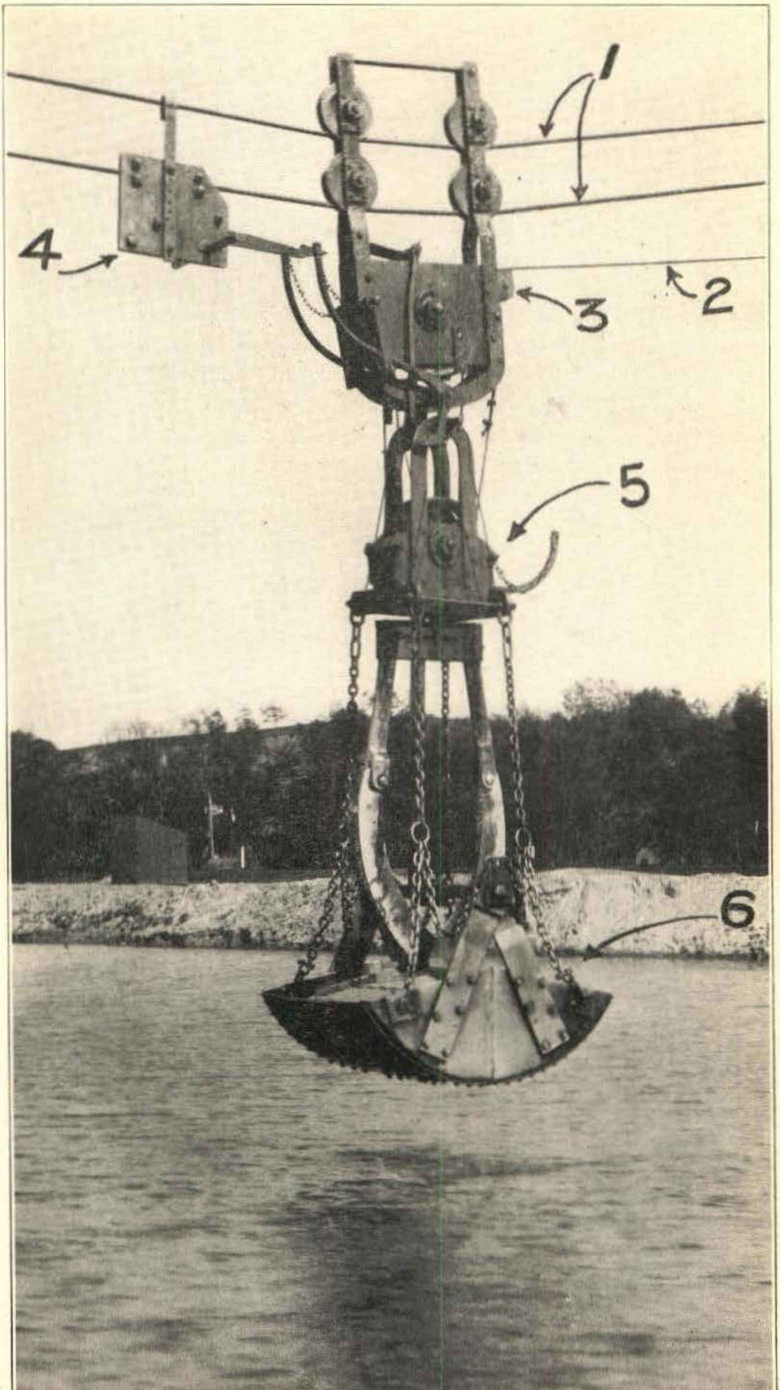


FIGURE 11

1—DOUBLE CABLE
2—DRAW LINE
3—CARRIER
4—TRIP BLOCK
5—BLOCK HEAD
6—CLAM SHELL

The equipment of a dredge operating on a tram supported by towers is about as follows:

1. Railroad spur.
2. Engine and engine house.
3. Towers and anchors for cables.
4. Double cable.
5. Carrier and block.
6. Clam dredge.
7. Draw line.
8. Scrapers, shovels, etc., for stripping and loading.
9. Equipment for screening and grading.

Large towers are erected 200 feet or more apart to hold the heavy cables upon which the dredge proper operates. The tower at the dumping end of the cable is the higher. It is built of heavy timber. Strong cables connect from the upper ends of the towers with heavy anchors. These support the double cable or tram line. The clam dredge proper has a weight of 2,000 to 3,000 pounds. (Figure 11.) It is built of heavy crucible steel. Its halves or clams are hinged to a steel bar about three inches in diameter and attached to a clam head by heavy chains and levers. The clam head, weighing about 500 pounds, contains strong pulleys through which passes a draw line cable about three-fourths

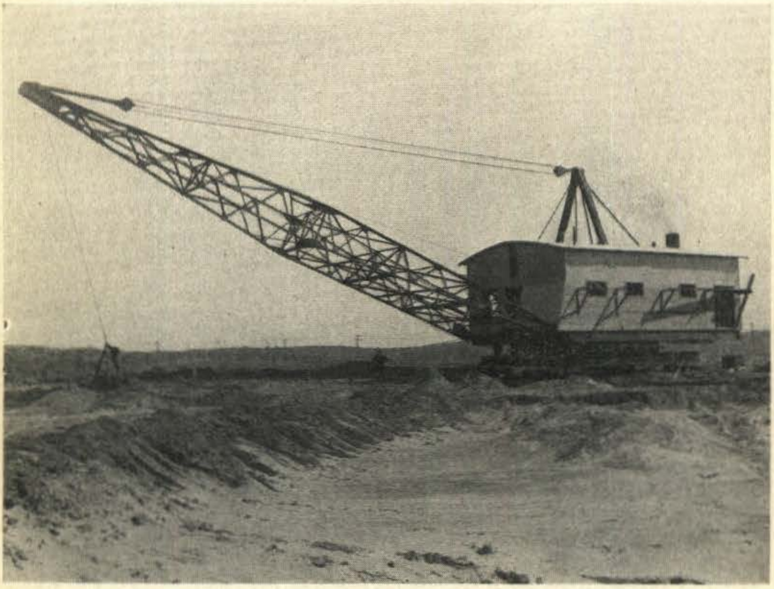


FIGURE 12

DRAW LINE DREDGE OR EXCAVATOR OWNED BY LYMAN SAND CO., FREMONT

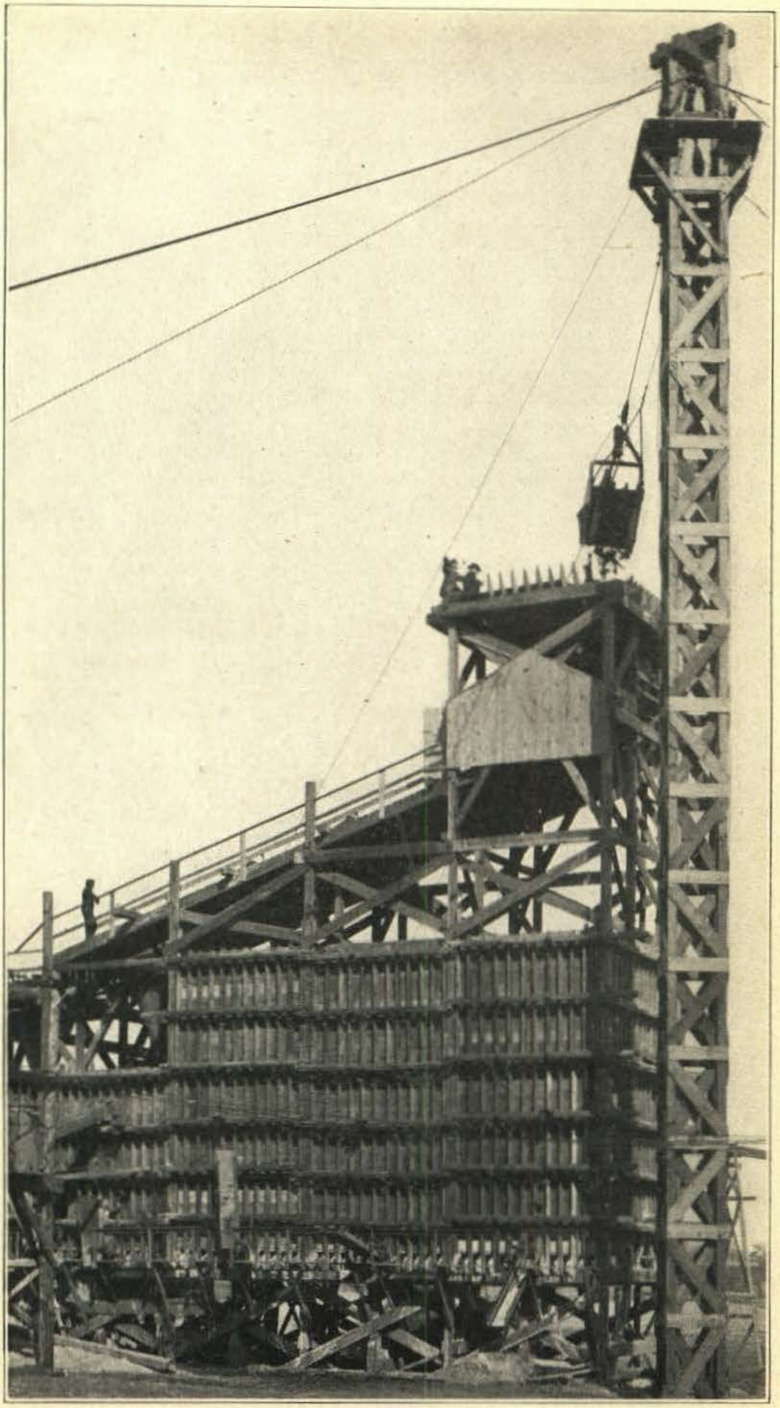


FIGURE 13
LINCOLN SAND AND GRAVEL COMPANY WASHING AND SCREENING PLANT

inch in diameter. A carrier, weight 1,000 to 1,500 pounds, runs on the double cable. The weight of the dredge, the block head, carrier and sand load is supported by the double cable.

When operating, the clam dredge, block head and carrier, run out on the double cable from the high tower to the trip block, by gravity. Upon reaching the trip block the open clam and block head descend to and through the water to the sand. The block head lowers, strikes and catches the hinge bar and as the dredge starts to rise, the clam shells close in on the sand, scooping up a load weighing 2,000 to 3,000 pounds or more. This load is carried upward to the carrier and trip, then to the high tower where it is dumped into storage, into a washing and grading plant, or directly into a car. Working at the average rate, a dredge makes a trip in about eighty seconds, varying with the distance and depth of working. From six to twenty cars of forty tons or more each are loaded at a plant in eight to ten hours.

Dredging along the Platte extends to a maximum depth of about eighty feet, removing evrything below the subsoil. The coarsest sand, approaching gravel, is, as a rule, secured at the greater depths. When practically all the sand that can be reached from a given position of the tramway has been exhausted, the towers are moved about fifty or sixty feet, to a new position and the dredging processes are repeated. The dredging and moving are repeated again and again, making a long deep lake. Lakes made in this way are used for fish culture, boating, swimming and ice production.

The draw line dredge (Figure 12) is constructed on a different plan from the clam dredge. It is practically the same as those used in making canals in the drainage districts of the state. The draw line dredge is operated on an anchored cable or on a boom. The latter type is the more common. In this equipment the bucket fills with sand by the pulling force of the drag line cable. The crane or boom swings in a radius of fifty feet or more and dumps to cars, or to a washing and grading plant.

Washing and Grading.—Discussing this subject several years ago, the author wrote: "Thus far, with few exceptions, no attempt has been made to screen or wash sand at the places of production. It would seem that the trade as it is now organizing, would demand a product ready for use. The screening might be done with less expense at the dredges than at the places of sand consumption. As the industry further develops we may expect more up-to-date methods of preparing the product for market. The sand thus prepared will demand a higher price, but the results will be more favorable to all concerned."

At this time, ten years after the above was written, most commercial plants are equipped (Figure 13) to produce washed sand, screened to market grades. By the use of wire screens, and revolving screens, and

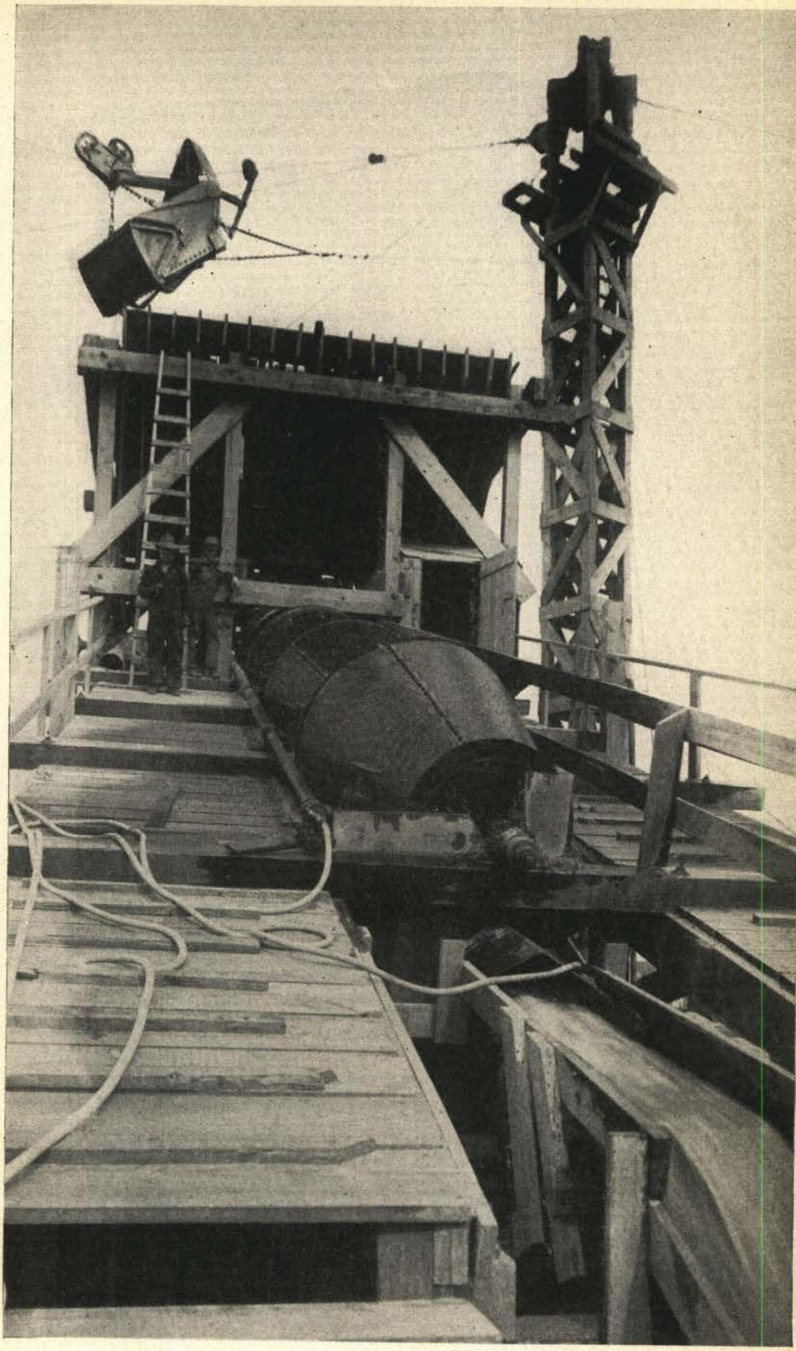


FIGURE 14
REVOLVING TUBULAR SCREENS OF LINCOLN SAND AND GRAVEL COMPANY PLANT NEAR LINCOLN

tanks (Figure 14) the grades, fine, medium, coarse, gravel and even drop aggregate are produced.

Much of the commercial sand is clean. The water brought up in pumping and dredging assists in the cleaning. In fact it performs this purpose. The washing and screening together remove practically all dirt and grains too fine for use.

Sand Storage.—The pit run of the dredges is dumped at once into cars. That which is sized for market goes to the drop screening and grading plants and then to cars.

In some places the sand is separated into different grades according to fineness and stored in high wedge shaped bins (Figure 13) from which the water drains off and and from which the sand is later dropped into cars for shipment.

Commercial Movement.—The output of some sand plants near towns and cities is marketed in sand wagons. Where larger quantities are hauled it is sometimes done in dump wagons which save time and labor.

Much of the sand produced at the large pits and dredges is hauled on railroads. It is not an uncommon sight to see half a train of sand drawn from a single loading station. (Figure 15.) Such sand moves to

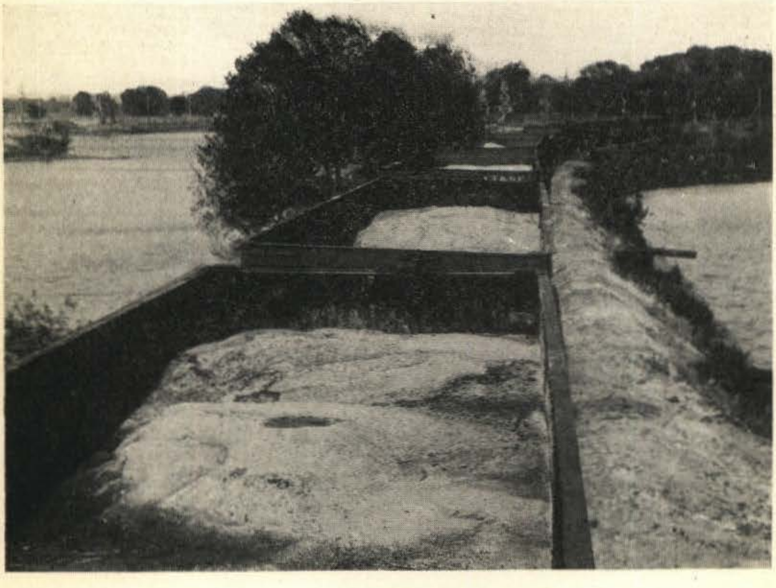


FIGURE 15
CARLOADS OF SAND, RICHEY PLANT, LOUISVILLE

the various towns and cities of Nebraska and to southwestern Iowa, northwestern Missouri and northeastern Kansas, from which it is distributed for use in both town and country. Sand is handled by coal and lumber dealers, and by dealers in construction materials and delivered to customers at the market price per cubic yard. Some dealers are well equipped to store and deliver sand. They have gravity bins and dump wagons.

SAND RESOURCES AND PRODUCTION BY DISTRICTS

It is not possible to divide the sand production of the state into well defined districts. The divisions here made seem most convenient and practical. They are based on valleys and drainage and are used because the sand resources and the production therefrom occur principally in valleys. There are fourteen fairly distinct sand producing areas or districts in the state.

Hat Creek—White River District

There are several small deposits of sand in this district and quite large areas in which practically no sand occurs. The northern parts of the area, where the Pierre shale and Brule clay outcrop, are nearly without sand and gravel. The southern part of the district extends from the foot of Pine Ridge southward along the many canyons and over the rough lands to the edge of Dawes Table. This division has a large number of sand and gravel deposits. The outwash from some of the canyons affords small supplies. Chadron, Crawford and Harrison are supplied by small pits within hauling distance. West of Chadron, sand is produced for the Northwestern Railroad and used mostly for bedding cars.

Though there are considerable quantities of sand in the Hat Creek-White River district, the production is small.

Niobrara District

The sand here occurs in Tertiary, drift and alluvial deposits. Much of the region is thinly settled making a small demand for market production. The Northwestern Railroad has loaded a large amount of sand in the vicinity of Long Pine, by the use of steam shovels. The source of material at or near Long Pine is in a sand plain thinly covered with subsoil. The sand is gray to yellowish and medium to coarse.

Throughout the western and central courses of the Niobrara Valley, local sand supplies are derived from wash produced by small streams, and from numerous small bank deposits. In some localities gravel is found in association with the bed rock of the Arikaree formation.

Deposits thought to be remnants of high benches or terraces are found near Valentine. Sand from this source was used in the construction of the Cornell Power Project, four miles east of Valentine.

Small pockets of glacial sand and gravel occur on the slopes south of the town, Niobrara, and at places in the Verdigre and Ponca valleys. These have been worked for ballast and for use in concrete.

Much of the sand found in the upland of the Niobrara district contains pieces of calcareous rock which decrease the value of the product for concrete. These particles of calcareous material should be removed before the sand is used for such purpose.

In its lower course, the Niobrara River carries a heavy load of fine to medium sand which can be used for some purposes.

North Platte District

This district has a vast amount of sand and gravel. That of best grade occurs in the river bed and in bench lands. The Tertiary and alluvial fan sands are not much used. There is no sand in the valley where the Brule clay is at or near the surface. Such areas are small, and not far from river and bench pits.

Much coarse bench gravel is shipped into western Nebraska from near Guernsey, Wyoming. It is used in concrete on the C. B. & Q. Railroad as far east as Omaha.

Bench Sand.—The benches are best developed on the north side of the valley, in Scottsbluff and Morrill counties. Here the benches are underlain with deposits grading from fine sand to coarse gravel and pebbles. These outcrop in the bench scarps as east of Scottsbluff and north of Bayard and are worked at some bank pits. They are capable however, of a greater production than will be needed in the valley. Some coarse sand and gravel is shipped from pits at Bayard to a number of points on the Burlington. The supply at Alliance is principally from this source.

Much bench gravel is shipped into Nebraska from the North Platte area in Wyoming. It is from near Gurnsey and is shipped as far east as Omaha for use in concrete.

River Sand.—The river sand varies from fine to coarse. Some of it is pebbly and might be screened to produce aggregate. One drawback experienced with river sand is its clay and silt content. This could be removed by washing. To date, no large dredge or washing and screening plant has been installed in the valley. Persons using river sand, simply drive to a point on a bar where the material looks clean and coarse enough and load what is needed.

Though the North Platte alluvium is not very deep, compared with that of some courses of the Platte Valley it contains an enormous amount of good sand material, and the river is bringing down a heavy load from the mountains. This resource seems to be in a condition which might be called inexhaustible.

Pumpkin Creek District

This district has few people. The only town, Harrisburg, the county seat of Banner County, is not on a railroad. The only railroad to cross the district is the Alliance-Denver Branch of the C. B. & Q.

The sand supplies are in alluvial, bench and Tertiary deposits. The source of best quality and most value is the bench lands. The sand resources in this district are more than sufficient for future development.

Lodgepole District

This area, though small, has a large amount of sand. The sources of production are sand draws, alluvial fans, and the eroded and weathered surfaces of the Ogallala formation which forms much of the slope land.

The sand is dirty to clean, usually mottled or stained and fine to coarse. Some of it occuring at the surface on valley slopes is quite pebbly. Free quartz and feldspar pebbles are common.

It would be possible to open a large number of bank pits in this district, especially in the vicinities of Chappell and Sidney. Here and at several other places in the valley, the slope land is quite sandy. In fact the surface indications are deceiving. One not acquainted with the structure would think that the sand is more abundant and coarser than it is. Sounding and sampling should be done before a large development is started.

Sand and gravel washed from the uplands to the mouths of ravines at the edges of the valley floor and built into alluvial fans, are a source of some sand production.

The ravines are dry much of the time. Their beds are strewn with sand, hence the name, "sand draw." These draws supply some sand, easy to load and haul. It is quite fortunate that sufficient sand is available in this district for the improvement of the Lincoln Highway which extends along the Lodgepole Valley.

Republican River District

Sand here occurs in alluvial deposits, the sand plain in the uplands, and in the Ogallala Formation. Numerous small pits (Figure 16) and a few larger ones, are worked. Practically all the district is accessible to local sand supplies.

The bed of the Republican is sandy, running from silt to medium and coarse. Its sand is used by farms and towns. Similar, but coarser sand is found in the beds of many tributaries which bring their load down from the sand deposits under the loess. Production from this source has some importance at Red Cloud, Lester, Guide Rock, and west of Superior. The Thompson Sand Company has exposed a large

FIGURE 16
BANK SAND PIT NEAR CAMBRIDGE

amount of coarse sand in the vicinity of Cowles. The exposure has a thickness, above the water table, of about 50 feet. The sand above the water line is loaded with scrapers. That below water is pumped. The sand from this place is shipped widely over southwestern Nebraska. The gravel is screened out for roofing and concrete and shipped as far as McCook. The sand plain of the uplands outcrops throughout most of the valley, especially on the north side. It has been worked by more than 100 bank pits producing fine, medium and coarse grades. The overburden, mostly loess is light to heavy.

McCook formerly was supplied principally from bank pits, but now nearly all its sand is secured from bars in a channel where the river recently changed its course.

The Ogallala formation was the source from which much of the ravine and river sand was derived, but it has little importance as a direct supply for mining.

Little Blue River District

The conditions in the western part of this district are similiar to those of the Republican Valley except that the sand plain is more generally exposed, and the alluvial deposits are coarser. From near Fairbury to the Kansas line the Benton and Dakota formations outcrop.

Much sand is exposed in the tributaries of the Little Blue that head in the Loess Plains. These valleys were eroded through the loess and into thick sand deposits below, making many sources of production. Some of these are accessible to the Northwestern, Burlington and St. Joseph and Grand Island railroads.

A few years ago sand in commercial quantities was mined at Brickton and shipped on the Burlington to Hastings and other towns. Two large pits were worked out. The sand is now hauled to the railroad and shipped. The output is about 2 cars per week. Mr. Zabel recently opened a pit north of Brickton.

Some sand has been shipped on the Northwestern from Davenport, and on the Burlington from Ayr. Quite extensive deposits not well located with respect to railroads, occur to the east of Deweese and a few miles above Hebron. Both these locations are north of the river. Exposures in the vicinity of Hebron supply local use and some shipment. The largest production in the Little Blue River District is near Fairbury by the Big Blue Sand & Gravel Co. Haulage is by tractor. Practically all of Fairbury, except on the bottom land proper, is deeply underlain with coarse sand. Soundings along the main line of the Rock Island southwest of Fairbury show thick deposits of coarse sand. A large sand producing plant may be installed here in the future. The exposures north and northeast of the city have been worked for several years by pit methods. A few miles west of Fairbury, on the Nelson

Branch of the Rock Island, are three or four exposures of considerable importance. These are worked principally by the railroad.

The alluvium of the Big Sandy, south of Alexandria, is coarse and a source of production. A thick bank exposure near Kesterson has been worked for shipment. A pit between Endicott and Steels produces clay and sand and ships over the St. Joseph and Grand Island Railroad. The Fairchild pit on a spur of the Burlington across the valley west of Endicott ships to a number of consumers both in Nebraska and Kansas. It is planned to install a steam shovel for loading in this pit.

Much of the sand in the Little Blue River District could be screened to market grades. Some of it would produce gravel and aggregate for It is planned to install a steam shovel for loading in this pit.

Big Blue River District

The sources of development here are the Loess Plain sands, the Aftonian sands, and the alluvium of valleys. The streams coming in from the west, i. e., from the loess plains, gather sand from below the loess, and distribute it on their beds. The deposits of this kind have some local importance. The alluvium of the trunk stream, the Big Blue River, is not coarse enough for sand production except at a few places. One of these is on the bottom land east of Wymore. A plant operated by Mr. Garrett about 5 miles north of Beatrice produces most of the sand used in that city. The sand is pumped and loaded on barges which are floated to the city.

There are many bank pits in the Big Blue District as at Ulysses, Crete, Beatrice, DeWitt, York, Milford, Beaver Crossing, and Sutton. The sand resources here are more than sufficient to supply the needs, yet it appears that the production is on the decrease, except at York and Crete, and that sand is being shipped in larger quantities from the Platte dredges. For the past few years a part of the production at York has been derived by dredging, in which the source of material is a thick bed of sand below the loess. The overburden is removed for brick making and the sand below is drawn out in a clam dredge and used for commercial purposes. Two companies, the Gould Sand Co. and the York Pit and Tile Co. are operating near York.

Salt Creek District

The sand resources of this district are in bank deposits and coarse sands and gravels in alluvial and terrace land. Several years ago a number of small pits were worked in the district, but most of them have been abandoned. There remain a few small pits which now produce for local use near Agnew, Raymond, Woodlawn, Denton, Davey, Ceresco, and Prairie Home. Much of the sand supply of the district, especially Lancaster County, has until recently been shipped from the Platte dredges on the Burlington, Missouri Pacific, Northwestern and Rock Island railroads. About two years ago a thick bed of coarse sand was discovered in the vicinity of Burlington Beach and Middle Creek near Lincoln. This coarse sand lies beneath the flood plain and bench lands. Soundings show a thickness of sand and gravel, ranging between 5 and 30 feet. It is overlain by clay, silt and some sand. The sand deposits run from 15 to 20 coarse, i. e., about 6 per cent or more gravel, 6 per cent or more aggregate, and 3 per cent or more coarse aggregate.

The Lincoln Sand and Gravel Company plant, just southwest of Lincoln, is well equipped for production, washing and grading (Figures 13 and 14.) The materials are derived from beneath a low bench and by pumping and draw line dredging. The pump is driven by a 35 horsepower electric motor, the hoisting is done with a 75 horsepower motor, and the screening by a 15 horsepower motor. The drag line dredge carries a bucket of 1½ tons capacity one a 1⅜-inch track cable.

The sand is passed through a revolving, tubular, disintegrator which separates the sand and clay. From this equipment it is dropped into a series of revolving, tubular screens, which separate the coarser materials into three sizes. (Figure 14.) The sand finer than gravel is passed over fine screens into separating tanks and further divided into two grades, coarse sand and plastering sand. The capacity of the plant is about 250 yards in 10 hours. The storage capacity is 20 cars. Much of the production is marketed in Lincoln. The products of the Lincoln Sand and Gravel Company plant are used for plaster, roofing, concrete, and for coarse aggregate.

The Western Sand and Gravel Co. has completed a large sand pumping plant on the southwest shore of Burlington Beach near Lincoln. This plant has installed modern equipment for all the processes in sand and gravel production. It has 15, 20, 25, 35 and 300 horse power motors. The washing, grading and loading plant, is one of the best in the state. Pumping will start in a few days from beneath Burlington Beach. It is planned to work a radius of more than 1,000 feet from the screening plant. The pump is to operate on a barge 30 x 60 feet. It will be connected with flexible tubes for suction and discharge. The sand will be discharged at a height of about 45 feet and through and over agitators, revolving screens, flat screens, and tanks, where it will be separated into about five grades ranging from plastering sand to coarse aggregate.

This plant is on a railroad spur and the shipment will be to Lincoln and many other points.

Big Nemaha District

The alluvium of this valley is mostly silt and clay. It has little sand for mining.

FIGURE 17
BANK PIT, WAHOO

There are a number of exposures of sand in the uplands. They are, for the most part, outcrops of the Aftonian sand plain. Most of these exposures have been opened and worked in a small way. Johnson County has several pits near Sterling, Tecumseh and Elk Creek. Bank deposits occur northwest of Humboldt, northeast of Salem, south of Falls City and southeast of Preston. In most of these the sand ranges from fine to very coarse, and the overburden is heavy.

Sand is shipped to this district from the Platte for country, town and railroad use.

Wahoo District

Though there are vast amounts of good sand in this district, they are heavily covered in most of the area by drift and loess.

The hilly uplands contain the Aftonian sand plain, but at too great depth for working except in a few places, as near Weston.

Terrace and Aftonian sands outcrop near Wahoo and are mined for local use and for shipment (Figure 17). The largest pit is near the Union Pacific Station.

Fine sand is exposed at a number of places in the terrace scarp east of Wahoo Valley between Wahoo and a point north of Ashland. This could be used to mix with the heavy soils and subsoils of Wahoo Valley in making road grades.

A thick sand plain lies beneath Todd Valley which is a broad stretch of smooth country east of Wahoo.

Loup District

The sand resources of this district are the sand plain lying below the loess deposits and the alluvial deposits of rivers. Small deposits of drift sand occur in the eastern part of the Loup District, but are not important as a source of production.

Quite coarse sand is found at places in the bench-like bottom of the Middle Loup Valley. One of the best examples is about 6 miles above Halsey where the product has been loaded for shipment to Broken Bow and elsewhere. Though the sand along the various branches of the Loup is as a rule, quite fine, there are many places where it is medium to coarse as near Ravenna, St. Paul, Fullerton and Genoa.

Small sand pits are worked near Dunning, Sargent, Comstock, Loup, Brewster, Burwell, Ord, Mason City, Ansley, Calloway, Arnold, and many other places in the Loup District.

Boone County, where most local deposits are too fine for use, receives much of its supply from Fremont and Columbus. An exposure of sand near Lindley, Platte County, could supply a large production for use in road making.

Platte sand is shipped to Newman Grove and most other towns in that part of the Loup District.

Elkhorn District

Sand resources occur at or near most towns in this district. The production is from the Tertiary sand plain, Aftonian sands and alluvial deposits.

The Tertiary sand plain is close to the surface in Holt and Rock counties. Pits opened in it have produced considerable medium to coarse sand for local use and shipment. The Northwestern's pits between Stuart and Atkinson, have shipped their product for ballast and concrete as far east as Fremont. The C. B. & Q. Railroad has a pit west of O'Neill. Pits turning out this kind of sand could be opened at many other points in this part of the district.

Neligh is supplied by local sand banks and from bars along the Elkhorn River. There are sand pits on the hill slopes near Madison and about two miles northwest of Meadow Grove. Sand and gravel pits from which much of the city's supply is derived are located about two miles east South Norfolk. The Robert King pit, one mile east of South Norfolk, produces very coarse gravel. Teams and scrapers load the sand above the water table. Below this a clam dredge is used. Some sand is worked at the wagon bridge just east of the city. River sand is used at Battle Creek. Tilden is supplied from bank pits. Stanton obtains medium to coarse sand from the river bed. Coarse sand outcrops about two miles northwest of the city. Bank sand is produced near Wisner, West Point, Scribner, and Hooper. There are a few pits on the north fork of the Elkhorn. One of them is located about 4½ miles southeast of Pierce and another 7 miles north by northwest.

Conditions in the Logan Valley are similar to those in the Elkhorn Valley, except that the sand deposits are as a rule too far below the surface to be mined. A considerable part of the sand supply of Wayne County is shipped from near Hartington and from the Platte. There is a pit about 9 miles northeast of Wayne. Wakefield, Pender, and Lyons each have small pits. Oakdale supplies most of her local trade. Formerly sand was mined in a pit just below the station at Thurston.

The shipment of Platte sand to the Elkhorn district is increasing.

Missouri River District

This district produces from the thick Tertiary sand plain, the Aftonian sand plain, the Dakota formation, sandy members of the Pennsylvanian beds and alluvial deposits.

Ponca Valley of Boyd and Knox counties has two sources of sand of some importance, in the benches or terraces of the Valley, and the drift or Tertiary deposits of the uplands. Good, clean, coarse sand is worked northeast of Butte. The benches at Spencer and Bristow yield sand and gravel. A pit is opened high on the slopes at Anoka. Coarse deposits occur on the divide south and southeast of Verdel.

Quite large exposures of coarse sand, part Tertiary and part glacial, occur along Bazile Creek in the vicinity of Creighton. The sand plain which comes to the surface near Creighton extends eastward in the upland to Dixon County. It is worked near Hartington, Coleridge, and several other places. Evidently enough sand of this age and kind is exposed in the Bow Valleys of Cedar County to supply all that local use may ever demand.

Near Martinsburg, Dixon County, is an extensive deposit of the glacio-fluvial sand. It is mined at different places in the vicinity, but only for local use. The largest pit is about three-quarters of a mile northeast of the town. Sand and clay are mined from the same bank opening in the northeastern part of Ponca.

Glacial deposits have yielded hundreds of cars of sand and gravel near Tekamah. (Figure 18.) The largest pit is on a spur of the Chicago, St. Paul, Minneapolis and Omaha railroad, about 2½ miles west of the city. Here the stripping ranges from a few inches to several feet in thickness. The sand runs fine, medium and coarse, but varies considerably. It is gray to yellowish in color and clean to dirty. Glacial boulders occur at all levels in the sand which has a maximum vertical exposure of 35 feet. The boulders are mostly Sioux quartzites, granites, gneiss, and limestones. Sand is loaded at this place by hand shovel and by team and scraper. The output has been used very generally by the railroad for ballast and other purposes. The pit also serves the local trade. One-half mile south of this place is the King Pit from which Tekamah obtains a large part of its supply. There are two pits north of Tekamah at distances of three and eight miles.

It is not known how large the sand supply is in Burt County, yet it is thought that only a small quantity of the available product has been mined. The sand lies unconformably on the Dakota formation and is exposed in several slopes in the vicinity of the large railroad pit. It appears to lie in old drainage ways. If the sand was coarser it would have a larger utilization. Thick overburden is a hindrance at places.

There are local sand pits near Omaha as at Florence, east of South Omaha and south of Gibson. The sand is yellowish gray to iron yellow in color. It is medium and angular to sharp. Pebbles of Sioux quartzite, vitreous quartz, granite and feldspar occur in it and are removed by screening.

Not much sand is produced in the Missouri River counties south of the Platte. The river sand is coarser south of Plattsmouth than to the north and on that account is made use of to some extent in con-

FIGURE 18
RAILROAD SAND PIT NEAR TEKAMAH

struction as at Nebraska City. A coarse sand is found in the bluffs east of Union and about two miles north of Peru. Small pits are operated for local use in the Weeping Water and Little Nemaha Valleys.

The Dakota formation has produced some sand near Ponca, Jackson, and Tekamah, but working is now abandoned.

The river sand is fine. Much of it passes mesh 100. Vitreous quartz is the predominating mineral. Hematite, hornblende, and a considerable showing of mica flakes are the accessory minerals. Clay is the principal impurity. Though the supply of Missouri River sand is large it is not probable that much of it will ever be used in construction.

The Pennsylvanian sands have little importance. The Dakota formation is prominently exposed along the Missouri River in Dixon, Dakota, Thurston and Burt counties, where it supplies a small part of the local demand. It should become of value in the district, since its friable sand rock is favorably located, if the product is ever used in glass making. The Tertiary sands outcrop in the Missouri Valley from Western Knox County eastward to Dixon County. They consist of thick sheets of fine sand and of coarse sand and gravel. Except near the mouths of ravines and along certain tributary valleys as the Bazile and Bows, the overburden is so thick as to preclude all possibility of profitable production, even though favorable transportation facilities should be secured.

Platte District

This district ranks high in the production of both sand and gravel. The sources of materials are in sandbars, the river bed, alluvial fans, the flood plain, terraces, upland sand plains and the Dakota Formation. Much of the production is from the flood plain and river bed.

The sand under the river and beneath the flood plain becomes finer down-valley and coarser with depth. There is a large area of sand ground in this district. All of the Platte Valley bottom is underlain with sand. The width of the valley floor is from 1 to 15 miles. The depth of sand is from 20 to more than 100 feet. Some parts of the area are deeply covered with soil and subsoil. This depth is greatest in the terraces where stripping is too expensive for sand production.

I will divide the district into areas and centers of production:

South Platte Area.—This stretch of the valley has a length of between 80 and 90 miles in which occur vast quantities of river sand and gravel, and older deposits exposed in the slope land. The materials in the river bed and flood plain are well suited to most purposes hence there is not much demand for production from bank pits.

Practically all towns along the river are supplied from sand bars and from the river bed, by wagon haulage. The materials thus used are medium to coarse, containing a considerable proportion of coarse

FIGURE 19
PLATTE RIVER SAND BARS

gravel and pebbles. No dredging, washing or screening plants have been installed.

Alluvial fans and sand draws are well defined in the South Platte Valley. The fans are composed of coarse materials washed from the uplands and deposited at the edges of the valley floor proper. They are used to some extent for local purposes, including road work. The beds of the sand draws are strewn liberally with good building sand.

North Platte to Kearney.—The valley floor here is quite smooth. It is bordered by terraces and bluff land. The terraces are underlain with sand of no commercial value. The bluffs contain outcrops of a sand plain from which there has been some production as in Plum and Elk Creek valleys.

Most towns in this area are located on first bottom land or on very low benches. They are all underlain with good building sand at shallow depths. Many excavations for foundations have removed sufficient sand for use in the building. This is particularly true at Kearney.

The bars and river bed (Figure 19) supply much of the sand used in this part of the valley. The sand is delivered to market in ordinary wagons or in sand wagons. Persons doing the hauling are paid about \$1.00 per yard, the amount depending on the distance and whether the sand is free at the river or whether a royalty has to be paid to the land owner. At Lowell Station, on the Burlington, sand was produced for shipment over a period of many years. It was taken from poorly defined bench land by teams and scrapers. Several years ago a quite large pit was worked a few miles east of Kearney. Its production was used by railroads and for shipment to a number of towns.

A sand pump was operated south of Lexington last year. This pump was first operated by a steam tractor and later by a gasoline engine. Its production was hauled by wagons and used mainly in street work in Lexington. A sand pump is now operated about one mile south of Kearney by Mr. May. This plant is run by two electric motors. The sand is hauled by wagon to Kearney.

The quantity of sand available in this part of the Platte Valley is simply enormous.

Grand Island.—A number of small pits operate near this city and some sand for local use is secured from river bars.

Grand Island has been well supplied for many years by the Walker Plant within the city limits (Figure 20). Production at the Walker Plant is by a centrifugal pump driven by a 35 horse power electric motor, working on a boat-like barge in a lake. The sand is pumped over screens and into storage bins which discharge either into wagons or cars. The plant is on a spur of the C. B. & Q. R. R. The production is used principally in Grand Island, but some of it is shipped on the Burlington in

FIGURE 20
WALKER PLANT AT GRAND ISLAND

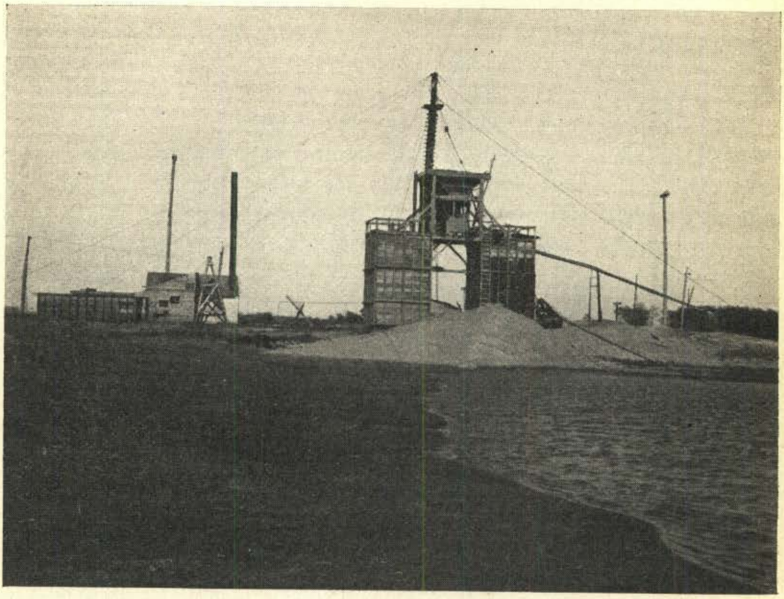


FIGURE 21

THE DONIPHAN SAND & GRAVEL CO. PLANT EIGHT MILES FROM GRAND ISLAND

both directions as far as Anselmo and Aurora. Small amounts are shipped on the Union Pacific. The plant has a capacity of 10 to 15 cars per day. The price of pit run sand on track is 20 cents per yard and of gravel $1.00 per yard.

The Doniphan Sand & Gravel Company plant (Figure 21) is on a spur of the St. Joseph & Grand Island railroad about 8 miles south of the city. The plant, operated by steam, has a drag line dredge with ¾-ton capacity, and a washing and screening plant, including bins. Several grades of sand and gravel are produced.

The Watt-Ammerman plant (Figure 22) also at Haspur Siding on the St. Joseph & Grand Island is well equipped for commercial production. The equipment includes two large centrifugal pumps operated by 50 and 100 horse power electric motors. The sand is drawn from a channel of the Platte and delivered over screens into bins. This company makes a specialty of gravel production. Some of the sand is loaded directly into cars without sizing. Much of the output of the plant is used in Hastings for street and building purposes. Some of it is shipped to towns on the Union Pacific and the St. Joseph and Grand Island railroads. The price on cars ranges from 20 cents per yard for pit run sand to 75 cents or more per yard for gravel. The plant has a capacity of 6 to 10 cars per day.

Central City.—Sand deposits here are similar to those in other parts of the Platte Valley. Large areas of alluvial ground have a thin overburden and the river is within a short distance of the pits. Production is from the river and the flood plain, and by open pit work, pumping and sand dredging.

The sand plant owned by Mr. Cone operates south of the river on a spur of the Burlington and ships to towns over a wide radius. Its product is principally pit run sand.

Columbus.—There has been sand production near this city for many years. The supply was, until a few years since, derived from the bars of the river and from small pits on the flood plain. Production is now by three large plants and by pumping and dredging. One plant is southwest of the city on a spur of the Union Pacific main line. Two plants are south of the city on spurs of the C. B. & Q. R. R.

Columbus is rapidly becoming an important sand producing center. Shipment is to a large number of towns on the Union Pacific and Burlington railroads.

Schuyler.—The sand supply of this city comes principally from the river. A small amount is derived from Shell Creek and from pits on the flood plain.

FIGURE 22

THE WATTS & AMMERMAN PLANT AT HASPUR NEAR GRAND ISLAND

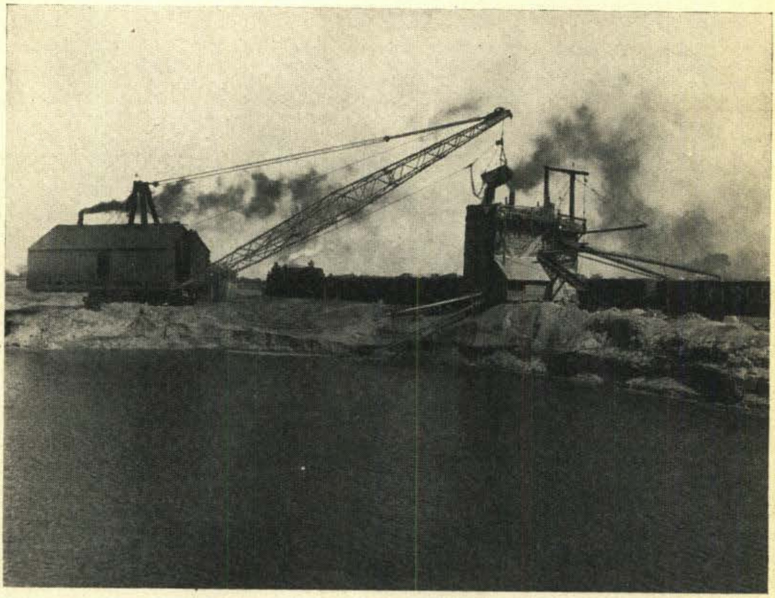


FIGURE 23
DRAW LINE DREDGE, THE LOWER LYMAN PLANT, FREMONT

Fremont.—This city is well located for the production of a large quantity of river sand. Much of the country to the west and south is thinly covered with subsoil and the sand below is very deep, and of good quality.

Some sand has been worked along the bluffs south of the river. This served for local purposes and later for ballasting and surfacing the Great Northern Railroad between Ashland and Sioux City. This road is now part of the C. B. & Q. system.

One of the first pits to be opened near Fremont, was the Northwestern about three miles west of the city. Here a spur and siding, about ⅜ mile long, lead out from the Fremont-Lincoln branch to a bench-like form of land in which occurs fine to medium sand. The loading is by hand shoveling. The output is used for bedding cars and other railroad purposes.

The first dredge established near Fremont was about one mile west of the city on the Northwestern Railroad. Here a clam dredge operated a number of years producing sufficient sand to make a large lake. Later this dredging equipment was moved southward a short distance to a spur on the Union Pacific at which place loading is now done with a clam dredge, by a draw line dredge, and by team and scraper. (Figure 23.) The plant is now owned by the Lyman-Curtis Sand and Gravel Company.

Dredging is progressing westward. The usual quality of Platte River sand is secured and marketed over a wide area. The combined plant has a capacity of about 20 cars per day.

About 3½ miles west of Fremont, where the Northwestern crosses the Union Pacific, and to the north of the track, is an important pumping and dredging station. The first pit here was opened about 10 years ago by Mr. Lyman. Operation has continued much of the time to date by clam dredging and draw line dredging. (Figure 24.) Recently Mr. Lyman installed a large sand pumping, washing and screening plant. Production of different grades of sand and gravel from this combined plant is 30 or more cars per day. Sand ground here is regarded as very valuable. The price received for commercial sand is about 19 cents per ton and that for gravel 82 cents. Shipment is over much of the area covered by the Northwestern in northeastern Nebraska.

The Richey plant east of the Northwestern Pit and on a spur of the Northwestern Railroad is equipped for extensive pumping. (Figure 25.) The plant equipment includes adequate facilities for screening and sizing the output. This company markets several commercial grades of sand and gravel. The modern equipment at this place permits the production of good gravel for general road and building purposes.

Valley.—Sand production was started at Valley by the use of clam dredges about twenty-five years ago. Two plants were erected south-

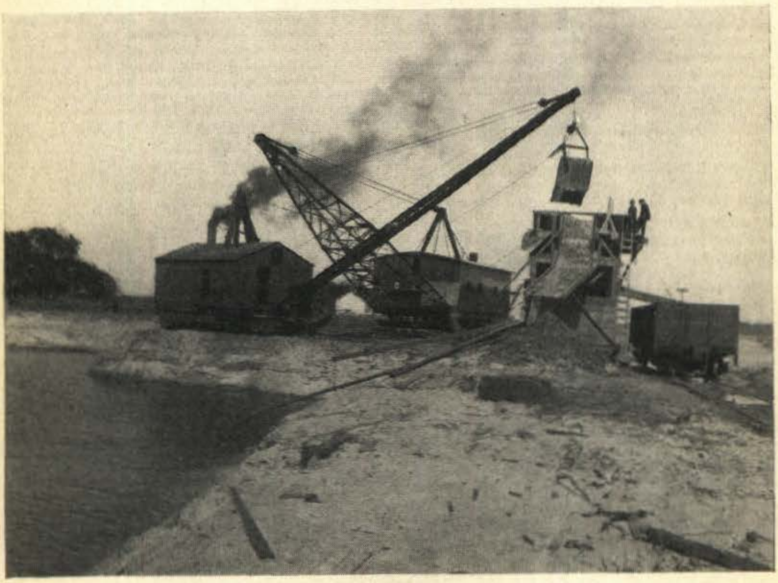


FIGURE 24
UPPER LYMAN DREDGES, FREMONT

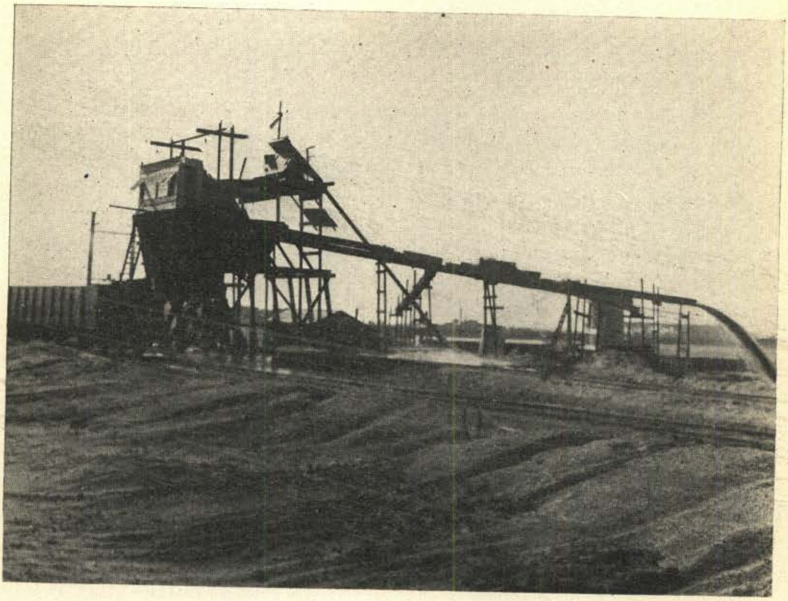


FIGURE 25
THE RICHEY PLANT WEST OF FREMONT

west of town, one on the Union Pacific main line and the other on the Union Pacific, Manhattan Branch. Dredging at these locations to depths of 40 to 60 feet resulted in making two very long lakes both of which extend into the big sheep yards west of town. At one of these places sand production has ceased, and the lake is now used principally for bathing. Bath houses and other equipment have been installed.

A larger lake alongside the Union Pacific main line is now being enlarged by dredging. Sand production here is by clam dredging. The output is shipped over the Union Pacific both to the east and west, but mainly to Omaha.

Ashland.—The production here is by dredging about 3 miles from the city. The dredges are on a C. B. & Q. spur east of the Platte River Bridge. Here is a large area of sand, thinly covered with overburden. The deposit has a maximum depth of about 70 feet. Two types of equipment are in operation, the clam dredge and the draw line dredge. (Figure 26.) They are both on the same railroad spur and working southward. The capacity of the clam dredge is about 10 to 12 cars per day. The capacity of the draw line dredge is 20 or more cars per day. None of the product is sized for market. The rubbish is removed by screens.

FIGURE 26
LYMAN CURTIS PLANT, ASHLAND

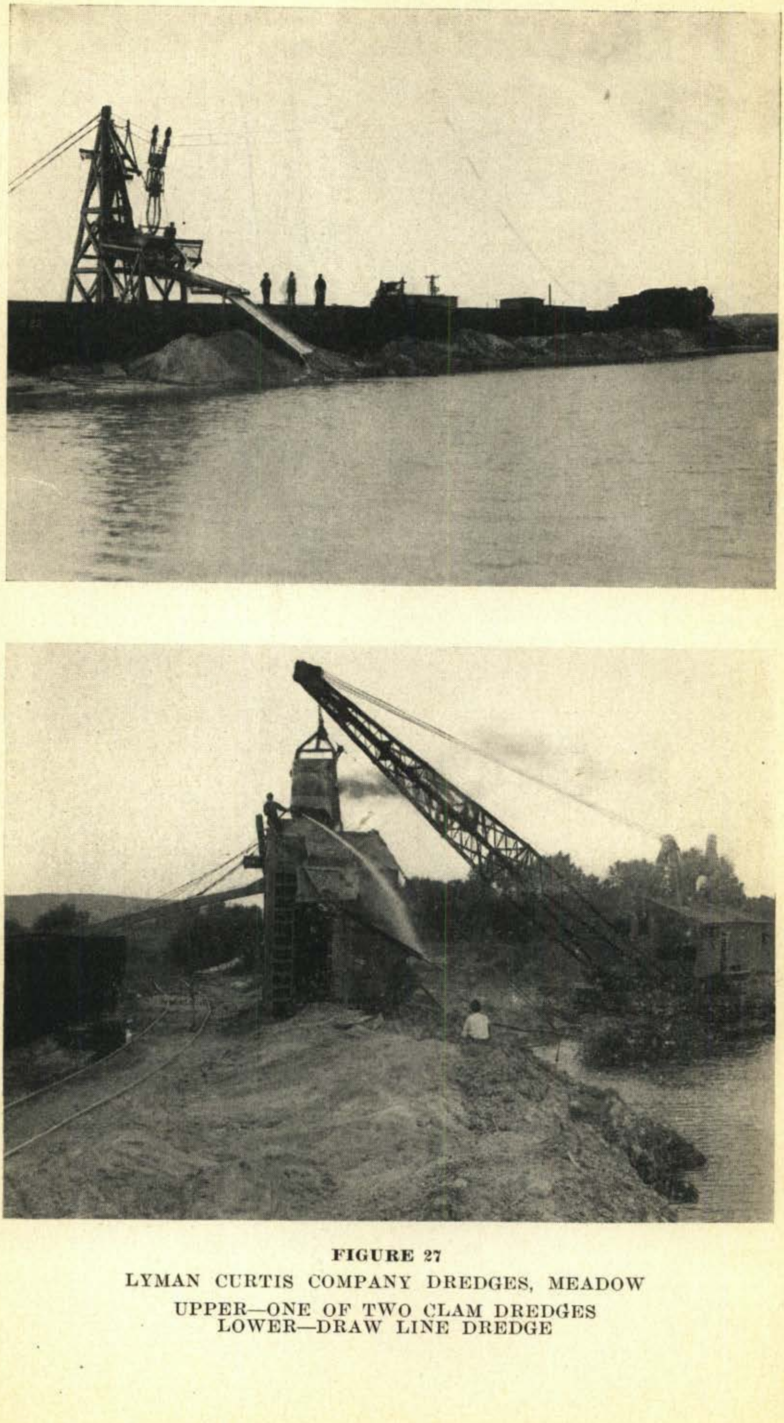


FIGURE 27

LYMAN CURTIS COMPANY DREDGES, MEADOW

UPPER—ONE OF TWO CLAM DREDGES
LOWER—DRAW LINE DREDGE

Shipments of the sand from these plants is to towns in eastern Nebraska and western Iowa.

The dredging at this point has been done for about nine years. To date a considerable amount of the ground has been worked out between the spur and the river. One lake about ⅜ mile long has been formed. It is now stocked with game fish.

Meadow.—This place is on a strip of Platte flood plain opposite Louisville. It is favored with good shipping facilities and nearness to the state's largest markets. Most production has been by pumping and dredging. As many as six plants have operated here at the same time. Three companies are now working, viz.: the Lyman-Curtis, Kiewit Sand and Gravel Co., and the Richey Sand and Gravel Company.

The Lyman-Curtis Co. is working between the Rock Island and the river at points south of the railroad station (Figure 27). It has two clam dredges and a draw line dredge. This company has dredged out several large lakes, between the points of the present workings and the Missouri Pacific track on the west. The larger of the clam dredges can load 20 cars per day. The other loads from 10 to 15 cars. The draw line dredge is now used in stripping ground between the clam dredges. The overburden is removed to the water table, a depth of one to four feet. The Lyman-Curtis Co. ships on the Rock Island and the Missouri Pacific railroads to a large number of towns in Nebraska and Iowa. Omaha is the principal market. Only pit run sand is produced.

The Richey Sand and Gravel Co. operates on a Missouri Pacific spur at a point about ¾ mile west of Meadow Station. The plant is about ¼ mile north of the Rock Island track. Production is by a clam dredge which operates about the same as those installed elsewhere in the valley. The sand is run over a screen to remove rubbish, and marketed as a pit run product. It has practically the same commercial movements as the product from other dredges at Meadow.

The Kiewit Sand & Gravel Company plant (Figure 28) northwest of the northern end of the Platte River bridge is on a spur of the Rock Island. This company recently installed modern equipment for sand production and screening to different market grades. The pump is operated on a barge anchored in the river. The sand is drawn from the river bed through a flexible nozzle and forced to the screening plant, a distance of about 200 feet. Here the sand spreads out over a series of screens. Most of the fine sand is carried over, but that which passes through the screen drops into storage bins for shipment. The capacity of the Kiewit plant is about 20 cars per day. The shipment is principally to Omaha for building purposes.

Louisville.—Sand dredging has been done at Louisville for about thirty years. It began on the flood plain, at a point northeast of the

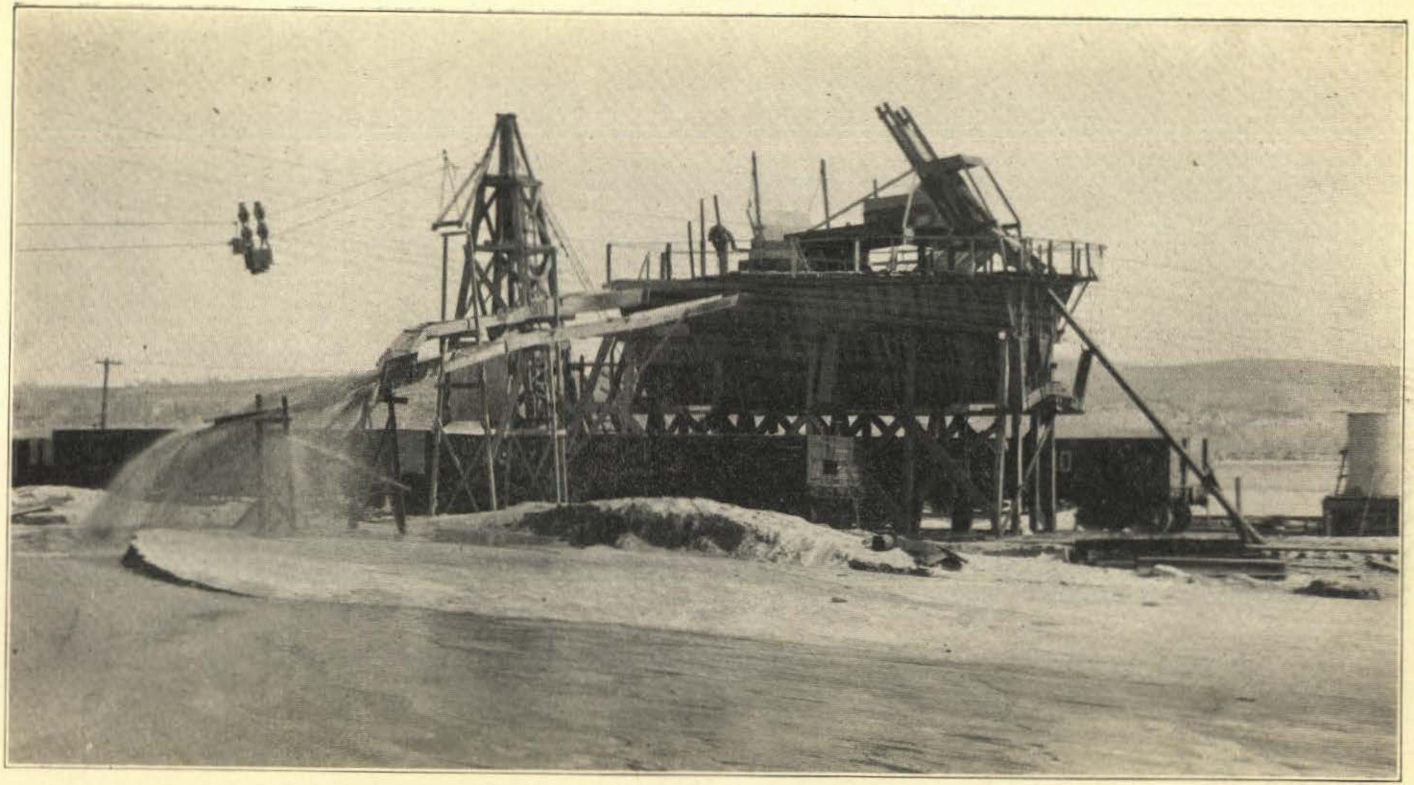


FIGURE 28
KIEWIT PLANT NEAR MEADOW

Burlington Station and near the river. Large lakes have been formed here and about one mile farther west.

The plants at Louisville have changed hands a number of times. The production is now by two companies, the Lyman-Curtis Company, working north of the Burlington Station, and the Richey Sand and Gravel Company, operating about one mile west of the Station (Figure 29). Both plants are on spurs of the C. B. & Q. R. R.

The Lyman-Curtis Company loads with a clam dredge. No equipment is provided for screening or washing the product. Pit run sand is shipped principally to Lincoln and Omaha. This plant works to depths of about 60 feet and has a capacity of about 10 cars per day.

The Richey plant west of Louisville is located between the railroad and the river. Loading is by dredging and pumping. The clam is worked about as at other places and produces only pit run sand, without screening. The river sand is pumped to screening and storage plants. The total capacity of the plant is about 30 cars per day. The product is shipped principally to Nebraska and Iowa points.

Cedar Creek.—Sand and gravel here are in alluvial ground, a drift deposit, and in pebbly parts of the Dakota formation. Production from alluvial ground was by barge dredging, steam shovel and clam dredg-

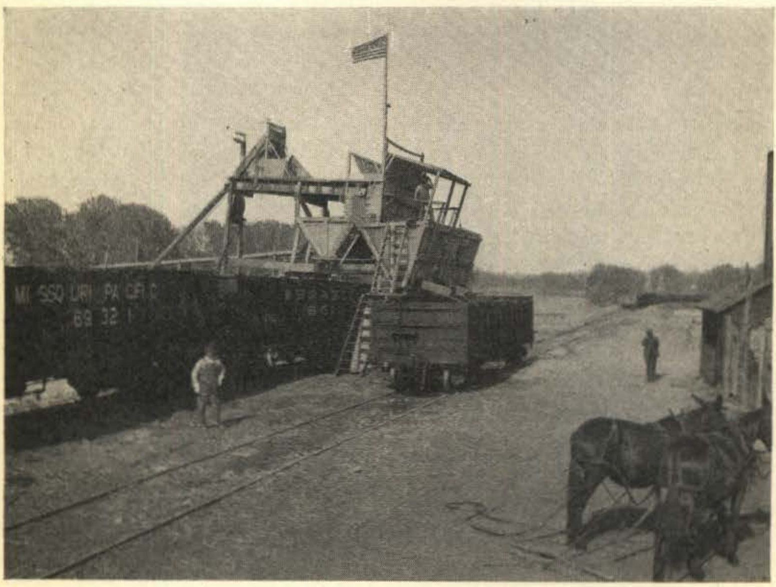


FIGURE 29

SCREENING AND LOADING AT THE RICHEY PLANT WEST OF LOUISVILLE ing. Dredging was abandoned about two years ago. Much of the best ground has been worked.

A clam dredge operates on a C. B. & Q. R. R. spur about midway between Cedar Creek and Cullom. It is north of the railroad opposite the old Cullom gravel pits.

Bank Gravel.—There are several exposures of gravel in the Dakota Formation between South Bend and Oreapolis. They outcrop in a number of ravines and in the bluffs along the river. The principal areas are 3½ miles southeast of Richfield, one mile or more west of Cedar Creek and south of the Platte about midway between Cedar Creek and Cullom Station.

Mining of the lower Platte bank gravel began about 30 years ago. A spur, known as the Spearman Switch, was run from southeast of Springfield to the gravel deposits north of the river. Here four large pits were opened and worked for several years. They are now abandoned and the switch has been taken up. The quantity of unmined gravel in the bluffs north of the river is large, but poorly located for shipment. The overburden is heavy, above 15 to 35 feet of sand and gravel.

About one mile west of Cedar Creek is a line of abandoned gravel pits. These were worked about 15 years ago by the Atwood-Newell Co. The openings are in deposits from 15 to 45 feet thick and occuring in the bluffs beneath a heavy overburden. These pits when working supplied a very large amount of the state's roofing gravel. Much gravel remains in the bluffs, but it cannot be worked profitably because heavy stripping is required.

Immediately west of the three large abandoned pits is the Omaha Gravel Company pit which has an exposure of gravel some 40 feet thick overlain by drift and loess deposits. The deposit is loose enough to be removed with scrapers. It was worked by sluicing to a screen which cut out the fine sand and drop the gravel into a bin. Formerly some of this gravel was hauled by wagons to Cedar Creek and loaded for shipment. Working here has been abandoned.

The exposure about midway between Cedar Creek and Cullom has been worked to a point where it is difficult to proceed because of a heavy ledge of standstone above the deposit. For a time, the gravel from beneath this rock was sluiced out. Gravel production here has been abandoned. There are other small exposures near this old pit, but they have little importance.

Platte Sand and Nebraska Roads

In the Platte Valley is the largest area of good sand, easily produced, found in the central part of the United States. It is a resource of great importance.

Evidently few people realize the important relation Platte sand will have in road building and road maintenance in Nebraska.

The outstanding points in this relationship are:

1. The Platte Valley, with its sands, crosses the state lengthwise near the middle. This places an important building material in a most accessible position.
2. The quantity of workable sand is inconceivably great. It has a volume of at least six cubic miles, which would last more than 30,000 years, allowing for a liberal increase in production. The supply could be conserved by a larger use of sand from the bars and bed of the river. If this were done it would not be possible to remove the materials faster than they are brought down by the river.
3. The Valley is well served with railroads. It is paralleled by trans-continental lines and crossed by 18 branch and trans-continental railroads. These facilitate wide distribution and use of the sand.
4. Platte Valley is served by several interstate highways of national importance, the improvement of which will require large amounts of sand and gravel.
5. Many miles of intrastate roads in and near the Platte Valley could be improved by the use of Platte sand and gravel in surfacing.
6. Platte sand could be distributed over a wider area for use in road markers, culverts and bridges.
7. It would be possible to open pits or to pump sand for county or state work at many places along the Platte. It would seem best, however, to produce from the bars and bed of the river where it can be done to advantage.

USES OF SAND

It is not the purpose of this report to discuss at length the various uses of sand. Persons wishing a more complete treatment of this subject should consult the report published by the State Geological Survey.

A limited amount of sand in Nebraska is used for the following purposes: 1. In poultry yards, 2. Filtration and sanitation, 3. Fire and furnace sand, 4. Sand wood, 5. Sanding walks and streets, 6. Bedding cars, 7. Moulding.

Much of the fine to medium sand produced at the Platte dredges is used as engine sand to increase traction on wet or slippery rails. This sand is treated at the division points to remove the water, and distributed over several system of roads. Such sand from Nebraska is used very generally in western Iowa.

Sand is used extensively in mortar and concrete for such construction as the following: 1. Plaster and masonry, 2. Water pipes, tanks and reservoirs, 3. Dams, piers and irrigation ditches, 4. Sewers, subways and tunnels, 5. Monolithic foundations and walls, 6. Curbs, gutters and sidewalks, 7. Culverts, bridges and pavements. Much sand is used in base work on streets and a vast amount will be needed for the construction of different kinds of roads.

USES OF SAND AND GRAVEL IN ROADS AND PAVEMENTS

By PROFESSOR GEORGE R. CHATBURN
Department of Applied Mechanics, University of Nebraska

SAND-CLAY ROADS

It is a well known fact that sand is in the best condition for road purposes when wet and poorest when dry; clay, on the other hand, is in its best condition when dry and poorest when wet. A proper mixture of sand and clay gives a surface which, for all conditions of moisture, is better than either one alone. (Figure 30.)

The proportion of sand and clay to be used should be about that in which the voids in the sand are just filled by the clay. However, the proportion depends on the characters of the clay and sand and simple field tests should always be made. Two are suggested—the slaking test and the flouring test.

FIGURE 30
SAND CLAY ROAD, MERRICK COUNTY

Slaking Test.—Sand and clay taken from different parts of the pits, so as to be representative, are separately dried, pulverized if necessary, sieved through a No. 10 sieve, and mixed in varying proportions; say, one part sand to three parts clay, one part sand to two and one-half parts clay, and so on as indicated:

Sand	1	1	1	1	1	1½	2	2½	3
Clay	3	2½	2	1½	1	1	1	1	1

Equal samples are taken from the several test mixes with a small measure. These are wetted and mixed to a stiff paste rolled by the hands into small spheres and dried in the sun. When dry they are placed in a shallow pan and enough water poured in the pan to cover them. Slaking will begin at once. The over-sandy specimens will break down first, then the over-clayed specimens. Those which stand up the longest will have the proper proportion of sand and clay for road purposes.

Flouring Tests.—Spheres are made up as before and lightly rubbed with the thumb and finger. Those having too much sand will break down rapidly, those having too much clay will "flour" or "dust" away, while those from the best mixtures will assume a glazed surface under the light rubbing. For durability it is recommended that the mixture having the next greater sand than the one which glazes should be selected. An examination of the sand for mica may be made with a low power microscope. If the sand contains more than 5% of mica it should be rejected.

Where sieves are at hand a more elaborate examination of the sand may be made, and depending on the number of separations available the mixtures in Table I are recommended:

TABLE I

	Two Separations	Three Separations	Four Separations	Six Separations
Clay—passing No. 200 sieve	39%	39%	39%	39%
Sand—				
Passing No. 100 sieve	....	....	....	8%
Passing No. 60 sieve	....	16%	16%	8%
Passing No. 40 sieve	....	....	15%	15%
Passing No. 20 sieve	....	....	....	15%
Passing No. 10 sieve	61%	45%	30%	15%

GRAVEL ROADS

What follows relates to that kind of gravel made up of fragments of stone which have been more or less rounded by the action of water and weather and the mechanical grinding of one particle of stone against another, and not to those angular fragments of broken rock which have not yet become rounded, such as the so-called disintegrated gravel of Sherman Hill, Wyoming, and other places in the west. This latter "gravel" is extensively used for ballast and depot platforms by the Union Pacific Railroad and has been used with success for road purposes.

The ordinary water-worn gravel is generally hard, tough and durable and when properly graded forms excellent road making materials. In order to be successfully used for road making purposes there must be present a binder, that is fine stone dust, clay or silt which acts as a weak cement to hold the particles together. The cementing power of such ingredients is not great but without it roads would not pack at all. The fine sand clay and dust should completely fill the voids of the larger pebbles, and the denser the whole mixture the better. Frequently bank run gravel may be found of the right proportions for road work. If the gravel stands up perpendicularly in the pit, requiring a pick to loosen it, it will most likely make good roads. Washed gravel may require the addition of fine sand and clay.

A mechanical or sieve analysis of the gravel is valuable in determining the grading of gravel. If in the process of mining and washing the sand and gravel have been separated into several grades, an analysis will enable the road maker to remix them properly for best results. The following table prepared by the author and extracted from his work on Rural Highway Engineering,* will give what he considers ideal grading of gravel for road purposes. Of course as shown in sand clay mixtures, all of the sieves need not be used; it is practicable to use two or three separations.

*Rural Highway Engineering, by George R. Chatburn, Wiley & Sons, New York.

TABLE II

	PERCENTAGE PASSING														
	Sieve Numbers									Screen Openings Inches					
	200	100	80	60	50	40	30	20	10	⅛	¼	½	1	2	3
Maximum Stone, 1-inch															
Upper Limit	24	30	33	34	38	43	49	56	70	74	78	85	100		
Medium	20	24	26	27	29	33	37	42	53	56	63	75	100		
Lower Limit	15	18	19	19	21	22	25	28	35	39	48	65	100		
Maximum Stone, 2 inches															
Upper Limit	20	24	26	27	30	33	37	44	58	63	74	78	85	100	
Medium	17	20	22	22	24	26	29	34	43	50	56	63	75	100	
Lower Limit	14	15	16	16	18	19	21	23	29	33	39	48	65	100	
Maximum Stone, 3 inches															
Upper Limit	18	22	23	24	27	29	33	38	50	60	72	75	80	90	100
Medium	16	18	19	20	21	23	26	30	38	45	54	58	67	83	100
Lower Limit	13	14	15	15	16	17	19	21	26	30	36	42	53	77	100

The material in the process of consolidation will shrink in volume about 50%. An easy method for obtaining a close approximation of the quantity of gravel required for any particular road is to multiply the length of the road in miles, by the width in feet and by the desired thickness (after consolidation) in inches, and the product by twenty-five. The result is the quantity of gravel in cubic yards. For example, suppose the road is one-half mile long, twenty feet wide and eight inches thick, then, ½x20x8x25=2,000 cubic yards of gravel as measured in wagons at the pit, will be required. This number may be a trifle too large; if the consolidation were always exactly 50%, twenty-four and four-ninths would be the exact multiplier instead of twenty-five.

GRAVEL-CONCRETE ROADS

Gravel may be substituted for broken stone in concrete roads. (Figure 31.) The chief difficulty in this state has been to obtain a gravel coarse enough for this purpose. The pebbles should form a graded mixture with the largest not less than one inch in diameter. Such a mixture can best be obtained with Nebraska gravel by first screening it into two or three grades and remixing. In this way, the excess sand can be saved and sold for other purposes. If the product could be run over two screens, the first with one-half inch openings, the other forty meshes per inch, it would be divided into three grades—fine sand, coarse sand and gravel. The coarse sand and gravel would make excellent concrete, the fine sand can be used for plastering and asphalt pavements.

Ordinarily the ingredients are divided into three parts, the cement, the fine aggregate—sand, and the coarse aggregate—stone or pebbles. The sand should be as hard as flint or quartz. Quartz is the predominent mineral in Nebraska sands. Sharpness is no longer considered a requisite of good sand. Sharp sands give a little greater mechanical bond but somewhat rounded sands pack closer and make a denser mortar; denseness is more important than the mechanical bond due to sharpness. As a rule, the coarser the aggregate, the better concrete will be made.

The pebbles ranging in size from one-fourth inch up to one inch make a good coarse aggregate. Here again the more uniformly coarse the better.

Cleanness is an important item in concrete making. If possible, the sand should be reasonably clean. Cleanness may be shown roughly by agitating a quantity of the sand in a glass bottle partly full of water and then allowing it to stand. The fine particles of silt and loam will take considerable time to settle. The sooner the water becomes clear the cleaner the aggregate. When settled the thickness of the layer of fine silt on top will be a measure of the "suspended" matter. This should not exceed 5% of the total thickness of the aggregate.

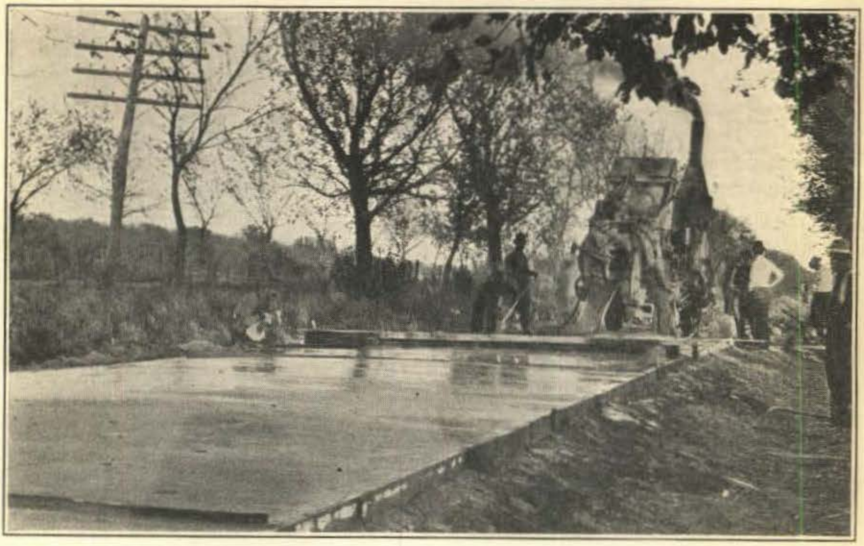


FIGURE 31

GRAVEL-CONCRETE ROAD

ABOVE—CONSTRUCTING ROAD NEAR KEARNEY
BELOW—FINISHED ROAD NEAR GRAND ISLAND

If a road laboratory is near, the coarse aggregate may be tested by the several methods standardized by the U. S. Office of Public Roads. For important roads it would be well to secure such tests. However, a mineralogical examination will show the kinds of stone present in the pebbles and the road maker can judge fairly well of its road making value.

Proportioning.—A simple method of proportioning is to ascertain the voids in the coarse and fine aggregates separately, then proportion the concrete so that the sand will a little more than fill the voids of the pebbles, and the cement a little more than fill the voids of the sand. On account of the swelling of the bulk due to particles of sand getting between the pebbles thus preventing them from coming into closest contact and the cement forming a coating on the grains of sand it is customary to take from 5 to 10% excess sand and the same per cent excess cement.

The proportions then may be calculated thus:

Voids in pebbles equal, say, 40%
Voids in sand equal, say, 35%

then take

1 part pebbles
.45 part sand
35% of .45=.16 parts cement

that is,

cement : sand : pebbles=16 : 45 : 1
= 1 : 3 : 6 approximately

The National Conference on Concrete Road Building recommends that the proportions do not exceed five parts of fine and coarse aggregate to one part of cement and that the fine aggregate should not exceed 40% of the mixture of fine and coarse aggregates.

The proportion obtained by the method of voids would not satisfy this specification. Early concrete roads soon went to pieces because they were too lean. The National Conference rule was to prevent this. It makes the limiting proportions,

cement : sand : stone=1 : 2 : 3

When the road is laid in two courses the lower may be made leaner, the Concrete Institute rule being

cement : sand : stone=1 : 2½ : 4

To get the quantity of the materials necessary, Fuller's rule may be used. This is "divide eleven by the sum of the parts of all the ingredients and the quotient will be the number of barrels of cement required for one cubic yard of concrete." To get the approximate quantities of materials in a piece of concrete road work, this rule may be used: Multiply together the length of the road in miles, the width in feet and the average thickness in inches, and that product by 180; divide the result by the sum of the parts of all the ingredients, the quotient is the number of barrels of cement required. As a sack of cement, weighing 94 pounds, is for practical purposes one cubic foot, and four sacks make one barrel, to get the number of sacks multiply the number of barrels by four. To get the sand or stone in cubic yards multiply the number of sacks of cement by the proportional part of sand or stone used and divide by twenty-seven. For example, to find the quantities of cement, sand, and pebbles necessary to build one-fourth mile of 1:2½:4 concrete road seventeen feet wide and six inches thick the application of the rule is as follows:

$$\text{Cement} = \tfrac{1}{4} \times 17 \times 6 \times 180 \times \frac{11}{1+2\frac{1}{2}+4}$$

$$= 6732 \text{ barrels}$$

$$= 25928 \text{ sacks}$$

$$\text{Sand} = \frac{25928 \times 2\frac{1}{2}}{27}$$

$$= 2400 \text{ cubic yards}$$

$$\text{Pebbles} = \frac{25928 \times 4}{27}$$

$$= 3840 \text{ cubic yards}$$

GRAVEL-CONCRETE ROAD—HALL COUNTY

The values found by this rule are slightly in excess of real requirements. To get a closer result use instead of 180 in the rule 179¼.

MARKERS, CULVERTS AND BRIDGES

Markers for section and quarter section corners, and for guide boards and danger signs along the highways can be made from Nebraska sand and gravel. (Figure 32.) Wooden forms are easily made and the mortar deposited in them until hard. For extra good work a mixture of one ce-

FIGURE 32

CONCRETE ROAD MARKER ON COUNTY LINE

ment to three sand may be used; for work not requiring so good or smooth surface a mixture of 1:4 or 1:5 may be employed. If made moderately dry, and tamped well, until it quakes, better results will be obtained than if mixed slushy. Markers should cure in a shady place for three or four weeks before setting them. The photograph shows a marker designed by Arthur Edgren, County Engineer of Lancaster County. The post contains four reinforcing rods, one near each corner and the slab is reinforced with horizontal and vertical rods. Cast-iron letter molds were attached to the form before putting on the concrete. These leave the letters depressed. The surface was rubbed down with a carborundum brick and the letters painted and varnished.

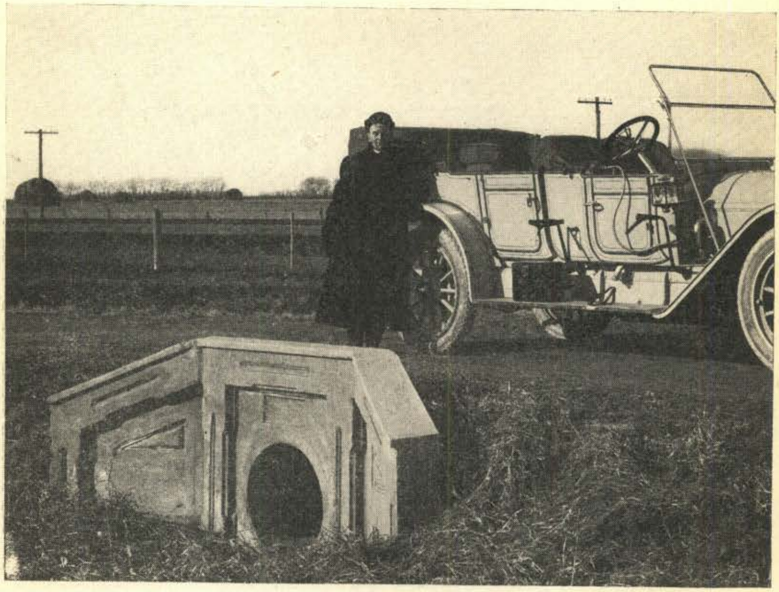
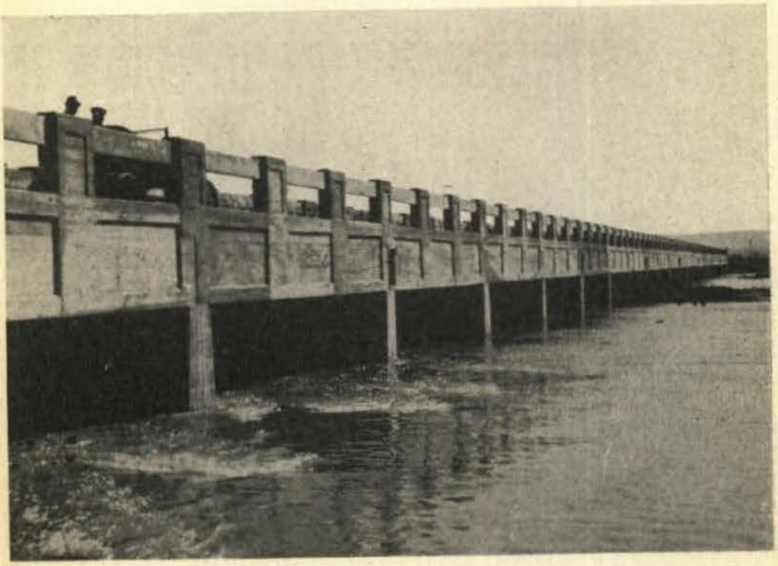


FIGURE 33
CONCRETE CULVERT

Culverts are made in various shapes and sizes. (Figure 33.) Lancaster County has for several years manufactured concrete tiling during the winter months. At this time many men are out of work and were it not that the County can thus supply them with labor would become charges upon the bounty of the public. A few molds, a place to work and a foreman constitute the overhead charges. The pipe of course must be transported to the place of use, but usually this would cost no more than transporting the raw materials. Pipes up to three feet in diameter and three inches in thickness are made without reinforcement. Larger sizes must be reinforced. The mixture is about the same as for the markers mentioned above or the building blocks used for the foundation of a house.

Culverts made in place require forms. Some of these are constructed of wood and removed after the hardening of the concrete by loosening wedges. Others are of steel and iron and are collapsible. In making these culverts it is well to separate the gravel into pebbles and sand and remix. The mixture should be made up in proportions for good building concrete. About 1:2:3 or 1:2:4 will answer very well. Wing walls, parapets and end markers can be constructed of these same materials.

As a culvert grows longer, it becomes a bridge. Concrete bridges are being generally constructed and range in size from sixteen feet long to several hundred. The concrete is always reinforced and all the materials should be carefully selected. Nebraska gravel should be separated into pebbles and sand before using. Real fine sand should also be eliminated.



CONCRETE STATE-AID BRIDGE ACROSS PLATTE RIVER

PAVEMENTS

Paved roadways have long been in use in the cities (Figure 34) and towns and are rapidly being adopted for rural roads. The materials generally used for pavements are: brick, stone block, wood block, asphalt and concrete. Concrete has already been mentioned. The other materials require a foundation course. This is usually made of concrete. Sand and gravel are applicable for this. A mixture of one cement to two sand, five pebbles will be found satisfactory. By pebbles here is meant all of the gravel that is retained on a one-fourth inch mesh sieve. With a foundation of concrete six inches thick on a well rolled subgrade no trouble with settlement should ever occur.

FIGURE 34
SAND USED IN STREET WORK, OMAHA

ASPHALT

Sheet asphalt is a mixture of sand and asphalt in the porportion of 90% sand to 10% asphaltic cement. The sands of Nebraska have proven entirely satisfactory for this form of pavement. A fine sand, most of it passing a No. 50 sieve, is best. The fine sands not desired for the concrete foundation may all be used here.

When pebbles not exceeding one-half inch in diameter are mixed with a mixture of asphalt and sand, an asphaltic concrete results. Pavements of this character are a little cheaper in first cost than the asphalt and many miles are now being layed in the United States. Sand and fine gravel are frequently used for a cushion course under the brick and in the cement grout used to fill the spaces between the bricks.

City street pavements require curbs and gutters. These are of late years usually made of concrete. Cement, sand and gravel (pebbles less than one-half inch and more than one-fourth inch in diameter) answer very well for this purpose. Sidewalks and carriage drives are made up of the same materials.

Once more, let it be urged that, in the use of Nebraska gravel, it being fine in character, having lots of sand mixed with it, care should be taken first to screen it and then remix in proper proportions. Upon this may depend success or failure.

FINANCIAL REPORT 1915-1916

Fund	Balance October 31, 1914	Drawn from October 31, 1914	Appropriation of 1915	Expended Oct. 31, 1916 from Apr. 1, 1915	Balance Oct. 31, 1916
State engineer	$1041.68	$1041.68	$5000.00	$3958.33	$1041.67
Assistant state engineer	625.00	625.00	3600.00	2850.00	750.00
Under secretaries	....	....	3200.00	2599.36	600.64
Stenographer	....	....	1680.00	1327.68	352.32
Office expense	1635.10	1635.10	4000.00	3552.52	447.48
Extra office help	691.30	691.30	15000.00	12008.43	2991.57
Office supplies, etc.	....	....	4000.00	3552.52	447.48
Traveling expenses	....	....	6000.00	4110.54	1889.46
Stenographer and field help	350.00	350.00	....	....	....

	Fees Collected	Paid to Treas.
Fees paid to general fund	$1790.25	$1790.25

	Amount of 1915–1916 Levy	Collected by State Treas Oct. 31, 1916	Amount Expended to Oct. 31, 1916	Balance of Appropriation Oct. 31, 1916
State Aid Bridge	$ 98164.13	$151579.57	$108364.34	$ 41635.66

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