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CHARLES D. WALCOTT, DIRECTOR

OPERATIONS AT RIVER STATIONS, 1900

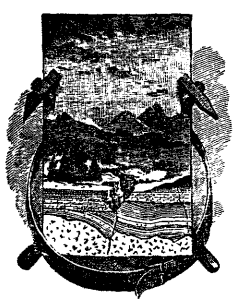
A REPORT OF THE

DIVISION OF HYDROGRAPHY

OF THE

UNITED STATES GEOLOGICAL SURVEY

PART IV



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OPERATIONS AT RIVER STATIONS, 1900.

PART IV.

MEASUREMENTS AT RIVER STATIONS.[1]

COMPUTATIONS OF SEEPAGE IN COLORADO.

Discharge measurements of a number of the principal rivers in Colorado, including South Platte River and its tributaries, also Arkansas and Uncompahgre rivers, have been made during low-water stages for several years past under the direction of the agricultural experiment station at Fort Collins, Colorado. It has been known for a number of years that a large amount of seepage water returned to the rivers from irrigated areas adjacent to them, and these measurements were instituted in order to determine the amount of this returned water. A report of the investigations up to 1896 was given in Bulletin No. 33 of the Colorado State Agricultural College. Annual measurements have been made since that time, and it is the intention of the college authorities to publish the complete results in an additional bulletin, which will appear shortly. The conclusions reached from these measurements, together with the following tables of the results of the measurements made in 1900, are taken from the tenth biennial report of the State engineer of Colorado, pages 210–236:

1. There is a real increase in the volume of the streams as they pass through the irrigated sections.

2. There is no such increase in the streams as they pass through the unirrigated sections. On the contrary, there is an actual loss, even when the drainage of a large area enters.

3. The increase is more as the irrigated area is greater.

4. The increase is approximately proportional to the irrigated area, and it seems probable that with more intimate knowledge of the amount of water applied and the features of the drainage the proportions would be found to be c ose.

5. The amount of the increase depends very slightly, if at all, upon the rainfa'l, and so far as it does it is influenced principally by the rainfall on the irrigated lands. Only where the lands are already saturated is the rainfall sufficient to cause seepage.

[1] Continued from Water-Supply and Irrigation Paper No. 49.

6. There is no perceptible underflow from the side channels, even where they drain several thousand square miles.

7. The inflow is practically the same throughout the year. It is more in summer, less in winter, principally because of the effect of the temperature of the soil.

8. The passage of the seepage water through the soil is very slow, so that it may take years for the seepage from the outlying lands to reach the river.

9. The amount of seepage is slowly but constantly increasing.

10. It may be expected to increase for some years to come.

11. An increased amount of land may be brought under cultivation with time, more especially on the lower portions of the streams.

12. The seepage being nearly constant throughout the year, while the needs are greatest in summer, the use of storage will best utilize the water from inflow.

13. On the Poudre River about 30 per cent of the water applied in irrigation returned to the river.

14. The use of water on the upper portions of a stream, when water is not immediately needed by prior appropriators, will increase the flow of the stream late in summer, and prevent such low stages as it would have without this regulating action.

15. The seepage water is already an important factor in the water supply for the agriculture of the State. The capital value of the water thus received in the valley of the Cache la Poudre alone is not less than $300,000, and perhaps $500,000, and for the Platte is from $2,000,000 to $3,000,000. It is large for the other streams, but of unknown amount.

16. An actual loss is incurred in carrying a stream like the Platte through sandy beds.

17. Ultimately the returns from seepage will make the lower portions of such valleys as the Platte more certain of water, and probably enable a larger acreage to be grown.

Computations of seepage on South Platte River, Colorado, 1899.

Date.	Stream or ditch.	In river.	Diverted by canals.	Inflow.	Amount in river + amount diverted and − inflow.	Increase in volume of river between points measured.	Increase from canyon to point where last measured.
		Sec.-ft.	*Sec.-ft.*	*Sec.-ft.*	*Sec.-ft.*	*Sec. ft.*	*Sec.-ft.*
Oct. 23	South Platte River at canyon	154.49					
Do.	High Line canal		131.59				
Do.	Denver Union Water Company's canal		32.00				
Oct. 24	Platte Canyon ditch		32.60				
Do.	Wasteway of Platte Canyon ditch			7.50			
Do.	Last Chance ditch		2.82				
Do.	City ditch		18.83				
Do.	South Platte River below City ditch	27.08			227.42	72.93	
Do.	Plum Creek			4.45			
Do.	Deer Creek			1.78			
Do.	Nevada ditch		21.73				
Do.	South Platte River at Littleton	60.08			88.04	60.96	133.89
Oct. 26	do	55.29					
Do.	Bear Creek			13.41			
Do.	Ditch		0.19				
Do.	Seepage stream			*a* 3.86			
Do.	Clark Gulch			*a* 10.87			
Do.	South Platte River at Fifteenth street bridge, Denver	84.91			71.69	16.40	150.29
Oct. 27	do	88.90					
Do.	Farmers and Gardeners' ditch		4.47				
Do.	Burlington ditch		89.30				

Computations of seepage on South Platte River, Colorado, 1899—Continued.

Date.	Stream or ditch.	In river.	Diverted by canals.	Inflow.	Amount in river + amount diverted and − inflow.	Increase in volume of river between points measured.	Increase from canyon to point where last measured.
		Sec.-ft	*Sec.-ft.*	*Sec.-ft.*	*Sec.-ft.*	*Sec.-ft.*	*Sec.-ft.*
Oct. 27	Clear Creek			0.18			
Do.	Fulton ditch		38.87				
Do.	South Platte River (city waste included)	54.67			135.51	46.61	196.90
Oct. 28	Brantner ditch below head of Fulton		45.75				
Do.	Brighton ditch		5.02				
Do.	South Platte River at bridge west of Brighton	81.38			132.15	77.48	274.38
Do.	Dry Creek			*a* 23.81			
Do.	Platteville ditch		4.60				
Do.	South Platte River below head of Platteville ditch	126.73			131.33	49.95	324.33
Oct. 30	Evans No. 2 ditch		14.94				
Do.	Side Hill and Meadow Island No. 2		1.60				
Do.	Bucker		7.20				
Do.	South Platte River	140.75			155.49	38.76	363.09
Do.	Cook & Hewes ditch		12.39				
Do.	St. Vrain Creek			94.91			
Oct. 31	South Platte River below Union ditch	270.87			188.35	47.65	410.74
Do.	Big Thompson Creek			39.49			
Do.	Section No. 3 ditch		12.60				
Do.	Lower Latham ditch		26.73				
Do.	South Platte River at Evans bridge	334.88			334.72	63.85	474.59
Nov. 1	Cache la Poudre River			151.01			
Do.	Lone Tree Creek			5.49			
Do.	Sterling seepage		5.59				
Do.	South Platte River below Hoover	575.27			424.36	89.48	564.07
Nov. 2	Boxelder Creek			6.79			
Do.	Harden ditch		5.62				
Do.	Latham waste			5.42			
Do.	Corona ditch		4.57				
Do.	South Platte River at head of Putnam ditch	638.19			636.17	60.90	624.97
Do.	Putnam ditch		8.61				
Nov. 3	Weldon Valley ditch		18.85				
Do.	South Platte River at Orchard bridge	613.98			641.44	3.25	628.22
Nov. 4	South Platte River at Shaffer's ford	701.33			701.33	87.35	715.57
Do.	Bijou Creek			4.00			
Do.	Dueul & Snyder ditch		9.69				
Do.	South Platte River at Fort Morgan bridge	702.78			712.47	7.14	722.71
Do.	Piatt ditch		13.41				
Nov. 5.	Platte and Beaver ditch		5.00				
Do.	A. A. Smith ditch		15.74				
Do.	South Platte River at Snyder bridge	741.26			775.41	72.63	795.34
Nov. 6.	Johnson & Edwards ditch		29.75				
Do.	Tetsel ditch		9.67				
Nov. 7.	South Platt ditch		27.58				
Do.	Davis Brothers' ditch		28.63				
Do.	Pawnee ditch		96.78				
Do.	South Platte River at Merino bridge	552.72			835.13	93.87	889.21
Do.	Sterling No. 1 ditch		21.98				
Do.	Sterling No. 2 ditch		13.72				
Nov. 8.	Smith & Henderson ditch		11.59				
Do.	South Platte River at Sterling bridge	581.16			628.45	75.73	962.94
Nov. 9.	Low Line ditch		54.82				
Do.	Iliff ditch		5.14				
Do.	South Platte River at Iliff bridge	567.39			627.35	46.19	1,009.13
Do.	Harmony No. 1 ditch		38.79				
Do.	Harmony No. 2 ditch		15.02				
Do.	South Platte River at Crook	582.96			636.77	69.38	1,078.51
Nov. 11.	Peterson ditch		110.28				
	South Platte River above Pole Creek	445.55			555.83	*b* 17.13	
Nov. 12.	South Platte River at State line	486.78			486.78	41.23	1,119.74

a Seepage not included in natural flow. *b* Decrease.

Computations of seepage on South Platte River, Colorado, 1900.

Date.	Stream or ditch.	In river.	Diverted by canals.	Inflow.	Amount in river + amount diverted and − inflow.	Increase in volume of river between points measured.	Increase from canyon to point where last measured.	Distance between points.	Increase in volume per mile.
		Sec.-ft.	*Sec.-ft.*	*Sec.-ft.*	*Sec.-ft.*	*Sec.-ft.*	*Sec.-ft.*	*Miles.*	*Sec.-ft.*
Oct. 19	High Line canal		73.30						
	South Platte River below High Line waste	97.85							
	Platte Canyon ditch		55.30						
	Last Chance ditch		14.70						
	City ditch		30.00						
Do	South Platte River	31.81			131.81	33.96	33.96	6.0	5.66
Oct. 20	Plum Creek			3.07					
Do	Deer Creek			23.54					
Do	Nevada ditch		13.48						
Do	Lee Gulch			a 0.75					
Do	Clark Gulch			a 0.503					
Do	Dutch Gulch			1.11					
Do	Nevada ditch waste			3.167					
Do	South Platte River at lower Littleton bridge	89.394			71.98	40.17	74.13	6.0	6.69
Do	Big Dry Creek seepage			0.96					
Do	Little Dry Creek			12.43					
Do	Bear Creek			10.83					
Do	Denver Union Water Co.'s canal		15.47						
Do	South Platte River at Fifteenth street, Denver	113.40			105.61	16.22	90.35	10.0	1 62
Oct. 22	do	161.26							
Do	Farmers and Gardeners' ditch		5.10						
Do	City sewer			61.42					
Do	Burlington ditch		121.72						
Do	Farmers and Gardeners' ditch waste			3.73					
Do	Heller ditch		2.11						
Do	Clear Creek			1.40					
Do	South Platte River at approach to Fulton ditch	95.50			157.87	b 3.39	86.96	11.0	b 0.31
Oct. 23	do	76.82							
Do	Fulton ditch		51.73						
Do	Stream flows into Fulton ditch			0.68					
Do	Brighton ditch		16.92						
Do	South Platte River at Brighton bridge	81.83	68.65		150.48	73.66	160.62	7.0	10.52
Do	Dry Creek			15.17					
Do	Platteville ditch		18.80						
Do	McCann seepage ditch			c 4.0					
Do	South Platte River	112.06	18.80	15.17	115.69	33.80	194.48	8.0	4.23
Do	Evans No. 2 ditch		48.38						
Oct. 24	Beaman and Meadow Island ditches		17.72						
Do	Independent ditch		23.70						
Do	South Platte River	44.48	89.80		134.28	22.22	216.70	8.0	2.78
Do	Cook & Hewes ditch		16.17						
Do	Seepage to Cook & Hewes ditch		2.00						
Do	St. Vrain Creek		52.57						
Do	South Platte River below Union ditch	121.94	16.17	52.57	85.54	41.06	257.76	9.0	4.56
Do	Section No. 3 ditch		2.62						
Do	Big Thompson Creek			16.78					
Do	Lower Latham seepage ditch			c 20.07					
Do	Lower Latham ditch		19.56						
Do	South Platte River at Evans bridge	192.58	22.18	16.78	197.98	76.04	333.80	7.5	10.14
Oct. 25	Poudre River			84.69					
Do	Lone Tree Creek			1.87					
Do	Sterling seepage ditch	4.65							
Do	South Platte River at Kersey bridge	298.77		86.56	212.21	19.63	353.43	6.0	3.27
Do	Boxelder Creek			6.78					

a Seepage gaged for record only. b Decrease. c Now enters river.

Computations of seepage on South Platte River, Colorado, 1900—Continued.

Date.	Stream or ditch.	In river.	Diverted by canals.	Inflow.	Amount in river + amount diverted and − inflow.	Increase in volume of river between points measured.	Increase from canyon to point where last measured.	Distance between points.	Increase in volume per mile.
		Sec.-ft.	*Sec.-ft.*	*Sec.-ft.*	*Sec.-ft.*	*Sec.-ft.*	*Sec.-ft.*	*Miles.*	*Sec.-ft.*
Oct. 26	South Platte River at Hardin Station	361.20		6.78	354.42	55.65	409.08	8.0	6.96
Do.	Latham waste			0.54					
Do.	Corona ditch		4.13						
Do.	Schultz ditch		11.58						
Do.	South Platte River above Putnam ditch	349.89	15.71	0.54	65.06	3.86	412.94	12.0	0.32
Do.	Putnam ditch		7.50						
Do.	Weldon Valley ditch		45.20						
Oct. 27	South Platte River at Orchard Station	323.78	52.71		376.49	26.60	439.54	8.5	3.13
Do.	Fort Morgan canal	238.01							
Do.	South Platte River	115.24			353.25	29.47	469.01	9.0	3.27
Do.	Dueul & Snyder ditch		5.64						
Do.	Upper Platte and Beaver ditch		116.72						
Do.	Piatt ditch		22.55						
Do.	South Platte River	14.05	144.91		158.96	43.72	512.73	9.0	4.86
Oct. 29	Lower Platte and Beaver ditch		46.15						
Do.	A. A. Smith ditch		25.19						
Do.	South Platte River at Snyder	26.48	71.34		97.82	83.77	596.50	11.0	7.62
Do.	Johnson & Edwards ditch		23.26						
Do.	Tetsel ditch		19.52						
Oct. 30	South Platte ditch		a 23.57						
Do.	Pawnee ditch		24.50						
Do.	Davis Brothers' ditch		2.78						
Do.	South Platte River at Merino bridge	18.39	93.63		112.02	85.54	682.04	18.0	4.75
Do.	Snyder ditch		7.26						
Do.	Springdale ditch		31.86						
Do.	Sterling No. 1 ditch		11.40						
Oct. 31	South Platte River at Sterling bridge	29.90	50.52		80.42	62.03	744.07	13.75	4.51
Do.	Bravo ditch		28.50						
Do.	Cedar Creek			0.50					
Do.	South Platte River at Iliff bridge	27.71	28.50	0.50	55.71	5.19	749.26	11.75	0.44
Nov. 1	South Platte River at Crook bridge	51.35				23.64	772.90	17.0	1.39
Do.	South Platte River at Sedgwick bridge	50.66				b 0.69	772.21	15.0	0.04
Nov. 2	South Reservation ditch at State line		2.47						
Nov. —	Lodgepole Creek			0.18					
Nov. 2	South Platte River at State line	76.35	2.47	0.18	78.64	27.98	800.19	17.0	1.65

a All water taken by this ditch.

b Decrease.

Computations of seepage.

BEAR CREEK, COLORADO, 1900.

Date.	Locality.	In river.	Diverted by canals.	Inflow.	Section gain or loss.	Total gain or loss.
		Sec.-feet.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*
October 27	Above Morrison dam	24.06				
Do	Below Morrison dam	6.57	9.69	0.23		
Do	Below Pioneer Union ditch	0.81	0.23		3.70	3.70
Do	County line	10.11	8.64	0.69	9.53	13.23
Do	Near mouth	4.64			2.48	15.71

CLEAR CREEK, COLORADO, 1900.

October 29	Three-fourths mile above Golden	27.39	20.94	0.49		
Do	Below Rocky Mountain ditch	4.46			−2.48	−2.48
October 30	do	10.56	1.75			
Do	Near where river branches	16.83	0.93		8.02	5.54
Do	Near junction of river	20.26			4.36	9.90
November 17	do	13.87	17.39			
Do	Below Clear Creek and Platte River ditch	0.23		0.49	3.75	13.65
Do	At mouth	2.87			2.15	15.80

SOUTH BOULDER CREEK, COLORADO, 1900.

	Gaging station	9.24	7.44			
	Below Dry Creek ditch	2.63	2.68		0.93	0.93
	One-half mile above mouth	0.07			0.12	1.05

BOULDER CREEK, COLORADO, 1900.

October 24	Gaging station	29.25	5.05			
Do	Valmont bridge	14.24	28.64		13.63	13.63
Do	Leggett's Crossing	18.10			3.86	17.49
October 25	do	9.97	11.98			
Do	Plumb Crossing, county line	9.59			11.60	29.09
Do	One-half mile above mouth	1.04	7.06		−1.49	27.60

ST. VRAIN CREEK, COLORADO, 1900.

October 17	South of Lyons	66.24	39.04			
Do	Below Oligarchy ditch	21.44	31.65	9.37	− 5.76	− 5.76
October 18	Below Ni Wot ditch	2.01	1.77	16.99	2.85	− 2.91
Do	Near County Line	31.95			14.72	11.81
October 19	do	25.55				
Do	Near mouth of Boulder Creek	36.02	5.41	13.09	10.47	22.28
Do	At Fleming bridge	49.28			5.58	27.86
Do	Near mouth	57.83			8.55	36.41

LEFT HAND CREEK, COLORADO, 1900.

October 20	Below Johnson ditch	3.92	4.37			
Do	Below Holland ditch	0.80	0.41		1.25	1.25
Do	At Williamson ditch				− 0.39	0.86
Do	One mile west of Burch School	0.18			0.18	1.04
Do	Near mouth	6.19			6.01	7.05

Computations of seepage—Continued.

LITTLE THOMPSON CREEK, COLORADO, 1900.

Date.	Locality.	In river.	Diverted by canals.	Inflow.	Section gain or loss.	Total gain or loss.
		Sec.-feet.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*
September 15	Below Eagle ditch	0.74		0.02		
Do.	Below mouth of Dry Creek	2.67	4.42		1.91	1.91
Do.	Rockwell bridge	3.34			5.19	8.10
September 16	do	3.31	3.75			
Do.	Below Minor & Langdon ditch	3.45		0.53	3.89	11.99
Do.	Graham bridge	11.10	9.08		7.65	19.54
Do.	Near mouth	5.30			3.28	22.82

BIG THOMPSON CREEK, COLORADO, 1900.

July 21	Below dam	104.76	157.16			
Do.	At Langston's	86.12	28.50	1.68	8.18	8.18
July 20	do	104.16				
Do.	Below L. & G. canal	99.87	46.23	35.67	6.27	14.45
Do.	Above Farmers' ditch	76.84	19.55	0.06	— 3.54	10.91
July 19	do	69.80				
Do.	Lytle bridge	21.61	47.10		— 1.09	9.82
Do.	Below Hill & Brush ditch	26.32	5.51	2.24	7.98	17.80
Do.	Ring place	30.58				
July 18	do	28.91				
Do.	Below Big Thompson and Platte River ditch.	10.39	23.06		8.80	26.60
Do.	Near mouth	23.76	26.08	14.20	25.25	51.85
September 18	Below dam at Chasten's	30.28	49.45			
Do.	At Langston's	29.21	10.40	0.66	8.67	8.67
September 17	Below L. & G. dam	28.78	6.86	16.71	—10.28	— 1.61
Do.	Below Farmers' ditch	34.45	3.35		9.02	7.41
Do.	Lytle bridge	3.24	31.27		0.06	7.47
September 9	do	2.27	1.72	1.62		
Do.	Below Hill & Brush ditch	5.18			3.01	10.48
September 8	do	4.67	6.99			
Do.	Below Big Thompson and Platte River ditch.	2.77	12.64	4.26	5.09	15.57
Do.	Near mouth	5.89			11.50	27.07

CACHE LA POUDRE RIVER, COLORADO, 1900.

August 2	At weir	308.85	197.13	0.39		
Do.	Above new Mercer ditch	117.19			5.08	5.08
August 3	do	138.02	105.80	53.20		
Do.	Below Larimer & Weld dam	82.29			— 3.13	1.95
July 12	do	146.88	76.79	64.79		
Do.	Below No. 2 Reservoir Supply ditch.	120.11			—14.77	—12.82
July 13	do	112.93	2.53	159.97		
Do.	Strauss bridge	221.62			— 3.74	—16.56
July 14	do	235.02	138.00			
Do.	Below No. 2 dam	80.18	34.38		—16.84	—33.40
Do.	Below Eaton ditch	51.43			5.63	—27.77
July 16	do	65.94	62.58	3.00		
Do.	Below Greeley No. 3 dam	12.66	6.27		6.30	—21.47
July 17	Mill power canal	37.56	59.25	1.23	30.17	8.70
Do.	Below Camp ditch	13.83			34.29	42.99
Do.	One-fourth mile above mouth	57.22			43.39	86.38
September 4	At weir in canyon	118.32	117.83			
Do.	Below Collins waterworks dam	4.87	34.24	25.22	4.38	4.38
September 5	Below Larimer & Weld dam				4.15	8.53
September 30	do	15.02	13.24	0.52		
Do.	Below No. 2 Reservoir Supply ditch.	5.74			3.56	12.09
Do.	Above head of Boxelder ditch	11.09			5.35	17.44
September 31	do	8.67	3.06			
Do.	Strauss bridge	11.75	0.97		6.14	23.58
Do.	Below No. 3 canal dam	12.15			1.37	24.95
September 5	do	9.87	6.97			
Do.	Below Eaton ditch	5.93			3.03	27.98
September 6	do	6.29	20.07	15.44		
Do.	Below Greeley No. 3 dam	2.96	5.93		1.30	29.28
Do.	Below Greeley power canal	18.43			21.40	50.68
September 7	do	18.75	33.64	0.18		
Do.	Below Camp ditch	9.78			24.49	75.17
Do.	Near mouth	44.63			34.85	110.02

Computations of seepage—Continued.

RIO GRANDE, COLORADO, 1900.

Date.	Locality.	In river.	Diverted by canals.	Inflow.	Section gain or loss.	Total gain or loss.
		Sec.-feet.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*
August 30	Railroad station at South Fork	194.24	33.41	0.85		
August 31	U. S. Geol. Survey gaging station.	209.83			48.15	48.15
August 20	....do	249.06	146.61			
Do	Above Del Norte canal	176.50			−25.95	22.50
August 21	....do	178.90	32.11			
Do	At Off's	168.48			21.69	43.89
August 22	....do	156.22	47.19			
Do	Below Prairie canal	99.29		0.31	−10.05	33.84
August 23	....do	108.91	96.00	4.33		
Do	Below Monte Vista bridge	14.00			− 3.24	30.60
August 24	....do	14.30	30.29			
Do	Below San Luis canal	5.90	14.24	5.21	21.89	52.49
Do	Below Hickory-Jackson ditch	10.65			13.98	66.47
August 25	....do	11.55	10.69			
Do	Below Alamosa	1.00			0.14	66.61
August 27	....do	1.01				
Do	Above mouth of Conejos River	1.35		14.33	0.24	66.85
Do	Below Conejos, north branch	15.33		6.90	− 0.35	66.50
Do	Below La Sauses	23.98			1.75	68.25
August 28	....do	22.31				
Do	Above State bridge	17.22			− 5.09	63.16

CONEJOS RIVER, COLORADO, 1900.

August 31	At State gaging station	24.65				
Do	Above San Juan bridge	24.77	1.97		2.09	
Do	At bridge	0.50	2.15		−22.12	−20.03
August 30	Above Cerritos	0.80		0.77	0.30	−19.73
Do	Below San Antonio Creek	0.55	3.32		− 1.02	−20.75
Do	At McIntire place	3.88			6.65	−14.10
August 29	....do	4.33	24.00			
Do	Below McIntire spring	31.33	14.19		3.00	−11.10
Do	Two hundred feet above bridge.	24.02			6.88	− 4.22

UNCOMPAHGRE RIVER, COLORADO, 1900.

November 1	At Batchelor switch	32.04	6.17	2.40		
Do	One-half mile below eleventh corner line.	29.37	1.44	3.21	1.10	1.10
Do	Near Ridgway	54.42			23.28	24.38
November 2	....do	57.64	2.42	35.58		
Do	Six and one-half miles below Ridgway.	88.15	12.32	1.98	− 2.65	21.73
Do	County Line	88.91			11.10	32.83
November 3	....do	92.11	50.06	0.50		
Do	Stark bridge, near Montrose	52.94	40.63		10.33	43.16
November 4	Bridge at Montrose	12.22	17.37		− 0.09	43.07
Do	Above Spring Creek	14.28	23.17	7.43	19.43	62.50
November 5	Wagon bridge, Olathe	14.51	10.47		15.97	78.47
Do	Below Boles & Mauny ditch		5.78		− 4.04	74.43
Do	One-half mile above mouth	8.45			14.23	88.66

LOUP RIVER NEAR COLUMBUS, NEBRASKA.

This station is located near the iron bridge of the Union Pacific Railway just west of Columbus, Nebraska, and only a short distance above the mouth of the river. It is described in Water-Supply Paper No. 37, page 240. Results of measurements for 1899 will be found in

the Twenty-first Annual Report, Part IV, page 214. During 1900 the following discharge measurements were made by Adna Dobson:

Discharge measurements of Loup River near Columbus, Nebraska.

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
1900.	*Feet.*	*Sec-feet.*	1900.	*Feet.*	*Sec.-feet.*
April 8	4.69	2,365	August 12	4.44	1,935
April 27	5.20	4,455	August 26	4.40	2,582
May 13	4.68	2,772	September 16	5.00	3,077
May 27	4.67	2,509	October 7	4.55	2,294
June 10	4.53	2,161	October 31	4.86	3,246
June 20	4.05	2,491	November 30	4.53	3,542
July 15	3.93	1,705	December 19	4.44	2,674
July 29	4.38	1,322			

Daily gage height, in feet, of Loup River near Columbus, Nebraska, for 1900.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1	4.75	5.10	4.85	3.78	4.43	4.15	4.45	4.70
2	4.75	5.09	4.70	3.90	4.43	4.20	4.45	4.65
3	4.75	4.95	4.50	3.87	4.32	4.23	4.48	4.60
4	4.75	4.96	4.85	4.54	4.28	4.23	4.48	4.48
5	4.75	4.98	4.87	4.28	4.25	4.25	4.50	4.48
6	4.75	4.95	4.82	4.93	4.25	4.25	4.50	4.45
7	4.75	4.98	4.75	4.46	3.98	4.25	4.55	4.40
8	4.71	5.32	4.65	4.62	4.05	4.27	4.55	4.43
9	4.70	5.30	4.55	4.70	4.63	4.27	4.58	4.45
10	4.72	5.00	4.53	4.40	4.68	4.28	4.60	4.48
11	4.74	4.95	4.65	4.35	4.55	5.98	4.58	4.55
12	4.70	4.95	4.65	4.20	4.44	5.25	4.58	4.55
13	4.80	5.68	4.62	4.15	4.48	5.45	4.58	4.59
14	4.81	5.20	4.61	3.98	4.43	5.63	4.58	4.55
15	4.80	5.14	4.65	3.93	4.63	5.48	4.57	4.55
16	4.82	5.05	4.65	4.28	5.53	5.00	4.57	4.50
17	4.85	5.03	6.28	4.73	5.83	4.70	4.56	*a* 4.58
18	4.87	5.01	5.20	4.78	5.50	4.48	4.55	.....
19	4.90	5.00	4.85	4.55	5.38	4.48	4.60	.....
20	5.00	4.95	3.98	4.38	4.48	4.45	4.66	.....
21	5.30	4.75	3.95	4.35	4.42	4.48	.....	.....
22	5.30	4.72	4.10	4.43	4.38	4.48	.....	.....
23	5.30	4.71	3.85	4.45	4.32	4.50	.....	.....
24	5.32	4.70	3.87	4.98	4.35	4.48	.....	.....
25	5.27	4.60	3.83	5.05	4.50	4.48	.....	.....
26	5.26	4.65	3.88	5.00	4.57	4.48	.....	.....
27	5.25	4.90	3.85	4.40	4.70	4.50	.....	.....
28	5.25	4.80	3.83	4.50	4.68	4.48	5.00	.....
29	5.20	4.82	3.83	4.38	4.53	4.48	5.00	.....
30	5.20	4.70	3.80	4.35	4.35	4.40	4.81	.....
31	.....	6.65	.....	4.35	4.28	.....	4.76	.....

a Closed for winter November 17.

PLATTE RIVER NEAR COLUMBUS, NEBRASKA.

This station, which was established in 1895, is located above Meridian Bridge, south of Columbus. It is described in Water-Supply Paper No. 37, page 242. Results of measurements for 1899 will be found in the Twenty-first Annual Report, Part IV, page 215. During 1900 the following discharge measurements were made by Adna Dobson:

Discharge measurements of Platte River near Columbus, Nebraska.

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
1900.	*Feet.*	*Sec.-ft.*	1900.	*Feet.*	*Sec.-ft.*
April 8	2.68	1,907	July 29	0.98	394
April 29	4.58	15,673	August 26	.86	149
May 13	5.05	21,827	September 16	1.07	403
May 27	4.90	18,557	October 31	1.72	998
June 10	4.95	15,696	November 30	1.17	317
June 24	4.30	12,519	December 19	2.33	569
July 15	2.06	1,456			

Daily gage height, in feet, of Platte River near Columbus, Nebraska, for 1900.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1	.....	4.00	4.45	3.30	0.10	(a)	(a)	1.60
2	.....	3.95	4.55	3.38	(a)	(a)	(a)	1.48
3	.....	3.94	4.69	3.32	(a)	(a)	(a)	1.37
4	.....	3.95	4.70	3.33	(a)	(a)	(a)	1.25
5	.....	4.65	4.66	3.87	(a)	(a)	(a)	1.23
6	.....	4.68	4.75	3.38	(a)	(a)	(a)	1.20
7	.....	5.60	5.05	2.95	(a)	(a)	(a)	1.16
8	2.69	5.30	5.00	2.87	(a)	(a)	(a)	1.10
9	2.65	5.20	4.95	3.02	(a)	(a)	(a)	1.03
10	2.64	5.20	4.95	3.00	(a)	(a)	(a)	(b)
11	2.64	5.30	5.10	2.73	(a)	2.78	(a)	(b)
12	2.64	5.30	4.95	2.43	(a)	2.25	(a)	(b)
13	2.64	5.05	4.85	2.20	(a)	2.05	(a)	(b)
14	2.64	5.05	4.80	2.10	(a)	1.80	(a)	(b)
15	2.63	5.00	4.95	3.06	(a)	1.48	(a)	(b)
16	2.64	4.95	5.20	3.23	0.03	1.07	(a)	(b)
17	2.68	4.90	5.34	2.30	(a)	1.01	(a)	(b)
18	3.50	4.90	4.96	1.83	(a)	(a)	(a)	.....
19	3.80	4.80	5.00	1.86	(a)	(a)	(a)	.....
20	3.70	4.75	4.90	1.98	(a)	(a)	(a)	.....
21	3.60	4.95	4.82	2.00	(a)	(a)	(a)	.....
22	3.95	5.10	4.60	1.43	(a)	(a)	(a)	.....
23	3.96	5.40	4.42	1.50	(a)	(a)	(a)	.....
24	3.98	5.30	4.30	1.75	(a)	(a)	1.70	.....
25	4.00	5.00	4.20	1.43	0.70	(a)	1.70	.....
26	4.10	4.95	3.96	1.50	.70	(a)	1.70	.....
27	4.25	4.90	3.90	1.65	.53	(a)	1.60	.....
28	4.45	4.70	3.74	1.63	.28	(a)	1.55	.....
29	4.63	4.50	3.60	.98	.03	(a)	1.50	.....
30	4.30	4.45	3.55	.85	.....	(a)	1.45	.....
31	.....	4.40	.....	.50	.....	.....	1.66	.....

a No water at gage; all in small channels. *b* Frozen. Closed for winter November 17.

ELKHORN RIVER NEAR NORFOLK, NEBRASKA.

Two gaging stations are maintained on this river, one at Norfolk and the other at Arlington, Nebraska. The station at the former place is at the Thirteenth street bridge, 2 miles south of the town and above the mouth of the North Fork of Elkhorn River. It is described in Water-Supply Paper No. 37, page 243. Results of measurements for 1899 will be found in the Twenty-first Annual Report, Part IV, page 217. During 1900 the following discharge measurements were made by O. V. P. Stout:

Discharge measurements of Elkhorn River near Norfolk, Nebraska.

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
1900.	*Feet.*	*Sec.-ft.*	1900.	*Feet.*	*Sec.-ft.*
April 20	2.43	568	June 29	1.38	223
May 4	3.65	1,207	Do	1.38	244
May 27	.....	465	August 3	1.23	150
Do	2.03	407	September 12	1.66	318

Daily gage height, in feet, of Elkhorn River near Norfolk, Nebraska, for 1900.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1	1.89	3.56	2.09	1.34	1.28	1.35	1.32	1.86
2	1.87	3.62	2.15	1.35	1.26	1.30	1.33	1.85
3	1.80	3.62	2.20	1.34	1.24	1.29	1.35	1.82
4	1.78	3.67	2.03	1.30	1.20	1.34	1.34	1.81
5	1.78	3.65	1.99	1.33	1.21	1.35	1.34	1.82
6	1.77	3.67	1.85	1.32	1.16	1.27	1.34	1.81
7	1.76	3.58	1.87	1.23	1.16	1.25	1.36	1.81
8	1.71	3.40	1.80	1.23	1.15	1.25	1.34	1.82
9	1.83	3.24	1.60	1.25	1.14	1.24	1.34	1.82
10	1.87	3.25	1.69	1.22	1.10	1.25	1.35	1.80
11	1.79	2.95	1.99	1.10	1.04	1.55	1.35	1.82
12	1.83	2.84	1.80	1.15	1.13	1.58	1.32	1.75
13	1.80	2.76	1.61	1.13	1.14	1.52	1.31	1.74
14	1.79	2.62	1.60	1.13	1.20	1.49	1.35	1.76
15	1.84	2.59	1.53	1.62	1.30	1.47	1.35	1.76
16	1.97	2.52	1.58	1.62	1.97	1.45	1.34	1.74
17	2.57	2.52	1.57	1.55	1.67	1.42	1.35	a 1.75
18	2.40	2.37	1.50	1.63	1.65	1.38	1.35	.....
19	2.39	2.32	1.50	1.62	1.68	1.42	1.34	.....
20	2.42	2.24	1.50	1.52	1.71	1.46	1.36	.....
21	2.42	2.17	1.57	1.52	1.62	1.46	1.62	.....
22	2.48	2.13	1.57	1.52	1.52	1.38	1.75	.....
23	2.66	2.11	1.49	1.53	1.48	1.42	1.97	.....
24	2.99	1.95	1.47	1.53	1.39	1.41	1.85	.....
25	3.02	1.95	1.45	1.52	1.42	1.42	1.85	.....
26	3.10	2.02	1.39	1.39	1.48	1.35	1.83	.....
27	3.31	1.96	1.34	1.41	1.53	1.33	1.86	.....
28	3.48	1.93	1.34	1.39	1.53	1.35	1.85	.....
29	3.68	1.83	1.36	1.42	1.46	1.35	1.85	.....
30	3.54	1.86	1.35	1.34	1.42	1.33	1.90	.....
31	.....	1.85	.....	1.30	1.35	.....	1.91	.....

a Closed for winter November 17.

ELKHORN RIVER NEAR ARLINGTON, NEBRASKA.

This station, which was established by Glenn E. Smith on April 28, 1899, is located at the wagon bridge 1 mile west of the town of Arlington. It is described in Water-Supply Paper No. 37, page 244. Results of measurements for 1899 will be found in the Twenty-first Annual Report, Part IV, page 218. During 1900 the following discharge measurements were made by O. V. P. Stout:

Discharge measurements of Elkhorn River near Arlington, Nebraska.

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
1900.	*Feet.*	*Sec.-ft.*	1900.	*Feet.*	*Sec.-ft.*
April 19	2.06	685	August 2	1.26	452
May 5	3.25	1,411	Do	1.26	431
Do	3.25	1,458	August 14	1.15	441
June 1	1.80	693	Do	1.15	415
Do	1.80	723	September 12	4.74	2,855
June 28	1.25	465	November 14	2.05	769
Do	1.25	468			

Daily gage height, in feet, of Elkhorn River near Arlington, Nebraska, for 1900.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1	1.76	3.59	1.81	0.97	1.37	2.14	1.94	3.82
2	1.75	3.51	1.87	.95	1.24	1.75	1.84	3.88
3	1.76	3.40	1.75	.98	1.16	1.52	1.82	3.75
4	1.74	3.33	1.93	.96	1.08	1.38	1.74	3.60
5	1.67	3.24	1.88	1.18	1.06	1.31	1.70	3.40
6	1.65	3.18	1.90	1.09	.99	1.27	1.65	3.15
7	1.61	3.22	1.92	1.02	.93	1.25	1.60	2.80
8	1.60	3.35	1.81	.99	.88	1.23	1.56	2.63
9	1.56	3.56	1.68	.92	.82	1.25	1.53	2.39
10	1.59	4.18	1.66	.88	.78	1.16	1.49	2.26
11	1.57	4.00	1.62	.91	.80	1.54	1.47	2.21
12	1.56	3.33	1.56	.85	.88	2.56	1.45	2.18
13	1.56	2.98	1.63	.84	.92	5.80	1.42	2.14
14	1.57	2.80	2.31	.76	1.18	5.70	1.39	2.07
15	1.60	2.70	1.60	.76	1.90	5.41	1.36	2.02
16	1.64	2.61	1.53	1.48	1.91	4.43	1.33	1.98
17	1.72	2.55	1.72	1.24	1.72	4.00	1.30	1.90
18	1.98	2.51	1.77	1.15	2.10	3.67	1.28	1.90
19	2.05	2.35	1.58	1.30	2.95	3.48	1.29	1.91
20	2.17	2.27	1.54	1.58	2.66	3.31	1.31	1.86
21	2.46	2.19	1.50	1.56	2.37	3.26	1.32	1.79
22	2.55	2.13	1.42	2.04	2.13	3.32	1.72	1.65
23	2.56	1.85	1.34	2.47	2.26	3.30	1.91	1.59
24	2.66	1.84	1.29	3.01	2.04	3.04	1.98	a1.54
25	2.67	1.77	1.25	2.72	1.96	2.89	2.06	.....
26	2.75	1.75	1.27	2.56	2.17	3.11	2.18	.....
27	2.75	1.88	1.36	2.35	2.12	2.66	2.26	.....
28	2.93	1.83	1.27	2.24	2.08	2.34	2.40	.....
29	3.33	1.73	1.18	1.75	2.02	2.09	5.43	.....
30	3.76	1.83	.98	1.56	1.95	2.01	4.48	.....
31	.....	1.72	.....	1.46	2.32	.....	4.12	.....

a Closed for winter November 24.

Miscellaneous discharge measurements of streams in Nebraska.

Date.	Stream.	Locality.	Hydrographer.	Discharge.
1900.				*Sec.-ft.*
June 22	Ash Creek, East	Bridge ¼ mile above forks.	T. J. O'Keefe	0.2
June 22	Ash Creek, West	do	do	.1
August 20	Ash Creek, East	do	do	.0
Do	Ash Creek, West	do	do	.0
July 17	Ash Creek, East	Head of Tomlin ditch, sec. 31, T. 32 N., R. 50 W.	A. B. McCoskey	.4
Do	Ash Creek, West	Above Broadhurst dam, sec. 35, T. 32 N., R. 51 W.	do	1.0
August 8	Beaver Creek	Above mill at Genoa	O. V. P. Stout	50.2
Do	do	Below diversion for Great East canal.	do	7.2
August 23	Little Blue River	Ayr	do	1.7
Do	do	W. of west line sec. 18, T. 5 N., R. 10 W.	do	1.6
June 7	Big Blue River	Blue Springs	do	262.0
Do	do	Wilber	do	189.8
Do	do	Dewitt	do	235.0
July 26	Blue Creek	Below head of Graff ditch, sec. 19, T. 16 N., R. 42 W.	E. D. Johnson	14.1
November 22	Buffalo Creek	Sec. 7, T. 1 N., R. 40 W	W. A. Channel	9.9
October 2	Deadman Creek	Head of Phillip's ditch, sec. 18, T. 30 N., R. 52 W.	T. J. O'Keefe	1.8
Do	do	Head of Porter and Rasmussen dams, sec. 1, T. 30 N., R. 53 W.	do	1.1
May 27	North Fork of Elkhorn River.	Norfolk Junction bridge	O. V. P. Stout	75.9
August 3	do	do	do	89.0
June 29	Frenchman River	Two miles above Culbertson.	Adna Dobson	79.0
August 17	do	Culbertson	O. V. P. Stout	84.0
July 26	do	Head Maranville dam, sec. 17, T. 6 N., R. 40 W.	A. B. McCoskey	a3.4
Do	do	Head of Inman's dam, sec. 12, T. 6 N., R. 41 W.	do	a8.0
Do	do	Head of Wirsig dam, sec. 24, T. 6 N., R. 40 W.	do	a14.0
July 27	do	Wauneta	do	74.3
Do	do	Palisade	do	91.2

Miscellaneous discharge measurements of streams in Nebraska—Continued.

Date.	Stream.	Locality.	Hydrographer.	Discharge.
1900.				*Sec.-ft.*
September 29	Frenchman River	Head of Inman's ditch, sec. 17, T. 6 N., R. 40 W.	E. D. Johnson	6.2
July 26	Graff ditch	Near head	do	13.3
November 22	Horse Creek	Sec. 11, T. 1 N., R. 39 W	W. A. Channel	1.2
November 14	Indian Creek	Line between secs. 10 and 11, T. 2 N., R. 37 W.	do	1.3
May 17	Lodgepole Creek	Sec. 14, T. 14 N., R. 51 W	E. D. Johnson	2.3
May 18	do	Sec. 31, T. 14 N., R. 47 W	do	2.6
May 15	do	Sec. 33, T. 14 N., R. 49 W	do	3.9
Do	do	Sec. 34, T. 14 N., R. 49 W	do	6.3
May 22	do	Sec. 12, T. 12 N., R. 45 W	do	1.3
May 25	do	Sec. 36, T. 15 N., R. 57 W	do	4.7
May 23	do	Sec. 23, T. 23 N., R. 15 W	do	7.3
May 26	do	Sec. 2, T. 14 N., R. 58 W	do	9.2
May 21	do	Sec. 3, T. 13 N., R. 46 W	do	2.3
August 7	do	Sec. 36, T. 13 N., R. 45 W	do	3.1
August 8	do	Sec. 3, T. 14 N., R. 58 W	do	6.2
August 9	do	Sec. 23, T. 15 N., R. 55 W	do	6.3
August 10	do	Sec. 33, T. 15 N., R. 57 W	do	12.3
Do	do	Sec. 3, T. 12 N., R. 45 W	do	1.3
August 14	do	Sec. 33, T. 14 N., R. 49 W	do	6.4
August 16	do	Sec. 31, T. 14 N., R. 47 W	do	2.5
August 17	do	Sec. 14, T. 14 N., R. 51 W	do	2.3
August 22	do	Sec. 2, T. 13 N., R. 46 W	do	2.8
September 10	do	Above Polly ditch, sec. 30, T. 15 N., R. 55 W.	do	2.4
Do	do	Below Polly ditch, at bridge.	do	1.1
Do	do	One mile west of Kimball	do	1.3
September 12	do	Kimball	do	4.9
September 15	do	do	do	1.1
September 18	do	do	do	4.3
October 3	do	Above Neuman's dam	do	3.3
October 8	do	Lodgepole Station	do	2.1
October 18	do	Chappell	do	3.1
June 28	Medicine Creek	Cambridge	Adna Dobson	24.5
September 24	Monroe Creek	Sec. 33, T. 33 N., R. 56 W	T. J. O'Keefe	.1
June 28	Muddy Creek	Three miles above Arapahoe.	Adna Dobson	3.7
September 6	Niobrara River	Sec. 11, T. 28 N., R. 53 W	T. J. O'Keefe	10.8
September 7	do	Greggs's bridge, near Marsland.	do	11.2
July 18	do	Above Marsland, sec. 6, T. 28 N., R. 51 W.	A. B. McCoskey	7.0
August 7	do	Dunlap	do	14.1
Do	do	Head of Mirage canal, sec. 26, T. 29 N., R. 41 W.	do	*a* 14.5
Do	do	Sec. 29, T. 29 N., R. 47 W	do	4.0
August 13	Platte River	Fremont	O. V. P. Stout	2,300.0
December 20	South Platte River	North Platte	Adna Dobson	963.0
September 26	North Platte River	Gering bridge	A. B. McCoskey	333.1
November 5	do	do	do	624.8
October 26	Plain Creek	Hoef's mill, sec 27, T. 31 N., R. 34 W.	do	28.8
August 18	North Fork of Republican River.	Benkelman	O. V. P. Stout	41.7
Do	South Fork of Republican River.	do	do	3.0
September 29	Republican River	Culbertson	do	0.0
June 28	do	Cambridge	Adna Dobson	72.0
July 18	do	Bridge at Edison	E. D. Johnson	15.6
Do	do	Bridge at Oxford	do	14.3
July 27	do	Bridge at McCook	A. B. McCoskey	103.8
November 22	Rock Creek	Sec. 21, T. 1 N., R. 39 W	W. A. Channel	8.8
August 17	Salt Creek	Lincoln	Adna Dobson	5,807.0
August 22	Soldier Creek	Fort Robinson	T. J. O'Keefe	1.8
September 22	do	do	do	2.5
September 24	Sowbelly Creek	Head of Nutto ditch, sec. 24, T. 32 N., R. 56 W.	do	3.1
August 24	Turkey Creek	Naponee	O. V. P. Stout	7.0
September 25	Warbonnet Creek	Sec. 21, T. 33 N., R. 56 W	T. J. O'Keefe	.7
August 23	White Clay Creek	Sec. 1, T. 31 N., R. 52 W	do	1.5
September 1	White River	First wagon bridge below Crawford.	do	13.5
September 3	do	Whitney	do	5.0
August 22	do	Head of Crawford canal ditch.	do	14.0
July 16	do	Head of Crawford ditch	A. B. McCoskey	15.5
Do	do	Below Crawford	do	28.3

a Diverting all the water of the river at that point at the time the gaging was made.

REPUBLICAN RIVER NEAR SUPERIOR, NEBRASKA.

This station, which was established June 20, 1896, is located about 1 mile west of Superior. Discharge measurements are made from the highway bridge, thus determining the total amount of water passing over the dam and through the mill race. The discharge of the mill race is measured also, and is deducted from the total discharge, in order to determine the amount passing over the dam. The station is described in Water-Supply Paper No. 37, page 245. Results of measurements for 1899 will be found in the Twenty-first Annual Report, Part IV, page 220. During 1900 the following measurements were made by O. V. P. Stout and Adna Dobson:

Discharge measurements of Republican River and mill race near Superior, Nebraska.

River.			Mill race.		
Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
1900.	*Feet.*	*Sec.-feet.*	1900.	*Feet.*	*Sec.-feet.*
April 15	0.91	989	April 15	-------	0
April 26	1.06	1,056	April 26	1.14	79
May 19	.63	457	May 19	2.60	113
June 1	.54	374	June 1	3.20	93
June 21	.43	312	June 21	3.10	58
August 16	1.73	433			
September 30	1.21	67			
October 23	1.31	118			

Daily gage height, in feet, of Republican River near Superior, Nebraska, for 1900.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1	0.74	0.94	0.73	0.41	1.14	(a)	0.94	0.83
2	.73	.92	.52	.39	1.35	(a)	.82	.98
3	.65	.90	.52	.30	—.25	(a)	.65	1.09
4	.65	.89	.49	.18	—.42	(a)	.99	1.23
5	.65	.84	.49	.21	1.29	(a)	.15	1.10
6	.64	.97	.48	.20	1.22	(a)	.15	1.12
7	.64	1.13	.43	.09	—.67	(a)	.01	1.15
8	.67	2.11	.39	.21	.01	(a)	.39	1.11
9	.62	1.61	.35	.09	—.08	(a)	.44	1.31
10	.64	1.25	.25	.39	—1.50	(a)	(a)	1.35
11	.64	1.10	.53	.24	(a)	1.72	.03	1.29
12	.66	1.02	.73	.19	(a)	2.62	-------	1.31
13	.80	.92	.79	.07	(a)	1.67	.22	1.30
14	.75	.90	.58	—.50	(a)	1.40	(a)	1.21
15	.91	.82	.51	—.58	.21	1.30	.41	1.24
16	1.00	.77	.65	.51	2.25	1.32	.25	1.29
17	1.10	.74	.41	.73	1.52	1.16	(a)	1.20
18	1.04	.66	.42	.90	1.40	1.22	.13	1.32
19	.98	.63	.42	1.05	1.42	1.19	.28	1.22
20	.98	.59	.41	1.23	1.24	1.17	.07	1.25
21	1.20	.62	.43	1.20	1.23	1.13	1.37	(b)
22	1.09	.62	.52	1.22	1.20	1.05	1.28	(b)
23	1.00	.59	.57	1.14	1.20	1.21	1.31	1.20
24	1.41	.63	.41	1.21	1.15	1.02	1.26	c1.32
25	1.01	.70	.53	1.14	1.03	.82	1.22	-------
26	1.06	.63	.53	1.18	.91	(a)	1.30	-------
27	1.11	.59	.54	1.09	.90	.23	1.15	-------
28	1.17	.49	.50	.72	.99	.32	1.25	-------
29	1.13	.49	.43	1.63	.10	.39	1.12	-------
30	1.00	.58	.38	1.46	(a)	.83	1.06	-------
31	-------	.49		1.30	(a)	-------	.87	-------

a No water at gage; all in mill race. b Ice. c Closed for the winter November 24.

Daily center depth, in feet, of mill race near Superior, Nebraska, for 1900.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1	3.65	3.60	4.53	4.28	5.00	2.00	3.41	3.50
2	3.59	3.75	3.85	4.30	5.35	.65	3.22	3.53
3	3.78	3.89	4.04	4.33	2.50	.54	3.14	3.53
4	3.60	3.84	4.12	4.27	2.25	.52	3.27	3.60
5	3.57	3.54	4.12	4.15	5.21	.53	2.60	3.60
6	3.59	3.57	4.11	4.04	5.09	.53	2.71	3.61
7	3.70	4.00	4.11	3.62	3.29	.50	2.53	3.66
8	3.97	4.31	4.10	4.07	3.85	.45	2.88	3.59
9	3.59	4.21	4.02	3.94	3.53	.40	2.95	3.88
10	3.89	2.99	3.70	4.28	1.33	.53	2.55	3.75
11	3.87	2.70	4.27	3.93	1.00	3.25	2.68	3.83
12	3.82	2.76	4.47	3.90	1.11	6.55	2.63	3.70
13	3.99	1.47	4.00	3.87	1.05	4.23	2.82	3.75
14	3.76	1.52	4.00	3.36	1.12	4.82	2.20	3.69
15	3.00	1.33	3.83	3.06	3.93	4.52	3.12	3.97
16	4.20	1.53	4.39	4.48	5.25	3.93	3.02	3.80
17	4.27	2.00	4.30	4.58	5.15	3.62	2.63	3.82
18	3.18	2.87	4.32	4.76	5.00	3.52	2.83	3.82
19	3.03	2.60	4.30	4.90	4.98	3.57	2.86	3.72
20	2.89	3.02	4.06	5.13	5.00	3.57	2.63	3.69
21	3.37	3.57	3.10	5.10	4.85	3.52	3.99	3.30
22	3.15	3.59	3.40	5.11	4.58	3.48	3.92	3.68
23	3.00	3.80	3.38	5.00	4.82	3.58	3.99	3.50
24	3.89	3.95	3.90	5.02	4.87	3.52	3.92	3.95
25	2.29	3.85	4.20	5.12	4.72	3.32	3.95	.....
26	2.80	4.02	4.34	4.92	4.52	2.52	3.89	.....
27	2.78	2.63	4.54	4.90	4.68	2.80	3.78	.....
28	3.20	4.02	4.40	4.60	4.55	2.80	4.02	.....
29	3.30	3.58	4.38	5.27	3.65	3.00	3.80	.....
30	3.60	4.33	4.12	5.40	3.12	3.14	3.62	.....
31	.....	4.05	.....	5.00	3.22	.....	3.55	.....

REPUBLICAN RIVER AT JUNCTION, KANSAS.

This station is described in Water-Supply Paper No. 37, page 248. On October 23, 1900, a new bench mark was established, at an elevation of 12.35 feet above the zero of the old gage. It is a spike driven in the west side of a cottonwood tree 18 inches in diameter and 10 feet west of the bridge. The spike is about 2 feet above the ground. The observer is W. M. Hickman, engineer of the waterworks pumping station, which is about 100 feet from the gage. Results of measurements for 1899 will be found in the Twenty-first Annual Report, Part IV, page 221. During 1900 the following measurements were made:

May 5: Gage height, 4.50 feet; discharge, 1,158 second-feet.
May 22: Gage height, 4.10 feet; discharge, 851 second-feet.
September 24: Gage height, 3.40 feet; discharge 364 second-feet.
October 23: Gage height, 2.80 feet; discharge, 203 second-feet.
November 30: Gage height, 2.80 feet; discharge, 133 second-feet.

Daily gage height, in feet, of Republican River at Junction, Kansas, for 1900.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	3.7	3.7	3.8	4.2	5.2	3.8	3.5	3.4	3.0	3.3	3.0	2.8
2	3.5	3.9	4.0	4.0	5.0	3.8	3.5	3.3	3.0	3.3	2.8	2.8
3	3.8	3.9	4.0	4.0	4.6	3.9	3.4	3.3	3.0	3.3	2.8	2.8
4	3.6	3.9	4.2	3.9	4.6	3.7	3.3	3.0	3.2	3.3	2.7	2.9
5	3.5	4.0	3.9	3.8	4.5	3.7	3.3	3.0	3.1	3.2	2.7	2.9
6	3.8	4.1	4.2	3.8	4.4	3.9	3.3	3.2	3.0	3.2	2.7	3.1
7	3.6	4.2	4.2	3.8	4.0	3.8	3.3	3.2	2.9	3.2	2.7	3.1
8	3.4	4.2	4.6	3.8	4.5	3.7	3.3	3.3	3.0	3.3	2.6	3.0
9	3.6	4.1	6.8	4.0	4.7	3.7	3.2	3.4	3.0	3.3	2.6	2.9
10	3.6	3.9	6.4	3.9	4.9	3.7	3.1	3.3	2.9	3.3	2.6	2.9
11	3.8	4.1	6.2	3.9	5.1	3.6	3.1	3.0	3.0	3.2	2.7	2.9
12	3.6	4.2	5.4	3.8	6.1	3.6	3.1	3.0	3.0	3.2	2.7	3.0
13	3.6	3.8	5.2	3.8	6.0	4.0	3.0	3.0	3.3	3.1	2.7	3.0
14	3.5	3.9	4.4	3.7	5.3	3.7	3.0	3.1	5.5	3.0	2.7	3.1
15	3.7	4.1	4.5	3.6	4.5	3.7	3.2	3.0	6.0	3.0	2.7	3.1
16	3.7	3.8	4.6	4.5	4.7	3.6	3.2	2.9	5.9	3.0	2.8	3.0
17	3.7	3.8	4.9	4.9	4.7	3.6	3.3	2.7	4.9	3.0	2.7	3.0
18	3.6	3.8	4.6	6.0	4.9	4.3	3.4	2.7	4.7	2.9	2.8	3.0
19	3.8	3.8	4.4	6.2	4.9	3.7	3.3	2.7	4.0	2.9	2.8	3.0
20	3.8	3.9	4.5	5.9	4.7	3.7	3.3	2.7	3.6	2.9	2.8	3.0
21	3.8	3.9	4.2	5.2	4.5	3.6	3.3	2.7	3.5	3.1	2.8	3.1
22	3.9	4.0	4.2	5.4	4.3	3.6	3.3	3.0	3.5	3.4	2.7	3.3
23	3.7	4.1	4.2	5.4	4.2	3.5	3.5	3.0	3.5	2.8	2.9	3.3
24	3.9	4.2	4.0	5.0	4.1	3.6	3.5	3.5	3.4	2.8	2.9	3.2
25	3.8	4.0	4.3	5.2	4.0	3.7	3.4	3.3	3.3	2.8	2.8	3.2
26	3.8	4.0	4.4	5.4	4.0	3.6	4.0	3.3	3.4	2.7	2.8	3.1
27	3.9	3.8	4.2	5.7	4.0	3.5	3.7	3.3	5.9	2.7	2.7	3.2
28	3.8	3.8	4.0	5.9	4.1	3.5	3.5	3.2	4.3	2.7	2.7	3.2
29	3.9	.....	4.0	5.5	4.0	3.5	3.5	3.2	3.8	2.8	2.8	3.2
30	3.8	.....	4.0	5.0	4.5	3.5	3.4	3.3	3.5	3.0	2.8	.....
31	3.7	.....	4.2	.....	4.6	.....	3.4	3.2	.....	3.2	.....	.....

SOLOMON RIVER NEAR NILES, KANSAS.

This station is described in Water-Supply Paper No. 37, page 249. Records of discharge measurements will be found as follows: For 1897, Nineteenth Annual Report, Part IV, page 342; for 1898, Twentieth Annual Report, Part IV, page 214; for 1899, Twenty-first Annual Report, Part IV, page 223. During 1900 the following discharge measurements were made by W. G. Russell:

Discharge measurements of Solomon River near Niles, Kansas.

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
1900.	*Feet.*	*Sec.-ft.*	1900.	*Feet.*	*Sec.-ft.*
April 20	18.05	3,693	October 4	4.60	75
April 21	12.10	1,636	October 30	4.60	63
May 23	6.00	266	December 1	4.90	82
June 14	5.40	157			

Daily gage height, in feet, of Solomon River near Niles, Kansas, for 1900.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	4.9	4.7	5.5	5.0	7.8	5.9	5.0	6.9	4.5	4.7	4.6	4.6
2	5.0	5.0	5.2	4.9	7.3	6.2	5.2	6.3	4.6	4.7	4.5	4.9
3	5.0	4.8	5.1	4.8	6.9	7.0	5.1	5.1	4.5	4.8	4.6	4.8
4	5.0	4.9	5.1	5.0	6.9	7.8	4.9	5.8	4.5	4.7	4.7	5.0
5	5.0	5.0	5.2	5.0	6.4	9.0	4.8	5.6	4.5	4.6	4.7	4.6
6	5.0	4.7	5.2	4.9	6.4	7.7	4.7	5.3	4.4	8.5	4.4	4.8
7	4.9	4.9	5.6	5.0	6.2	7.0	4.7	5.3	4.4	7.3	4.5	4.6
8	4.9	4.7	5.8	5.0	6.1	6.3	4.6	5.4	4.5	5.6	4.7	4.3
9	4.6	5.0	6.3	4.9	6.5	5.7	4.6	5.1	4.2	5.0	4.8	4.7
10	4.6	5.1	12.9	4.8	9.5	5.5	4.5	5.1	4.3	4.9	4.3	4.6
11	4.8	5.2	9.6	4.8	7.8	5.4	4.5	4.9	4.5	4.9	4.6	4.7
12	4.8	5.1	7.2	4.9	8.6	5.4	4.4	9.0	4.4	4.8	4.7	5.0
13	5.0	5.0	6.5	4.9	7.3	5.4	4.4	7.4	4.4	4.9	4.8	4.3
14	4.9	5.0	6.2	4.7	7.1	5.4	5.1	7.0	4.3	4.6	4.3	4.7
15	4.8	4.9	5.7	5.1	6.5	5.3	4.8	5.5	5.5	4.6	4.2	4.8
16	4.7	5.0	5.6	5.2	10.3	5.4	4.4	5.1	13.4	4.6	4.6	4.7
17	4.6	5.0	5.3	6.2	9.0	5.5	4.3	5.1	8.1	4.5	4.6	4.5
18	4.3	5.0	5.3	18.3	8.4	5.4	4.3	5.0	7.0	4.5	4.6	4.4
19	4.7	5.0	5.3	20.2	7.5	5.3	4.6	7.8	6.5	4.8	4.5	4.4
20	4.8	5.0	5.2	20.1	6.8	5.2	4.4	8.9	6.0	4.8	4.5	4.5
21	5.1	5.4	5.2	12.4	6.5	5.1	4.3	7.0	7.9	4.7	4.8	4.6
22	5.2	5.3	5.1	8.8	6.3	5.1	4.3	6.2	6.0	4.8	4.5	4.8
23	5.1	5.4	5.2	8.4	5.9	5.0	4.2	5.3	5.5	4.8	4.9	4.5
24	5.1	5.0	5.0	7.6	5.8	4.9	7.9	5.3	5.2	4.7	5.0	4.6
25	5.0	5.1	4.8	7.2	5.7	5.0	5.5	5.3	5.0	4.6	4.6	4.7
26	4.9	5.0	4.9	7.1	9.7	4.9	4.7	5.0	10.3	4.8	4.7	4.4
27	4.8	5.0	4.9	7.8	9.5	4.8	5.4	4.9	9.0	4.6	4.4	4.7
28	4.8	4.9	4.9	8.8	9.8	4.9	5.1	4.8	6.8	4.5	4.4	4.9
29	5.0	------	5.0	9.7	7.1	4.9	5.2	4.6	5.4	4.7	4.6	4.6
30	5.1	------	5.0	8.3	6.4	5.0	7.5	4.6	5.0	4.6	4.7	------
31	4.7	------	4.9	------	6.0	------	7.9	4.5	------	4.7	------	------

SALINE RIVER NEAR SALINA, KANSAS.

This station is described in Water-Supply Paper No. 37, page 250. The observer is Charles Tressin. Records of results of measurements will be found as follows: For 1897, Nineteenth Annual Report, Part IV, page 346; for 1898, Twentieth Annual Report, Part IV, page 316; for 1899, Twenty-first Annual Report, Part IV, page 224. During 1900 the following discharge measurements were made by W. G. Russell:

April 7: Gage height, 3.70 feet; discharge, 57 second-feet.
April 21: Gage height, 19.00 feet: discharge, 2,851 second-feet.
May 23: Gage height, 5.90 feet; discharge, 197 second-feet.
October 4: Gage height, 5.00 feet; discharge, 133 second-feet.
October 30: Gage height, 3.90 feet; discharge 55 second-feet.
December 2: Gage height, 3.90 feet; discharge, 52 second-feet.

Daily gage height, in feet, of Saline River near Salina, Kansas, for 1900.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	3.9	3.5	4.0	3.9	6.1	5.9	4.3	5.0	4.1	4.1	4.3	3.9
2	3.8	3.4	3.9	3.8	6.2	6.9	4.9	5.0	3.7	3.9	4.0	3.9
3	3.7	3.4	3.4	3.8	6.5	12.0	5.4	4.8	3.5	3.7	3.9	3.9
4	3.7	3.5	4.2	3.8	6.8	14.1	4.7	4.5	3.6	5.0	3.7	3.9
5	3.5	3.4	4.2	3.7	6.4	9.2	4.4	4.5	3.4	4.5	3.7	3.9
6	3.6	3.3	3.9	3.8	6.1	6.8	4.2	4.4	3.4	3.9	3.8	3.9
7	3.5	3.4	4.1	3.8	5.8	6.1	4.0	4.3	3.3	3.8	3.7	3.9
8	3.6	3.5	4.3	3.8	5.7	5.7	4.0	4.3	3.2	3.7	3.7	3.8
9	3.6	3.7	6.0	3.8	5.7	5.4	3.9	4.1	3.2	3.6	3.5	3.8
10	3.6	3.7	10.1	3.9	6.6	5.1	3.7	3.8	3.3	3.6	3.5	3.7
11	3.5	3.7	8.2	3.8	8.4	5.0	4.0	4.0	3.4	3.6	3.7	4.0
12	3.6	3.6	6.5	4.0	7.0	4.8	3.7	3.9	6.2	3.4	3.5	3.8
13	3.6	3.7	6.1	3.9	6.2	4.7	4.4	3.8	6.0	3.5	3.6	3.9
14	3.8	3.6	5.5	4.1	5.8	4.7	4.0	3.8	4.2	3.5	3.7	3.8
15	3.9	3.5	4.9	4.2	8.4	4.6	3.7	3.4	3.6	3.5	3.7	3.8
16	3.9	(a)	4.6	6.5	11.5	4.4	3.7	3.6	4.4	3.5	3.6	3.7
17	3.8	(a)	4.3	5.2	10.2	4.4	3.5	3.6	4.6	3.2	3.5	3.8
18	3.7	(a)	4.1	12.9	8.5	4.5	3.6	3.5	4.1	3.5	3.7	3.9
19	3.6	3.5	4.0	15.9	7.3	4.4	3.6	3.4	4.0	3.5	3.8	3.7
20	3.8	3.5	3.9	18.0	6.7	4.2	3.6	3.2	4.2	3.3	3.6	3.6
21	3.8	3.6	3.7	19.2	6.2	4.5	3.5	3.2	3.6	3.5	3.5	3.8
22	3.6	3.7	3.8	15.1	6.0	7.8	3.5	3.0	3.6	3.9	3.7	3.8
23	3.7	3.6	3.8	9.1	5.7	7.9	3.7	3.0	3.5	4.0	3.7	3.9
24	3.8	3.6	4.0	7.9	5.5	6.4	19.0	3.3	3.6	3.7	3.6	4.0
25	3.7	3.6	3.9	7.4	5.5	5.7	20.2	3.2	3.5	4.9	3.9	3.9
26	3.7	3.7	3.9	7.7	12.5	5.3	17.5	3.4	12.8	3.5	4.0	3.8
27	3.3	3.7	3.8	7.0	11.8	5.0	11.8	3.2	8.0	4.0	3.8	3.8
28	3.5	3.9	3.7	6.9	7.1	4.8	7.1	3.3	5.4	3.8	3.7	3.6
29	3.5	.....	3.8	6.6	6.2	4.8	5.7	4.9	4.8	3.8	3.7	3.9
30	3.6	.....	3.7	6.2	7.0	4.5	5.5	7.6	4.5	3.8	3.9	.....
31	3.6	.....	3.7	.....	6.1	.....	5.1	5.2	.....	3.7	.....	.....

a Frozen.

SMOKY HILL RIVER AT ELLSWORTH, KANSAS.

This station is described in Water-Supply Paper No. 37, page 251. On October 22, 1900, the bench mark was tested and found to be correct. This river has not fluctuated much during the year. There were a few periods of high water, but they were of short duration, and the river quickly resumed its normal stage. Results of measurements for 1899 will be found in the Twenty-first Annual Report, Part IV, page 225. During 1900 the following measurements were made by W. G. Russell:

April 9: Gage height, 1.05 feet; discharge, 22 second-feet.
June 19: Gage height, 1.70 feet; discharge, 136 second-feet.
September 14: Gage height, 2.42 feet; discharge, 416 second-feet.
October 22: Gage height, 1.20 feet; discharge, 57 second-feet.

Daily gage height, in feet, of Smoky Hill River at Ellsworth, Kansas, for 1900.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	(a)	1.10	(a)	1.05	1.85	2.40	1.90	1.50	1.00	1.55	1.10	0.90
2	(a)	1.10	(a)	1.05	1.85	2.40	3.10	1.50	.95	1.50	1.10	.85
3	(a)	1.10	(a)	1.10	1.80	2.20	2.30	1.45	.90	1.50	1.10	.85
4	(a)	(a)	1.30	1.10	1.70	2.00	2.10	1.40	.90	1.50	1.10	.85
5	1.25	(a)	(a)	1.05	1.70	1.60	1.80	1.40	.85	1.50	1.10	.90
6	1.25	1.50	(a)	1.05	1.65	1.55	1.60	1.35	.85	1.70	1.05	.90
7	1.20	1.50	(a)	1.05	1.65	1.55	1.55	1.30	.85	1.60	1.05	.85
8	1.20	(a)	1.40	1.05	1.60	1.50	1.50	1.30	.85	1.60	1.05	.85
9	1.25	(a)	1.75	1.05	1.60	1.50	1.50	1.25	.95	1.55	1.00	.85
10	1.20	(a)	1.85	1.05	1.60	1.50	1.40	1.20	1.00	1.55	1.00	.85
11	1.20	(a)	1.45	1.10	1.55	1.55	1.40	1.20	1.30	1.50	1.00	.85
12	1.20	(a)	1.40	1.20	1.50	1.55	1.35	1.15	1.50	1.50	.95	.85
13	1.15	(a)	1.35	1.25	1.50	1.50	1.30	1.10	1.30	1.45	.95	.85
14	1.15	(a)	1.30	1.35	1.50	1.50	1.30	1.05	1.70	1.40	.95	.90
15	1.20	(a)	1.30	1.45	1.75	1.50	1.25	1.00	2.60	1.40	.90	.90
16	1.20	(a)	1.30	1.50	1.80	1.45	1.25	1.00	2.90	1.35	.90	.90
17	1.15	(a)	1.25	1.90	1.70	1.50	1.20	1.00	2.40	1.30	.90	.90
18	1.10	(a)	1.25	1.80	1.70	1.65	1.15	.95	2.00	1.30	.90	.90
19	1.10	(a)	1.20	2.85	1.65	1.70	1.10	.95	2.00	1.25	.90	.90
20	1.15	(a)	1.20	2.60	1.60	1.90	1.30	.95	1.90	1.20	.90	.90
21	1.15	(a)	1.20	2.45	1.50	2.90	1.10	.90	1.90	1.30	.90	.90
22	1.10	(a)	1.15	2.40	1.50	2.80	1.10	.90	1.85	1.40	.95	.95
23	1.10	1.15	1.15	2.20	1.45	2.75	1.05	.90	1.80	1.30	.95	.95
24	1.10	(a)	1.10	2.10	1.45	2.70	1.70	.85	1.70	1.25	.95	.95
25	1.50	(a)	1.10	2.00	1.40	2.60	1.40	1.20	1.60	1.20	.90	.90
26	1.10	(a)	1.10	1.90	3.00	2.40	1.30	1.20	1.70	1.20	.90	.90
27	1.10	(a)	1.15	1.80	2.00	2.20	1.35	1.20	1.70	1.15	.90	.90
28	1.10	(a)	1.15	1.75	1.80	2.00	1.25	1.15	1.65	1.15	.90	.90
29	(a)	------	1.10	1.80	1.60	1.90	1.40	1.10	1.60	1.15	.90	.90
30	(a)	------	1.10	1.75	1.60	2.00	1.60	1.05	1.55	1.10	.90	------
31	(a)	------	1.50	------	1.50	------	1.55	1.05	------	1.10	------	------

a Frozen.

BLUE RIVER NEAR MANHATTAN, KANSAS.

This station is described in Water-Supply Paper No. 37, page 252. On December 17, 1900, the gage wire and weight were stolen, and a new gage was established at the same elevation as the old gage. Since September 18, 1900, Elmer Drake has been the observer at this station, his home being about 40 yards from the gage. The results of measurements for 1899 will be found in the Twenty-first Annual Report, Part IV, page 227. During 1900 the following measurements were made:

Discharge measurements of Blue River near Manhattan, Kansas.

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
1900.	*Feet.*	*Sec.-ft.*	1900.	*Feet.*	*Sec.-ft.*
May 4	6.10	1,518	September 25	5.75	1,342
May 22	6.00	1,389	October 24	4.40	711
June 14	4.60	702	November 24	4.30	570
June 25	4.50	723			

Daily gage height, in feet, of Blue River near Manhattan, Kansas, for 1900.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	5.00	4.05	4.95	4.30	7.55	5.60	6.15	4.75	6.70	4.90	5.40	4.25
2	4.60	3.95	4.90	4.40	6.90	5.90	4.70	4.95	5.70	5.20	6.00	4.20
3	4.35	4.20	4.80	4.25	6.30	6.10	4.10	4.65	5.15	5.05	5.60	4.20
4	4.35	4.05	4.65	4.05	6.10	5.60	4.05	4.50	4.80	4.70	5.05	4.15
5	4.55	4.05	5.20	4.15	5.65	5.15	4.05	4.35	4.40	5.30	4.75	4.10
6	4.35	4.15	6.15	4.15	5.65	5.00	3.95	4.15	4.15	5.15	4.45	4.20
7	4.25	4.05	7.25	4.20	7.80	4.85	3.85	4.10	4.30	4.95	4.40	4.30
8	4.20	3.70	10.85	4.25	13.00	4.90	3.85	4.00	4.15	4.60	4.40	4.30
9	4.25	3.90	10.80	4.15	12.85	4.75	3.80	4.10	4.15	4.45	4.40	4.30
10	4.25	4.20	8.10	4.20	10.95	4.65	3.75	4.00	4.05	4.35	4.40	4.30
11	4.15	4.25	7.25	4.20	9.55	4.55	3.85	4.00	4.05	4.30	4.40	4.30
12	4.25	4.10	6.60	4.10	8.75	4.45	5.10	4.00	4.20	4.25	4.30	4.20
13	4.35	4.05	5.95	4.05	8.10	4.60	4.60	4.30	4.20	4.20	4.30	4.20
14	4.35	4.25	5.60	4.05	7.25	4.50	4.15	4.35	4.85	4.20	4.30	4.30
15	4.35	4.15	5.25	4.15	7.10	5.75	3.95	4.15	9.55	4.20	4.30	4.20
16	4.25	4.35	5.10	5.50	10.60	5.15	10.00	4.65	8.70	4.20	4.30	4.20
17	4.35	4.05	4.95	5.30	11.10	4.95	20.00	4.85	8.55	4.20	4.30	4.20
18	4.35	4.15	4.75	6.20	8.65	4.85	13.80	4.60	8.00	4.20	4.30	4.20
19	4.25	4.00	4.65	7.10	6.95	6.15	10.00	5.65	7.30	4.15	4.30	4.20
20	4.15	4.05	4.65	6.95	6.50	5.50	9.15	6.30	7.85	4.10	4.30	4.20
21	4.25	4.25	4.55	6.30	6.20	4.80	8.75	5.95	8.10	4.20	4.30	4.20
22	4.25	4.30	4.60	6.05	5.95	4.80	7.90	5.75	7.40	4.40	4.30	4.20
23	4.15	4.15	4.45	5.50	5.75	4.70	7.25	5.45	6.65	4.40	4.20	4.20
24	4.25	4.35	4.40	5.55	5.50	4.55	9.95	5.15	6.30	4.40	4.30	4.25
25	4.25	4.55	4.35	6.70	5.50	4.30	7.95	5.35	5.70	4.40	4.30	4.30
26	4.15	4.70	4.40	7.95	5.45	4.35	6.70	5.30	9.30	4.40	4.20	4.25
27	4.15	4.65	4.35	9.65	5.95	4.20	6.20	5.10	9.60	4.40	4.25	4.20
28	3.40	4.60	4.40	8.60	5.80	4.20	5.35	4.75	6.95	4.45	4.30	4.10
29	4.25	.....	4.35	7.20	6.15	4.30	5.35	5.75	5.70	4.60	4.30	4.10
30	4.10	.....	4.50	9.05	5.40	6.30	5.05	6.55	5.05	4.70	4.30	.....
31	3.95	.....	4.45	.....	5.45	.....	4.70	7.95	.....	4.70	.....	.....

KANSAS RIVER AT LECOMPTON, KANSAS.

This station is described in Water-Supply Paper No. 37, page 253. On June 24, 1900, a new gage was established, the old gage having been broken. The present gage, a pine board 1 inch by 1 inch by 10 feet long, divided into feet and tenths, is spiked on top of the old gage, and is at the same elevation. On October 26, 1900, a bench mark was established on top of the bottom flange of the iron strut connecting the two iron cylinders at the south end of the highway bridge over the river. The bench mark is at the west end of the strut, next to the cylinder. Its elevation is 12.19 feet above the zero of the gage. Records of discharge during 1899 will be found in Twenty-first Annual Report, Part IV, page 228. During 1900 the following discharge measurements were made by W. G. Russell:

Discharge measurements of Kansas River at Lecompton, Kansas.

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
1900.	*Feet.*	*Sec.-ft.*	1900.	*Feet.*	*Sec.-ft.*
May 19	6.20	12,352	October 3	4.70	6,060
May 21	4.95	7,669	October 26	3.00	3,441
June 13	3.30	4,455	November 26	2.90	4,436
June 24	3.10	4,333			

Daily gage height, in feet, of Kansas River at Lecompton, Kansas, for 1900.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.40	2.20	2.50	3.60	5.00	5.60	4.75	3.90	3.75	5.15	4.20	2.80
2	2.40	2.20	2.60	3.60	5.60	5.35	4.70	3.65	4.00	4.60	5.25	2.80
3	2.30	2.20	2.70	3.60	5.35	5.10	4.40	3.40	3.95	4.75	4.65	2.80
4	2.30	2.30	2.85	3.50	4.95	4.75	4.20	3.05	3.90	4.70	4.30	2.80
5	2.30	2.40	3.10	3.50	4.80	4.55	3.90	3.00	3.85	4.45	4.20	2.70
6	2.30	2.45	3.70	3.40	4.55	4.35	3.55	3.00	3.80	4.40	4.20	2.70
7	2.30	2.55	4.95	3.40	4.50	4.15	3.35	3.00	3.70	4.20	4.15	2.70
8	2.40	2.60	7.35	3.60	4.45	4.00	3.25	2.90	3.45	4.15	4.05	2.70
9	2.50	2.60	9.90	3.60	5.10	4.00	3.15	2.90	3.25	4.10	4.00	2.70
10	2.50	2.60	10.20	3.60	6.50	3.85	3.00	2.80	3.20	4.00	3.80	2.70
11	2.60	2.70	8.40	3.50	5.85	3.65	2.90	2.80	3.20	4.00	4.05	2.70
12	2.60	2.70	7.25	3.50	5.45	3.45	2.80	2.70	3.20	3.85	4.00	2.70
13	2.60	2.80	6.35	3.40	5.35	3.30	2.80	2.70	3.10	3.70	3.80	2.60
14	2.70	2.80	5.90	3.40	5.20	3.30	2.95	2.70	3.00	3.60	3.75	2.60
15	2.70	2.70	5.45	3.20	5.00	3.25	2.90	2.95	3.15	3.60	3.60	2.60
16	2.60	2.70	4.90	3.30	5.00	3.20	2.90	3.35	3.25	3.55	3.50	2.60
17	2.60	2.65	4.50	3.30	5.10	3.20	3.05	3.45	5.80	3.50	3.35	2.60
18	2.60	2.60	4.50	3.65	6.35	3.20	8.40	3.30	5.70	3.50	3.40	2.60
19	2.50	2.60	4.25	4.50	6.00	3.20	7.90	3.10	5.55	3.40	3.40	2.60
20	2.50	2.50	4.05	4.70	5.20	3.20	5.75	3.05	5.45	3.30	3.40	2.60
21	2.50	2.50	4.00	4.90	4.95	3.20	5.15	3.00	5.30	3.30	3.30	2.60
22	2.50	2.50	3.90	5.60	4.80	3.10	5.00	3.15	5.10	3.20	3.25	2.60
23	2.40	2.45	3.90	5.70	4.80	3.10	5.25	3.45	4.65	3.20	3.20	2.60
24	2.40	2.40	3.80	5.50	4.70	3.10	5.60	3.55	4.55	3.20	3.15	2.60
25	2.40	2.40	3.80	5.20	4.65	3.10	5.90	3.70	4.65	3.10	2.90	2.60
26	2.35	2.40	3.75	4.95	4.60	3.00	5.45	3.70	5.25	3.00	2.90	2.60
27	2.30	2.40	3.70	4.90	4.75	3.00	5.00	3.60	6.20	2.95	2.90	2.60
28	2.30	2.40	3.65	4.90	4.85	3.00	5.00	3.50	6.90	2.90	2.90	2.60
29	2.30	.....	3.60	5.70	5.20	4.05	4.85	3.45	7.50	2.90	2.85	2.60
30	2.30	.....	3.60	5.55	5.75	4.35	4.60	3.35	5.90	2.95	2.80	.....
31	2.30	.....	3.60	.....	5.90	.....	4.30	3.40	.....	3.50	.....	.....

ARKANSAS RIVER.

This river and its tributaries drain practically all of the southwestern quarter of the State of Colorado. The main stream heads in the vicinity of Tennessee Pass, in the central portion of the State. Thence it flows southerly for about 70 miles, then easterly for about 50 miles, to Canyon, receiving a number of tributaries from the mountainous area on either side. At Canyon it suddenly emerges from the main mountainous area, and thence it flows in an easterly direction through Pueblo, where it enters the great plains of eastern Colorado and Kansas. Within 200 miles of Canyon practically all of the water of the river is diverted for irrigation, even most of the flood waters being stored and used, so that little water, except at the very highest stages of the river, flows out of the State of Colorado. There is still, however, a considerable discharge during April and May, which was unusually large for those months of the year 1900, when, owing to the heavy rains upon the plains, the discharge of the stream was abnormal, and vast quantities of water flowed from it into the Gulf of Mexico.

The tributaries are of two classes: (1) Those that issue from the mountains, which have a perennial flow, and (2) those which drain the great plains, receiving water only during rains or in the early spring. Of the first class are Lake Creek, Badger Creek, and Grape Creek; while Fountain Creek, St. Charles River, Huerfano River, Apishapa River, and Purgatory River receive a portion of their supply from the plains and a portion from the mountains. Of the second

class are such water courses as Horse Creek, Adobe Creek, Big Sandy Creek, Timpas Creek, and many others of lesser note. The drainage from the plains is at times enormous, but usually the water courses of that district are dry. The flood discharge from some of these creeks has been estimated to be at least 10,000 cubic feet per second. Of the streams which head in the mountains but flow for long distances through the plains, the normal discharge is invariably used for irrigation, no water being discharged into the Arkansas except during flood seasons. Considerable water is being stored along the Arkansas, in the reservoirs of The Great Plains Water Company, also at Twin Lakes, while other reservoirs of importance but of smaller size are filled during the flood season. More water might, however, be stored by building canals large enough to receive that from the plains and conduct it to reservoirs.

A number of gaging stations have been maintained along the Arkansas and its tributaries, which will be described on the following pages in their geographic order. Those along the Lower Arkansas in Colorado were maintained with the assistance and cooperation of The Great Plains Water Company, one of the engineers of which, Mr. C. W. Beach, has made a number of measurements.

The seepage of the Arkansas Basin furnishes an interesting problem, which is being investigated by Prof. L. G. Carpenter, of the Colorado State Agricultural College, at Fort Collins. A study has also been made of the underground supply, the results of which have been published in the records of the United States Geological Survey.[1]

During the year 1900 about 30,000 acre-feet of water was stored in the reservoirs of The Great Plains Water Company, and the dam at the Twin Lakes reservoir was completed, permitting the use, during the latter part of the irrigation season, of these lakes, to the great benefit of crops lying under the canal of the Twin Lakes Land and Water Company.

LAKE CREEK AT TWIN LAKES, COLORADO.

This creek enters the Arkansas a short distance above Granite, Colorado. It is not a large stream, but it is of importance because it flows through Twin Lakes, which have been adapted as reservoirs by the Twin Lakes Land and Water Company. Measurements of this creek were begun June 21, 1899, by O. O. McReynolds, chief engineer of the Twin Lakes Land and Water Company, who at that time had charge of the work on the dam, and records were kept for a short time during that summer and again during the summer of 1900. In July, 1900, the stations were relocated and put upon a somewhat more permanent basis, one station being established July 10, at a point where the stream discharges from the upper lake, the gage rod being fastened to a fishway constructed several years before.

[1] Sixteenth Ann. Rept., Pt. II, pp. 535-588.

The measurements were made by wading. The channel at this upper station, known as the Interlaken station, is permanent and of such a character that excellent results were obtained, but the station can not be maintained in 1901, as the storage of water in the reservoirs will flood the locality to such an extent that it will be impossible to make measurements. The lower Twin Lakes station was established July 16, 1900, by O. O. McReynolds, at a footbridge constructed across the channel below the point where the artificial waterway from the lower lake enters the natural channel, the gage being fastened to one of the supports of the footbridge. The channel is rocky, but is fairly permanent in nature, the banks being high and not subject to overflow. The object of establishing the two stations was to ascertain the amount of storage water turned out from the lower lake by the water company, in order to determine the quantity of water the company would be entitled to at its head gate below. The records were kept by O. O. McReynolds.

In addition to the measurements made at the stations on Twin Lakes, one measurement was made at Granite, below the mouth of Lake Creek, namely, on July 9, when the discharge was found to be 570 second-feet. During 1900 no station was regularly maintained at Granite.

A description of the stations first established was published in Water-Supply Paper No. 37, page 256. The results of measurements for 1899 will be found in the Twenty-first Annual Report, Part IV, page 238. During 1900 the following measurements were made by A. L. Fellows, O. O. McReynolds, and C. W. Beach:

Discharge measurements at Twin Lakes, Colorado.

New (Interlaken) station, at head of channel between lakes.			Old station at bridge between lakes.		
Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
1900.	*Feet.*	*Sec.-ft.*	1900.	*Feet.*	*Sec.-ft.*
July 10	0.85	248	July 9	1.70	203
July 18	.50	122	July 16	1.00	146
August 3	.25	52			
September 4	.15	25			

New station at junction of old channel and new cut below lower lake.			Old station at head of old channel below lower lake.		
Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
1900.	*Feet.*	*Sec.-ft.*	1900.	*Feet.*	*Sec.-ft.*
July 16	2.40	245	July 10	2.50	193
July 18	2.35	210			
Do	2.50	260			
Do	1.97	118			
August 11	2.13	156			
September 4	1.30	25			

Daily gage height, in feet, of Lake Creek at new (Interlaken) station between Twin Lakes, Colorado, for 1900.

Day.	July.	Aug.	Sept.	Day.	July.	Aug.	Sept.	Day.	July.	Aug.	Sept.
1		0.30	0.20	12		0.23		23	0.45	0.20	
2		.30	.20	13		.20		24	.40	.20	
3		.30	.20	14		.20		25	.40	.20	
4		.30	.20	15		.20		26	.40	.20	
5		.30	.20	16		.20		27	.40	.20	
6		.30	.20	17		.20		28	.36	.20	
7		.30	.20	18		.20		29	.35	.20	
8		.30	.20	19		.20		30	.35	.20	
9		.25		20		.20		31	.33	.20	
10		.25		21		.20					
11		.25		22	0.45	.20					

Daily gage height, in feet, of Lake Creek at new station below lower of Twin Lakes, Colorado, for 1900.

Day.	July.	Aug.	Sept.	Day.	July.	Aug.	Sept.	Day.	July.	Aug.	Sept.
1		1.60	1.40	12		2.14		23	2.40	2.10	
2		1.60	1.40	13		2.10		24	2.40	2.10	
3		1.60	1.40	14		2.10		25	2.35	2.10	
4		1.60	1.40	15		2.10		26	2.35	2.10	
5		1.60	1.40	16		2.10		27	1.82	2.10	
6		1.60	1.40	17		2.10		28	1.76	1.49	
7		1.91	1.40	18		2.10		29	1.73	1.45	
8		2.23	1.40	19		2.10		30	1.73	1.45	
9		2.18		20		2.10		31	1.67	1.45	
10		2.18		21		2.10					
11		2.18		22	2.40	2.10					

ARKANSAS RIVER AT SALIDA, COLORADO.

This station is located at the footbridge near the railroad shops at Salida, Colorado. It was established April 11, 1895, and has been maintained during a portion of each year since. The gage rod, a vertical timber, is fastened to the north side of the footbridge, but considerable difficulty has been experienced by its being knocked out by ice and by logs during high water, three new rods being necessary in 1900. The banks are high and do not overflow. The bed of the stream consists of sand, gravel, and bowlders. Two large bowlders interfere to a great extent with the accuracy of the results. As the station is an important one, these bowlders should be removed, so as to improve the character of the channel, and thus render the results of measurements more reliable. A durable gage rod could be constructed on the left bank of the stream by laying a heavy timber in an inclined position. The stream is very swift at this point, but the channel is straight, and the discharge can readily be measured from the footbridge. Little water is used above Salida, and none is used below that place until Canyon is reached. The observer is William Furniss, who has kept the records for the last two years, the gage heights being sent to the local forecast official of the Weather Bureau at Denver, who has had them published in the morning papers.

A brief description of this station was published in Water-Supply

Paper No. 37, page 258. The results of measurements for 1899 will be found in the Twenty-first Annual Report, Part IV, page 230. During 1900 the following measurements were made by A. L. Fellows:

August 8: Gage height, 1.08 feet; discharge, 443 second-feet.
August 22: Gage height, 0.88 foot; discharge, 364 second-feet.
March 15: Gage height, 0.90 foot; discharge, 271 second-feet.
June 14: Gage height, 4.30 feet; discharge, 3,036 second-feet.

Daily gage height, in feet, of Arkansas River at Salida, Colorado, for 1900.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1	0.40	0.95	5.00	1.90	0.95	0.70	0.80
2	.40	1.25	4.60	2.00	.90	.70	.80
3	.30	1.45	4.40	1.85	.90	.70	.80
4	.30	1.55	4.10	1.65	.90	.70	.75
5	.30	1.80	3.75	1.85	.90	.70	.70
6	.40	1.90	3.75	1.90	.90	.70	.70
7	.50	2.00	4.10	1.60	.90	.75	.70
8	.40	2.00	4.45	1.50	1.00	.85	.70
9	.40	2.15	4.65	1.25	1.00	.90	.70
10	.40	2.45	4.40	1.20	1.05	.90	.70
11	.35	2.60	3.40	1.20	1.10	1.00	.70
12	.30	2.60	2.80	1.10	1.00	.90	.60
13	.30	2.60	2.80	1.10	1.00	.90	.60
14	.30	2.70	3.00	1.20	.90	.90	.60
15	.30	2.60	2.75	1.05	.90	.85	.60
16	.30	2.60	2.80	1.15	.80	.80	.60
17	.30	2.60	2.80	1.20	.80	.80	.60
18	.30	2.60	2.65	1.20	.80	.80	.60
19	.35	2.70	2.55	1.35	.80	.80	.55
20	.55	3.00	2.35	1.40	.80	.80	.50
21	.60	3.10	2.50	1.30	.80	.80	.50
22	.70	3.00	2.80	1.30	.80	.90	.50
23	.85	3.20	2.80	1.30	.80	.90	.50
24	.80	3.60	3.10	1.40	.80	.80	.50
25	.80	3.80	2.80	1.35	.80	.80	.50
26	.80	4.10	2.65	1.30	.80	.80	.50
27	.70	4.20	1.95	1.30	.80	.80	.50
28	.70	4.30	2.00	1.15	.80	.80	.50
29	.95	4.50	2.00	1.10	.70	.80	.45
30	1.10	4.60	1.85	1.00	.70	.80	.40
31	.....	5.00	.....	1.00	.70	.....	.40

ARKANSAS RIVER NEAR CANYON, COLORADO.

This station is located at the Hot Springs Hotel, 1½ miles west of Canyon and a short distance below the mouth of Grape Creek. It was established in 1889, and records have been kept since that time, thus furnishing most valuable data of the discharge of the river. The station is of special importance, being located at the mouth of the canyon and at a point practically above all of the irrigation ditches, except the Canyon City ditch (sometimes called the North Side ditch) and the South Canyon ditch (sometimes called the South Side ditch), both of which head above the station. During the irrigation season each of these ditches carries from 25 to 60 cubic feet of water per second, according to the needs of the irrigators, and their discharge should be added to the discharge at the station in order to obtain the total run-off at the mouth of the canyon. The gage rod is an inclined timber fastened to the north end of the suspension bridge belonging to the Hot Springs Hotel. The channel is straight for a long distance, and being lined with bowlders it does not readily

change, thus furnishing an opportunity to obtain fairly accurate results. The observer is G. A. Prentiss, manager of the Hot Springs Hotel. During 1900 the following measurements were made of the two ditches mentioned:

Discharge measurements of Canyon City and South Canyon ditches.

Date.	Canyon City ditch.	South Canyon ditch.
1900.	*Sec.-ft.*	*Sec.-ft.*
March 14	8	21
June 14	68	50
July 20	56	51
September 8	58	31

A description of this station was published in Water-Supply Paper No. 37, page 258. The results of measurements for 1899 will be found in the Twenty-first Annual Report, Part IV, page 231. During 1900 the following measurements were made by A. L. Fellows and R. W. Hawley:

March 14: Gage height, 2.85 feet; discharge, 408 second-feet.
June 14: Gage height, 5.50 feet; discharge, 3,235 second-feet.
July 20: Gage height, 2.85 feet; discharge, 570 second-feet.
September 8: Gage height, 2.10 feet; discharge, 229 second-feet.
September 12: Gage height, 2.10 feet; discharge, 205 second-feet.

Daily gage height, in feet, of Arkansas River near Canyon, Colorado, for 1900.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	------	------	------	2.90	3.45	6.65	4.45	2.40	2.10	2.10	2.10	2.50
2	------	------	------	3.00	3.40	6.60	4.25	2.35	2.15	2.10	2.10	2.50
3	------	2.50	2.70	3.00	3.30	6.45	4.20	2.40	2.10	2.10	2.10	2.50
4	------	------	------	3.00	3.30	6.30	4.15	2.35	2.10	2.10	2.20	2.40
5	------	------	------	3.10	3.40	6.25	3.85	2.30	2.10	2.10	2.30	2.40
6	2.60	------	------	3.10	3.40	6.20	3.80	2.50	2.10	2.10	2.30	2.40
7	------	------	------	3.10	3.50	6.35	3.70	2.45	2.10	2.10	2.30	2.40
8	------	------	------	3.10	3.60	6.50	3.45	2.45	2.10	2.10	2.30	2.40
9	------	------	------	3.10	3.70	6.40	3.75	2.55	2.10	2.10	2.25	2.40
10	------	2.60	2.80	3.10	3.90	6.35	3.90	2.60	2.10	2.15	2.20	2.40
11	------	------	------	3.10	4.05	6.15	3.45	2.55	2.10	2.20	2.25	2.40
12	------	------	------	3.10	4.45	5.65	3.45	2.40	2.15	2.20	2.20	2.50
13	2.60	------	------	3.10	4.50	5.75	3.45	2.45	2.10	2.25	2.20	2.40
14	------	------	------	3.20	4.45	5.65	3.35	2.55	2.10	2.30	2.20	2.40
15	------	------	------	3.20	4.40	5.60	3.20	2.40	2.10	2.35	2.20	2.30
16	------	------	------	3.20	4.35	5.40	3.30	2.30	2.10	2.35	2.20	2.30
17	------	2.60	2.80	3.20	4.45	5.50	3.20	2.20	2.10	2.40	2.25	2.40
18	------	------	------	3.20	4.85	5.45	3.00	2.15	2.05	2.40	2.30	2.40
19	------	------	------	3.30	4.90	5.45	3.00	2.15	2.00	2.35	2.30	2.40
20	2.50	------	------	3.45	5.05	5.35	2.95	2.10	2.00	2.30	2.30	2.40
21	------	------	------	3.50	4.95	5.30	2.90	2.20	2.00	2.20	2.30	2.40
22	------	------	------	3.50	4.80	5.35	2.85	2.20	2.00	2.20	2.30	2.50
23	------	------	------	3.40	4.90	5.35	2.80	2.20	2.00	2.20	2.30	2.50
24	------	2.60	2.80	3.40	4.90	5.55	3.00	2.15	2.00	2.20	2.40	2.40
25	------	------	------	3.30	5.25	5.65	2.85	2.15	2.00	2.20	2.40	2.30
26	------	------	------	3.30	5.60	5.25	2.85	2.25	2.05	2.20	2.40	2.30
27	2.50	------	------	3.20	5.95	5.05	2.90	2.20	2.15	2.20	2.50	2.30
28	------	------	------	3.20	6.25	5.05	2.80	2.20	2.10	2.15	2.50	2.40
29	------	------	------	3.45	6.65	4.60	2.65	2.15	2.00	2.10	2.50	2.40
30	------	------	------	3.65	6.45	4.55	2.55	2.10	2.10	2.10	2.50	2.40
31	------	------	2.90	------	6.65	------	2.35	2.15	------	2.10	------	2.40

ARKANSAS RIVER AT PUEBLO, COLORADO.

This station, which was established in September, 1894, is located at the Union avenue bridge in the city of Pueblo. Until March, 1900, the gage rod was a 2-inch by 6-inch plank bolted to the masonry wall at the south end of the Main street bridge, but owing to the scouring of the channel it became necessary to replace the gage by one about 69 feet below the south end of the Union avenue bridge. Discharge measurements, however, are still made at the Main street bridge. The channel at this point is excellent, and it would be of very great value to the entire division to have a permanent station of concrete established here. The channel, which is of bowlders and gravel, is confined by high masonry walls, so that there is little change, except that it fills during low water and scours out during high water. The flow of the stream is rapid, but not too swift for accurate measurements. This station is an important one, being located near the head of the principal irrigation portion of the valley, only one ditch of importance being taken out above it in the Pueblo district, although considerable water is used in the ditches in the neighborhood of Canyon, which is in another water district. It is upon the gagings made at this point that the water superintendents and commissioners depend for distribution of water to ditches below. The present gage rod is a 2-inch by 6-inch vertical timber, bolted, like the former rod, to the masonry wall and marked in feet and tenths. On June 13, 1900, the gage rod was connected with a bench mark on the coping at the northwest corner of the Union avenue bridge, which was found to be 19.79 feet above the zero of the rod. The gage readings during 1900 have been made by T. J. Burrows, water commissioner of the Pueblo water district.

Gage heights at this station during 1899 were published in Water-Supply Paper No. 37, page 259. The results of measurements for 1899 will be found in the Twenty-first Annual Report, Part IV, page 232. During 1900 the following measurements were made by A. L. Fellows, C. W. Beach, and R. W. Hawley:

Discharge measurements of Arkansas River at Pueblo, Colorado.

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
1900.	*Feet.*	*Sec.-ft.*	1900.	*Feet.*	*Sec.-ft.*
March 3	2.17	498	July 17	2.50	751
March 16	2.05	435	July 21	2.25	583
April 8	2.34	675	September 3	1.35	153
April 12	2.15	608	September 5	1.43	191
May 21	5.70	5,072	September 7	1.40	174
June 13	5.10	3,963	September 25	1.82	346

Daily gage height, in feet, of Arkansas River at Pueblo, Colorado, for 1900.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.00	1.90	1.75	1.60	3.75	5.65	3.75	2.00	1.30	1.60	1.85	1.90
2	2.00	1.85	1.80	1.56	3.55	6.75	3.55	1.90	1.40	1.60	1.90	1.90
3	2.05	1.90	1.85	1.50	3.50	6.10	3.35	1.90	1.40	1.60	1.90	1.90
4	2.20	1.85	2.00	1.50	3.40	6.20	3.30	1.80	1.40	1.60	1.90	1.80
5	2.10	1.80	1.95	4.55	3.40	5.45	3.25	1.80	1.50	1.52	1.95	1.90
6	1.95	1.80	1.95	2.60	3.80	5.60	3.10	1.80	1.45	1.50	1.95	1.90
7	1.95	1.90	1.80	2.40	3.80	5.50	2.95	1.80	1.40	1.50	1.90	1.90
8	1.95	1.50	1.80	2.40	3.80	5.95	2.90	1.75	1.40	1.55	1.90	1.90
9	1.90	1.60	1.75	2.40	3.80	6.00	3.15	1.90	1.40	1.62	1.90	1.90
10	1.85	1.85	1.76	2.45	4.10	5.80	2.95	2.10	1.40	1.62	1.90	1.90
11	1.85	1.90	1.80	2.25	4.25	5.60	2.65	1.90	2.00	1.70	1.90	1.90
12	1.85	1.95	1.90	2.20	4.50	5.15	2.90	1.80	1.60	1.70	1.90	1.90
13	1.85	1.90	2.00	2.20	4.40	5.10	2.85	1.80	1.60	1.70	1.90	1.90
14	1.90	1.95	2.15	2.20	4.25	5.00	2.70	1.80	1.50	1.70	1.90	1.90
15	1.95	1.95	2.10	2.75	4.10	5.10	2.70	1.70	1.50	1.70	1.90	1.90
16	2.00	1.95	2.00	1.95	3.95	4.90	2.70	1.70	1.50	1.80	1.90	1.90
17	1.95	1.90	1.95	2.30	4.00	5.00	2.55	1.70	1.55	1.90	1.90	1.90
18	1.90	1.95	2.00	2.40	4.30	4.90	2.45	1.70	1.50	1.90	2.00	1.90
19	1.75	2.05	2.00	2.40	4.30	4.70	2.40	1.70	1.50	1.90	2.00	1.90
20	1.85	2.20	2.00	2.45	5.90	4.75	2.40	1.65	1.49	1.80	2.00	1.70
21	1.90	2.15	1.90	2.85	5.45	4.70	2.30	1.60	1.58	1.80	2.00	1.90
22	1.95	2.00	1.80	3.00	4.80	4.70	2.30	1.60	1.51	1.80	2.00	1.80
23	1.90	2.05	1.80	2.95	4.70	4.85	2.30	1.60	1.55	1.80	2.00	1.80
24	1.90	2.05	1.80	2.75	4.90	4.80	3.00	1.60	1.60	1.80	2.00	1.80
25	1.75	2.00	1.80	2.65	5.20	5.05	2.50	1.50	1.60	1.80	2.00	1.80
26	1.80	1.90	1.80	2.65	5.20	4.45	2.20	1.50	1.50	1.80	2.00	1.90
27	1.75	2.00	1.80	2.50	5.20	4.45	2.20	1.50	1.65	1.80	2.10	1.80
28	1.80	1.95	1.80	2.75	5.50	4.10	2.00	1.50	1.70	1.80	2.10	1.80
29	1.90	.....	1.80	3.35	6.00	3.95	1.75	1.45	1.70	1.80	2.10	1.90
30	1.80	.....	1.60	4.25	6.60	3.85	2.15	1.40	1.70	1.80	2.00	1.90
31	1.85	.....	1.60	.....	6.20	.....	2.15	1.40	.....	1.85	.....	1.90

ARKANSAS RIVER NEAR NEPESTA, COLORADO.

This station, which is located at the wagon bridge a short distance above the town of Nepesta, is maintained by The Great Plains Water Company. It was established September 8, 1897, and has been maintained during the irrigation seasons of 1898, 1899, and 1900. The gage rod consists of a vertical timber securely fastened to the upstream cylinder of the bridge, on the left side of the river, readings at low water being made by means of a small temporary gage on the right-hand side. The channel above and below the station is straight for several hundred feet. The bed is sandy and shifting, so that the results are not altogether satisfactory for the purpose of making a rating table. The observer is J. A. Braun, railway station agent at Nepesta. A brief description of this station was published in Water-Supply Paper No. 37, page 260. The results of measurements for 1898 and 1899 will be found in the Twenty-first Annual Report, Part IV, page 233. During 1900 the following measurements were made by C. W. Beach and R. W. Hawley:

April 12: Gage height, 4.30 feet; discharge, 1,101 second-feet.
October 8: Gage height, 3.70 feet; discharge, 146 second-feet.

Daily gage height, in feet, of Arkansas River near Nepesta, Colorado, for 1900.

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	a6.4	7.2	5.7	4.5	3.4	3.7	3.9	3.9
2	a6.4	7.5	5.5	4.4	3.3	3.7	3.9	.....
3	6.4	8.0	5.3	4.2	3.3	3.7	3.9	.....
4	6.1	7.3	5.2	4.2	3.1	3.7	3.9	.....
5	6.0	7.1	5.1	4.1	3.1	3.5	4.0	.....
6	6.4	7.0	4.9	3.9	3.2	3.5	3.8	.....
7	6.5	7.0	4.7	3.7	3.2	3.6	3.7	.....
8	6.5	7.0	4.7	3.7	3.3	3.7	3.7	.....
9	6.4	6.8	4.6	3.9	2.9	3.7	3.6	.....
10	6.7	7.0	4.7	4.0	3.0	3.8	3.3	.....
11	7.0	6.9	4.6	3.8	3.0	3.7	3.4	.....
12	7.4	6.8	4.5	3.5	3.1	3.5	3.4	.....
13	7.0	6.6	4.6	3.5	3.6	3.5	3.9	.....
14	6.7	6.5	4.5	3.5	3.5	3.6	3.8	.....
15	6.8	6.5	4.4	3.5	3.4	3.7	4.0	.....
16	6.5	6.5	4.3	3.5	2.9	3.9	3.9	.....
17	6.3	6.5	4.2	3.3	3.2	3.9	4.1	.....
18	6.5	6.8	4.1	3.3	3.4	4.0	4.1	.....
19	6.5	6.4	4.0	3.1	3.4	4.0	4.1	.....
20	7.0	6.2	3.9	3.2	3.3	3.9	4.0	.....
21	9.0	6.3	3.9	3.0	3.5	3.8	4.0	.....
22	7.5	6.4	3.8	3.1	3.1	3.8	4.0	.....
23	7.4	6.5	3.8	3.1	3.1	3.8	3.9	.....
24	7.0	6.5	4.1	3.1	3.5	3.8	3.9	.....
25	6.8	6.5	5.5	3.1	3.6	4.0	3.9	.....
26	7.0	6.4	5.0	2.9	3.6	4.0	3.9	.....
27	7.1	6.3	4.9	2.9	3.2	3.9	3.9	.....
28	7.3	6.2	4.2	3.0	3.3	3.7	4.0	.....
29	7.7	6.1	4.1	3.0	3.4	4.0	4.0	.....
30	8.1	5.9	4.9	3.0	3.8	3.9	4.0	.....
31	7.5	.....	4.6	3.1	.....	3.9	.....	.....

a Estimated.

ARKANSAS RIVER NEAR ROCKYFORD, COLORADO.

This station is located about 2 miles northeast of Rockyford, at a wagon bridge crossing the river. It was established May 3, 1897, by S. W. Cressy, water commissioner of that district. Mr. Cressy maintained the station as long as he remained in charge of the office, but since then no reports have been received. The last report is dated April 7, 1900. The river is straight for a distance above and below the bridge, but the bed is very sandy, and changes radically at different stages of the water, so that the results obtained from any single rating table should be considered approximate. A better location for the station is at the ford about 3 miles above. A brief description of the station was published in Water-Supply Paper No. 37, page 261. Results for 1897 and 1899 will be found in the Twenty-first Annual Report, Part IV, page 234. The figures for 1898 were published in the Nineteenth Annual Report, Part IV, page 338.

Daily gage height, in feet, of Arkansas River near Rockyford, Colorado, for 1900.

Day.	Jan.	Feb.	Mar.	Apr.	Day.	Jan.	Feb.	Mar.	Apr.	Day.	Jan.	Feb.	Mar.	Apr.
1	.....	1.28	1.18	1.19	12	.....	(*a*)	1.20	.....	23	1.00	(*b*)	1.05	.....
2	.....	1.23	1.20	1.20	13	.....	(*a*)	1.20	.....	24	1.00	(*b*)	1.00	.....
3	.....	1.25	1.04	1.20	14	.....	(*a*)	1.20	.....	25	1.07	1.20	1.00	.....
4	.....	1.28	1.12	1.20	15	.....	(*a*)	1.28	.....	26	1.13	1.20	1.09	.....
5	.....	1.30	1.22	2.75	16	1.15	(*a*)	1.20	.....	27	1.15	1.20	1.10	.....
6	.....	1.25	1.25	3.95	17	1.18	(*a*)	1.20	.....	28	1.20	1.10	1.14	.....
7	.....	1.28	1.25	3.30	18	1.18	(*b*)	1.19	.....	29	1.25	.....	1.17	.....
8	.....	1.30	1.18	.....	19	1.10	(*b*)	1.25	.....	30	1.30	.....	1.20	.....
9	.....	1.25	1.10	.....	20	1.10	(*b*)	1.18	.....	31	1.30	.....	1.20	.....
10	.....	(*a*)	1.10	.....	21	1.05	(*b*)	1.12	.....					
11	.....	(*a*)	1.05	.....	22	1.00	(*b*)	1.08	.....					

a Frozen. *b* No record.

ARKANSAS RIVER AT PROWERS, COLORADO.

This station was established in September, 1899, but no records were kept until the spring of 1900. It is at the diversion dam across the river at the head of the Colorado and Kansas canal, that point being selected in the hope that the channel there might prove to be permanent, which up to the present time has been the case, and the rating curve obtained gives excellent results within the limits of the measurements made. The station is of special importance, as it is practically at the head of irrigation district No. 67, only the Colorado and Kansas canal and the Peterson ditch being taken out above in that district. The gage rod consists of a piece of board fastened to the upper side of the right-hand wing of the dam, the zero of the rod being level with the lowest place on the crest of the dam. During the greater part of the year little water passes this point, and during the low stages water is so valuable that the greatest care should be exercised in its distribution. The observer is D. L. Birge, head-gate keeper of the Colorado and Kansas canal. During 1900 the following measurements were made by A. L. Fellows and C. W. Beach:

July 19: Gage height, 0.38 foot; discharge, 113 second-feet.
July 5: Gage height, 0.60 foot; discharge, 304 second-feet.
July 28: Gage height, 0.775 foot; discharge, 546 second-feet.

When the last measurement was made 60 second-feet was going into the ditches.

Daily gage height, in feet, of Arkansas River at Prowers, Colorado, for 1900.

Day.	Apr.	May.	June.	July.	Aug.	Nov.	Dec.
1	.....	4.10	2.60	0.90	0.20	(a)	0.15
2	.....	3.10	2.70	.70	.20	.....	.10
3	.....	2.80	3.00	.50	.15	.....	.10
4	.....	2.70	3.50	.40	.15	.....	.20
5	.....	2.30	3.00	.40	.10	.....	.20
6	.....	2.20	3.10	.30	.10	.....	.20
7	.....	2.20	2.70	.30	.20	.....	.15
8	.....	2.20	2.30	.20	.30	.....	.20
9	.....	2.20	2.30	.20	.20	.....	.20
10	.....	2.30	2.20	.20	.30	.....	.30
11	.....	2.30	2.40	.20	.40	.....	.20
12	.....	2.90	2.90	.15	.70	.....	.20
13	.....	2.20	2.40	.15	.60	.....	.20
14	.....	2.70	2.30	.20	.50	.....	.10
15	1.30	2.60	2.10	.20	.40	.....	.15
16	1.20	2.40	2.00	.20	.30	.....	.20
17	1.20	2.20	2.00	.05	.10	.....	.20
18	3.70	2.10	1.80	.05	.00	.....	.20
19	2.30	2.30	1.80	.15	(a)	.....	.30
20	1.90	2.10	1.70	.10	.....	.....	.25
21	2.20	2.20	1.50	.15	.....	.....	.20
22	1.70	3.40	1.80	.15	.....	.....	.20
23	1.80	3.10	1.80	.15	.....	.....	.20
24	1.70	2.80	1.40	.15	.....	.....	.20
25	2.80	2.60	1.20	.25	.....	0.20	.30
26	2.60	2.50	1.30	.40	.....	.10	.20
27	1.30	2.50	1.20	1.50	.....	.10	.20
28	1.10	2.50	1.10	.90	.....	.10	.30
29	4.90	2.40	.90	.70	.....	.10	.20
30	4.70	2.40	1.20	.50	.....	.20	.20
31	.....	3.10	.....	.25	.....	.....	.20

a No record from August 19 to November 24; water being diverted into irrigation canals.

ARKANSAS RIVER AT AMITY CANAL HEAD GATES, COLORADO.

The station is located at the head of Amity canal, 7 miles west of Lamar, and is maintained by the Amity Canal Company, which keeps the records of the amount of water flowing into the ditch, over the dam, and out of the wasteway of the canal. No measurements were made at this point during 1900. On April 7, 1900, E. R. Bannister, head-gate keeper of the Amity canal, made a single measurement at the wagon bridge crossing the river north of Lamar, and found a discharge of 8,890 second-feet.

ARKANSAS RIVER NEAR GRANADA, COLORADO.

This station was established July 24, 1898, being located at the head gates of the Buffalo Creek canal, 2 miles northeast of Granada. There is an earth and brush dam across the river at that point, but owing to its unstable nature the gage heights are of little value, giving, as they do, merely an idea of the rise and fall of the river, without particular reference to the actual discharge. Since the establishment of the station readings have been made throughout the irrigation seasons (1898, 1899, and 1900) by Ben Riley, head-gate keeper of the Buffalo canal. No measurements have been made at this point, and no rating table has been computed. A brief description of the station, with gage heights for 1899, was published in Water-Supply Paper No. 37, page 264.

Daily gage height, in feet, of Arkansas River near Granada, Colorado, for 1900.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	3.60	2.60	2.00	1.20	4.70	3.90	2.00	1.60	1.40	1.80	1.80	1.80
2	3.60	3.60	2.00	1.20	4.00	4.00	2.00	1.60	1.40	1.60	1.80	1.80
3	3.60	3.60	2.00	1.00	4.30	4.60	1.80	1.60	1.40	1.00	1.80	1.80
4	3.60	3.40	1.80	1.80	4.80	4.60	1.80	1.60	1.40	1.00	1.80	1.80
5	3.60	3.00	1.80	2.80	4.50	4.00	2.40	1.60	1.60	1.00	1.80	1.80
6	3.60	2.80	1.80	3.40	4.10	3.40	2.40	1.40	1.40	1.00	1.80	2.00
7	3.60	2.60	1.60	3.50	3.40	3.20	2.40	1.40	1.40	1.00	1.80	2.00
8	3.60	2.00	1.40	3.60	3.10	3.00	2.60	1.40	1.20	1.40	1.80	2.00
9	3.60	2.00	1.40	3.00	3.00	2.80	3.00	1.50	1.20	1.60	1.80	.....
10	3.60	2.00	1.40	2.60	3.00	2.80	3.60	1.60	1.20	1.50	1.80	.....
11	3.60	2.00	1.40	3.00	3.00	3.15	3.60	1.80	1.20	1.60	1.80	.....
12	3.60	2.80	1.40	2.80	2.80	3.35	3.60	1.60	1.80	1.60	1.80	.....
13	3.60	2.80	1.60	2.80	3.50	3.00	3.00	1.60	1.60	1.60	1.80	.....
14	3.00	2.40	1.60	2.40	3.60	3.10	3.00	1.80	1.60	1.60	1.80	.....
15	3.00	2.00	1.40	2.60	3.50	3.00	2.80	1.60	1.60	1.60	1.80	.....
16	3.00	2.00	1.40	2.60	3.30	3.00	3.70	1.60	1.40	1.60	1.80	.....
17	3.00	2.40	1.80	3.80	3.30	2.90	3.20	1.60	1.40	1.60	1.80	.....
18	2.80	2.60	1.80	3.80	3.20	3.00	3.00	1.60	1.60	1.60	1.80	.....
19	2.80	2.60	1.80	3.60	3.20	3.00	3.00	1.35	1.60	1.80	1.80	.....
20	2.80	2.60	1.80	3.40	3.50	3.00	2.80	1.35	1.60	1.80	2.00	.....
21	2.00	2.80	1.40	3.00	3.90	3.00	2.00	1.35	1.60	1.60	2.00	.....
22	2.00	3.00	1.40	3.00	4.00	2.80	2.00	1.60	1.60	1.60	2.00	.....
23	2.00	2.60	.80	3.30	3.80	2.60	2.00	1.35	1.60	1.60	2.00	.....
24	2.00	2.60	.80	2.70	3.40	2.60	2.00	.80	1.60	1.60	2.00	.....
25	2.00	2.80	.80	2.20	3.40	2.00	2.00	.90	1.60	1.60	1.80	.....
26	2.00	2.40	.80	2.00	3.40	2.00	2.00	1.40	1.60	1.60	1.80	.....
27	2.00	2.00	.80	2.00	3.20	2.00	2.00	1.40	1.80	1.60	1.80	.....
28	1.80	2.00	.80	2.00	3.20	2.00	2.00	1.40	1.80	1.80	1.80	.....
29	1.80	.....	1.60	2.40	3.20	1.80	3.00	1.40	1.80	1.80	1.80	.....
30	2.60	.....	1.60	3.80	3.80	3.40	2.20	1.40	1.80	1.80	1.80	.....
31	2.60	.....	1.60	.....	3.70	.....	1.70	1.40	.....	1.80	.....	.....

ARKANSAS RIVER AT HUTCHINSON, KANSAS.

This station was established May 13, 1895. It is described in Water-Supply Paper No. 37, page 265. On October 25, 1900, a new gage was put in. It is a pine timber, 2 inches by 2 inches by 5 feet long, marked in feet and tenths, and is fastened to the east side of the east cylinder of the third set of cylinders from the north end of the bridge, at the same elevation as the old gage. Results of measurements will be found as follows: For 1896, Eighteenth Annual Report, Part IV, page 233; for 1897, Nineteenth Annual Report, Part IV, page 361; for 1898, Twentieth Annual Report, Part IV, page 343; for 1899, Twenty-first Annual Report, Part IV, page 236. During 1900 the following discharge measurements were made by W. G. Russell:

Discharge measurements of Arkansas River at Hutchinson, Kansas.

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
1900.	*Feet.*	*Sec.-ft.*	1900.	*Feet.*	*Sec.-ft.*
April 12	4.65	6,321	June 20	4.05	3,901
April 13	4.25	4,738	September 27	1.35	77
April 14	4.10	3,887	October 25	1.30	87
May 18	4.75	5,989	November 29	1.30	84
June 9	5.10	8,476			

Daily gage height, in feet, of Arkansas River at Hutchinson, Kansas, for 1900.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.80	2.00	2.00	1.80	3.70	4.60	3.20	1.50	1.10	1.70	1.45	1.30
2	1.80	2.00	2.10	1.80	3.65	4.70	3.10	1.50	.95	1.65	1.45	1.30
3	1.80	2.00	2.20	1.70	3.60	5.00	3.00	1.45	.95	1.60	1.45	1.30
4	1.90	2.00	2.30	1.70	5.20	4.80	2.90	1.45	.95	1.50	1.35	1.30
5	1.90	1.90	3.20	1.70	5.35	4.80	2.80	1.40	.95	1.40	1.35	1.30
6	1.90	1.90	3.00	1.70	5.10	5.20	2.70	1.40	.95	1.35	1.25	1.30
7	2.00	1.90	2.80	1.70	4.90	5.55	2.70	1.40	.90	1.30	1 25	1.25
8	1.90	1.90	2.70	1.70	4.90	5.40	2.70	1.50	.90	1.30	1.25	1.25
9	1.90	1.90	2.70	1.70	4.70	5.20	2.60	1.45	.90	1.30	1.25	1.25
10	1.90	1.90	2.70	4.65	4.50	5.00	2.50	1.40	1.30	1.25	1.25	1.25
11	1.90	1.90	2.60	4.75	4.30	4.60	2.40	1.35	1.20	1.20	1.25	1.25
12	2.00	1.90	2.50	4.65	4.20	4.60	2.30	1.30	1.20	1.20	1.25	1.25
13	2.00	1.90	2.50	4.60	4.20	4.70	2.20	1.25	1.20	1.20	1.25	1.25
14	2.00	1.90	2.50	4.25	4.10	4.90	2.10	1.20	1.20	1.20	1.25	1.25
15	2.10	1.90	2.40	4.10	4.15	4.70	2.10	1.15	1.15	1.20	1.25	1.25
16	2.10	1.90	2.30	4.00	4.40	4.90	2.00	1.10	1.10	1.15	1.25	1.25
17	2.10	1.90	2.20	3.90	4.60	4.70	1.90	1.05	1.10	1.10	1.25	1.25
18	2.10	2.00	2.20	3.80	4.75	4.60	1.90	1.05	1.10	1.10	1.20	1.25
19	2.10	2.00	2.10	3.60	4.50	4.30	1.90	1.05	1.20	1.10	1.15	1.25
20	2.10	2.00	2.00	4.50	4.40	4.10	1.85	1.00	1.25	1.10	1.20	1.25
21	2.10	2.00	2.00	5.30	4.20	4.00	1.80	1.00	1.20	1.30	1.25	1.25
22	2.10	2.00	2.00	4.60	4.20	3.90	1.70	1.25	1.20	1.45	1.25	1.25
23	2.10	1.90	1.90	4.35	4.20	3.80	1.70	1.20	1.25	1.35	1.25	.....
24	2.00	1.90	1.90	4.00	4.20	3.70	1.70	1.20	1.25	1.30	1.25	.....
25	2.00	1.90	1.90	4.10	4.05	3.60	1.70	1.10	1.20	1.25	1.25	.....
26	2.00	2.00	1.90	4.10	5.10	3.50	1.60	1.10	1.15	1.30	1.25	.....
27	2.00	2.00	1.90	4.00	5.20	3.50	1.60	1.05	1.35	1.30	1.25	.....
28	2.00	2.00	1.90	4.10	4.80	3.50	1.55	1.05	1.40	1.35	1.30	.....
29	2.00	.....	1.90	4.05	4.70	3.50	1.50	1.10	1.50	1.50	1.30	.....
30	2.00	.....	1.90	3.90	4.50	3.40	1.50	1.10	1.70	1.60	1.30	.....
31	2.00	.....	1.90	.....	4.60	.....	1.50	1.10	.....	1.50	.....	.....

VERDIGRIS RIVER NEAR LIBERTY, KANSAS.

This station, which was originally established in August, 1895, is described in Water-Supply Paper No. 37, page 265. In 1900 a new

bench mark was established, consisting of 3 nails driven horizontally into a root on the river side of a cottonwood tree 40 feet south of the gage, the nails being 8 inches below a sandstone rock which protrudes from a hollow in the tree. Its elevation is 11.88 feet above the zero of the old gage. Results of measurements will be found as follows: For 1896, Eighteenth Annual Report, Part IV, page 235; for 1897, Nineteenth Annual Report, Part IV, page 369; for 1898, Twentieth Annual Report, Part IV, page 344; for 1899, Twenty-first Annual Report, Part IV, page 237. During 1900 the following discharge measurements were made by W. G. Russell:

May 16: Gage height, 2.90 feet; discharge, 265 second-feet.
June 11: Gage height, 3.40 feet; discharge, 542 second-feet.
June 23: Gage height, 2.40 feet; discharge, 169 second-feet.
October 1: Gage height, 34.70 feet; discharge, 35,000 second-feet.[1]
October 28: Gage height, 3.00 feet; discharge, 437 second-feet.
November 28: Gage height, 4.00 feet; discharge, 885 second-feet.

Daily gage height, in feet, of Verdigris River near Liberty, Kansas, for 1900.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.05	2.00	2.50	2.60	4.45	4.40	26.65	2.45	1.60	34.75	24.75	4.00
2	2.00	2.00	2.60	2.60	3.90	4.25	13.20	2.40	1.65	34.70	27.95	3.80
3	2.00	2.00	2.65	2.50	3.65	3.90	4.20	2.30	1.80	5.75	26.90	3.80
4	2.00	2.00	2.70	2.50	3.55	3.60	3.70	2.30	1.95	5.20	16.50	3.80
5	2.10	2.00	4.60	2.40	3.20	3.40	4.00	2.20	1.85	4.80	7.50	3.70
6	2.10	1.90	13.00	2.40	6.10	3.25	4.20	2.20	1.70	4.35	5.80	3.70
7	2.10	1.90	16.10	2.40	4.30	3.10	3.45	2.10	1.70	4.00	5.45	3.60
8	2.10	1.90	11.45	2.40	4.10	2.95	2.95	2.10	1.70	3.80	5.15	3.60
9	2.10	2.10	6.20	2.40	4.90	2.75	2.75	2.10	1.70	3.65	4.95	3.60
10	2.10	2.20	5.60	2.40	4.15	2.65	3.00	2.10	1.70	3.50	4.80	3.50
11	2.10	2.10	5.25	2.45	3.55	3.30	2.85	2.10	1.70	3.40	4.70	3.40
12	2.20	2.10	4.85	2.50	3.25	3.15	3.60	2.10	1.80	3.30	4.60	3.40
13	2.20	2.10	4.45	2.60	3.10	3.05	3.35	2.00	1.80	3.20	4.45	3.30
14	2.20	2.25	3.95	2.60	2.90	3.80	2.95	2.00	1.70	3.15	4.40	3.30
15	2.20	2.30	3.75	2.90	2.80	4.55	2.75	2.00	1.80	3.05	4.30	3.30
16	2.10	2.30	3.35	2.80	2.85	3.40	6.30	2.00	1.70	3.00	4.20	3.20
17	2.00	2.20	3.20	16.65	10.85	3.10	9.25	1.90	1.75	2.90	4.10	3.20
18	2.00	2.00	3.20	10.50	21.50	2.90	7.65	1.90	2.45	2.90	4.00	3.20
19	2.00	2.00	3.15	6.70	20.55	2.80	4.70	1.80	2.85	2.90	4.10	3.20
20	2.00	2.00	3.10	5.40	10.75	2.65	3.75	1.70	2.75	2.80	5.00	3.20
21	2.00	2.00	3.10	3.90	7.30	2.55	3.15	1.70	2.85	2.80	5.10	3.10
22	2.10	2.00	3.05	3.80	5.40	2.45	3.00	1.70	2.85	2.95	4.80	3.10
23	2.10	2.00	2.95	3.85	5.10	2.40	2.95	1.70	2.80	2.90	4.80	3.10
24	2.00	2.05	2.80	7.25	5.05	2.40	4.75	1.60	2.70	3.40	4.50	3.10
25	2.00	2.70	2.80	6.50	6.70	2.35	4.80	1.60	4.55	3.40	4.30	3.10
26	2.00	2.55	2.80	5.25	5.50	2.30	3.90	1.90	13.45	3.35	4.10	3.10
27	2.00	2.45	2.80	5.00	6.00	2.30	3.20	1.75	12.10	3.10	4.10	3.00
28	2.00	2.40	2.80	4.90	6.05	2.30	3.00	1.55	28.00	3.00	4.10	3.00
29	2.00	.....	2.70	3.90	5.65	3.20	2.90	1.60	32.00	2.90	4.00	3.00
30	2.00	.....	2.70	4.35	5.30	10.50	3.10	1.60	36.00	8.75	4.00	.....
31	2.00	.....	2.70	.....	4.60	.....	2.65	1.60	.....	15.80	.....	.....

NEOSHO RIVER NEAR IOLA, KANSAS.

This station, which was established in July, 1895, is described in Water-Supply Paper No. 37, page 267. Records of discharge measurements for the years 1896, 1897, 1898, and 1899 will be found in the Twenty-first Annual Report, Part IV, pages 245 and 246. During

[1] Partly estimated; 33,048 second-feet measured.

1900 the following discharge measurements were made by W. G. Russell:

May 15: Gage height, 2.80 feet; discharge, 414 second-feet.
June 12: Gage height, 3.40 feet; discharge, 637 second-feet.
June 22: Gage height, 3.20 feet; discharge, 489 second-feet.
October 2: Gage height, 5.80 feet; discharge, 4,476 second-feet.
October 29: Gage height, 7.10 feet; discharge, 7,559 second-feet.
November 27: Gage height, 3.30 feet; discharge, 788 second-feet.

Daily gage height, in feet, of Neosho River near Iola, Kansas, for 1900.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.10	2.30	2.60	2.80	4.00	5.25	5.50	3.20	2.10	7.80	17.40	3.20
2	2.20	2.30	2.60	2.80	3.90	4.15	4.20	2.95	2.10	5.55	18.95	3.10
3	2.20	2.30	2.60	2.80	3.50	3.90	3.50	2.75	2.10	4.70	12.50	3.10
4	2.20	2.30	2.70	2.70	3.50	3.80	3.30	2.60	2.10	3.95	5.30	3.00
5	2.20	2.30	3.05	2.70	3.50	3.70	3.30	2.50	2.10	3.60	4.90	3.00
6	2.20	2.30	8.00	2.70	3.40	3.70	3.20	2.45	2.10	3.40	4.45	3.00
7	2.20	2.30	7.80	2.70	3.50	3.70	3.20	2.40	2.10	3.20	4.10	2.90
8	2.20	2.30	7.60	2.70	3.80	3.55	3.20	2.30	2.10	3.20	3.75	2.90
9	2.20	2.30	6.95	2.70	3.55	3.50	3.20	2.30	2.10	3.10	3.65	2.80
10	2.20	2.30	7.80	2.80	3.50	3.50	3.15	2.25	2.10	3.00	3.50	2.80
11	2.20	2.30	9.15	2.80	3.40	3.35	3.10	2.20	2.10	3.00	3.50	2.80
12	2.20	2.30	8.85	2.90	3.30	3.35	3.00	2.20	2.10	3.00	3.40	2.80
13	2.20	2.30	5.95	2.90	3.15	3.40	3.00	2.20	2.10	2.90	3.30	2.80
14	2.20	2.30	4.70	2.90	2.95	3.60	2.90	2.20	2.10	2.90	3.20	2.70
15	2.30	2.30	4.15	2.90	2.80	3.50	2.80	2.20	2.10	2.90	3.20	2.70
16	2.30	2.30	3.85	7.50	4.50	3.50	2.70	2.20	2.25	2.85	3.10	2.70
17	2.30	2.30	3.80	7.60	13.00	3.80	2.85	2.10	2.75	2.80	3.00	2.70
18	2.30	2.30	3.70	4.35	15.60	3.55	2.85	2.10	3.15	2.80	3.00	2.70
19	2.30	2.30	3.55	4.90	15.80	3.35	2.75	2.10	3.40	2.80	3.00	2.70
20	2.30	2.30	3.60	6.25	7.10	3.30	2.70	2.10	3.15	2.70	3.60	2.70
21	2.30	2.30	3.30	4.40	5.20	3.30	2.60	2.10	2.95	2.70	3.35	2.70
22	2.30	2.30	3.10	3.65	4.80	3.20	2.70	2.10	2.90	2.70	3.15	2.60
23	2.30	2.30	2.90	7.65	4.40	3.05	2.80	2.10	2.90	2.70	3.20	2.60
24	2.30	2.30	2.90	8.80	4.15	2.90	2.90	2.10	3.40	2.70	3.45	2.60
25	2.30	2.40	2.90	5.00	3.95	2.75	3.05	2.10	7.30	2.80	3.50	2.60
26	2.30	2.45	2.90	5.40	4.15	2.55	3.25	2.10	4.45	2.90	3.40	2.60
27	2.30	2.50	2.85	4.90	4.40	2.50	3.65	2.10	4.90	2.80	3.30	2.65
28	2.30	2.60	2.80	3.95	3.90	2.70	3.85	2.10	10.80	2.80	3.30	2.60
29	2.30	.....	2.80	4.05	7.20	2.90	3.65	2.10	11.70	7.50	3.30	2.70
30	2.30	.....	2.80	4.20	7.95	5.90	3.60	2.10	10.30	11.00	3.30	.....
31	2.30	.....	2.80	.....	7.35	.....	3.45	2.10	.....	10.75	.....	.....

TEXAS RIVERS.

The year 1900 was marked by an increased flow of all of the Texas rivers. The flow of the two previous years was somewhat below the average. In all of the streams from the Pecos east, and especially in that section bounded by the Pecos and Colorado rivers and by the International and Great Northern and the Southern Pacific railroads, generally known as the Edwards Plateau, the increase in the flow is marked, the discharge of the Colorado being greater than at any time during the last twelve years. All of the streams forming the system at the foot of the Edwards Plateau, namely, Barton Springs at Austin, the San Marcos at San Marcos, Comal River at New Braunfels, San Antonio River at San Antonio, Leona River at Uvalde, Los Moras Creek at Brackettville, Mud Creek in the western part of Kinney County, and the San Felipe Springs at Del Rio, have shown a decided increase in their volume. In fact, during 1900 the entire section referred to has raised the best stock of the last ten years, which means an abundance

of rain. Barton Springs more than trebled its flow of 1898, while San Antonio River, which had been dry for several years, began to flow during the latter part of 1899, and its discharge increased to such an extent that the water-power plants started up early in the year 1900. Leona River at Uvalde, which had also been dry for several years, began to flow again; Los Moras Creek shows an increase since the flood of June, 1899; and Mud Creek—dry since 1893—began to flow, making irrigation from it again possible.

BRAZOS RIVER AT WACO, TEXAS.

In September, 1898, a gage was established on the southwest bank of Brazos River at Waco. It consists of an inclined iron bar, 3 inches by 1 inch, reading from 0 to 4.3 feet, bolted to a hard pine stick 16 feet long, embedded in cement in the sloping limestone of the bank, flush with the surface, on which are painted the graduations above 4.3 feet. The gage is inclined at an angle of $\sin^{-1}\frac{10}{54}$ to the horizontal. Three bench marks have been established. The first is on the lowest water table on the southwest pier of the suspension bridge, and is marked "U. S. G. S. 44.33 B. M." The hydrant at the corner of First and Austin streets is at an elevation (by gage) of 43.32 feet, while the top of the rail of the San Antonio and Aransas Pass Railroad, a few feet from the hydrant, is at an elevation of 41.12 feet. During 1900 fourteen measurements of the flow were made. The bed of the river is shifting sand, and nearly every freshet modifies the cross section, so that at the same gage heights the river sometimes flows in one channel, sometimes in two channels, under the suspension bridge from which the measurements are made. In order, therefore, to plot a rating curve, the measurements for 1900 will have to be arranged in a January to July group and an August to December group, as the channel was modified. So far as known, the minimum flow of Brazos River at Waco occurred on December 26, 1898, the discharge being 141 second-feet.

The United States Weather Bureau commenced observations of the flow of the river at Waco on August 1, 1900, on a gage painted on the southeast portion of the pier of the St. Louis and Southern Railway bridge nearest the center of the river. Graduations are in feet and tenths, and extend from zero to 37 feet. The bench mark is the top of the rail in front of the St. Louis and Southern Railway station at Waco. It is 41.5 feet above the zero of the gage, and, according to the levels of the railroad company, it is 410 feet above sea level. During the year this gage was for many weeks surrounded by a sand bank, and on two occasions the edge of the water was 60 feet distant from the gage.

During 1900 the following measurements of discharge were made:

Discharge measurements of Brazos River at Waco, Texas.

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
1900.	*Feet.*	*Sec.-ft.*	1900.	*Feet.*	*Sec.-ft.*
January 31	4.10	1,341	December 19	3.50	552
February 22	3.30	658	December 20	3.40	512
March 13	3.10	540	December 28	3.20	411
August 28	3.35	399	December 29	3.18	403
August 29	3.30	373	December 30	3.17	397
September 7	4.70	1,323	December 31	3.16	394
September 8	4.60	1,197			

Daily gage height, in feet, of Brazos River at Waco, Texas, for 1900.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	4.45	4.00	3.10	4.05	11.00	12.35	4.65	6.25	3.45	14.35	9.90	3.90
2	4.30	3.90	3.10	4.00	11.40	14.30	4.60	6.60	3.40	10.95	6.20	3.80
3	4.25	3.90	3.00	4.00	11.85	12.30	4.60	6.00	3.25	8.50	5.45	3.80
4	4.25	3.90	3.00	3.85	10.20	10.25	4.65	7.35	3.20	7.40	5.80	3.80
5	4.15	3.80	3.00	3.75	9.55	9.00	4.85	6.60	3.15	6.90	5.85	3.70
6	4.25	3.80	3.00	3.70	8.90	8.35	4.75	5.90	3.10	6.80	6.10	3.60
7	4.30	3.80	3.75	14.50	8.40	7.85	4.65	5.45	4.45	6.50	5.60	3.60
8	4.20	3.80	3.95	22.90	8.05	7.70	4.60	5.45	4.40	6.05	5.55	3.60
9	5.90	3.85	3.45	20.90	7.50	7.20	4.55	6.40	4.50	5.85	5.05	3.60
10	5.85	3.95	3.35	19.70	7.10	6.90	4.50	5.90	9.10	5.75	4.85	3.60
11	9.15	3.70	3.25	11.50	6.90	6.55	4.50	5.65	9.45	5.65	4.60	3.60
12	7.90	3.80	3.10	9.25	6.60	6.55	4.70	5.95	8.35	5.20	4.50	3.65
13	6.15	3.80	3.10	12.00	6.50	6.40	4.75	5.50	9.15	5.10	4.50	3.65
14	5.70	3.75	3.10	9.60	6.20	6.20	4.60	5.20	8.20	5.05	4.40	3.65
15	5.40	3.60	3.15	8.90	6.45	6.05	4.65	6.55	7.45	4.90	4.35	3.70
16	5.45	3.55	3.20	8.20	8.20	5.75	9.35	6.70	7.05	4.75	4.30	3.60
17	5.20	3.50	3.20	8.00	7.50	5.50	7.70	5.95	6.45	4.55	4.20	3.60
18	5.00	3.50	3.20	7.30	6.80	5.40	6.05	5.50	6.20	4.50	4.20	3.55
19	4.90	3.45	3.15	7.00	6.35	5.30	6.80	5.25	5.70	4.40	4.20	3.50
20	4.70	3.40	3.10	6.55	6.25	5.15	6.75	5.05	5.20	4.35	4.15	3.40
21	4.70	3.35	3.05	6.80	7.00	5.25	5.95	5.00	5.00	5.25	4.10	3.40
22	4.60	3.30	3.00	6.60	7.20	5.45	5.60	4.45	10.25	8.20	4.15	3.40
23	4.50	3.30	3.75	6.80	6.70	5.10	4.75	3.85	15.20	7.15	4.20	3.40
24	4.45	3.20	6.25	6.65	6.65	4.60	5.50	3.45	19.65	7.85	4.05	3.40
25	4.30	3.20	5.60	6.70	7.25	5.15	7.15	3.60	21.15	6.95	3.95	3.30
26	4.25	3.20	5.00	6.00	7.50	5.05	9.05	3.55	22.30	7.10	3.90	3.30
27	4.20	3.20	5.10	8.05	9.55	4.95	8.30	3.50	23.95	6.45	3.90	3.30
28	4.10	3.10	4.85	12.00	8.00	4.80	7.45	3.45	25.70	5.90	4.05	3.30
29	4.10	.....	4.65	12.00	7.45	4.75	7.40	3.40	22.95	6.00	4.10	3.20
30	4.10	.....	4.35	13.80	12.70	4.70	6.45	3.50	17.00	5.55	3.90	3.20
31	4.05	.....	4.15	.....	16.30	.....	6.15	3.60	.....	8.80	.....	3.20

LEON RIVER, TEXAS.

Leon River rises in Eastland County, Texas, and flows through Comanche, Hamilton, Coryell, and Bell counties, emptying into Little River, a tributary of Brazos River. A short distance above Belton it receives the waters of Cowhouse Creek. The flow of Leon River is utilized at Belton by the electric-light plant. The dam, which was built in 1894, is of wood, built up in a compact mass. The downstream face has a vertical fall of 7 feet, and then terminates in a slightly inclined apron, which serves to break the fall of the water and carry it off without damage to the lower toe. The length of the dam is 160 feet, the total height above bed rock 12 feet. The bulkheads are built up to a level above the banks, and constitute the piers of one of the highway bridges across the river. The water is taken

from the lake above the dam by a flume on the west side of the river. This flume rests on a well-protected framework, which is boarded up on the river side. The power house is about 100 feet below the dam, where a fall of 11 feet is obtained. The river rarely ceases to flow at Belton, but during the fall it is so low that it does not furnish sufficient power to supply the electric lights for the town. On an average the river furnishes sufficient power for two-thirds of the year, and an auxiliary steam plant is used to tide over the stages of low water. The power required by the electric-light plant is from 150 to 200 horsepower. On December 19, 1900, the flow of the river was measured by Thomas U. Taylor at a point halfway between the dam and the bridge of the Gulf, Colorado and Santa Fe Railroad, about 75 yards below the dam, and a flow of 165 second-feet was found. The measurement was made in the afternoon, and about 6 inches of water was flowing over the dam.

LAMPASAS RIVER, TEXAS.

The junction of Lampasas and Leon rivers forms Little River, which flows into Brazos River. The Sulphur Fork of Lampasas River rises in the city of Lampasas, and is formed by two springs, the Hancock and the Hanna. The Hancock Spring is about 1 mile from the court-house, and its flow on December 18, 1900, as measured by Thomas U. Taylor, was 10.3 second-feet. The measurement was made just below the ford, and about 400 feet below the bath house at the spring. The dam of the electric-light plant, which is a little more than a half mile below the spring, backs the water up to within 200 yards of the spring. The flow of the spring is stated by citizens to be reliably constant. The Hanna Spring is about a fourth of a mile from the court-house, and almost on the opposite side of the town. It rises in a large artificial pool, 60 feet in diameter, constructed of stone and cement. The water, which is strongly impregnated with sulphur, flows out of the pool over an inclined apron, and can be diverted to the large bath house near. The stream formed by the spring has been diverted from its original channel, and is conveyed underground a distance of about 200 yards, although at certain places it is visible through the boxes, the sides of which project above the surface of the ground. At one of the boxes the flow of the spring on December 19, 1900, was found to be 4 second-feet. The waters of these springs are utilized by various power plants.

There are three dams across the Lampasas within $1\frac{1}{2}$ miles of the city of Lampasas. The electric-light plant is in the suburbs of the city. It has a stone dam 14 feet high and 160 feet long. The water is conveyed, by a race nearly 300 yards long, to the power house, where a fall of 14 feet is obtained. The waters above this stone dam are held back during the day, being used only at night, and the lake above the dam fills and the water begins to flow over the dam shortly after midday. A judicious use of flashboards would render more

power available. With an efficiency of 75 per cent a flow of 1 cubic foot of water would give a continuous horsepower of 1.2, or a total of 12 horsepower if used continuously, or a total of 28.8 horsepower if used for only ten hours during the day and held back for fourteen hours. An auxiliary steam engine is used at the power plant. The second dam is about three-fourths of a mile below the stone dam. It is an old-fashioned wooden structure 120 feet long, and gives a fall of 11 feet. The triangular frame bents are constructed with the inclined braces upstream. To these braces sheeting is nailed, which forms the upstream face of the dam. With a good hydraulic wheel 1 cubic foot of flow should give 1 horsepower at this dam. The power here is used by the Donovan flour mill, but the flow of the stream is under the control of the upper dam to such an extent that a gasoline engine is used as an auxiliary power. The lower dam, which is also of wood, is about three-fourths of a mile below the Donovan dam, and has a fall of about 10 feet.

COLORADO RIVER AT AUSTIN, TEXAS.

During 1900 the flow of Colorado River of Texas was the largest during the last twelve years. The flood of April 7, which carried away the great masonry dam at Austin, was general over southwest Texas, but its only disaster was limited to the demolition of that structure. A full discussion of the flow of the river will be found in Water-Supply Paper No. 40. From measurements made in 1899 it was demonstrated that the minimum flow of the river at the head of the lake created by the Austin dam (the so-called Lake McDonald) was less than 200 second-feet, from which should be deducted the evaporation from the 3 square miles of lake surface, making the flow at the forebay of the dam still smaller. The supposed minimum flow of 1,000 second-feet, upon which the construction of the dam and its allied enterprises was predicated, was one of the greatest overestimates known to American engineering practice. With a fall of 62 feet, the flow of the river at low stages could not develop even 900 horsepower, while 5,227 horsepower had been counted upon for minimum stages of the river.

Records of the depth of water on the crest of the dam at Austin were kept from September 1, 1895, to January 1, 1900, and the maximum and average depths of water on the crest as recorded by the gage were as follows:

Depths of water on crest of Austin dam.

Year.	Maximum depth.	Average depth.
	Feet.	*Feet.*
1896	2.60	0.496
1897	2.20	.422
1898	4.20	.280
1899	9.80	.412
Average for 4 years		.4025

On account of the inequalities of the crest line of the dam, all depths must be increased by 0.009 foot to get an average for the whole spillway of 1,091 feet.

Experiments with an electric current meter were made during January and March of 1900, to determine the coefficient C in the weir formula $Q = Cl H^{\frac{3}{2}}$. The results obtained indicate that for the Austin dam C was nearly 3.09, the theoretical coefficient used by Frizell. Substituting this value of C and the length of l (1,091 feet), we get $Q = 3.371\ H^{\frac{3}{2}}$.

The average flow through the penstocks for the same years (1896, 1897, 1898, and 1899) was about 250 second-feet. The following table gives the maximum and average daily discharge, in second-feet, including the flow through the penstocks:

Discharge of Colorado River at Austin dam.

Year.	Gage height.		Discharge.		
	Maximum.	Average.	Maximum.	Minimum.	Average.
	Feet.	*Feet.*	*Sec.-ft.*	*Sec.-ft.*	*Sec.-ft.*
1896	2.60	0.505	14,100	.....	1,460
1897	2.20	.431	11,000	200	1,200
1898	4.20	.326	29,000	210	1,880
1899	9.80	.421	103,400	134	1,170

The average discharge for the four years is 1,160 second-feet.

Prior to the flood of April 7, 1900, the discharge of the river at the station below the dam was at low stages absolutely under the control of the turbines at the power house at the dam, and measurements made opposite the city, at the station between the two bridges, did not give the unobstructed flow of the river. Since the destruction of the dam measurements have been made at the station about a fourth of a mile above the highway bridge on Congress avenue. The station is described in Water-Supply Paper No. 37, page 274.

During 1900 the following measurements were made by Thomas U. Taylor:

Discharge measurements of Colorado River at Austin, Texas.

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
1900.	*Feet.*	*Sec.-ft.*	1900.	*Feet.*	*Sec.-ft.*
April 7	33.50	122,000	September 13	2.46	1,398
August 24	2.40	1,160	September 17	2.35	1,107
August 25	2.35	990	September 18	2.25	935
August 27	2.21	793	September 19	2.19	895
August 30	2.13	747	September 20	2.14	806
September 1	2.40	1,198	September 21	2.10	739
September 4	2.45	1,306	December 22	2.90	2,109

Daily gage height, in feet, of Colorado River at Austin, Texas, for 1900.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.50	2.60	2.10	2.70	4.00	4.70	2.30	3.00	2.35	6.20	4.15	3.05
2	2.40	2.50	2.20	2.80	4.50	5.00	2.30	3.05	2.30	5.70	3.90	3.00
3	2.40	2.50	2.50	2.90	5.00	5.50	2.30	3.10	2.30	5.30	7.25	3.00
4	2.50	2.40	2.60	3.10	10.00	5.00	2.35	3.60	2.45	5.05	6.00	3.00
5	2.40	2.40	2.50	3.40	11.60	4.30	2.35	4.90	2.40	4.70	4.55	3.00
6	2.40	2.40	2.50	5.66	6.00	4.10	2.45	4.30	2.40	4.45	4.15	3.00
7	2.50	2.30	2.40	32.70	4.50	3.70	2.35	4.05	2.35	4.40	3.80	2.90
8	2.40	2.30	2.30	14.70	4.10	3.60	2.30	4.75	2.30	4.25	3.65	2.90
9	2.60	2.20	2.20	10.60	5.50	3.50	2.30	5.60	2.40	4.05	3.50	2.90
10	2.50	2.20	2.20	10.40	4.90	3.20	2.20	4.75	2.40	3.95	3.40	2.90
11	2.50	2.10	2.10	9.70	4.40	3.10	2.20	4.35	2.50	3.90	3.30	2.90
12	2.40	2.00	2.20	9.40	4.50	3.00	2.40	4.15	2.60	3.80	3.25	2.90
13	2.60	2.00	2.10	9.30	4.10	3.00	2.30	4.40	2.50	3.70	3.20	3.00
14	2.70	1.90	2.00	9.00	4.20	3.10	2.25	3.65	3.35	3.60	3.20	3.00
15	3.00	1.90	2.00	8.60	4.50	3.00	2.40	3.30	2.75	3.60	3.20	3.00
16	2.90	2.00	2.10	8.50	7.00	2.80	2.40	3.15	2.50	3.60	3.20	3.05
17	2.80	2.10	2.00	8.40	7.00	2.80	8.77	3.05	2.35	3.50	3.20	3.10
18	2.70	2.00	2.00	8.20	5.50	2.70	5.40	2.90	2.25	3.50	3.10	3.10
19	2.70	2.00	2.10	8.10	4.90	2.60	8.15	2.85	2.20	3.40	3.10	3.00
20	2.60	1.90	2.30	8.00	4.80	2.70	9.40	2.70	2.10	3.40	3.10	2.95
21	2.60	1.90	2.30	7.70	4.50	2.70	6.75	2.60	2.10	3.55	3.10	2.90
22	2.50	1.80	2.40	7.60	4.40	2.60	4.75	2.50	2.10	4.60	3.10	2.90
23	2.50	1.90	2.50	7.60	4.20	2.50	3.95	2.45	2.45	4.70	3.10	2.90
24	2.40	1.90	2.50	7.40	5.20	2.50	3.55	2.40	7.40	4.70	4.85	2.90
25	2.40	2.00	2.60	7.30	4.50	2.50	3.25	2.35	19.50	5.40	5.60	2.80
26	2.40	2.10	2.80	6.00	4.80	2.50	3.30	2.30	17.60	4.65	3.60	2.80
27	2.50	2.10	2.90	5.60	4.90	2.40	3.05	2.20	21.95	4.25	3.35	2.80
28	2.50	2.20	3.00	4.90	6.00	2.40	3.00	2.20	21.30	3.95	3.20	2.80
29	2.60	.....	2.90	4.60	6.00	2.45	3.30	2.20	11.90	3.75	3.20	2.80
30	2.70	.....	2.80	4.30	5.00	2.30	3.35	2.20	7.05	4.40	3.10	2.80
31	2.50	.....	2.70	.....	5.00	.....	3.15	2.65	.....	5.20	.....	2.80

BARTON SPRINGS, TEXAS.

These springs are about 2 miles southwest of the court-house in the city of Austin. Their flow was formerly so great that two mills were operated on the right or southwest bank of the creek formed by them. The upper springs come out of several fissures or faults in the limestone rock on the right side of the creek and supply probably half of the total flow. Another spring is on the left side of the creek, a short distance below the upper springs, and its flow has been unfailing. The third spring is on the right side of the creek, and it was formerly utilized to run the Walsh mill. It had been dry for several years, but early in 1900 it began to flow again. The flow of the creek to which the springs give rise, and which empties into Colorado River at Austin, has responded sympathetically to the rainfall in the Edwards Plateau. In 1894 and 1895 C. C. Babb made measurements of its flow and found a discharge of 17 and 25 second-feet, respectively. In 1898 Thomas U. Taylor measured the flow and found the following discharges: March 26, 20 second-feet; May 3, 30 second-feet. On August 31, 1900, the flow had increased to 69 second-feet, and on December 21, 1900, it was found to be 32.5 second-feet.

BLANCO RIVER, TEXAS.

Blanco River rises in Kendall County, flows easterly for 60 miles, and then turns southeast and flows into San Marcos River 4 miles below San Marcos. In dry years its flow ceases and water stands in

pools, but in years of average rainfall it has a small flow, except in time of flood. On December 24, 1900, it was measured at Ware's ford, 2 miles east of San Marcos, by Thomas U. Taylor, and a flow of 15 second-feet was found. On the same date San Marcos River was measured by Mr. Taylor at the Westerfield ford, and a discharge of 157 second-feet was found.

COMAL RIVER, TEXAS.

The mountains of the Edwards Plateau terminate about a mile northwest of New Braunfels, and from the fissures at the foot of the bluffs the celebrated springs that form Comal River gush forth. The waters have been used for power since 1860, but it is only since 1880 that systematic methods have been used. At present the waters are all used by the Landa and Faust mills. The Landa mill is about a half mile from the main springs, and is located near the banks of a dry branch of Comal River. A gravel dam deflects a large percentage of the water from Comal Springs Creek into the Landa mill race. The Faust mill is a half mile below the Landa mill, and is north of the court-house at New Braunfels. Comal River is the most unique, picturesque, and reliable stream in Texas. Its flow is reasonably uniform, and it has a fall of 43 feet in its length of 2 miles. From the surface of Lake Comal (formed by the gravel dam referred to) to the surface of Landa's mill pond there is a fall of 2 feet; at Landa's mill there is a fall of 22 feet; from the tailrace of Landa's mill to the surface of Faust Lake there is a fall of 3 feet; at the Faust dam there is a fall of 8 feet; and from the latter dam to the Guadalupe there is a fall of nearly 10 feet. In 1882 the flow was measured, independently, by two civil engineers, by the use of floats, and each found a discharge of 375 second-feet. From that time until 1899 there was a gradual decrease of flow, the minimum, from the best evidence obtainable, being 290 second-feet. Early in 1900, however, the flow of Comal River, like that of all of its sister springs in the Edwards Plateau, increased to its former volume of twenty years ago.

On December 25, 1900, when it was certain that the power plants would be idle, Thomas U. Taylor visited Comal River, in order to obtain a measurement of the flow that would be uninfluenced by the drafts for power purposes. The sections selected were on the Landa raceway, about 50 yards below the gravel dam, and on Comal Springs Creek, 275 yards below the dam. The joint discharge was found to be 374 second-feet, the full capacity of the springs. On December 26 the flow was again measured at the same section, with all of the mills running, and a discharge of 272.6 second-feet was found. The level of the water in the race at the section selected was not affected by shutting off the power.

Records have been kept of the flow of the river over a weir in the

lower or Clements dam, from which the following calculations of discharge were made:

Discharge measurements of Comal River over weir at Clements dam, 1900.

	Sec.-ft.
January 20	301
February 4	283
February 22	305
March 8	335
March 13	326
March 18	326
April 1	324
April 15	329
May 13	433
June 5	372

Guadalupe River was measured September 20, 1900, by Thomas U. Taylor, at the railroad bridge at New Braunfels, and a discharge of 653 second-feet was fonnd.

SAN ANTONIO RIVER, TEXAS.

San Antonio River rises about 3 miles north of the mission of San Fernando, the geographic center of the city of San Antonio. To better control and utilize the waters of the river, two canals, an upper and a lower, were constructed in 1878 and 1881, respectively. A power house was built on each canal, and they are known as the upper and lower power houses. The fall at the upper power house is about 7 feet, that at the lower power house 12 feet, while at Guenther's upper and lower mills the fall is 3.5 feet and 6 feet, respectively. In 1896 the flow of San Antonio Springs became so low that the mills were abandoned. Previous to this, in 1895, an auxiliary steam plant of 130 horsepower was put in at the lower power house. The water at these power stations was pumped from artesian wells—one 12-inch at the upper station and one 12-inch and three 8-inch at the lower station. In 1891 a steam and electric power plant was constructed on the banks of the river, near Commerce street, where there are four 8-inch wells and three 12-inch wells.

In December, 1895, the flow of San Antonio River at the head gate of the lower canal was measured by C. C. Babb, and a discharge of 34.3 second-feet was found, to which should be added 1.2 second-feet for the leakage through the dam, and 4 second-feet for the diversion through the upper labor ditch, making a total of nearly 40 second-feet. On the same date Mr. Babb measured the flow of San Pedro Springs and found a discharge of 9 second-feet. On November 30, 1896, Mr. Babb again made measurements and found the discharge of San Antonio River and San Pedro Springs to be 29 second-feet and 11.7 second-feet, respectively. On December 30, 1897, the flow of San Antonio River was measured by Thomas

U. Taylor at the footbridge leading from the hot wells to San Jose Mission, and a discharge of 11 second-feet was found. In March, 1898, it was again measured at the same place and a discharge of 9 second-feet was found, and in June, 1899, the discharge was 10 second-feet, all of which came from San Pedro Springs.

An indication of the stage of the underground water can be obtained from the record of the water level in the standpipes at the waterworks on Commerce street and at the upper power house. These standpipes are connected to the artesian wells. The standpipe at the Commerce street works is about 50 feet high. Following is a record of the heights of the water in this standpipe. The datum at this station is the bottom of the standpipe.

Heights of water in Commerce street standpipe.

Date.	Height.	Date.	Height.
	Feet.		*Feet.*
May, 1893	42.10	May 1, 1900	44.10
December 6, 1897	33.80	May 5, 1900	45.10
April, 1898	31.60	May 9, 1900	46.20
April 29, 1900	43.00	May 22, 1900	47.10

The record of the standpipe at the lower power house is as follows:

Heights of water in standpipe at lower power house.

Date.	Height.	Date.	Height.
1900.	*Feet.*	1900.	*Feet.*
January 1	1.8	July 1	14.65
February 1	6.76	August 1	12.67
March 1	13.76	September 8	12.10
April 1	13.77	October 1	11.47
May 1	15.57	November 1	11.38
May 24	18.74	December 1	10.51
June 1	17.99		

It is well to note that the dates of low and flush water at San Antonio correspond exactly with those at Uvalde.

During the latter part of the year 1899 the river revived, and in 1900 the following measurements were made by Thomas U. Taylor:

Discharge measurements of San Antonio River and its tributaries.

Date.	Stream.	Locality.	Discharge.
1900.			*Sec.-ft.*
September 12	San Antonio River	At hot wells	125.0
September 18	do	do	124.2
September 19	San Pedro Creek	Near street-car crossing about 100 yards below lower or large pool.	1.6
Do	San Pedro ditch	do	7.0

The last two measurements were made early in the morning, in order to ascertain the free flow of the springs unmodified by the

dams. At the time of measurement the water had been flowing uninterruptedly over the two small dams at the head of the ditch and the river for from twelve to fourteen hours. There is a head gate on the river which can be raised and lowered at will in order to flush or scour out the pools.

On September 19, 1900, the flow at the head gate of the lower canal, where Mr. Babb measured it in 1895, was again measured. The water at this point flows under an arched stone conduit of 20 feet span. A wooden strip is embedded in the cement floor of the canal. The depth of the water over the wooden strip was 38½ inches, and a flow of 94 second-feet was found. On November 29, 1900, the depth of water was 28.8 inches, and a flow of 59 second-feet was found.

LEONA RIVER AT UVALDE, TEXAS.

The behavior of this river has been so irregular for several years that a recapitulation of some of the data heretofore published is of special interest in connection with the new data presented herewith.

Leona Spring is situated in the suburbs of Uvalde. It was dry in 1885, but soon after it revived and continued to flow until 1893, when it ceased flowing and has been dry since. In 1893 a pumping station was located on the banks near the spring, but when the spring failed the pumping plant was transferred to its present location, within 150 yards of the court-house. At the new station a pit 15 feet by 15 feet was excavated to a depth of 24 feet, and the pumps were placed in its bottom, a well 4 feet by 7 feet having been sunk in the bottom of the pit to a depth of 16 feet, or to the 40-foot level below the ground surface, out of which water was pumped to a standpipe. At first the water in this well rose to within 35 feet of the surface, but in December, 1897, it was noticed that the supply was failing. In May, 1898, the supply continuing to fail, a second pit 10 feet by 10 feet by 9 feet deep was excavated on the southwest side of the first or main pit, and a well was sunk to a depth of 63 feet below the surface of the ground. The pumps were then placed in the new pit, making their position about 33 feet below the surface. In January, 1899, the water level had fallen so low that it was necessary to bore three wells in the pump well to a depth of 30 to 35 feet, reaching a total depth of 98 feet below the ground surface. In June, 1899, after the heavy rains over southwest Texas, known as the Brackett flood, the water was standing at about the 93-foot level and was slowly rising. On September 16, 1900, the water had risen to within 2 feet of the pumps, or to the 35-foot level; that is, the water had risen about 58 feet in fifteen months, or nearly 4 feet a month, and on December 1, 1900, it had reached the pumps and arrangements were made to raise them. Accurate measurements during September, 1900, showed that the water in the wells was at that time rising at the rate of 4 inches a month.

Between Leona Spring and the brickyard crossing on the road from Uvalde to Pearsall there are several small springs, the largest being Mulberry Spring, which during the early part of 1900 was flowing; in September, 1900, its flow had ceased, and on December 1, 1900, it had a flow of about 1 second-foot. In 1895 C. C. Babb found a discharge at the brickyard crossing of 11 second-feet; but when the spring was visited by Thomas U. Taylor in June, 1899, the river at the ford was dry, and there was no water flowing between Uvalde and Fort Inge, 4 miles below Uvalde. On September 17, 1900, Mr. Taylor found a flow at the brickyard crossing of 5 second-feet.

NUECES RIVER, TEXAS.

The two main forks of Nueces River rise in Edwards County, Texas, and flow south through the rugged mountains of the Edwards Plateau, uniting about 14 miles from Uvalde and about 6 miles above the crossing of the Southern Pacific Railroad. On their way through the mountains both branches are fed by springs, and there is perpetually running water in the streams, which begin to flow about 12 miles south of Rock Springs and continue to flow until their junction at the foot of the Edwards Plateau. At about the junction of the streams the usual flow sinks into gravel beds, occasionally reappearing in big, clear pools at points where the gravel has been washed off from the solid bed-rock bottom. Four or 5 miles below the Southern Pacific Railroad bridge flowing water again appears, the stream along its lowland course being fed by numerous springs. On September 17, 1900, Thomas U. Taylor made a measurement of the flow about 5 miles below the railroad crossing, and a discharge of 18 second-feet was found.

There are a few irrigated farms along the Nueces. Mr. J. H. Ethridge, of Montell, Uvalde County, Texas, is the owner of the Casa Blanca irrigation and mill ditch, which was constructed in 1893. This ditch is $2\frac{1}{2}$ miles long, 7 feet deep for the first half mile, and 2 to 3 feet deep the rest of the way. Water is diverted from Nueces River by means of a dam of loose rock which raises the level of the water in the river. Six miles below the Southern Pacific Railroad bridge Patrick Dolan has introduced a 15-horsepower gasoline engine with which he irrigates his orchards and gardens, pumping water from the river. The cost of the outfit was $735, but Mr. Dolan finds that with the present high price of gasoline (18 cents a gallon) irrigation by that means is too costly. His experience is that with gasoline at 12 cents a gallon irrigation by pumping can be made to pay in that section of the country. At Cotulla Mr. George Copp uses a duplex pump having a 6-inch suction and a 4-inch discharge, with a 12-horsepower steam engine. He irrigates 100 acres and raises a very fine quality of Bermuda onions for a spring crop and tomatoes for a fall crop.

LOS MORAS CREEK, TEXAS.

Los Moras Creek rises at Brackettville, near Fort Clark, in Kinney County, Texas, about 7 miles north of the Southern Pacific Railroad. On December 24, 1895, the flow was measured by C. C. Babb, about 300 yards below the dam, under the footbridge leading from the town to the military post, and a discharge of 21 second-feet was found. On June 30, 1899, it was measured at Mulligans Bend, about a fourth of a mile east of the court-house at Brackettville, by Thomas U. Taylor, and a flow of 60 second-feet was found; and on September 13, 1900, a flow of 51 second-feet was found at the same place. The increase in the flow was due probably to the increased rainfall along the Southern Pacific, which skirts the foothills of the Edwards Plateau.

On June 14, 1898, occurred the biggest flood in the history of Kinney County, and extending over the country from Spofford to Del Rio. The Los Moras Mountains, about 4 miles a little east of north from Brackett, form a crescent in which Brackett and Fort Clark are situated, and all of the depressions and dry streams from these mountains converge toward the former place. From 11.30 p. m. on June 13, 1899, to about 6 a. m. on June 14, a total rainfall of 18 inches fell at Brackett and in the Los Moras Mountains. By 5 a. m. of the latter day the flood was upon the town, standing 7.4 feet deep in the court-house, 6.7 feet in the store of Roach & Company, 9.6 feet in the Terrell House, while in the street in front of the hotel it was 12.1 feet deep. The main channel of Los Moras Creek, between Brackett and Fort Clark, was at flood height, while the draw that runs into the creek at Mulligans Bend was flooded to the depth of 30 feet. The lowlands between Spofford and Brackett were flooded for miles, and the tracks of the Southern Pacific Railroad were wrenched up and twisted like ribbons.

In March, 1900, another flood occurred at Brackett, but the damage was slight, the flood being more than 9.5 feet below the height attained by the flood of the previous June. Former floods occurred on May 28, 1880, and on October 1, 1881. During the 1880 flood the water flooded the stores in Brackett and did considerable damage. On October 1, 1881, there was a rainfall of 14.2 inches in a few hours, and by 3 a. m. the town was flooded, and much damage was done to homes and to business houses.

The waters of Los Moras Creek are used for irrigating farms and gardens within 10 miles of Brackett. The ditch nearest to Brackett is on the west side of the creek. It is used by the Seminole Negro Indians on the Fort Clark Reservation, and is therefore the property of the Government. It is about 1 mile long, 5 feet wide, and 1 foot deep. The Indelkofer-Gilder ditch, also on the west side of the creek, diverts water 1 mile below the intake of the Seminole ditch. It is 600 feet long, 4 feet wide, and 1 foot deep. The McGovern ditch diverts water from the east side of the creek a short distance above the intake of

the Indelkofer-Gilder ditch. It is 600 yards long, 5 feet wide, and 1 foot deep. About 6 miles below Brackett two ditches—the Smith and the Stratton—divert water, one from the west and the other from the east side of the creek. The Smith ditch is 600 feet long, 4 feet wide, and 1 foot deep. The Stratton ditch is 3 miles long, 8 feet wide, and 1 foot deep, and irrigates a hay farm below the Southern Pacific Railroad.

PINTO CREEK, TEXAS.

Pinto Creek rises in Kinney County, Texas, and is about halfway between Brackett and Del Rio. At the crossing of the Southern Pacific Railroad it has a sluggish flow, but the geologic formations and topography throughout its course are such as to make it susceptible to sudden and great rises. Its flow was measured on September 15, 1900, by Thomas U. Taylor, at the crossing of the Southern Pacific Railroad, and a discharge of 38 second-feet was found. The waters of the Pinto have been used for irrigation, the Lower Pinto Irrigation Company having utilized those near the Rio Grande. Their ditch, which was constructed in 1875, was 10 miles long, 6 feet wide, and 1 foot deep, and crossed the Pinto by means, first, of a siphon flume, and then by a trestle flume, but these were so difficult to maintain, on account of the sudden floods to which the creek is subject, that the company was forced to abandon the system.

MUD CREEK, TEXAS.

Mud Creek is between Pinto and Sycamore creeks, in Kinney County. Its source is about 6 miles north of Amanda, on the Southern Pacific Railroad. The stream is formed and fed by springs, but its flow is not reliable. From 1893 to the latter part of 1899 the creek was practically dry, but after the Brackett flood the flow revived, and by the spring of 1900 there was sufficient water in the creek to supply the irrigation systems, all of which are above the Southern Pacific Railroad. The ditch of the Mud Creek Irrigation and Agricultural Company diverts water about 3 miles above the railroad, and during the season of 1900 about 400 acres were irrigated by it.

SAN FELIPE SPRINGS, TEXAS.

San Felipe Creek has its source in four large springs, the upper one being 2 miles above the railroad bridge near the town of Del Rio, the others being within about 200 yards of the bridge. Measurements at the former place in 1895 are described in Bulletin of the United States Geological Survey No. 140, page 85. Measurements made in 1899 are described in Water-Supply Paper No. 37, page 277. On September 15, 1900, Thomas U. Taylor measured the outflow from these springs and found a discharge of 99 second-feet, and Madre ditch, which diverts water just below the lower spring, was found to be carrying

50 second-feet. This makes the total flow of the springs at that time 149 second-feet.

RIO GRANDE.

The Rio Grande and its tributaries drain the mountainous area to the south and east of the Continental Divide in southwestern Colorado, the principal streams flowing from the east side of the Needle Mountains and from the south and east side of the San Juan Range. Important streams also flow from the La Garita Mountains in Saguache and Mineral counties. The main stream flows in an easterly direction for about 75 miles, receiving numerous tributaries from the mountainous region through which it passes. At the town of Del Norte the valley widens into what is known as San Luis Valley, and thence the stream flows in a southeasterly and southerly direction for about 75 miles more, to a point about 20 miles southeast of Antonito, where it crosses the State line. Below Del Norte few streams of importance flow into the river, for nearly all of those that issue from the mountains lose their waters in the plains before they reach the main stream. This is particularly true of the drainage north and east of the river, from the Cochetopa Hills and the Sangre de Cristo Mountains. Although the streams flowing from them are numerous and carry large volumes of water, yet they furnish no source of supply to the Rio Grande itself, all the water being lost either in the sands or in broad, shallow lakes, until Trinchera Creek, flowing through the Costilla land grant, is reached. This stream, although usually dry, furnishes a supply at different seasons of the year. On the south and west side of the river, however, many important streams flow from the mountains, which in their higher stages carry large volumes of water to the Rio Grande. Among these are the Alamosa, La Jara, Conejos, and other creeks of lesser importance. The supply from these streams also is mostly used during the summer time, so that after the flood stages are past little water flows from any of these sources into the Rio Grande. A similar condition of affairs exists in the Rio Grande itself, as most of the water is used in the upper part of the valley, and in the late summer very little passes Alamosa, below which place there are few irrigating canals. During the flood stages, however, great volumes of water flow from the Rio Grande and from several of its tributaries, which might be stored and used for the extension of the irrigated area. Farming is carried on extensively among the upper valleys of several of the streams issuing from the mountains to the north and east of San Luis Valley, but no measurements have been made upon any of these streams.

The study of seepage and return waters resulting from irrigation furnishes an interesting problem in this valley, which Prof. L. G. Carpenter, of Fort Collins, has undertaken to study.

But three stations have been maintained in San Luis Valley, namely, at Del Norte and at the State line, on the main Rio Grande, and about 10 miles west of Antonito, on Conejos River.

RIO GRANDE NEAR DEL NORTE, COLORADO.

This station is about 2 miles west of the town of Del Norte, above the main canal taking water from the Rio Grande. Continuous records have been kept here since the fall of 1889. The gage rod is an inclined 2-inch by 6-inch plank fastened to a post driven into the right bank of the river. On June 16, 1900, the gage rod was connected with an iron bench mark of the United States Geological Survey, set in the ground about 25 feet south of the rod, the zero of the rod being 9.25 feet below the bench mark. Gagings are made by means of a car which travels across the river along a steel cable, the distance being marked on a tag wire. The channel is excellent, the water, although falling rapidly, seldom scouring, and the bed, therefore, remaining practically the same from year to year. The bed of the channel is covered with small bowlders and the sides, although not high, have never been known to overflow. The observer is J. S. Regan, who has kept the records regularly ever since the station was established.

A description of this station was published in Water-Supply Paper No. 37, page 277. The results of measurements for 1899 will be found in the Twenty-first Annual Report, Part IV, page 256.

During 1900 the following measurements were made by A. L. Fellows:

March 30: Gage height, 1.54 feet; discharge, 346 second-feet.
May 12: Gage height, 3.84 feet; discharge, 2,441 second-feet.
June 16: Gage height, 3.66 feet; discharge, 2,382 second-feet.
August 18: Gage height, 1.34 feet; discharge, 221 second-feet.

Daily gage height, in feet, of Rio Grande near Del Norte, Colorado, for 1900.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	.....	.....	1.58	1.86	5.76	2.42	1.42	1.28	1.58	1.50	1.56
2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
3	.....	2.50	1.84	1.62	1.94	5.26	2.30	1.40	1.32	1.60	1.50	.....
4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
5	.....	.....	.....	1.66	2.18	4.90	2.26	1.48	1.40	1.56	1.46	.....
6	2.08	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
7	.....	.....	.....	1.70	2.50	4.76	2.08	1.50	1.36	1.54	1.40	.....
8	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	*a* 2.18
9	.....	.....	.....	1.56	2.92	4.40	2.00	1.42	1.60	1.54	1.44	.....
10	.....	2.46	1.62	.....	.....	.....	.....	.....	.....	.....	.....	.....
11	.....	.....	.....	1.52	3.82	4.12	1.94	1.40	1.46	1.52	1.32	.....
12	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
13	2.16	.....	.....	1.58	3.78	3.86	1.86	1.36	1.38	1.50	1.36	.....
14	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
15	.....	.....	.....	1.60	3.64	3.54	1.78	1.32	1.32	1.52	1.30	*a* 2.38
16	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
17	.....	2.58	1.58	1.64	4.52	3.68	1.70	1.32	1.32	1.52	1.32	.....
18	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
19	.....	.....	.....	1.62	4.80	3.32	1.62	1.32	1.30	1.50	1.36	.....
20	2.14	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
21	.....	.....	.....	1.76	4.20	3.18	1.64	1.34	1.30	1.52	1.32	.....
22	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	*b* 2.26
23	.....	.....	.....	1.60	4.36	3.10	1.62	1.30	1.30	1.54	1.38	.....
24	.....	2.18	1.54	.....	.....	.....	.....	.....	.....	.....	.....	.....
25	.....	.....	.....	1.78	5.14	3.00	1.56	1.30	1.48	1.58	1.30	.....
26	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
27	2.64	.....	.....	1.74	5.52	2.76	1.52	1.28	1.56	1.54	1.42	.....
28	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
29	.....	.....	.....	1.82	5.80	2.44	1.48	1.26	1.54	1.52	1.48	*b* 2.18
30	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
31	.....	.....	1.52	.....	5.62	.....	1.44	1.24	.....	1.48	.....	.....

a Ice gorge below gage. *b* Solid ice.

CONEJOS RIVER NEAR LOS MOGOTES, COLORADO.

This river, the most important tributary of the Rio Grande in Colorado, rises on the eastern slope of the San Juan Range, which forms the western boundary of Conejos County. It first flows southeasterly, and then bends in a northeasterly direction at the town of Conejos, and enters the Rio Grande below the mouth of Trinchera Creek. The entire normal flow of the stream is used during the irrigation season; but during the flood stages and in the winter considerable water goes to waste.

The gaging station, which was established August 25, 1899, is about 10 miles west of Antonito, and is reached by driving from that town. It was first located at the wagon bridge crossing the river, but the rod at that point being maliciously destroyed, the station was moved about 500 yards downstream, where it was attached to a pier projecting into the river near a farmhouse. The channel is fairly good, being of gravel, and not particularly subject to change or overflow. Owing to the removal of the gage from its old station, no rating table was possible for 1899, and but few measurements were made in 1900. Records were kept for one month only, for the reason that the observer, Gustav Timm, moved away early in the season, and no one was found to make the observations.

San Antonio River, a branch of Conejos River, was measured twice during the season, about a half mile south of Antonito. The discharge on May 11 was 473 second-feet, and on June 22 it was 4 second-feet. After that the stream was practically dry.

A description of the Los Mogotes station was published in Water-Supply Paper No. 37, page 278. During 1900 the following measurements were made by A. L. Fellows:

March 28: Gage height, 1.68 feet; discharge, 144 second-feet.
May 11: Gage height, 3.10 feet; discharge, 1,087 second-feet.
August 17: Gage height, 1.15 feet; discharge, 33 second-feet.
June 23: Gage height, 2.30 feet; discharge, 467 second-feet.

Daily gage height, in feet, of Conejos River near Los Mogotes, Colorado, for 1900.

Day.	Mar.	Day.	Mar.	Day.	Mar.	Day.	Mar.
1	2.60	9	2.55	17	1.85	25	1.80
2	2.60	10	2.45	18	1.75	26	1.80
3	2.62	11	1.75	19	1.70	27	1.80
4	2.62	12	1.85	20	1.80	28	1.85
5	2.65	13	1.85	21	1.80	29	1.80
6	2.65	14	1.98	22	1.80	30	1.75
7	2.30	15	1.85	23	1.80	31	1.95
8	2.50	16	1.85	24	1.80		

RIO GRANDE AT CENICERO, COLORADO.

This station is a short distance above the Colorado State line, at a point where the river is crossed by a wagon bridge. Gagings were

begun July 28, 1899, since which time continuous records have been kept. There are two gage rods, one for high water and the other for low water. The high-water rod is a 2-inch by 6-inch timber attached to the west side of the central downstream cylinder of the bridge. The low-water rod is a scale, marked in feet and tenths, on the perpendicular face of a large bowlder about a hundred yards below the bridge. The channel is in most respects an excellent one. The bed consists of bowlders and rock, and is subject to little change; the banks are high and are not subject to overflow. Gagings can be made at the bridge, but during low water they are usually made by wading. On June 22, 1900, both gages were referred to a bench mark consisting of a chiseled point marked "B. M." on the face of the lava bluff under the west end of the bridge, 7.42 feet above gage datum. The station is an extremely important one, giving, as it does, the discharge of the river at the Colorado State line, including practically all of the Colorado drainage. Roman Mondragon, who keeps a store at the west end of the bridge, has kept the records during the last year.

A description of this station was published in Water-Supply Paper No. 37, page 279. The results of measurements for 1899 will be found in the Twenty-first Annual Report, Part IV, page 257. During 1900 the following measurements were made by A. L. Fellows:

March 29: Gage height, 1.60 feet: discharge, 236 second-feet.
June 22: Gage height, 1.80 feet; discharge, 420 second-feet.
May 10: Gage height, 2 feet; discharge, 594 second-feet.
August 16: Gage height, 0.75 foot; discharge, 18 second-feet.

Daily gage height, in feet, of Rio Grande at Cenicero, Colorado, for 1900.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.0	2.0	2.5	1.6	1.8	5.0	1.1	0.8	0.7	0.9	1.1	1.8
2	2.0	2.0	2.6	1.6	1.9	4.8	1.0	.8	.7	.9	1.1	1.8
3	2.0	2.3	2.6	1.6	1.9	4.7	1.0	.8	.8	.9	1.1	1.8
4	2.0	2.0	2.4	1.7	1.9	4.6	.9	.8	.8	.9	1.1	1.9
5	2.0	2.0	2.1	1.7	1.9	4.5	.9	.8	.9	.9	1.1	1.9
6	2.0	2.0	2.1	1.8	1.9	4.2	.9	.8	.9	.9	1.1	2.0
7	2.0	2.0	2.1	1.8	1.9	4.0	.9	.8	.9	.9	1.1	2.0
8	2.0	2.6	2.2	1.8	2.0	3.9	.9	.8	.9	.9	1.1	2.0
9	2.0	2.6	2.0	1.8	2.0	3.8	.9	.8	.9	.9	1.1	2.0
10	2.0	2.0	2.0	1.8	2.1	3.8	.9	.8	1.0	.9	1.1	2.0
11	2.0	2.0	2.1	1.8	2.2	3.7	.9	.8	.9	.9	1.1	2.0
12	2.0	2.0	2.1	1.8	2.7	3.6	.9	.8	1.0	.9	1.1	2.0
13	2.0	2.0	2.1	1.8	2.8	3.2	.9	.8	1.0	.9	1.1	2.0
14	2.0	2.0	2.1	1.7	2.9	3.0	.9	.8	.9	.9	1.1	2.0
15	2.0	.9	2.1	1.7	2.9	2.9	.9	.8	.9	.9	1.1	2.0
16	2.0	.8	2.1	1.7	2.9	2.7	.9	.8	.9	.9	1.1	2.0
17	2.0	2.4	2.0	1.7	2.9	2.5	.9	.8	.9	.9	1.1	2.0
18	2.0	2.4	1.9	1.7	2.8	2.4	.9	.8	.9	.9	1.2	2.0
19	2.0	2.4	1.9	1.6	3.0	2.2	.9	.8	.9	1.0	1.3	2.0
20	2.0	2.4	1.9	1.6	3.1	2.0	.9	.8	.9	1.0	1.9	2.0
21	2.0	2.4	1.9	1.5	3.8	1.9	.8	.8	.9	1.0	1.8	2.0
22	2.0	2.4	1.8	1.6	3.5	1.8	.8	.8	.9	1.0	1.8	2.0
23	2.0	2.4	1.8	1.6	3.3	1.8	.8	.8	.9	1.0	1.7	2.0
24	2.0	2.4	1.7	1.8	3.1	1.6	.8	.8	.9	1.0	1.6	2.0
25	2.6	2.4	1.7	1.8	3.1	1.6	.8	.8	.9	1.0	1.6	2.0
26	2.3	2.4	1.7	1.8	3.4	1.5	.8	.8	.9	1.0	1.6	2.0
27	2.0	2.4	1.7	1.9	3.9	1.5	.8	.8	.9	1.0	1.7	2.0
28	2.0	2.5	1.6	1.9	4.4	1.4	.8	.8	.9	1.0	1.5	2.0
29	2.0	.....	1.6	1.8	4.8	1.3	.8	.8	.9	1.0	1 5	2.0
30	2.6	.....	1.6	1.8	5.0	1.2	.8	.8	.9	1.1	1.8	2.0
31	2.0	.....	1.6	.....	5.0	.....	.8	.7	.....	1.1	.....	2.0

RIO GRANDE AT EMBUDO, NEW MEXICO.

This station, established in 1889, is about 300 feet east of the railroad station at Embudo. It is described in Water-Supply Paper No. 37, page 280. The results of measurements will be found as follows: For 1896, Eighteenth Annual Report, Part IV, page 251; for 1897, Nineteenth Annual Report, Part IV, page 385; for 1889 to 1898, Twentieth Annual Report, Part IV, page 366; for 1899, Twenty-first Annual Report, Part IV, page 258. During 1900 the following measurements of discharge were made by P. E. Harroun:

Discharge measurements of Rio Grande at Embudo, New Mexico.

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
1900.	*Feet.*	*Sec.-ft.*	1900.	*Feet.*	*Sec.-ft.*
April 10	7.90	529	June 27	8.00	587
April 21	7.65	495	August 3	7.00	179
May 23	11.00	3,581	August 29	6.90	167
May 30	11.70	6,139	September 25	7.20	244
June 6	11.20	4,786	November 8	7.30	282
June 15	10.20	2,375	December 4	7.50	353
June 22	8.55	840			

Daily gage height, in feet, of Rio Grande at Embudo, New Mexico, for 1900.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	7.70	7.80	7.90	7.80	7.80	11.90	7.75	7.10	6.90	7.20	7.30	7.60
2	7.70	7.80	8.05	7.80	7.90	11.75	7.70	7.10	6.90	7.20	7.20	7.55
3	7.70	7.80	8.40	7.80	8.10	11.65	7.70	7.00	7.60	7.20	7.20	7.45
4	7.70	7.80	8.35	7.80	8.15	11.45	7.75	7.00	7.45	7.20	7.20	7.40
5	7.70	7.80	8.30	7.80	8.20	11.40	7.75	7.00	7.40	7.20	7.20	7.40
6	7.70	7.80	8.30	7.90	8.25	11.35	7.70	7.00	7.20	7.20	7.20	7.40
7	7.70	7.85	8.30	7.90	8.25	11.30	7.70	7.00	7.15	7.20	7.20	7.40
8	7.70	7.90	8.30	7.90	8.20	11.30	7.60	7.00	7.10	7.20	7.30	7.40
9	7.65	7.80	8.30	7.90	8.45	11.20	7.55	7.00	7.10	7.20	7.30	7.30
10	7.60	7.80	8.30	7.90	8.90	11.20	7.45	7.00	7.10	7.20	7.30	7.30
11	7.50	7.80	8.30	7.90	9.35	11.00	7.30	7.00	7.10	7.20	7.30	7.30
12	7.50	7.80	8.30	7.80	9.60	10.85	7.20	7.00	7.30	7.20	7.30	7.35
13	7.60	7.80	8.30	7.80	9.95	10.60	7.20	7.00	7.40	7.20	7.30	7.45
14	7.65	7.80	8.30	7.80	10.10	10.35	7.20	7.00	7.35	7.20	7.30	7.55
15	7.70	7.80	8.30	7.80	10.10	10.20	7.15	7.00	7.25	7.20	7.30	7.60
16	7.80	7.80	8.30	7.80	10.10	10.05	7.10	7.00	7.20	7.20	7.30	7.60
17	7.80	7.80	8.30	7.80	10.00	9.60	7.10	7.00	7.20	7.20	7.30	7.60
18	7.80	7.80	8.30	7.75	9.90	9.20	7.10	7.00	7.20	7.20	7.35	7.60
19	7.85	7.80	8.30	7.70	10.30	9.05	7.10	7.00	7.20	7.20	7.40	7.60
20	7.90	7.80	8.30	7.60	11.30	8.85	7.00	7.00	7.20	7.20	7.50	7.55
21	7.90	7.80	8.05	7.60	10.45	8.65	7.00	7.00	7.20	7.20	7.55	7.50
22	7.90	7.80	8.00	7.60	11.15	8.50	7.00	6.95	7.20	7.20	7.60	7.50
23	7.85	7.80	7.90	7.60	11.00	8.50	7.05	6.90	7.20	7.20	7.60	7.50
24	7.80	7.80	7.85	7.60	10.80	8.40	7.10	6.90	7.10	7.20	7.60	7.50
25	7.80	7.80	7.80	7.70	10.80	8.25	7.10	6.90	7.15	7.20	7.60	7.50
26	7.80	7.80	7.80	7.75	10.90	8.10	7.10	6.90	7.20	7.30	7.65	7.50
27	7.80	7.80	7.80	7.80	11.35	8.00	7.10	6.90	7.20	7.30	7.75	7.55
28	7.80	7.80	7.80	7.80	11.65	7.90	7.10	6.90	7.20	7.30	7.80	7.60
29	7.80	.....	7.80	7.80	11.75	7.80	7.10	6.90	7.20	7.30	7.75	7.60
30	7.80	.....	7.80	7.80	12.00	7.80	7.10	6.90	7.20	7.30	7.70	7.60
31	7.85	.....	7.80	.....	11.95	.....	7.10	6.90	.....	7.30	.....	7.60

RIO GRANDE AT RIO GRANDE, NEW MEXICO.

This station, established February 3, 1895, is about one-fourth of a mile above the railroad station at Rio Grande, and at the head of White Rock Canyon. It is described in Water-Supply Paper No. 37,

page 281. Results of measurements will be found as follows: For 1896, Eighteenth Annual Report, Part IV, page 254; for 1897, Nineteenth Annual Report, Part IV, page 386; for 1898, Twentieth Annual Report, Part IV, page 370; for 1899, Twenty-first Annual Report, Part IV, page 259. During 1900 the following measurements were made by P. E. Harroun:

Discharge measurements of Rio Grande at Rio Grande, New Mexico.

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
1900.	*Feet.*	*Sec.-ft.*	1900.	*Feet.*	*Sec.-ft.*
April 9	6.00	830	June 21	6.35	1,095
April 20	5.70	666	June 26	5.50	663
May 22	9.80	4,729	August 2	4.10	158
May 29	10.20	6,184	November 10	5.00	356
June 5	10.00	6,034	December 6	5.10	464
June 13	8.40	3,260			

Daily gage height, in feet, of Rio Grande at Rio Grande, New Mexico, for 1900.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	5.55	5.50	5.70	5.75	6.35	10.45	5.05	4.15	4.00	4.80	5.00	5.20
2	5.40	5.50	5.65	5.90	6.60	10.40	4.95	4.10	4.00	4.80	4.90	5.20
3	5.40	5.50	5.90	6.25	6.75	10.30	4.80	4.10	4.15	4.90	4.90	5.20
4	5.70	5.50	5.90	6.00	6.60	10.20	5.45	4.10	4.70	4.90	4.90	5.25
5	5.65	5.50	6.15	6.00	6.80	10.00	5.50	4.10	6.20	4.80	4.95	5.15
6	5.45	5.50	6.25	6.10	7.45	9.55	5.35	4.20	5.55	4.80	4.95	5.15
7	5.60	5.60	6.15	5.95	7.40	9.30	5.10	4.20	10.00	4.75	4.90	5.25
8	5.50	5.60	6.00	6.00	7.25	9.15	5.00	4.20	7.30	4.75	4.95	5.30
9	5.65	5.35	6.00	6.10	7.65	8.90	5.05	4.30	6.25	4.75	4.90	5.25
10	5.60	4.95	6.00	6.05	8.00	8.85	4.85	4.45	5.80	4.70	4.90	5.35
11	5.55	5.25	6.00	5.85	8.35	8.80	4.70	4.80	5.20	4.70	4.95	5.35
12	5.30	5.55	6.25	5.80	8.80	8.60	4.65	4.25	5.40	4.75	4.90	5.30
13	5.60	5.50	6.35	5.75	8.95	8.35	4.60	4.20	5.60	4.75	4.90	5.30
14	5.55	5.55	6.60	5.80	8.95	8.05	4.45	4.15	5.40	4.80	4.90	5.25
15	5.65	5.55	6.85	5.95	8.85	7.55	4.35	4.20	5.05	4.95	4.85	5.20
16	5.65	5.55	6.55	5.95	8.70	7.45	4.25	4.15	4.90	4.95	4.90	5.20
17	5.65	5.35	6.45	5.85	8.50	7.15	4.25	4.10	4.80	5.00	4.85	5.05
18	5.55	5.35	6.40	5.85	8.40	6.95	4.20	4.10	4.85	4.95	4.85	4.90
19	5.45	5.45	6.20	5.75	9.15	6.65	4.20	4.10	4.95	4.95	4.90	5.10
20	5.40	5.55	5.95	5.75	9.55	6.35	4.10	4.10	4.95	4.95	5.05	5.05
21	5.50	5.55	5.95	5.90	9.60	6.25	4.15	4.10	4.85	4.90	5.15	5.15
22	5.60	5.50	5.95	6.75	9.75	6.15	4.10	4.10	4.75	5.00	5.20	5.15
23	5.60	5.45	5.85	6.60	9.75	6.40	4.15	4.00	4.75	4.95	5.15	5.05
24	5.55	5.60	5.85	6.35	9.35	5.85	4.25	4.00	4.70	5.00	5.15	4.90
25	5.60	5.55	5.80	6.25	9.25	5.90	4.20	4.00	4.70	4.95	5.20	4.85
26	5.55	5.55	5.75	6.15	9.40	5.70	4.25	3.90	4.70	5.00	5.15	4.90
27	5.55	5.70	5.65	6.00	9.90	5.45	4.20	3.90	4.70	5.10	5.20	5.05
28	5.50	5.65	5.75	6.20	9.95	5.35	4.20	3.90	4.80	5.05	5.35	5.00
29	5.40	.....	5.65	6.50	10.20	5.15	4.15	3.90	4.80	5.00	5.25	5.00
30	5.35	.....	5.55	6.25	10.40	5.80	4.20	3.90	4.80	5.00	5.25	5.00
31	5.50	.....	5.55	.....	10.45	.....	4.20	3.90	.....	5.00	.....	4.95

RIO GRANDE NEAR SAN MARCIAL, NEW MEXICO.

This station, established January 29, 1895, is at the railroad bridge a half mile south of the town. It is described in Water-Supply Paper No. 37, page 282. Results of measurements will be found as follows: For 1896, Eighteenth Annual Report, Part IV, page 257; for 1897, Nineteenth Annual Report, Part IV, page 387; for 1898, Twentieth Annual Report, Part IV, page 371; for 1899, Twenty-first Annual

Report, Part IV, page 261. During 1900 the following discharge measurements were made by P. E. Harroun:

Discharge measurements of Rio Grande near San Marcial, New Mexico.

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
1900.	*Feet.*	*Sec.-ft.*	1900.	*Feet.*	*Sec.-ft.*
April 6	5.83	20	June 18	7.70	1,410
April 18	6.70	170	June 24	7.30	605
April 27	5.85	6	June 30	6.40	59
May 19	8.00	2,074	September 11	8.05	3,474
May 27	7.90	2,979	November 13	5.60	43
June 3	9.40	6,855	December 20	6.80	198
June 10	8.50	3,166			

Daily gage height, in feet, of Rio Grande near San Marcial, New Mexico, for 1900.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	6.75	6.80	6.70	6.40	6.50	9.05	6.10	4.30	3.30	5.30	5.20	6.45
2	6.90	6.80	6.80	6.25	6.60	9.40	5.90	4.30	3.30	5.20	5.30	6.45
3	6.90	6.75	6.80	6.20	6.60	9.50	5.80	4.20	3.30	5.10	5.35	6.40
4	6.80	6.70	6.80	6.10	6.70	9.35	5.70	4.20	3.30	5.00	5.50	6.50
5	6.80	6.85	6.80	6.00	6.70	9.40	5.70	4.10	3.30	5.00	5.50	6.50
6	6.60	7.00	6.80	5.90	6.70	9.25	5.60	4.10	3.30	4.90	5.50	6.60
7	6.50	6.90	6.80	5.80	6.70	9.00	5.70	4.10	3.30	4.90	5.60	6.60
8	6.60	6.90	6.80	5.80	6.80	8.90	5.65	4.10	7.15	4.90	5.60	6.60
9	6.65	6.90	6.80	6.35	7.25	8.75	5.40	4.10	9.20	4.80	5.60	6.70
10	6.95	6.75	6.80	6.50	7.40	8.50	5.40	4.10	9.10	4.80	5.70	6.70
11	6.90	6.70	6.95	6.60	7.40	8.45	5.30	3.90	8.00	4.70	5.70	6.70
12	6.80	6.85	6.90	6.50	7.40	8.55	5.25	3.90	7.35	4.70	5.70	6.70
13	6.70	6.80	6.90	6.50	7.85	8.75	5.20	3.90	6.65	4.60	5.70	6.70
14	6.70	6.60	6.90	6.50	8.25	8.45	5.10	3.90	8.25	4.60	5.70	6.70
15	6.80	6.60	6.70	6.70	8.25	8.00	5.10	3.90	7.20	4.50	5.70	6.70
16	6.90	6.70	6.80	6.70	8.00	7.95	5.10	3.90	6.70	4.50	5.80	6.70
17	6.80	6.85	6.90	6.70	7.90	7.70	5.00	3.90	6.35	4.46	5.80	6.70
18	6.85	6.80	7.00	6.70	7.75	7.70	5.00	3.80	6.20	4.60	5.80	6.70
19	6.80	6.70	7.55	6.65	7.90	7.60	5.00	3.80	6.10	4.60	5.80	6.70
20	6.95	6.90	7.15	6.60	7.85	7.50	4.90	3.80	6.00	4.70	5.90	6.70
21	7.00	6.95	7.10	6.55	9.03	7.40	4.90	3.80	5.90	4.70	5.90	6.70
22	6.95	6.90	7.10	6.55	9.30	7.30	4.90	3.80	5.90	4.70	5.90	6.70
23	6.90	6.85	7.00	6.50	8.85	7.30	4.80	3.80	5.80	4.80	6.00	6.70
24	6.80	6.80	7.00	6.00	8.75	7.25	4.80	3.80	5.70	4.80	6.00	6.85
25	6.85	6.85	6.90	5.60	8.65	7.25	4.70	3.60	5.60	4.90	6.10	6.85
26	6.95	6.80	6.90	5.60	8.55	7.10	4.70	3.60	5.50	4.90	6.10	6.85
27	6.75	6.75	6.90	5.60	8.40	6.85	4.60	3.60	5.70	5.00	6.20	6.95
28	6.90	6.70	6.85	5.75	8.30	6.60	4.50	3.60	5.65	5.00	6.20	6.90
29	6.80	.....	6.70	6.50	8.55	6.50	4.50	3.60	5.40	5.10	6.30	6.50
30	6.90	.....	6.60	6.60	8.75	6.35	4.40	3.60	5.30	5.10	6.30	5.90
31	6.90	.....	6.50	.....	8.95	.....	4.40	3.60	.....	5.20	.....	5.65

RIO GRANDE NEAR EL PASO, TEXAS.

Measurements of the Rio Grande have been made at this place for a long time, during the last three years under the direction of W. W. Follett, consulting engineer of the International (Water) Boundary Commission, and by his successor, P. D. Cunningham. The present station is at Courchesne's limekiln, 4 miles north of El Paso. It is described in Water-Supply Paper No. 37, page 283. Results of measurements for 1899 will be found in the Twenty-first Annual Report,

Part IV, page 262. During 1900 the following discharge measurements were made by T. N. Courchesne:

Discharge measurements of Rio Grande near El Paso, Texas.

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
1900.	*Feet.*	*Sec.-ft.*	1900.	*Feet.*	*Sec.-ft.*
January 3	5.40	90	February 27	5.40	89
January 6	5.40	93	March 3	4.50	13
January 9	5.40	89	May 17	6.50	518
January 11	5.80	151	May 18	7.50	908
January 13	6.50	341	May 22	7.50	769
January 16	6.20	246	May 26	9.30	2,120
January 18	5.90	143	May 28	9.20	2,146
January 22	5.50	102	June 1	9.60	2,369
January 24	5.60	111	June 6	10.40	3,500
January 27	5.60	113	June 9	10.40	3,319
January 30	5.50	94	June 10	10.30	2,686
February 1	5.50	100	June 13	9.50	1,680
February 3	5.40	90	June 18	8.30	957
February 6	5.40	88	June 22	7.10	358
February 8	5.50	105	June 25	6.20	131
February 10	5.60	108	June 27	5.90	95
February 13	5.60	117	June 30	5.40	17
February 15	5.50	101	September 9	8.40	1,164
February 19	5.80	134	September 13	9.40	2,005
February 22	5.40	94	September 17	8.70	1,278
February 24	5.30	77	September 22	6.20	126

Daily gage height, in feet, of Rio Grande near El Paso, Texas, for 1900.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Sept.	Dec.
1	5.40	5.50	5.15	4.30	4.30	9.65	5.10	(*a*)	(*b*)
2	5.40	5.40	4.90	4.30	4.30	9.65	5.00	.....	.....
3	5.40	5.40	4.65	4.30	4.30	10.05	5.00	.....	.....
4	5.40	5.40	4.35	4.30	4.30	10.30	5.00	.....	.....
5	5.45	5.40	(*c*)	4.30	4.30	10.40	5.00	.....	.....
6	5.45	5.40	(*c*)	4.30	(*c*)	10.45	5.00	.....	.....
7	5.40	5.50	(*c*)	4.30	(*c*)	10.45	5.00	.....	.....
8	5.40	5.50	(*c*)	4.30	(*c*)	10.40	(*a*)	.....	.....
9	5.45	5.50	(*c*)	4.30	(*c*)	10.40	.....	8.00	.....
10	5.65	5.55	(*c*)	4.30	(*c*)	10.35	.....	5.90	.....
11	5.80	5.60	(*c*)	4.30	(*c*)	10.10	.....	5.10	.....
12	5.75	5.60	(*c*)	4.30	(*c*)	9.75	.....	6.15	.....
13	6.45	5.60	(*c*)	4.30	(*c*)	9.40	.....	9.10	.....
14	6.35	5.60	(*c*)	4.30	(*c*)	9.30	.....	8.35	.....
15	6.30	5.50	(*c*)	4.30	(*c*)	9.25	.....	7.85	.....
16	6.15	5.50	(*c*)	4.30	(*c*)	9.15	.....	7.75	.....
17	5.95	5.50	(*c*)	4.30	6.80	8.45	.....	8.50	.....
18	5.85	5.90	(*c*)	4.30	7.55	8.30	.....	7.75	.....
19	5.70	5.80	(*c*)	4.30	7.65	7.90	.....	7.05	.....
20	5.60	5.70	(*c*)	4.30	7.65	7.60	.....	6.35	.....
21	5.60	5.55	(*c*)	4.30	7.65	7.35	.....	6.30	.....
22	5.50	5.40	(*c*)	4.30	7.55	7.00	.....	6.15	5.05
23	5.50	5.40	(*c*)	4.30	7.40	6.75	.....	6.20	5.40
24	5.60	5.35	4.65	4.30	8.25	6.45	.....	5.60	5.40
25	5.60	5.30	4.55	4.30	9.80	6.25	.....	5.50	5.40
26	5.60	5.40	4.40	4.30	9.30	6.05	.....	5.40	5.40
27	5.60	5.40	4.30	4.30	9.25	5.90	.....	5.40	5.40
28	5.60	5.40	4.30	4.30	9.20	5.75	.....	5.25	5.35
29	5.55	.....	4.30	4.30	9.10	5.55	.....	5.10	5.15
30	5.50	.....	4.30	4.30	9.30	5.30	.....	5.00	5.10
31	5.50	.....	4.30	.....	9.40	.....	.....	.....	5.10

a River dry from July 8 to September 9.
b River dry from October 1 to December 23.
c River dry.

LOWER RIO GRANDE.

During 1900 the International (Water) Boundary Commission established a number of gaging stations on the Rio Grande below El Paso, Texas, and on some of its tributary streams, as noted below. This commission has had charge of the investigation looking toward the building of an international dam at El Paso, and the stations were established in order to obtain data regarding the fluctuations of the lower river to determine questions which had arisen in connection with hydrographic problems. Information regarding the river at the several localities where stations have been established has been furnished through the courtesy of Gen. Anson Mills, chairman of the International (Water) Boundary Commission. The stations are as follows, in order downstream: Rio Grande near Fort Hancock, Texas; Rio Grande 7 miles above Presidio, Texas; Rio Grande 6 miles below Presidio, Texas; Rio Grande near Langtry, Texas; Pecos River near Moorhead, Texas; Devils River near Devilsriver, Texas; Rio Grande near Devilsriver, Texas; and Rio Grande near Eagle Pass, Texas.

RIO GRANDE NEAR FORT HANCOCK, TEXAS.

This station was established March 27, 1900, by the International (Water) Boundary Commission. It is one and one-half miles southeast of Fort Hancock, on the Southern Pacific Railway, in the El Paso Valley, and is about 55 miles below El Paso. During 1900 the following measurements of discharge were made:

Discharge measurements of Rio Grande near Fort Hancock, Texas.

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
1900.	*Feet.*	*Sec.-ft.*	1900.	*Feet.*	*Sec.-ft.*
May 24	4.00	217	June 16	6.30	971
May 27	7.60	1,627	June 19	5.60	527
May 30	6.80	1,082	June 23	3.80	186
June 4	7.30	1,399	June 28	2.60	14
June 8	8.00	2,368	September 25	— .10	13

Daily gage height, in feet, of Rio Grande near Fort Hancock, Texas, for 1900.

Day.	May.	June.	Sept.*b*	Oct.	Day.	May.	June.	Sept.*b*	Oct.	Day.	May.	June.	Sept.*b*	Oct.
1	(*a*)	6.70	.60	—.50	12	.....	7.15	—.10	—.30	23	4.00	3.60	.10	—.10
2	.....	7.15	.60	—.50	13	.....	6.75	—.10	—.30	24	4.00	3.30	.10	—.10
3	.....	7.10	.60	—.50	14	.....	6.55	—.10	—.30	25	4.30	3.10	—.10	—.10
4	.....	7.25	60	—.50	15	.....	6.45	1.50	—.30	26	7.80	2.90	—.10	—.10
5	.....	7.25	1.30	—.30	16	.....	6.35	1.10	—.30	27	7.50	2.90	—.10	—.10
6	.....	7.85	.90	—.30	17	.....	6.55	.90	5.00	28	7.00	2.60	—.50	—.10
7	.....	7.90	.40	—.30	18	.....	5.70	1.35	4.00	29	6.90	1.80	—.50	—.10
8	.....	7.95	—.10	—.30	19	.....	5.50	1.20	1.10	30	6.80	.80	—.50	—.10
9	.....	8.00	—.10	—.30	20	.....	4.90	.90	—.10	31	6.65	(*b*)	.....	—.10
10	.....	7.75	—.10	—.30	21	3.80	4.50	.80	—.10					
11	.....	7.50	—.10	—.30	22	3.90	4.00	.30	—.10					

a River dry from March 27 to May 21.
b River dry from July 1 to September 1; also throughout November and December.

RIO GRANDE ABOVE PRESIDIO, TEXAS.

This station was established April 4, 1900, by the International (Water) Boundary Commission. It is 7 miles above Presidio and above the mouth of Concho River, one of the principal tributaries of the Rio Grande, and is about 200 miles below El Paso. Its location is far enough above the mouth of Concho River to be free from the effects of backwater from that stream. During 1900 the following measurements of discharge were made:

Discharge measurements of Rio Grande above Presidio, Texas.

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
1900.	*Feet.*	*Sec.-ft.*	1900.	*Feet.*	*Sec.-ft.*
May 23	2.00	101	July 2	1.80	116
May 26	0.00	000	July 5	1.70	59
May 28	2.00	96	July 7	2.30	218
June 1	4.20	907	July 23	2.20	193
June 6	4.20	901	August 4	1.50	54
June 8	4.40	1,157	September 24	2.70	305
June 11	5.35	1,589	September 27	1.70	46
June 13	6.50	2,376	October 3	2.10	80
June 15	4.60	1,170	October 18	4.75	970
June 18	3.60	692	October 20	5.10	1,435
June 22	3.00	400	October 23	2.10	125
June 25	2.30	192	October 25	1.60	45
June 27	1.50	110			

Daily gage height, in feet, of Rio Grande above Presidio, Texas, for 1900.

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Day.	May.	June.	July.	Aug.	Sept.	Oct.
1	(a)	4.10	(b)	(b)	(b)	3.75	17	(a)	3.60	(b)	(b)	(b)	3.50
2	.....	3.50	3.00	2.50	(b)	2.60	18	.....	3.60	(b)	(b)	(b)	5.25
3	.....	3.00	5.50	1.20	3.10	2.40	19	.....	3.40	2.60	(b)	(b)	2.30
4	.....	4.00	3.00	1.05	(b)	1.10	20	.....	4.10	3.40	(b)	(b)	3.40
5	.....	4.00	1.75	.....	(b)	(b)	21	.....	3.35	2.35	2.00	3.20	3.20
6	.....	4.20	2.90	2.05	.70	(b)	22	2.50	3.00	1.75	1.95	2.75	2.40
7	.....	4.20	2.50	.30	2.85	(b)	23	2.00	2.70	1.80	.60	4.10	2.15
8	.....	4.40	2.50	1.15	1.65	(b)	24	(b)	2.45	(b)	(b)	2.55	1.75
9	.....	5.00	1.50	2.75	(b)	(b)	25	(b)	2.15	1.05	(b)	1.25	1.55
10	.....	5.15	1.00	2.05	(b)	(b)	26	(b)	1.70	.55	(b)	1.15	1.35
11	.....	5.30	2.50	1.50	(b)	(b)	27	1.90	1.55	2.00	(b)	1.65	.95
12	.....	6.15	1.50	(b)	(b)	(b)	28	3.55	1.75	(b)	(b)	2.45	1.00
13	.....	5.90	(b)	.25	(b)	(b)	29	(b)	1.45	(b)	(b)	5.70	.85
14	.....	5.00	(b)	(b)	(b)	(b)	30	2.45	1.45	(b)	(b)	7.00	.60
15	.....	4.45	(b)	.95	(b)	(c)	31	3.50	.....	(b)	(b)	.....	(c)
16	.....	4.15	(b)	(b)	(b)	(b)							

a River dry from April 4 to May 21.
b River dry.
c River dry throughout November and December.

RIO GRANDE BELOW PRESIDIO, TEXAS.

This station was established April 8, 1900, by the International (Water) Boundary Commission. It is 6 miles below Presidio, also below the mouth of Concho River, and about 215 miles below El Paso. It is at the western end of the canyon section of the Rio Grande.

During 1900 the following measurements of discharge were made:

Discharge measurements of Rio Grande below Presidio, Texas.

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
1900.	*Feet.*	*Sec.-ft.*	1900.	*Feet.*	*Sec.-ft.*
May 20	3.40	14	September 10	8.90	5,061
May 22	8.30	1,762	September 12	8.95	4,082
May 25	4.90	66	September 14	8.35	2,797
May 29	4.85	98	September 17	7.45	1,725
June 7	7.10	1,030	September 19	7.20	1,262
June 9	7.45	1,318	September 25	6.85	1,249
June 12	8.70	2,213	September 28	7.90	2,169
June 14	7.50	1,668	October 4	7.75	2,573
June 16	6.50	1,021	October 6	7.60	2,112
June 19	6.00	735	October 9	7.80	2,265
June 21	5.85	710	October 11	7.25	1,602
June 23	5.10	355	October 13	7.45	1,685
June 26	4.40	167	October 15	6.70	1,127
June 28	4.40	107	October 17	9.50	4,702
July 3	6.40	729	October 19	7.20	1,497
July 6	5.10	275	October 22	6.70	1,158
July 9	8.40	1,425	October 24	6.20	893
July 12	11.30	8,834	October 27	6.05	731
July 14	10.50	6,890	October 29	5.90	601
July 17	8.45	2,655	November 5	5.60	492
July 19	8.25	2,477	November 7	5.60	476
July 22	9 40	4,068	November 10	5.50	459
July 24	10.80	7,893	November 12	5.50	431
July 26	9.85	5,608	November 14	5.40	403
July 28	10.60	7,491	November 16	5.40	399
August 1	11.75	11,586	November 19	5.30	370
August 3	11.75	12,784	November 22	5.20	333
August 6	12.95	16,049	November 26	5.20	311
August 9	11.35	10,357	November 28	5.10	288
August 11	10.40	7,032	December 3	5.00	256
August 13	9.35	5,001	December 8	5.00	255
August 15	9.00	4,129	December 10	5.00	248
August 21	7.60	2,053	December 13	5.00	248
August 23	8.90	4,035	December 20	5.00	220
August 25	9.20	4,823	December 22	5.00	225
August 28	8.05	2,643	December 24	4.90	214
August 30	7.50	2,039	December 27	4.90	211
September 5	7.00	1,437	December 29	4.90	213
September 7	7.80	2,367			

Daily gage height, in feet, of Rio Grande below Presidio, Texas, for 1900.

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	3.70	8.40	6.75	11.70	7.10	8.30	5.80	5.20
2	3.70	8.20	6.20	10.60	7.20	7.90	5.70	5.20
3	3.65	7.40	7.07	12.05	11.85	8.35	5.70	5.00
4	3.60	7.00	8.75	10.65	7.30	7.75	5.70	5.00
5	3.60	7.05	5.80	11.20	7.05	7.75	5.60	5.00
6	3.60	7.05	5.15	12.60	6.85	7.60	5.60	5.00
7	3.60	7.00	6.40	11.75	7.85	7.65	5.60	5.00
8	3.50	7.15	8.75	12.20	8.15	7.60	5.60	5.00
9	3.50	7.50	8.25	11.40	8.60	7.70	5.60	5.00
10	3.50	7.60	11.50	10.95	8.80	7.40	5.50	5.00
11	4.50	7.85	12.90	10.80	9.40	7.25	5.50	5.00
12	3.50	8.80	11.60	10.05	8.65	7.20	5.50	5.00
13	3.50	9.85	11.45	9.55	8.65	7.45	5.50	5.00
14	3.50	7.55	10.35	9.50	8.30	6.95	5.40	5.00
15	3.50	6.85	8.90	8.90	7.95	6.75	5.40	5.00
16	3.50	6.60	7.90	8.85	7.75	7.15	5.40	5.00
17	3.50	6.35	8.55	8.70	7.45	9.50	5.40	5.00
18	3.45	6.05	7.95	8.30	7.10	7.80	5.30	5.00
19	3.40	5.95	8.15	8.35	7.10	7.15	5.30	5.00
20	3.40	6.40	8.55	7.90	6.90	7.60	5.30	5.00
21	10.25	5.95	8.75	7.90	7.00	7.10	5.30	5.00
22	7.77	5.45	8.55	8.20	8.15	6.75	5.30	5.00
23	6.15	5.05	9.65	9.05	7.90	6.55	5.20	4.90
24	5.35	4.95	10.80	9.40	7.35	6.35	5.20	4.90
25	4.90	4.45	10.55	9.30	6.85	6.30	5.20	4.90
26	4.70	4.45	9.85	8.75	7.30	6.15	5.20	4.90
27	6.15	4.25	10.90	8.35	8.55	6.15	5.20	4.90
28	5.60	4.40	10.70	7.95	9.00	6.05	5.20	4.90
29	4.80	4.55	10.65	7.75	9.10	6.00	5.20	4.90
30	4.40	7.60	10.55	7.55	9.30	6.00	5.20	4.90
31	7.15	.....	10.85	7.35	.....	5.80	.....	4.90

RIO GRANDE NEAR LANGTRY, TEXAS.

This station was established in April, 1900, by the International (Water) Boundary Commission. It is located one-half mile south of Langtry station on the Southern Pacific Railway, and is about 440 miles below El Paso, Texas, at the eastern end of the canyon section of the Rio Grande, and a short distance to the west of the mouth of Pecos River, one of the principal tributaries of the Rio Grande. The following measurements of discharge were made in 1900:

Discharge measurements of Rio Grande near Langtry, Texas.

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
1900.	*Feet.*	*Sec.-ft.*	1900.	*Feet.*	*Sec.-ft.*
May 11	1.60	513	August 21	5.80	9,394
Do	1.60	406	August 25	3.40	3,693
May 12	1.50	351	August 29	3.70	4,153
May 15	1.60	371	September 2	2.90	2,515
May 16	1.60	478	September 7	3.30	3,427
May 23	3.90	3,826	September 12	3.40	3,313
May 29	1.80	859	September 16	3.40	3,712
June 2	2.85	2,273	September 22	2.40	1,920
June 5	3.80	1,991	September 26	3.25	3,441
June 10	2.10	1,339	October 2	3.90	4,688
June 13	3.30	2,958	October 8	2.90	2,674
June 17	3.25	2,893	October 12	2.60	2,325
June 24	2.60	1,701	October 15	2.40	2,020
June 28	1.70	811	October 23	2.50	2,285
July 2	2.20	1,348	October 26	2.00	1,630
July 5	5.45	8,287	October 31	1.70	1,124
July 9	2.35	1,428	November 4	1.65	1,070
July 12	3.65	3,499	November 8	1.55	992
July 15	6.90	11,836	November 12	1.45	888
July 18	4.70	5,617	November 16	1.40	858
July 22	3.20	2,751	November 21	1.40	836
July 26	5.20	7,671	November 26	1.30	772
July 30	5.45	8,330	November 30	1.30	761
August 2	5.70	8,236	December 5	1.25	726
August 6	6.30	10,100	December 10	1.20	685
August 8	11.25	24,401	December 14	1.15	667
August 13	5.90	8,561	December 20	1.20	680
August 16	4.35	5,258	December 24	1.15	644

Daily gage height, in feet, of Rio Grande near Langtry, Texas, for 1900.

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.70	1.75	2.70	5.55	2.85	3.40	1.65	1.30
2	2.30	3.95	2.80	5.60	2.90	3.90	1.60	1.30
3	1.80	2.75	3.05	6.25	2.90	4.00	1.60	1.30
4	1.70	2.10	3.05	6.25	4.70	3.55	1.60	1.30
5	1.85	2.85	4.65	8.30	7.35	2.85	1.55	1.20
6	1.75	3.05	3.45	6.00	4.75	3.35	1.50	1.20
7	1.75	2.60	3.10	6.30	3.15	2.95	1.50	1.20
8	1.95	2.45	2.75	10.30	2.80	2.85	1.55	1.20
9	1.90	2.25	2.25	9.25	2.70	2.80	1.80	1.20
10	1.75	2.30	2.10	7.50	2.95	2.80	1.70	1.20
11	1.60	2.30	3.35	6.90	3.20	2.85	1.50	1.20
12	1.50	2.30	3.40	6.30	3.55	2.60	1.45	1.20
13	1.55	3.25	7.50	5.80	4.25	2.55	1.40	1.20
14	1.55	3.45	6.80	5.20	4.00	2.50	1.40	1.20
15	1.55	3.40	6.70	4.80	3.65	2.30	1.40	1.20
16	1.70	4.15	4.40	4.40	3.35	2.25	1.40	1.20
17	1.50	3.15	4.05	4.25	3.10	2.40	1.40	1.20
18	1.50	2.85	4.60	3.80	2.75	5.15	1.40	1.20
19	1.45	2.55	3.95	3.80	2.70	4.50	1.40	1.20
20	1.65	2.40	3.70	5.75	2.60	4.30	1.40	1.20
21	1.95	2.65	3.40	5.80	2.50	3.75	1.40	1.20
22	4.10	2.90	3.20	5.10	2.45	2.80	1.40	1.20
23	3.65	2.95	4.90	4.30	3.45	2.40	1.40	1.20
24	3.75	2.55	3.50	3.45	2.85	2.50	1.40	1.15
25	2.90	2.20	3.25	3.30	3.35	2.25	1.30	1.15
26	2.35	1.95	5.40	3.35	3.15	2.10	1.30	1.10
27	2.25	1.80	5.30	3.40	2.90	2.00	1.30	1.10
28	1.95	1.70	4.95	3.40	3.85	2.00	1.30	1.10
29	1.85	3.05	5.50	3.55	4.80	1.90	1.30	1.10
30	1.60	2.55	5.35	3.50	3.20	1.90	1.30	1.10
31	1.50	.....	5.60	3.00	.....	1.75	.....	1.10

PECOS RIVER NEAR PECOS, TEXAS.

The gaging station is at the Margueretta flume, about 6 miles above the city of Pecos. The gage is vertical, and is nailed to one of the bents of the flume. The measurements are made above the flume, by wading, a wire being stretched across the river and tagged every 4 feet. The bottom is sand, and slight changes occur at every rise; but considering the character of the bottom it is remarkable that the changes of configuration of the cross section are so inconsiderable. The observer is Willard H. Dennis, and during the year 1900, in addition to his services as observer of daily gage heights, he obtained measurements of the velocity, a Price acoustic meter being used, from which the flow was calculated by Thomas U. Taylor. Discharge measurements and daily gage heights were also observed in the canal flume. This station is described in Water-Supply Paper No. 37, page 285.

During the year 1900 West Valley ditch, one of the diversions of Pecos River, was measured thirty-two times, as follows:

Discharge measurements of West Valley ditch.

Date.	Discharge.	Date.	Discharge.
1900.	*Sec.-ft.*	1900.	*Sec.-ft.*
April 22	12.0	July 15	10.6
April 26	10.0	July 18	14.0
April 30	18.0	July 21	17.4
May 9	12.0	July 23	10.8
May 11	12.0	July 25	11.0
May 14	12.8	August 1	14.0
May 16	12.5	August 4	11.8
May 18	10.4	August 6	18.3
May 20	13.6	August 10	8.0
May 22	15.0	August 20	11.8
June 4	16.0	August 24	16.6
June 6	17.0	September 3	12.0
July 1	11.4	September 5	13.5
July 5	11.4	November 20	12.0
July 7	13.7	December 1	20.3
July 13	13.6	December 4	14.3

The average flow of West Valley ditch through the season is 12 second-feet.

During 1900 the following measurements of discharge of the river were made:

Discharge measurements of Pecos River near Pecos, Texas.

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
1900.	*Feet.*	*Sec.-ft.*	1900.	*Feet.*	*Sec.-ft.*
February 25	2.60	273	July 7	3.15	276
March 3	1.90	144	July 13	1.90	92
March 6	1.70	140	July 15	1.60	59
March 9	1.60	125	July 18	1.52	47
March 11	1.50	110	July 21	3.30	353
March 13	1.20	69	July 23	3.50	393
March 17	1.75	143	July 25	2.60	193
March 20	1.00	50	August 1	3.15	311
March 28	.90	43	August 4	2.20	125
April 1	.80	39	August 6	1.75	70
April 8	.70	25	August 10	3.55	335
April 16	.60	23	August 13	2.55	135
April 22	.60	21	August 20	3.30	333
April 26	.50	20	August 24	3.40	273
April 30	.50	21	September 3	1.90	58
May 9	3.10	277	September 5	1.90	62
May 11	2.50	126	November 20	2.62	214
May 14	2.00	69	December 1	2.40	168
May 16	------	330	December 4	2.28	148
May 18	2.80	221	December 8	2.20	132
May 20	2.40	153	December 11	2.10	127
May 22	2.90	260	December 15	2.17	135
June 6	3.30	258	Do	2.10	127
June 4	2.90	216	December 17	2.12	136
July 1	2.00	89	December 19	2.00	135
July 5	1.80	70			

Discharge measurements of Margueretta flume near Pecos, Texas.

Date.	Discharge.	Date.	Discharge.
1900.	*Sec.-ft.*	1900.	*Sec.-ft.*
February 25	29	May 22	155
March 3	81	June 4	127
March 6	84	June 6	140
March 9	79	July 1	127
March 11	75	July 5	148
March 13	104	July 7	146
March 17	44	July 13	140
March 20	115	July 15	129
March 28	115	July 18	135
April 1	117	July 21	210
April 8	108	July 23	209
April 16	115	July 25	185
April 22	115	August 1	131
April 26	118	August 4	151
April 30	106	August 6	137
May 9	138	August 10	124
May 11	127	August 13	147
May 14	125	August 20	165
May 16	162	August 24	156
May 18	94	September 3	160
May 20	137		

Daily gage height, in feet, of Pecos River near Pecos, Texas, for 1900.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	3.00	3.35	2.50	0.80	6.05	4.75	2.00	3.20	1.90	6.30	4.15	2.40
2	2.90	3.35	2.35	.80	4.70	3.80	1.90	3.00	1.80	6.10	4.00	2.40
3	2.90	3.30	1.95	.85	7.15	3.25	2.05	2.60	1.85	7.05	4.00	2.40
4	2.90	3.35	1.90	.70	6.60	3.05	2.05	2.25	1.94	7.65	4.00	2.30
5	2.95	3.25	1.90	1.50	6.70	3.50	2.50	1.95	4.10	5.65	4.00	2.30
6	2.85	3.30	1.75	.80	6.50	3.25	4.10	1.83	6.00	5.55	4.20	2.20
7	2.75	3.30	1.70	.70	5.25	3.95	3.25	3.50	5.65	5.35	4.20	2.20
8	2.60	3.15	1.60	.70	4.40	4.55	2.65	5.65	6.35	5.05	4.05	2.20
9	3.35	3.10	1.60	.70	3.25	4.30	2.90	4.55	7.00	4.90	4.00	2.20
10	3.80	3.10	1.55	.65	2.85	4.25	2.60	3.54	7.55	4.90	4.00	2.20
11	3.85	3.25	1.50	.60	2.55	4.15	2.05	3.10	7.85	4.85	3.90	2.10
12	3.70	3.15	1.50	.60	2.25	3.90	1.95	2.85	7.60	4.65	3.80	2.10
13	3.30	3.15	1.25	.60	2.05	5.00	1.85	2.55	7.35	4.50	3.80	2.20
14	3.35	3.00	1.20	.60	2.00	4.55	1.65	2.40	7.20	4.40	3.75	2.20
15	3.70	3.05	1.20	.60	2.00	4.45	1.55	2.25	6.80	4.30	3.60	2.17
16	4.25	2.85	1.30	.60	3.65	3.55	1.50	2.95	5.80	4.25	3.45	2.20
17	4.25	2.95	1.75	.60	2.85	3.10	1.50	3.75	5.50	5.60	3.25	2.14
18	4.40	2.90	1.75	.60	2.85	2.85	1.51	3.70	5.50	9.50	3.05	2.10
19	4.40	2.90	1.80	.60	2.60	2.65	1.50	3.55	5.85	7.95	2.80	2.03
20	4.25	2.90	1.35	.60	2.35	2.80	1.90	3.30	5.90	6.15	2.66	2.00
21	4.15	3.00	1.00	.60	3.30	3.95	3.45	3.30	5.75	5.95	2.65	2.00
22	3.80	2.90	.90	.60	3.05	3.05	3.70	5.15	5.55	6.05	2.60	2.00
23	3.60	2.85	.95	.60	3.80	2.95	3.60	3.85	8.35	6.15	2.60	2.00
24	3.60	2.90	1.00	.60	3.85	2.55	2.70	3.40	7.55	6.00	2.45	2.00
25	3.45	2.60	1.00	.60	5.00	2.40	2.55	3.15	5.90	5.85	2.50	2.00
26	3.30	2.50	1.00	.50	6.45	2.45	2.45	2.95	5.35	5.55	2.40	2.00
27	3.25	2.50	.95	.50	7.10	2.25	2.95	2.50	5.45	5.35	2.40	2.00
28	3.35	2.50	.90	.50	6.90	2.10	2.80	2.10	6.05	5.00	2.40	2.00
29	3.20	.....	.90	.50	6.30	2.25	2.10	2.00	6.65	4.90	2.40	2.00
30	3.40	.....	.80	.50	6.10	2.10	2.23	2.00	6.95	4.55	2.40	2.00
31	3.45	.....	.80	.....	5.75	.....	3.20	1.90	.....	4.35	.....	2.00

Daily gage height, in feet, of Margueretta flume near Pecos, Texas, for 1900.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.80	0.15	0.50	1.80	2.45	2.25	2.50	2.70	2.90	2.25	2.40	2.56
2	1.80	.15	.90	1.75	2.05	2.30	2.50	2.77	2.88	2.40	2.40	2.53
3	1.80	.10	1.35	1.70	2.35	2.25	2.52	2.70	2.87	2.40	2.40	2.53
4	1.80	.10	1.40	1.90	2.35	2.35	2.55	2.80	2.84	2.50	2.40	2.53
5	1.40	.10	1.40	2.25	2.35	2.35	2.60	2.79	2.90	2.38	2.45	2.53
6	.90	.10	1.40	1.95	2.35	2.40	2.68	2.78	2.95	2.38	2.50	2.52
7	.85	.10	1.40	1.85	2.30	2.45	2.68	2.88	2.90	2.40	2.50	2.59
8	.80	1.15	1.40	1.80	2.35	2.40	2.60	2.80	3.05	2.30	2.50	2.60
9	.95	1.00	1.40	1.90	2.10	2.40	2.60	2.80	3.10	2.35	2.50	2.60
10	.80	1.00	1.35	1.80	2.15	2.45	2.58	2.78	2.50	2.35	2.50	2.60
11	.65	1.00	1.30	1.80	2.10	2.40	2.45	2.80	1.95	2.30	2.50	2.60
12	.60	1.00	1.30	1.85	2.15	2.40	2.45	2.80	2.28	2.30	2.50	2.60
13	1.60	1.00	1.55	1.85	2.20	2.40	2.68	2.90	2.52	2.30	2.50	2.62
14	1.50	.90	1.60	1.90	2.10	2.40	2.60	2.88	2.60	2.35	2.51	2.60
15	1.40	.95	1.65	1.90	2.15	2.45	2.60	2.86	2.68	2.35	2.50	2.62
16	1.95	.95	1.45	1.95	2.45	2.30	2.56	2.90	2.55	2.38	2.45	2.62
17	1.80	1.05	.80	1.90	2.20	2.35	2.56	2.85	2.60	2.45	2.40	2.60
18	.35	1.20	.90	1.90	2.00	2.40	2.50	2.86	2.70	2.28	2.45	2.60
19	(a)	1.20	.90	1.90	2.15	2.45	2.50	2.84	1.72	2.30	2.45	2.60
20	------	.90	1.40	1.85	2.30	2.45	2.58	2.85	2.00	2.38	2.48	2.68
21	------	.60	1.85	1.90	2.35	2.40	2.75	2.82	2.20	2.38	2.50	2.68
22	------	.60	1.80	1.80	2.30	2.40	2.80	2.90	2.55	2.38	2.50	2.68
23	------	.55	1.80	1.90	2.30	2.50	2.72	2.85	2.50	2.40	2.50	2.66
24	.40	.60	1.80	1.90	2.35	2.40	2.60	2.91	2.24	2.35	2.50	2.62
25	.30	.60	1.90	1.90	2.25	2.40	2.70	2.88	2.30	2.38	2.50	2.66
26	.30	.60	1.80	1.90	2.05	2.45	2.32	2.90	2.38	2.35	2.50	2.70
27	.25	.60	1.80	1.90	2.40	2.45	2.55	2.90	2.60	2.38	2.50	2.70
28	.18	.60	1.80	1.90	2.45	2.50	2.80	2.98	2.65	2.30	2.50	2.70
29	.10	------	1.70	1.80	2.50	2.50	2.65	2.90	2.60	2.30	2.52	2.70
30	.15	------	1.70	1.75	2.50	2.50	2.62	2.90	2.42	2.45	2.52	------
31	.15	------	1.75	------	2.45	------	2.72	2.90	------	2.40	------	------

(a) No water in flume.

TOYAH CREEK, TEXAS.

Toyah Creek rises in natural springs about 40 miles southwest of Pecos, Texas. These springs are mainly in section 256, patented by the State of Texas to Antonio Ball. They are in a flat valley hemmed in by a horseshoe curve of the Davis Mountains. About 3 miles to the northwest is Phantom Lake. It is stated by close observers that the water of this lake is of the same composition and general character as that of the Toyah Springs, and it is probable that the lake is on the underground stream that issues from the earth in the springs. The largest of the Toyah Springs is oval shaped, about 100 feet long by 60 feet broad. Its water level is influenced by the weeds and long grass which grow in it, also by the atmosphere. As measured on September 5, 1900, by Thomas U. Taylor, the entire discharge was 46 second-feet. A large percentage of the water is deflected into the ditch of the Toyah Creek Irrigation Company. The flow of the spring is equal to about 8 heads; a head being defined as the amount of water flowing through an opening 1 foot square the upper edge of which is 4 inches below the water surface. There is an unverified and hazy tradition that the flow once amounted to 12 heads, but this is doubted. The springs are about an eighth of a mile east of the post-office at Toyahvale. La Loma is about 1 mile below the head spring, on the right bank. India (known as Brogado post-office) is about 4 miles below the springs, on the right bank, while Saragossa is 9 miles below the head spring, on the right bank of the creek.

For several miles the creek skirts the foothills of the Davis Mountains, and, in addition to the well-known springs mentioned it is fed by small invisible springs and by seepage. It empties into Toyah Lake, a large, flat depression charged with alkali, about 35 miles from Toyahvale and about 12 miles south of Pecos.

A half mile above Saragossa, on the main Saragossa ditch, is the Clements grain and flour mill, a building constructed of adobe and timber, where there is a fall of 12 feet. The principal irrigation ditch leading from the largest of the Toyah Springs (now known as the Clements or Murphy ditch) was projected as early as 1875, but the ditches of the Saragossa and Toyah Creek companies were chartered in 1875 and 1876. Afterwards the companies passed through various ownerships and changes, until 1894, when Mr. E. Clements obtained all of the rights and titles of the Saragossa ditch, and in 1895 a controlling interest in the Toyah Creek ditch. The Saragossa ditch diverts water from Toyah Creek about 6¼ miles below the Toyah Springs and about 1¾ miles above the town of Saragossa. Both ditches are now operated under the Clements management, being connected by a lateral. The original Saragossa ditch was constructed probably as early as 1869, at a point where the bed of the creek ended in rather swampy lands. These lands are now in the Saragossa farm. From the best evidence obtainable, the flow of the Saragossa Spring was formerly about 15 second-feet, and it was the largest affluent of Toyah Creek below section 256 (Toyah Spring). No dam is used at the head of the Saragossa ditch, the bottom of the ditch being low enough to drain the creek.

In all there are five ditches diverting water from Toyah Creek, as follows: (1) Clements (or Murphy) ditch, 9 miles long, taken out of Toyah Springs on the south side, and irrigating about 1,500 acres; (2) the Giffin ditch, 1 mile long, taken out of Toyah Creek on the north side, and irrigating about 400 acres; (3) the Saragossa ditch (included in the Clements system), 2 miles long, taken out on the south side of the creek about 6 miles below Toyah Springs, and irrigating 1,500 acres; (4) the St. Isabella ditch, 2 miles long, taken out on the north side of the creek 19 miles below Toyah Springs, and irrigating about 60 acres (the creek at this place usually has no flow, the water for irrigation being obtained from springs); (5) the Pruett ditch, 2 miles long, head gate 26 miles below Toyah Springs, taken out on the south side, and irrigating about 300 acres. The crops raised are mostly corn, wheat, kaffir corn, and sweet potatoes. From Toyahvale to Saragossa the irrigation has been very effective.

PECOS RIVER NEAR MOORHEAD, TEXAS.

This station was established in April, 1900, by the International (Water) Boundary Commission. It is near Moorhead, immediately

above the high bridge of the Southern Pacific Railway. During 1900 the following measurements of discharge were made:

Discharge measurements of Pecos River near Moorhead, Texas.

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
1900.	*Feet.*	*Sec.-ft.*	1900.	*Feet.*	*Sec.-ft.*
May 14	2.30	930	September 4	1.25	305
May 17	1.90	655	September 8	1.10	259
May 23	2.00	746	September 13	2.25	931
May 30	1.90	795	September 19	2.90	1,475
June 2	2.90	1,557	September 23	4.20	2,478
June 7	2.30	1,017	September 28	2.95	1,486
June 11	1.70	648	October 3	2.90	1,445
June 16	1.90	767	October 9	3.10	1,589
June 19	2.10	908	October 12	2.50	1,298
June 28	1.45	484	October 20	2.00	993
July 3	1.40	469	October 23	3.10	1,859
July 6	1.30	463	October 28	2.90	1,764
July 10	1.20	362	November 1	2.80	1,315
July 13	1.50	516	November 5	2.20	960
July 17	9.25	9,265	November 9	2.10	877
July 18	1.70	587	November 13	2.00	783
July 23	1.20	314	November 19	1.90	702
July 27	1.10	302	November 27	1.70	589
July 31	1.50	440	December 1	1.65	542
August 4	1.50	443	December 7	1.60	532
August 10	1.60	495	December 11	1.55	509
August 14	2.10	835	December 15	1.55	535
August 18	1.50	467	December 19	1.50	477
August 23	1.30	374	December 24	1.50	440
August 27	1.40	424	December 30	1.50	442
August 31	1.40	404			

Daily gage height, in feet, of Pecos River near Moorhead, Texas, for 1900.

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.65	2.80	1.50	1.50	1.50	3.35	2.85	1.60
2	1.90	2.95	1.45	1.50	1.40	3.00	2.75	1.60
3	1.65	2.80	1.40	1.50	1.30	2.90	2.55	1.60
4	1.50	2.80	1.40	1.50	1.30	2.90	2.45	1.60
5	1.50	2.70	1.35	1.50	1.40	2.90	2.25	1.60
6	1.40	2.55	1.30	1.50	1.35	2.80	2.20	1.60
7	1.40	2.25	1.30	1.55	1.20	2.70	2.20	1.60
8	1.50	2.05	1.30	1.80	1.10	3.25	2.10	1.60
9	2.10	1.90	1.30	1.85	1.10	3.05	2.10	1.60
10	2.85	1.80	1.20	1.60	1.10	2.85	2.10	1.60
11	2.75	1.70	1.20	1.55	1.10	2.65	2.00	1.60
12	2.55	1.70	1.35	1.50	1.50	2.45	2.20	1.60
13	2.35	1.90	1.50	1.40	2.25	2.25	2.00	1.60
14	2.20	1.90	1.50	2.10	2.50	2.20	2.10	1.60
15	2.10	1.90	1.45	2.05	2.25	2.20	2.20	1.60
16	2.00	1.90	1.30	1.95	2.80	2.15	2.10	1.50
17	1.90	1.90	5.80	1.65	2.90	2.10	2.00	1.50
18	1.85	1.80	1.75	1.50	3.00	2.10	1.95	1.50
19	1.75	2.00	1.45	1.50	2.90	2.10	1.90	1.50
20	1.60	2.00	1.40	1.45	2.85	2.00	1.80	1.50
21	4.70	2.00	1.40	1.40	2.75	2.15	1.75	1.50
22	2.25	1.85	1.30	1.30	2.60	2.80	1.80	1.50
23	2.05	1.70	1.20	1.25	3.85	3.10	1.90	1.50
24	2.00	1.60	1.20	1.25	2.95	3.35	1.80	1.50
25	1.90	1.50	1.20	1.40	2.75	3.25	1.80	1.50
26	1.85	1.40	1.20	2.15	2.60	3.15	1.80	1.50
27	1.80	1.40	1.10	1.40	2.60	2.95	1.70	1.50
28	1.70	1.45	1.20	1.40	3.15	3.10	1.70	1.50
29	1.80	1.50	1.35	1.40	2.95	3.80	1.60	1.50
30	1.95	1.50	1.45	1.40	3.05	3.35	1.60	1.50
31	2.30	.....	1.50	1.40	.....	3.05	.....	1.50

DEVILS RIVER AT DEVILSRIVER, TEXAS.

This station was established in April, 1900, by the International (Water) Boundary Commission. It is opposite the Southern Pacific Railway station at Devilsriver. The river is about 50 miles in length,

has a perennial flow, and during flood periods is subject to great fluctuations. During 1900 the following measurements of discharge were made:

Discharge measurements of Devils River at Devilsriver, Texas.

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
1900.	*Feet.*	*Sec.-feet.*	1900.	*Feet.*	*Sec.-feet.*
May 20	2.80	1,175	August 14	2.90	1,084
May 24	3.35	1,458	August 20	2.70	955
May 30	3.00	1,262	August 23	2.65	902
June 4	2.90	1,200	August 27	2.60	859
June 7	2.80	1,060	August 31	2.60	841
June 11	2.80	1,049	September 6	2.70	982
June 15	2.80	994	September 10	2.65	864
June 19	2.80	1,000	September 14	2.50	781
June 23	2.70	917	September 20	2.50	747
June 27	2.70	896	September 24	10.25	26,386
June 29	8.20	13,493	October 3	2.90	1,131
July 3	2.95	1,171	October 9	2.80	1,063
July 6	2.80	895	October 22	3.00	1,274
July 10	2.70	918	November 2	3.30	1,592
July 14	2.65	908	November 6	3.80	1,040
July 19	2.70	948	November 14	2.70	937
July 23	2.60	858	November 23	2.70	948
July 27	2.60	891	December 4	2.50	862
July 31	2.60	900	December 7	2.60	911
August 4	2.70	997	December 13	2.60	901
August 7	2.65	944	December 18	2.60	897
August 11	3.10	1,311	December 29	2.50	831

Daily gage height, in feet, of Devils River at Devilsriver, Texas, for 1900.

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.95	3.00	3.20	2.65	2.70	3.00	4.25	2.60
2	2.80	2.90	3.20	2.70	2.70	2.90	3.75	2.60
3	2.80	2.90	2.90	2.80	2.70	2.90	3.30	2.60
4	2.80	2.90	2.90	2.75	2.70	2.90	3.00	2.60
5	2.80	2.90	2.90	2.65	2.70	2.80	2.95	2.60
6	2.80	2.85	2.90	2.60	2.70	2.80	2.80	2.60
7	2.85	2.85	2.80	2.60	2.70	2.80	2.80	2.60
8	2.80	2.80	2.80	4.60	2.70	2.80	2.80	2.60
9	2.80	2.80	2.80	4.35	2.70	2.80	2.80	2.60
10	2.80	2.80	2.80	3.45	2.60	2.90	2.80	2.60
11	2.75	2.80	2.80	3.15	2.60	3.00	2.80	2.60
12	2.75	2.80	2.80	2.95	2.60	3.00	2.80	2.60
13	2.80	2.80	2.70	2.90	2.60	3.00	2.80	2.60
14	3.25	2.80	2.70	2.90	2.55	3.00	2.70	2.60
15	4.00	2.80	2.65	2.90	2.50	3.00	2.70	2.60
16	3.10	2.80	2.70	2.85	2.50	3.00	2.60	2.60
17	2.90	2.80	2.70	2.80	2.50	3.00	2.60	2.60
18	2.90	2.80	2.70	2.80	2.50	3.00	2.70	2.60
19	2.90	2.75	2.70	2.80	2.50	3.00	2.70	2.50
20	2.90	2.80	2.70	2.75	2.50	3.00	2.70	2.50
21	3.75	2.75	2.70	2.75	2.50	3.00	2.70	2.50
22	5.35	2.75	2.70	2.70	10.60	3.00	2.70	2.50
23	3.45	2.80	2.60	2.70	15.25	3.00	2.70	2.50
24	3.35	2.80	2.55	2.70	11.00	3.00	2.70	2.50
25	3.20	2.80	2.55	2.70	6.20	3.00	2.60	2.50
26	3.10	2.80	2.80	2.70	5.05	3.00	2.60	2.50
27	3.05	2.80	2.60	2.60	4.35	3.00	2.60	2.50
28	3.00	2.80	2.60	2.60	3.40	3.00	2.60	2.50
29	3.00	8.25	2.65	2.60	3.00	3.00	2.60	2.50
30	3.00	4.55	2.75	2.60	3.00	3.00	2.60	2.50
31	3.00	.....	2.65	2.60	.....	3.90	.....	2.50

RIO GRANDE NEAR DEVILSRIVER, TEXAS.

This station was established in April, 1900, by the International (Water) Boundary Commission. It is alongside the Southern Pacific Railway track, about a half mile below the mouth of Devils River

and about 480 miles below El Paso. During 1900 the following measurements of discharge were made:

Discharge measurements of Rio Grande near Devilsriver, Texas.

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
1900.	*Feet.*	*Sec.-ft.*	1900.	*Feet.*	*Sec.-ft.*
May 25	4.90	5,586	September 6	8.50	18,012
May 31	3.90	3,303	September 11	4.30	4,261
June 4	4.45	5,062	September 15	5.30	6,643
June 8	4.20	4,054	September 21	4.50	4,531
June 12	3.90	3,543	September 25	7.60	13,457
June 15	4.60	5,101	October 4	5.80	7,552
June 20	4.10	3,930	October 10	5.00	5,460
June 23	4.10	3,725	October 14	4.70	4,428
June 27	3.70	2,826	October 22	5.00	5,343
June 30	4.70	4,948	October 25	5.00	5,364
July 4	4.20	3,848	October 27	4.70	4,519
July 7	4.40	5,009	November 3	4.50	4,013
July 13	6.40	10,478	November 7	4.25	3,346
July 20	4.90	5,612	November 10	4.20	3,288
July 24	5.55	7,692	November 15	4.05	2,990
July 28	5.90	9,151	November 20	4.00	2,911
August 1	6.70	10,917	November 24	3.95	2,770
August 7	6.45	10,609	November 28	3.85	2,655
August 11	7.75	14,735	December 4	3.80	2,562
August 15	6.10	8,854	December 8	3.75	2,435
August 20	6.00	8,971	December 13	3.75	2,465
August 24	5.25	6,653	December 18	3.75	2,419
August 28	5.20	6,205	December 23	3.70	2,346
September 1	4.75	5,277	December 29	3.65	2,348

Daily gage height, in feet, of Rio Grande near Devilsriver, Texas, for 1900.

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	3.60	4.20	3.95	6.75	4.65	5.25	4.85	3.80
2	3.60	4.70	4.05	6.90	5.95	4.70	4.60	3.80
3	3.50	5.60	3.70	6.90	4.60	5.00	4.45	3.80
4	3.50	4.40	4.10	6.75	5.00	5.70	4.40	3.80
5	3.30	4.35	4.60	8.70	6.80	5.60	4.40	3.80
6	3.35	4.30	4.65	7.45	8.50	5.45	4.30	3.80
7	3.55	4.45	4.40	6.35	5.80	5.25	4.30	3.80
8	3.60	4.15	4.40	9.45	4.30	5.10	4.30	3.80
9	3.80	3.85	4.40	10.50	3.95	5.00	4.25	3.80
10	3.90	3.75	3.75	9.65	3.90	5.00	4.20	3.80
11	3.80	3.75	3.60	7.70	4.35	5.00	4.20	3.80
12	3.80	3.90	3.60	7.10	4.35	4.85	4.20	3.80
13	3.65	3.95	5.75	6.70	4.65	4.80	4.20	3.80
14	3.90	3.85	7.10	6.40	5.70	4.65	4.10	3.80
15	4.45	4.65	6.30	6.10	5.15	4.45	4.05	3.80
16	3.80	4.45	6.45	5.55	5.00	4.40	4.00	3.80
17	3.70	4.35	6.60	5.45	4.95	4.40	4.00	3.80
18	3.60	4.50	6.35	5.20	4.85	4.35	4.00	3.80
19	3.60	4.60	5.15	5.00	4.70	4.55	4.00	3.70
20	3.50	4.20	4.80	6.10	4.60	5.40	4.00	3.70
21	4.10	3.95	4.40	6.30	4.50	6.25	4.00	3.70
22	6.15	3.85	4.40	5.80	9.90	5.00	4.00	3.70
23	6.15	3.95	5.60	5.90	16.60	4.75	4.00	3.70
24	4.70	3.85	5.25	5.15	12.25	5.00	4.00	3.70
25	4.80	3.60	4.50	4.90	7.10	5.00	3.85	3.70
26	4.35	3.40	4.75	4.85	5.60	4.85	3.80	3.70
27	4.05	3.60	5.95	5.55	5.00	4.70	3.80	3.70
28	4.00	3.50	5.75	5.20	4.80	4.50	3.80	3.70
29	3.90	8.75	5.70	4.55	6.80	4.50	3.80	3.70
30	3.80	4.65	6.30	4.75	6.10	4.50	3.80	3.70
31	3.80	.....	6.35	4.55	.....	5.25	.....	3.70

RIO GRANDE NEAR EAGLE PASS, TEXAS.

This station was established in April, 1900, by the International (Water) Boundary Commission. It is a half mile above the railway bridge between Eagle Pass and Ciudad Porfirio Diaz, Mexico, and

about 540 miles below El Paso, Texas. During 1900 the following measurements of discharge were made:

Discharge measurements of Rio Grande near Eagle Pass, Texas.

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
1900.	*Feet.*	*Sec.-ft.*	1900.	*Feet.*	*Sec.-ft.*
May 27	4.20	7,321	September 11	3.90	6,506
May 30	3.80	5,182	September 14	4.55	10,138
June 6	3.90	6,098	September 29	4.50	13,851
June 8	3.80	5,867	October 2	4.40	12,307
June 11	3.70	4,900	October 5	4.80	12,320
June 15	3.90	6,030	October 8	4.20	8,900
June 18	4.30	6,743	October 15	3.80	6,599
June 21	3.80	5,329	October 23	4.20	7,674
June 22	3.60	4,794	October 25	4.10	6,896
June 25	3.70	5,042	October 26	4.20	7,333
June 29	3.50	4,519	October 29	3.90	6,748
July 2	3.70	4,451	November 5	3.60	5,759
July 6	3.80	4,994	November 7	3.40	5,618
July 9	4.00	5,839	November 12	3.20	5,924
July 13	4.20	7,401	November 16	3.20	4,837
July 14	5.55	16,111	November 19	3.30	5,766
July 16	5.80	16,733	November 21	3.30	4,830
July 23	3.90	5,766	November 21	3.30	4,781
July 30	4.80	10,359	November 26	3.20	4,877
August 3	5.30	12,524	November 28	3.20	4,729
August 6	6.30	17,026	November 30	3.10	4,859
August 20	4.50	8,187	December 4	3.10	4,468
August 23	4.85	9,353	December 5	3.10	4,532
August 27	4.20	6,556	December 11	3.10	4,379
August 31	4.10	6,369	December 27	2.90	3,454
September 3	4.40	7,689			

Daily gage height, in feet, of Rio Grande near Eagle Pass, Texas, for 1900.

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	3.70	3.80	3.75	5.40	5.15	5.05	3.80	3.20
2	3.55	3.80	3.70	5.30	4.00	4.70	4.00	3.20
3	3.45	3.75	3.75	5.20	4.45	4.90	3.80	3.20
4	3.35	4.65	3.90	5.65	4.00	4.95	3.65	3.10
5	3.25	4.15	4.00	5.50	4.40	4.70	3.60	3.10
6	3.20	3.90	4.30	6.15	6.20	4.45	3.50	3.10
7	4.00	4.00	4.10	5.70	5.30	4.50	3.50	3.10
8	3.50	3.80	4.00	5.90	4.20	4.40	3.45	3.10
9	3.20	4.10	3.70	9.75	3.90	4.35	3.40	3.10
10	3.35	3.70	3.45	7.90	3.70	4.30	3.50	3.10
11	3.50	3.70	3.45	7.35	3.60	4.20	3.45	3.10
12	3.50	3.70	3.85	6.60	3.90	4.15	3.40	3.10
13	3.50	3.65	4.20	6.05	4.10	4.00	3.35	3.10
14	7.40	3.80	5.55	5.65	4.60	3.95	3.30	3.10
15	10.50	3.95	5.85	5.45	4.55	3.85	3.40	3.10
16	6.55	4.00	5.80	5.20	4.40	3.85	3.35	3.10
17	4.80	4.50	5.35	4.90	4.35	3.90	3.30	3.05
18	4.30	4.35	5.30	4.85	4.25	4.50	3.30	3.00
19	4.30	3.80	4.70	4.60	4.00	4.15	3.30	3.00
20	4.20	3.70	4.35	4.50	4.05	4.95	3.30	3.00
21	4.20	3.80	4.05	5.15	3.90	5.30	3.30	2.95
22	5.30	3.60	3.90	5.20	5.80	4.45	3.30	2.90
23	5.10	3.60	3.90	5.00	11.70	4.15	3.30	2.95
24	5.05	3.60	3.90	4.90	10.80	4.05	3.25	3.00
25	4.95	3.65	3.80	4.35	9.95	4.05	3.20	3.00
26	4.55	3.40	4.10	4.20	6.10	4.45	3.20	2.90
27	4.15	3.10	4.65	4.30	5.45	4.05	3.20	2.90
28	3.90	3.90	4.95	4.55	4.90	4.20	3.20	2.90
29	3.85	3.40	4.80	4.45	4.65	3.95	3.20	2.90
30	3.80	6.00	4.75	4.30	5.20	3.90	3.20	2.90
31	3.80	.....	5.15	4.10	.....	4.05	.....	2.90

GREEN RIVER AT GREENRIVER, WYOMING.

This station was established May 2, 1895. It is at the pump house of the Union Pacific Railway Company. A description of the station was published in Water-Supply Paper No. 37, page 286. Results of

measurements for 1899 will be found in the Twenty-first Annual Report, Part IV, page 302. The station was discontinued March 31, 1900. No measurements of discharge were made during the year.

Daily gage height, in feet, of Green River at Greenriver, Wyoming, for 1900.

Day.	Jan.	Feb.	Mar.	Day.	Jan.	Feb.	Mar.	Day.	Jan.	Feb.	Mar.
1	1.65			12		1.60	1.20	23	1.75		
2		1.65	1.50	13	1.85			24		1.45	1.35
3	1.70			14		1.55	1.25	25	1.75		
4		1.65	1.55	15	1.85			26		1.45	1.40
5	1.75			16		1.55	1.30	27	1.70		
6		1.60	1.65	17	1.85			28		1.50	1.50
7	1.80			18		1.55	1.30	29	1.70		
8		1.60	1.50	19	1.85			30			1.60
9	1.80			20		1.50	1.30	31	1.65		
10		1.60	1.20	21	1.80						
11	1.85			22		1.50	1.30				

BLACK FORK OF GREEN RIVER NEAR GRANGER, WYOMING.

This station, established April 28, 1897, is below the mouth of Hams Fork. It is described in Water-Supply Paper No. 37, page 287. Results of measurements for 1899 will be found in the Twenty-first Annual Report, Part IV, page 303. During 1900 the following measurements were made by A. J. Parshall:

May 3: Gage height, 1.45 feet; discharge, 778 second-feet.
May 15: Gage height, 2.85 feet; discharge, 1,969 second-feet.
June 7: Gage height, 2.20 feet; discharge, 1,455 second-feet.
June 20: Gage height, 0.85 foot; discharge, 468 second-feet.
July 4: Gage height, 0.13 foot; discharge, 75 second-feet.
July 28: Gage height, —0.20 foot; discharge, 27 second-feet.

Daily gage height, in feet, of Black Fork of Green River near Granger, Wyoming, for 1900.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1				0.65	1.75	2.95	0.20	—0.20	*a*—0.20
2				.70	1.70	2.90	.20	— .20	
3		1.20	1.70	.75	1.45	2.50	.15	— .20	
4				.75	1.50	2.45	.10	— .20	
5				.85	1.55	2.20	.10	— .20	
6	1.30			1.00	1.65	2.20	.05	— .20	
7				1.00	1.80	2.30	.00	— .20	(*a*)
8				1.00	1.90	2.15	.00	— .20	(*a*)
9				1.35	2.00	2.05	.00	— .20	(*a*)
10		1.60	1.80	1.35	2.25	2.05	.00	— .20	(*a*)
11			1.95	1.25	2.60	1.85	.00	— .20	(*a*)
12			2.60	1.20	2.90	1.70	.00	— .20	(*a*)
13	1.30		2.80	1.00	2.95	1.60	—.10	— .20	(*a*)
14			2.05	1.00	2.90	1.50	—.20	— .20	(*a*)
15			1.35	1.00	2.55	1.40	—.20	*a*— .20	(*a*)
16			1.25	1.00	2.50	1.25	—.20	*a*— .20	(*a*)
17		1.60	1.35	.90	2.60	1.10	—.20	*a*— .20	(*a*)
18				.90	2.70	1.00	—.20	*a*— .20	(*a*)
19				.90	2.70	1.00	—.30	*a*— .20	(*a*)
20	1.30			1.05	2.70	.95	—.30	*a*— .20	(*a*)
21				1.20	2.45	.85	—.30	*a*— .20	(*a*)
22				1.30	2.55	.75	—.20	*a*— .20	(*a*)
23				1.30	2.55	.70	—.20	*a*— .20	(*a*)
24		1.80	.90	1.30	2.85	.65	—.10	*a*— .20	(*a*)
25				1.25	2.95	.60	.00	*a*— .20	
26				1.20	2.95	.65	—.05	*a*— .20	
27	1.30			1.30	3.00	.65	—.10	*a*— .20	
28				1.30	3.35	.55	—.20	*a*— .20	(*a*)
29				1.30	3.40	.35	—.20	*a*— .20	(*a*)
30				1.60	3.25	.25	—.20	*a*— .20	(*a*)
31			.70		3.05		—.20	*a*— .20	

a Water standing in pools.

ASHLEY CREEK NEAR VERNAL, UTAH.

This stream drains an area directly east of the Uinta Basin. About 7½ miles above the town of Vernal the river appears from its canyon, and within the next few miles a series of canals divert its low-water flow, which is applied to the adjacent lands—Vernal Valley—which are extensively irrigated. This valley is described in detail in the Twenty-first Annual Report, Part IV, pages 311 to 313. A gaging station was established in the canyon of this stream on March 15, 1900, by C. T. Prall. It is located at the ranch of the observer, E. Marett. The gage is a vertical rod, painted white, fastened to the west side of the single pier of the wagon bridge. The bench mark is a 20-penny nail driven in the pier opposite the 4-foot mark. The channel is straight for a distance above and below the bridge, and the bed is rocky. At high stages two other channels discharge a portion of the water, and these also have to be measured.

The three principal canals diverting water from Ashley Creek below the gaging station are, in order downstream, Upper Ashley canal, Rock Point canal, and Central Ashley canal. During the season of 1900 they were measured twice by C. C. Babb, with the following results:

Discharge measurements of canals diverting water from Ashley Creek.

Date.	Upper Ashley canal.	Rock Point canal.	Central Ashley canal.
1900.	*Sec.-ft.*	*Sec.-ft.*	*Sec.-ft.*
May 29	181	25.0	138
August 21	*a* 12	6.8	*a* 10

a At measuring weir.

On October 30, 1900, Ashley Creek was measured by A. L. Fellows at its mouth, near Jensen, Utah, and a discharge of 11 second-feet was found. During the year the following measurements were made at the regular station in the canyon by C. T. Prall and others:

Discharge measurements of Ashley Creek near Vernal, Utah.

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
1900.	*Feet.*	*Sec.-ft.*	1900.	*Feet.*	*Sec.-ft.*
February 8	.....	34	July 23	0.67	72
March 15	0.48	37	Do	.67	83
May 1	.62	45	August 21	.60	40
May 28	3.20	776	November 12	.55	47
June 11	1.74	306			

Daily gage height, in feet, of Ashley Creek near Vernal, Utah, for 1900.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1		0.48	0.60	2.45	0.95	0.65	0.55	0.70	0.60	0.55
2		.48	.65	2.40	.95	.65	.55	.65	.60	.55
3		.49	.63	2.25	.90	.65	.50	.65	.60	.55
4		.50	.70	2.40	.90	.65	.50	.65	.60	.55
5		.49	.98	2.00	.90	.65	.50	.60	.60	.55
6		.49	1.20	1.85	.90	.65	.50	.60	.60	.55
7		.48	1.20	1.70	.90	.65	.50	.60	.55	.55
8		.49	1.50	1.65	.85	.65	.50	.65	.55	.55
9		.53	2.20	1.70	.85	.65	.50	.60	.55	.55
10		.50	2.50	1.70	.85	.65	.58	.60	.55	.55
11		.50	2.85	1.75	.85	.65	.65	.60	.55	.55
12		.50	2.50	1.65	.85	.60	.60	.60	.55	.55
13		.50	2.25	1.55	.85	.60	.60	.60	.55	.55
14		.50	2.05	1.50	.85	.60	.55	.60	.55	.55
15		.50	2.20	1.45	.85	.55	.55	.60	.55	.50
16		.50	2.50	1.43	.85	.55	.55	.60	.55	.50
17		.50	2.50	1.40	.85	.55	.55	.60	.55	.50
18	0.48	.50	2.45	1.35	.80	.55	.55	.60	.60	.50
19	.48	.50	2.30	1.20	.80	.55	.55	.60	.60	.50
20	.48	.50	2.20	1.20	.75	.55	.55	.60	.60	.50
21	.48	.50	2.35	1.20	.75	.60	.55	.60	.60	.50
22	.49	.53	2.60	1.20	.70	.60	.60	.60	.65	.50
23	.50	.63	3.00	1.15	.70	.60	.60	.60	.65	.50
24	.50	.60	3.20	1.10	.70	.60	.75	.60	.65	.50
25	.49	.60	3.25	1.05	.70	.60	.70	.60	.60	.50
26	.49	.60	3.30	1.00	.70	.60	.65	.60	.60	.50
27	.48	.60	3.45	1.00	.70	.60	.70	.60	.60	.50
28	.48	.60	3.35	1.00	.70	.60	.70	.60	.55	.50
29	.48	.65	3.15	1.00	.70	.60	.65	.60	.55	.50
30	.48	.65	2.80	1.00	.70	.60	.65	.60	.55	.50
31	.48		2.65		.70	.60		.60		.50

UINTA RIVER NEAR WHITEROCKS, UTAH.

This station, established by C. C. Babb on September 16, 1899, is described in Water-Supply Paper No. 37, page 288. During 1900 daily records were not kept at this place, but frequent measurements of discharge were made by C. T. Prall and others, as follows:

Discharge measurements of Uinta River near Whiterocks, Utah.

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
1900.	*Feet.*	*Sec.-ft.*	1900.	*Feet.*	*Sec.-ft.*
January 3	*a* 1.05	114	June 22	1.50	418
January 8	*a* .90	105	June 29	1.33	341
January 16	*a* .92	113	July 7	1.20	250
January 22	*a* 1.00	116	July 12	1.10	224
January 30	*a* 1.05	114	July 20	1.04	196
February 5	*a* .90	112	August 9	1.05	182
February 12	*a* .83	106	August 21	1.02	186
February 19	*a* 1.02	117	September 4	1.04	165
February 26	.84	115	September 17	.96	150
March 5	.85	121	October 9	1.00	163
March 12	.89	130	October 29	.95	145
March 19	.80	120	November 5	.90	128
March 26	.87	130	November 19	.90	136
April 9	.92	144	November 26	.95	150
April 16	.86	132	December 3	1.05	170
May 22	2.30	1,162	December 11	*a* 1.00	134
June 1	2.20	1,059	December 17	*a* 1.00	143
June 8	1.81	691	December 24	*a* .95	133
June 15	1.60	477			

a Gage height doubtful on account of ice.

WHITEROCKS RIVER NEAR WHITEROCKS, UTAH.

This station was established September 15, 1899, by C. C. Babb, in connection with the investigation of the water supply for the Uinta Indian Reservation. It is in the canyon of the river, about 10 miles

above the Indian agency at Whiterocks, and is described in Water-Supply Paper No. 37, page 289. Results of measurements for 1899 will be found in the Twenty-first Annual Report, Part IV, pages 322, 323, and 324. Daily gage readings were not maintained during 1900, but frequent measurements of discharge were made by C. T. Prall and others, as follows:

Discharge measurements of Whiterocks River near Whiterocks, Utah.

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
1900.	*Feet.*	*Sec.-ft.*	1900.	*Feet.*	*Sec.-ft.*
January 4	*a* 0.95	50	June 7	1.80	290
January 9	*a* .95	46	June 16	1.60	194
January 17	*a* .93	46	June 23	1.52	166
January 23	*a* .90	49	June 30	1.33	125
January 31	*a* .90	44	July 6	1.22	98
February 13	*a* 1.00	46	July 13	1.16	79
February 20	*a* .96	44	July 21	1.10	69
February 27	1.00	53	August 10	1.10	58
March 6	1.00	59	August 22	1.10	66
March 13	.80	49	September 5	1.10	59
March 20	.82	47	September 18	1.04	52
March 27	.88	45	October 10	1.05	65
April 10	.86	41	October 30	.88	49
April 17	.92	47	November 6	.95	61
May 23	2.80	730	November 20	.95	57
June 2	2.20	488			

a Gage height doubtful on account of ice.

UINTA RIVER AT FORT DUCHESNE, UTAH.

This station, established by C. C. Babb on September 14, 1899, is at the highway bridge at the military post. It is described in Water-Supply Paper No. 37, page 290. Results of measurements for 1899 will be found in the Twenty-first Annual Report, Part IV, pages 322, 323, and 324. During 1900 the following measurements of discharge were made by C. T. Prall and others:

Discharge measurements of Uinta River at Fort Duchesne, Utah.

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
1900.	*Feet.*	*Sec.-ft.*	1900.	*Feet.*	*Sec.-ft.*
January 5	*a* 2.56	129	June 13	3.30	420
January 11	*a* 2.50	118	June 18	3.05	284
January 19	*a* 2.60	132	June 25	2.98	197
January 25	*a* 2.55	123	July 2	2.76	170
February 2	*a* 2.55	119	July 2	2.76	169
February 10	*a* 2.60	101	July 9	2.59	114
February 15	*a* 2.55	115	July 17	2.39	58
February 22	2.67	143	July 25	2.44	68
March 2	2.77	149	August 4	2.21	19
March 8	2.85	173	August 17	2.18	25
March 14	2.61	137	August 28	2.27	34
March 21	2.42	84	September 11	2.58	91
March 28	2.37	62	October 8	2.62	95
April 12	2.43	76	October 26	2.64	103
April 18	2.39	72	November 3	2.63	101
April 27	2.41	72	November 10	2.62	97
May 3	2.48	90	November 17	2.65	103
May 14	3.17	376	November 24	2.74	114
May 16	3.69	798	November 29	2.61	94
May 18	3.98	1,202	December 8	2.65	95
May 21	3.87	1,045	December 15	2.65	103
May 24	4.35	1,972	December 22	2.65	100
May 31	4.14	1,254	December 26	2.60	91
June 9	3.46	501			

a Gage height doubtful on account of ice.

Daily gage height, in feet, of Uinta River at Fort Duchesne, Utah, for 1900.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	(a)	2.42	2.54	3.98	2.77	2.21	2.20	2.63	2.63	2.70
2	(a)	2.41	2.51	3.85	2.75	2.20	2.22	2.68	2.65	2.70
3	(a)	2.44	2.48	3.78	2.78	2.20	2.23	2.69	2.65	2.70
4	2.78	2.49	2.45	3.71	2.75	2.20	2.35	2.63	2.65	2.70
5	2.77	2.54	2.48	3.63	2.72	2.35	2.45	2.60	2.65	2.63
6	2.74	2.55	2.53	3.59	2.62	2.47	2.43	2.55	2.61	2.68
7	2.78	2.54	2.52	3.53	2.60	2.43	2.40	2.55	2.64	2.58
8	2.86	2.53	2.55	3.47	2.60	2.40	2.39	2.60	2.64	2.60
9	2.80	2.53	2.60	3.45	2.59	2.39	2.40	2.60	2.65	2.63
10	2.68	2.52	2.76	3.39	2.54	2.33	2.48	2.60	2.65	2.70
11	2.67	2.46	3.10	3.43	2.48	2.25	2.50	2.60	2.65	2.65
12	2.66	2.46	3.38	3.43	2.43	2.25	2.53	2.60	2.65	2.60
13	2.63	2.47	3.25	3.33	2.40	2.25	2.50	2.60	2.65	2.50
14	2.61	2.47	3.20	3.20	2.38	2.25	2.44	2.50	2.65	2.40
15	2.58	2.46	3.26	3.17	(b)	2.25	2.44	2.58	2.65	2.40
16	2.57	2.43	3.67	3.10	.....	2.19	2.43	2.65	2.65	2.50
17	2.56	2.41	3.89	3.08	.....	2.17	2.42	2.65	2.65	2.50
18	2.53	2.40	4.42	3.04	.....	2.17	2.42	2.70	2.65	2.60
19	2.52	2.40	3.97	3.01	.....	2.20	2.42	2.70	2.70	2.60
20	2.47	2.40	3.89	2.98	.....	2.22	2.43	2.70	2.70	2.60
21	2.44	2.44	3.84	2.99	.....	2.27	2.44	2.68	2.75	2.80
22	2.42	2.41	4.05	2.95	.....	2.30	2.45	2.65	2.80	2.60
23	2.41	2.43	4.20	2.94	.....	2.30	2.50	2.68	2.80	2.50
24	2.41	2.41	4.33	3.00	.....	2.30	2.68	2.68	2.75	2.40
25	2.41	2.40	4.26	2.98	.....	2.30	2.74	2.65	2.75	2.50
26	2.42	2.39	4.38	2.93	.....	2.32	2.74	2.65	2.70	2.60
27	2.43	2.41	4.50	2.85	.....	2.32	2.60	2.65	2.67	2.60
28	2.38	2.44	4.53	2.87	.....	2.31	2.53	2.65	2.65	2.60
29	2.38	2.60	4.38	2.82	2.30	2.30	2.52	2.65	2.61	2.60
30	2.42	2.61	4.17	2.80	2.24	2.29	2.52	2.65	2.60	.....
31	2.43	.....	4.09	.....	2.22	2.25	.....	2.65	.....	.....

a Frozen. *b* No record July 15 to 28.

During the year two of the largest canals diverting water from Uinta River in this locality, known, respectively, as Canal No. 1 and Bench ditch, both heading above Fort Duchesne, were measured twice, with the following results:

Discharge measurements of canals above Fort Duchesne.

Date.	Canal No. 1.		Bench ditch.	
	Gage height.	Discharge.	Gage height.	Discharge.
1900.	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
June 9	1.10	31	1.10	39
October 10	.8	9	.70	22

UINTA RIVER AT OURAY SCHOOL, UTAH.

This station, established November 8, 1899, is at the highway bridge over the river near the Ouray School, on the Uinta Indian Reservation. It is described in Water-Supply Paper No. 37, page 291. Results of measurements for 1899 will be found in the Twenty-first Annual

Report, Part IV, pages 322 and 324. During 1900 the following measurements of discharge were made by C. T. Prall and others.

Discharge measurements of Uinta River at Ouray School, Utah.

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
1900.	*Feet.*	*Sec.-ft.*	1900.	*Feet.*	*Sec.-ft.*
March 9	0.80	181	August 17	−0.17	31
March 22	.31	83	August 28	.00	46
March 29	.26	58	September 11	.95	210
April 13	.34	78	October 8	.45	103
April 19	.23	64	October 27	.57	117
May 4	.38	90	November 3	.56	114
June 4	2.50	764	November 10	.52	108
June 13	1.72	427	November 17	.53	108
June 18	1.32	290	November 24	.79	160
June 25	1.15	251	November 30	.48	97
July 9	.38	84	December 7	*a* .50	74
July 25	−.10	32			

a Gage height doubtful on account of ice.

Daily gage height, in feet, of Uinta River at Ouray School, Utah, for 1900.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	(*a*)	0.28	0.50	3.30	0.70	−0.23	−0.05	0.58	0.49	0.30
2	(*a*)	.25	.48	3.20	.70	−.28	.00	.70	.57	.43
3	(*a*)	.30	.42	2.70	.....	−.35	−.04	.56	.53	.30
4	(*a*)	.45	.38	2.50	.66	−.31	.09	.56	.56	(*a*)
5	(*a*)	.39	.39	2.40	.68	−.22	.25	.52	.54	(*a*)
6	(*a*)	.46	.47	2.25	.....	.07	.23	.51	.54	(*a*)
7	(*a*)	.48	.49	2.10	.42	.03	.18	.51	.52	(*a*)
8	(*a*)	.47	.47	2.00	.39	−.01	.11	.49	.52	(*a*)
9	0.80	.42	.56	1.90	.37	−.14	.....	.50	.50	(*a*)
10	.....	.42	.90	1.90	.....	−.20	.60	.54	.50	.54
11	.64	.35	1.35	1.82	.20	−.21	.72	.51	.49	*b* .46
12	.66	.34	1.89	1.98	.12	−.22	.45	.51	.45	.....
13	.58	.37	1.84	1.70	−.04	−.20	.36	.56	.48	.....
14	.58	.34	1.72	1.60	−.04	−.20	.27	.54	.51	.....
15	.52	.30	1.68	1.50	−.05	−.20	.26	.52	.45	.....
16	.50	.28	2.27	.....	−.04	−.19	.26	.52	.51	.....
17	.48	.27	2.77	.....	.05	−.18	.26	.52	.52	.....
18	.46	.25	2.95	.....	−.02	−.17	.21	.52	.68	.....
19	.40	.24	2.95	1.24	−.04	−.14	.22	.57	.68	.....
20	.38	.25	2.95	1.25	−.06	−.08	.26	.60	.68	.....
21	.35	.29	2.90	1.30	−.06	−.05	.29	.60	.62	.....
22	.30	.35	2.85	1.15	−.10	−.02	.27	.57	.71	.....
23	.30	.46	3.48	1.15	−.10	−.05	.26	.58	.90	.....
24	.30	.31	3.73	1.30	−.10	−.01	.47	.60	.71	.....
25	.31	.31	3.70	1.15	−.06	.07	1.10	.57	.70	.....
26	.30	.25	3.70	1.02	.07	.10	.70	.56	.78	.....
27	.30	.25	4.00	.....	.01	.07	.70	.56	.68	.....
28	.28	.25	4.15	.85	−.12	−.01	.65	.60	.61	.....
29	.20	1.05	3.80	.82	−.16	−.02	.60	.52	.38	.....
30	.23	.80	3.55	.....	−.19	−.04	.58	.54	.25	.....
31	.29	.....	3.05	.....	−.20	−.07	.....	.49	.....	.....

a Frozen. *b* Readings discontinued for winter December 11.

LAKE CREEK, UTAH, NEAR MOUTH.

This stream has its source on the southern slope of the Uinta Mountains, and drains an area immediately to the west of the basin of Uinta River. It empties into Duchesne River about 3 miles above the bridge over the latter stream on the stage road from Fort Duchesne to Price. The permanent gage rod consists of a 1-inch by 4-inch by 8-foot board nailed vertically to the west abutment on the lower side of the wagon bridge near the mouth of the creek. Bench mark No.

1 is a 20-penny wire nail in the abutment opposite the 4.50-foot mark on the gage. Bench mark No. 2 is directly over the gage rod, and is the head of a wire nail in the southwest corner of the bridge upright. Its elevation is 5,066.58 feet above sea level; the elevation of the zero of the rod is 5,055.99 feet above sea level. The channel of the river has a sharp bend about 100 feet above the bridge, but is straight for about 600 feet below it. The bed is composed of medium-sized cobblestones, and forms a fair section. During flood stages measurements are made from the bridge, but at other periods they are made by wading at a point about 400 feet below it.

Lake Creek is formed by the junction of an east and a west fork about 25 miles above its mouth. During 1900 the following measurements were made of these forks and of the main stream a short distance below the junction:

Miscellaneous discharge measurements of Lake Creek and its tributaries.

Date.	Stream.	Locality.	Gage height.	Discharge.
1900.			*Feet.*	*Sec.-ft.*
August 6	West Fork	Above mouth	1.40	93
Do	East Fork	do	2.10	112
Do	Lake Creek	One-half mile below junction of forks	2.67	290
August 14	West Fork	Above mouth	1.22	69
Do	East Fork	do	1.94	87
Do	Lake Creek	One-half mile below junction of forks	2.49	192

During 1900 the following measurements of the discharge at the main station, near the mouth of the creek, were made by C. T. Prall and others:

Discharge measurements of Lake Creek, Utah, near mouth.

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
1900.	*Feet.*	*Sec.-ft.*	1900.	*Feet.*	*Sec.-ft.*
July 3	2.40	256	October 4	2.05	132
July 18	2.08	134	October 31	1.95	102
August 3	1.96	109	November 8	1.95	105
August 16	1.86	96	November 15	1.93	102
August 23	1.88	99	November 23	*a* 2.10	138
August 31	1.80	85	December 6	*a* 2.32	148
September 7	1.90	101	December 13	*a* 2.38	121
September 14	1.98	123	December 20	*a* 2.10	103

a Gage height doubtful on account of ice.

DUCHESNE RIVER AT PRICE ROAD BRIDGE, UTAH.

This station, established by C. C. Babb on October 26, 1899, is 3 miles below the mouth of Lake Creek, at the highway bridge on the stage road from Price to Fort Duchesne. It is described in Water-Supply Paper No. 37, page 291. Results of measurements for 1899 will be found in the Twenty-first Annual Report, Part IV, pages 322, 323, and 325.

Twice during the year 1900 C. T. Prall measured the main river at the ford immediately above the mouth of Strawberry Creek, or about 23 miles above the main station, with the following results:

September 15: Gage height, 2.10 feet; discharge, 216 second-feet.
October 5: Gage height, 2.14 feet; discharge, 232 second-feet.

Mr. Prall also made two measurements of the flow of Strawberry Creek a short distance from its mouth and one-fourth of a mile below the mouth of Indian Creek, with the following results:

September 15: Discharge, 84 second-feet.
October 5: Gage height, 1.20 feet; discharge, 92 second-feet.

During 1900 the following measurements at the main gaging station were made by and Mr. Prall and others:

Discharge measurements of Duchesne River at Price road bridge, Utah.

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
1900.	*Feet.*	*Sec.-ft.*	1900.	*Feet.*	*Sec.-ft.*
March 10	5.25	283	August 3	5.10	298
March 17	5.28	311	August 18	4.98	247
March 23	5.50	393	August 23	5.05	284
March 31	5.43	328	September 1	4.98	246
April 14	5.52	414	September 7	5.07	279
April 20	5.48	391	September 13	5.18	336
May 5	5.89	583	September 20	5.08	275
May 19	7.55	2,674	October 4	5.25	325
May 25	8.20	3,807	October 31	5.20	294
June 5	7.58	2,667	November 8	5.18	294
June 14	6.70	1,466	November 15	5.18	291
June 21	6.20	995	November 23	5.30	357
June 27	5.98	677	December 6	5.38	356
July 11	5.43	441	December 13	5.22	316
July 19	5.28	386			

Daily gage height, in feet, of Duchesne River at Price road bridge, Utah, for 1900.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	5.48	6.00	8.58	5.75	5.11	4.95	5.31	5.20	5.20
2	.....	5.32	5.90	8.35	5.65	5.12	4.98	5.31	5.20	5.27
3	.....	5.37	5.88	8.20	5.62	5.11	4.97	5.29	5.20	5.33
4	5.41	5.63	5.83	8.10	5.60	5.12	5.07	5.28	5.20	5.39
5	5.42	5.61	5.85	7.65	5.60	5.22	5.15	5.25	5.20	5.44
6	5.46	5.58	5.95	7.38	5.50	5.35	5.15	5.22	5.20	5.45
7	5.39	5.51	6.06	7.45	5.42	5.32	5.08	5.20	5.20	5.40
8	5.40	5.55	6.10	7.45	5.40	5.20	5.02	5.20	5.20	5.40
9	5.30	5.55	6.20	7.24	5.40	5.19	5.10	5.19	5.20	5.33
10	5.27	5.60	6.45	7.16	5.39	5.18	5.23	5.20	5.20	5.30
11	5.35	5.50	6.70	7.00	5.44	5.11	5.28	5.20	5.20	5.30
12	5.34	5.51	7.04	6.93	5.40	5.10	5.20	5.24	5.19	5.25
13	5.29	5.52	6.93	6.83	5.39	.....	5.18	5.24	5.17	5.23
14	5.30	5.51	6.70	6.73	5.40	.....	5.12	5.21	5.18	5.23
15	5.31	5.48	6.71	6.60	5.35	.....	5.09	5.20	5.18	5.23
16	5.29	5.49	7.00	6.50	5.40	5.00	5.07	5.21	5.19	(a)
17	5.29	5.46	7.28	6.45	5.40	4.99	5.02	5.22	5.19	.....
18	5.29	5.45	7.45	6.39	5.36	4.98	5.01	5.22	5.23	.....
19	5.27	5.43	7.55	6.35	5.31	4.98	5.01	5.22	5.22	.....
20	5.27	5.45	7.48	6.26	5.28	5.00	5.07	5.29	5.27	.....
21	5.29	5.51	7.40	6.23	5.29	5.08	5.09	5.28	5.25	.....
22	5.30	5.59	7.48	6.16	5.29	5.11	5.09	5.27	5.31	.....
23	5.45	5.62	7.80	6.13	5.30	5.05	5.14	5.28	5.30	.....
24	5.70	5.61	8.05	6.10	5.35	5.00	5.39	5.28	5.30	.....
25	5.95	5.61	8.20	6.10	5.37	5.02	5.38	5.28	5.20	.....
26	5.69	5.58	8.45	6.03	5.38	.....	5.29	5.28	5.24	.....
27	5.73	5.61	9.05	5.99	5.39	.....	5.54	5.24	5.20	.....
28	5.69	5.70	9.35	5.94	5.37	5.00	5.39	5.23	5.20	.....
29	5.53	6.15	9.00	5.90	5.24	.....	5.30	5.22	5.20	.....
30	5.43	6.05	8.70	5.82	5.17	4.92	5.28	5.23	5.20	.....
31	5.43	.....	8.50	.....	5.12	4.92	.....	5.21	.....	.....

(a) Frozen.

GREEN RIVER DRAINAGE IN COLORADO.

No stations are maintained in Colorado upon Green River or any of its tributaries, but in November, 1900, a short trip was made into the basin, and a number of gagings were made, the results of which are given in the following table:

Miscellaneous discharge measurements in northwestern Colorado.

Date.	Stream.	Locality.	Hydrographer.	Discharge.
1900.				*Sec.-ft.*
November 5	Yampa River	Craig	A. L. Fellows	282
November 6	Williams River	Hamilton	do	35
Do	Axial River	Axial	do	5
November 2	Yampa River	Thornburg Bridge	do	322
November 1	do	Lily Park	do	371
Do	Snake River	do	do	65
November 7	White River	Meeker	do	394
Do	Piciance Creek	White River City	do	13
November 8	White River	Rangely	do	413

GRAND RIVER, COLORADO.

This stream is the largest in Colorado, and drains a greater portion of the State than any other river. It rises in the north-central part of the State, in Middle Park, and drains the mountainous country on the west side of the Front Range and on the south side of the Continental Divide, the river and its tributaries flowing through mountainous tracts at their heads, and thence through canyons and broken country throughout the rest of their courses. Upon most of the streams little irrigation has been practiced, except along the valleys immediately contiguous to the channels. The Uncompahgre, however, is an exception, practically all of the water of that stream having been diverted and used in irrigating the tablelands of the Uncompahgre Valley. Dolores River also furnishes a notable exception, its waters being carried through the divide between the Grand and San Juan drainage basins and used to irrigate lands lying in the latter drainage. Owing to the comparatively small amount of land that has been irrigated along Grand River, only a small fraction of the water in this division has been used; but a number of projects have been devised for the construction of large canals to carry the water to the fertile benches lying along the various streams, and in the case of Gunnison River there is a project to carry its waters through the divide for the purpose of irrigating lands in Uncompahgre Valley.

GRAND RIVER AT GLENWOOD SPRINGS, COLORADO.

This station was first located May 12, 1899, at the request of the Denver and Rio Grande Railroad Company, at the railroad bridge a quarter of a mile west of the depot and just above the mouth of Roaring Fork. A wire gage was used. At the beginning of 1900, however, a new gage rod was located near the electric-light works of the Colorado Hotel. Measurements are made from the wagon bridge crossing the river between the town and the hotel. The channel is

good, being composed of gravel and rock, and does not change much; the banks are high and not subject to overflow. Gage readings were taken during only the high-water season of 1899, being discontinued June 17. They were resumed, however, on January 1, 1900, at the new station.

During 1900 Roaring Fork was measured twice at Glenwood Springs—the first time on July 8, when the discharge was 1,570 second-feet, and the second time on August 23, when the discharge was 423 second-feet.

A description of the Glenwood Springs station was published in Water-Supply Paper No. 37, page 293. During 1900 the following measurements of Grand River were made by A. L. Fellows:

March 19: Gage height, 3.80 feet; discharge, 1,140 second-feet.
July 8: Gage height, 5.40 feet; discharge, 3,764 second-feet.
August 23: Gage height, 3.60 feet; discharge, 1,086 second-feet.

Daily gage height, in feet, of Grand River at Glenwood Springs, Colorado, for 1900.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	3.40	3.50	3.45	3.75	5.20	10.05	6.45	4.10	3.40	3.20	3.20	3.05
2	3.45	3.45	3.45	3.95	5.25	9.75	6.30	4.05	3.40	3.20	3.20	3.25
3	3.45	3.45	3.50	4.15	5.20	9.65	6.25	4.00	3.35	3.20	3.20	3.00
4	3.45	3.45	3.55	4.25	5.40	9.55	6.00	3.90	3.30	3.20	3.20	3.15
5	3.55	3.45	3.65	4.30	6.05	9.10	5.85	3.95	3.30	3.20	3.20	3.25
6	3.55	3.40	3.60	4.30	6.20	8.80	5.75	4.10	3.30	3.20	3.20	3.25
7	3.45	3.40	3.50	4.25	6.30	9.00	5.55	4.10	3.30	3.20	3.20	3.35
8	3.40	3.30	3.50	4.45	6.55	9.30	5.45	4.00	3.30	3.20	3.20	3.30
9	3.40	3.35	3.55	4.50	6.85	9.40	5.40	3.95	3.30	3.20	3.20	3.15
10	3.45	3.40	3.65	4.40	7.30	9.35	5.30	3.90	3.35	3.20	a3.20	3.10
11	3.35	3.40	3.70	4.20	7.80	9.10	5.25	3.80	3.40	3.20	3.30	3.00
12	3.35	3.50	3.90	4.10	8.10	8.60	5.10	3.80	3.40	3.20	3.30	2.90
13	3.45	3.35	4.00	3.95	8.10	8.25	5.00	3.80	3.40	3.20	3.30	2.85
14	3.50	3.40	4.10	4.00	7.90	8.20	5.00	3.70	3.40	3.20	3.25	2.80
15	3.55	3.40	4.10	4.10	7.65	8.05	4.90	3.70	3.40	3.20	3.40	3.00
16	3.50	3.50	4.00	4.20	7.45	8.05	4.85	3.60	3.30	3.20	3.40	3.00
17	3.50	3.35	3.95	4.10	7.60	8.15	4.70	3.60	3.20	3.20	3.40	3.00
18	3.45	3.40	3.85	4.05	7.80	8.10	4.70	3.60	3.20	3.20	3.40	3.05
19	3.45	3.40	3.85	3.95	7.90	7.95	4.50	3.60	3.20	3.20	3.40	3.00
20	3.45	3.45	3.85	3.85	7.80	7.90	4.50	3.60	3.20	3.20	3.50	3.00
21	3.30	3.45	3.90	4.25	7.75	7.90	4.40	3.60	3.20	3.20	3.35	3.10
22	3.40	3.35	3.90	4.70	7.50	7.95	4.40	3.60	3.20	3.20	3.40	3.10
23	3.35	3.45	3.95	4.90	7.80	7.90	4.40	3.60	3.20	3.20	3.40	3.10
24	3.45	3.35	3.95	4.70	8.25	7.95	4.40	3.60	3.20	3.20	3.45	3.00
25	3.35	3.45	4.05	4.70	8.55	7.80	4.40	3.60	3.20	3.20	3.35	3.00
26	3.30	3.45	4.00	4.65	8.70	7.60	4.40	3.60	3.20	3.20	3.20	3.10
27	3.35	3.50	4.05	4.65	9.10	7.25	4.40	3.60	3.20	3.20	3.25	3.15
28	3.40	3.40	4.05	4.75	9.65	6.95	4.30	3.60	3.20	3.20	3.30	3.00
29	3.40	.....	3.90	5.10	10.00	6.80	4.30	3.60	3.20	3.20	3.20	2.80
30	3.40	.....	3.85	5.30	10.15	6.55	4.30	3.50	3.20	3.20	3.15	2.95
31	3.50	.....	3.80	.....	10.15	.....	4.15	3.50	.....	3.20	.....	2.90

a Estimated from September 24 to November 10.

GRAND RIVER AT GRAND JUNCTION, COLORADO.

This station, established October 18, 1894, is at the wagon bridge across the river near the pump house of the city waterworks at Grand Junction and a short distance above the mouth of Gunnison River. The river at this point discharges through two channels, and a record is kept of the discharge in each channel, requiring separate discharge measurements. During the last four years the greater part of the water has run through the left channel, and during the year 1900 there was a flow through the right channel for a short time only. Gage

rod No. 1 is attached to the south end of the wagon bridge crossing the river south of the town. Gage rod No. 2 consists of a wire and weight fastened to the upper side of the bridge over the left channel. The channel is sandy and shifting, and the discharge must, therefore, be considered approximate. During 1900 no measurements were made in the right channel and only two measurements were made in the left channel. Owing to the few measurements made and to the shifting of the channel no rating table was possible. W. H. Smith, of Grand Junction, made the reports throughout the year. A description of the station was published in Water-Supply Paper No. 37, page 294. The results of measurements for 1899 will be found in the Twenty-first Annual Report, Part IV, page 281. During 1900 the following measurements were made by A. L. Fellows at rod No. 2:

March 20: Gage height, 4.15 feet; discharge, 1,762 second-feet.
July 7: Gage height, 5.80 feet: discharge, 6,177 second-feet.

Daily gage height, in feet, of Grand River at Grand Junction, Colorado, for 1900.

[Rod No. 1—right channel.]

Day.	May.	June.	Day.	May.	June.	Day.	May.	June.	Day.	May.	June.
1		4.70	9		3.45	17			25		
2		4.50	10		3.50	18			26		
3		4.05	11		3.30	19			27	3.80	
4		3.75	12		2.40	20			28	4.30	
5		3.50	13		2.00	21			29	4.55	
6		3.40	14		(*a*)	22			30	4.40	
7		3.20	15			23			31	4.70	
8		3.15	16			24					

a This channel was dry after June 13.

Daily gage height, in feet, of Grand River at Grand Junction, Colorado, for 1900.

[Rod No. 2—left channel.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1				4.30	5.60	10.35	6.70	3.35	2.40	3.10	2.80	2.45
2				4.30	5.60	10.20	6.60	3.30	2.40	3.05	2.80	
3		3.90	3.90	4.40	5.50	*a*10.00	6.45	3.30	2.40	3.00	2.80	
4				4.40	5.55	*a*9.80	6.25	3.15	2.50	3.00	2.80	
5				4.50	5.85	9.60	5.95	3.10	2.50	3.00	2.80	2.50
6				4.50	6.50	9.10	5.65	3.10	2.50	3.10	2.75	
7	(*b*)			4.60	6.90	9.05	5.40	3.05	2.50	3.10	2.70	
8				4.60	6.95	9.10	5.20	3.10	2.50	3.10	2.70	
9				4.70	7.50	9.45	5.20	3.00	2.50	3.00	2.70	
10		3.60	4.00	4.60	8.25	9.05	5.20	3.00	2.60	3.00	2.70	
11				4.50	8.60	9.10	5.20	3.00	2.60	3.00	2.60	
12				4.40	*a*8.60	8.80	5.10	2.90	2.70	2.90	2.65	2.70
13	(*b*)			4.25	*a*8.65	8.60	4.75	2.90	2.80	2.90	2.60	
14				4.10	*a*8.65	8.75	4.70	2.90	2.90	2.90	2.65	
15				4.20	*a*8.70	8.75	4.60	2.90	2.90	2.90	2.60	
16				4.20	8.70	8.65	4.50	2.90	2.85	2.90	2.60	
17		3.80	4.30	4.20	9.10	8.35	4.50	2.75	2.75	2.90	2.60	
18				4.10	9.20	8.70	4.40	2.55	2.60	2.90	2.60	
19				4.05	9.20	8.40	4.00	2.50	2.60	2.90	2.65	2.50
20	3.70			4.00	9.20	8.45	4.00	2.50	2.60	2.90	2.85	
21				4.10	8.90	8.30	3.95	2.50	2.60	2.90	2.90	
22				4.45	8.60	8.25	4.00	2.50	2.60	3.10	2.90	
23				5.05	8.85	8.45	3.90	2.50	2.75	3.05	2.90	
24		3.90	4.30	5.30	9.30	8.30	3.90	2.50	2.95	3.00	2.90	
25				5.00	9.55	8.35	3.80	2.50	3.05	3.00	2.90	
26	3.60			4.80	9.75	8.15	3.80	2.40	3.25	2.90	2.90	2.60
27				4.80	9.95	7.55	3.80	2.40	3.30	2.90	2.80	
28				5.05	10.55	7.50	3.75	2.40	3.15	2.95	2.75	
29				5.25	10.80	7.25	3.70	2.40	3.10	3.00	2.65	
30				5.40	10.95	6.90	3.70	2.40	3.10	2.90	2.55	
31					11.15		3.45	2.40		2.90		

a Estimated. *b* Frozen.

GUNNISON RIVER AT IOLA, COLORADO.

Gunnison River, the largest tributary of the Grand in Colorado, rises in the south-central part of the State, in the Saguache Mountains and the Cochetopa Hills, and flows in a westerly direction, emptying into Grand River near the western boundary of the State, a short distance south of Grand Junction. Comparatively little of the water is used for irrigation, but a canal line has been surveyed with a view to taking the water from the river and carrying it to the valley of the Uncompahgre. It was for the purpose of determining the amount of water available for this project that the Iola station was established in March, 1900. The rod is at a wagon bridge which crosses the river about a quarter of a mile above the Denver and Rio Grande Railroad station at Iola. It consists of a piece of 2-inch by 4-inch timber fastened to the downstream side of the second pier of the bridge from the south end, the zero of the rod being 7.43 feet below the bench mark—a spike in the base of an old post 40 feet south of the southern end of the bridge, on the west side of the road. The chief value of the station is with reference to determining the amount of water available for the proposed canal to the Uncompahgre Valley, although, owing to the fact that a number of streams enter the Gunnison below the station, the results obtained do not show the total amount available. The channel at this place is wide, and the bed being of gravel and bowlders is not particularly susceptible to change. The banks, although not high, are not subject to overflow. The observer is A. Pomel, postmaster at Iola, who telegraphs the gage height daily to the local forecast official of the United States Weather Bureau at Denver, who has it printed in the morning papers.

The station on Gunnison River previously maintained at Grand Junction was not continued during the year 1900, for the reason that during high stages of Grand River the water backs up Gunnison River considerably above the point where the gage rod is located, seriously affecting the gage readings. Two measurements were made there, however, the first on March 20, when, with a gage height of 2.50 feet, the discharge was 1,477 second-feet, and the second on July 7, when, with a gage height of 2.90 feet, the discharge was 2,121 second-feet.

During 1900 the following measurements were made at the Iola station by A. L. Fellows:

May 3: Gage height, 3 feet; discharge, 1,272 second-feet.
June 28: Gage height, 3.40 feet; discharge, 1,658 second-feet.
July 5: Gage height, 2.90 feet; discharge, 1,169 second-feet.
August 9: Gage height, 2.20 feet; discharge, 431 second-feet.
August 25: Gage height, 2.10 feet; discharge, 392 second-feet.

Daily gage height, in feet, of Gunnison River at Iola, Colorado, for 1900.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1	2.4	2.9	5.7	3.1	2.1	2.1	2.0
2	2.5	3.0	5.3	3.1	2.1	2.1	2.0
3	2.4	3.0	5.4	3.0	2.1	2.1	2.0
4	2.5	3.2	5.2	2.9	2.1	2.0	2.0
5	2.5	3.4	5.1	2.9	2.1	2.0	2.0
6	2.4	3.5	5.1	2.8	2.1	2.0	2.0
7	2.4	3.6	5.2	2.8	2.1	2.0	2.0
8	2.5	3.9	5.2	2.7	2.1	2.0	2.0
9	2.4	4.0	5.0	2.7	2.2	2.0	2.0
10	2.4	4.6	4.8	2.6	2.2	2.0	2.0
11	2.3	4.6	4.6	2.6	2.2	2.0	2.0
12	2.3	4.8	4.6	2.6	2.1	2.0	2.0
13	2.3	4.7	4.5	2.6	2.1	2.0	2.0
14	2.3	4.6	4.4	2.5	2.1	2.0	2.0
15	2.4	4.4	4.0	2.5	2.1	2.0	2.0
16	2.4	4.6	4.0	2.5	2.1	2.0	2.0
17	2.4	4.8	4.2	2.4	2.1	2.0	2.0
18	2.4	4.9	4.1	2.4	2.1	2.0	2.0
19	2.4	4.8	4.0	2.3	2.1	2.0	2.0
20	2.5	4.8	3.9	2.3	2.1	2.0	2.0
21	2.7	4.6	3.9	2.2	2.1	2.0	2.0
22	3.0	4.6	4.0	2.1	2.1	2.0	2.0
23	2.8	4.7	4.0	2.1	2.1	2.0	2.0
24	2.7	5.0	4.0	2.1	2.1	2.0	2.0
25	2.7	5.0	3.9	2.1	2.1	2.0	2.0
26	2.6	5.1	3.7	2.1	2.1	2.0	2.0
27	2.6	5.4	3.5	2.1	2.1	2.0	2.0
28	2.8	5.6	3.4	2.2	2.1	2.0	2.0
29	2.9	5.7	3.3	2.2	2.1	2.0	2.0
30	3.0	5.8	3.2	2.1	2.1	2.0	2.0
31	.....	5.8	.....	2.1	2.1	.....	2.0

UNCOMPAHGRE RIVER AT MONTROSE, COLORADO.

Uncompahgre River has its source in Ouray County, in the high peaks of southwestern Colorado, and flows northwesterly, entering Gunnison River at Delta. The upper portion of its drainage basin is mountainous, but proceeding downstream the country becomes more rolling, and irrigation is possible along the valleys and adjacent mesas. In the vicinity of Montrose a number of canals divert nearly all of the normal flow of the Uncompahgre, and if further irrigation is to be had in the district recourse must be had to storage or to a diversion of the waters of Gunnison River.

The Fort Crawford station on the Uncompahgre, previously maintained, was not kept up during the year 1900, owing to the extremely shifting character of the channel at that place, and instead the station at Montrose was established in the fall of 1899, no records being kept, however, until the spring of 1900. During the greater portion of the year there is little water at Montrose, the canals above diverting most of the flow. The station is at the bridge which crosses the river opposite the town, about a half mile from the depot of the Denver and Rio Grande Railroad. The rod consists of a 1-inch by 4-inch board nailed to the inside of the pier just above the bridge. The channel being of gravel and bowlders is favorable to obtaining accurate measurements, not being susceptible to change. The banks are high and are not subject to overflow. Records were kept for a short time only, as there was little water during the greater part of the irrigation season of 1900. The observer was Mr. W. E. Obert, com-

missioner of the Montrose water district. The records were discontinued July 7, 1900. During the year the following measurements were made by A. L. Fellows:

July 5: Gage height, 1.80 feet; discharge, 150 second-feet.
August 10: Gage height, 0.50 foot; discharge, 2 second-feet.

Daily gage height, in feet, of Uncompahgre River at Montrose, Colorado, for 1900.

Day.	Apr.	May.	June.	July.	Day.	Apr.	May.	June.	July.	Day.	Apr.	May.	June.	July.
1	.....	1.20	2.75	1.70	12	.68	1.60	2.75	.....	23	1.08	2.20	2.90	.....
2	.....	1.20	2.70	1.70	13	.90	1.35	2.60	.....	24	1.10	2.65	2.65	.....
3	.....	1.18	2.65	1.60	14	.93	1.40	2.60	.....	25	1.00	2.30	2.55	.....
4	.....	1.32	2.75	1.85	15	.92	1.65	2.40	.....	26	.98	2.50	2.40	.....
5	.....	1.45	2.65	1.75	16	.98	2.25	2.50	.....	27	.95	2.55	2.05	.....
6	.....	1.00	2.65	1.65	17	1.02	2.35	2.35	.....	28	1.00	2.75	1.70	.....
7	.....	1.00	2.70	1.15	18	.98	2.20	2.30	.....	29	1.10	2.90	1.65	.....
8	1.05	1.12	2.45	.....	19	1.05	2.10	2.10	.....	30	1.15	2.85	1.60	.....
9	.90	1.40	2.35	.....	20	1.18	2.00	1.90	.....	31	.....	2.80	.....	.....
10	.78	1.65	2.70	.....	21	1.18	1.90	1.75	.....					
11	.75	1.65	2.75	.....	22	1.18	1.85	1.60	.....					

DOLORES RIVER AT DOLORES, COLORADO.

This river is the last important tributary of Grand River. It rises in the La Plata and San Miguel mountains, the highest peak of which, Mount Wilson, attains an elevation of more than 14,000 feet. For about 50 miles its course is southwesterly; it then turns and flows in an almost due north direction for nearly 100 miles; then turns to the west and enters Grand River after passing into Utah. Throughout the greater part of its course the river flows through natural canyons, and comparatively little irrigation is practiced along the stream itself, except at Dolores, where for about 40 miles the valley widens to from a half mile to a mile, and a number of ranches are cultivated. By far the greater part of the waters of the river, however, is used in the San Juan watershed, being diverted by means of a tunnel and a great cut in Montezuma Valley. The head gates of the canals carrying this water are about 2 miles west of the town of Dolores. The gaging station is above the head gates, and about a half mile above the Colorado Southern Railroad station at Dolores. The gage rod consists of a vertical plank attached to the left abutment of the footbridge crossing the river. The channel is not subject to change, and the results obtained are excellent. The bed of the stream is composed of small stones and gravel, and the banks are high and do not overflow. The observer is Mrs. M. D. Smith, of Dolores. A description of the station was published in Water-Supply Paper No. 38, page 305. The results of measurements for 1899 will be found in the Twenty-first Annual Report, Part IV, page 282. During 1900 the following measurements were made by A. L. Fellows:

March 24: Gage height, 2.90 feet; discharge, 145 second-feet.
May 5: Gage height, 3.90 feet; discharge, 767 second-feet.
June 27: Gage height, 3.25 feet; discharge, 320 second-feet.
August 11: Gage height, 2.60 feet; discharge, 31 second-feet

Daily gage height, in feet, of Dolores River at Dolores, Colorado, for 1900.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	3.10	3.00	2.80	2.95	3.50	4.90	3.10	2.60	2.50	2.80	2.80	*a* 3.05
2	3.10	2.90	2.80	3.15	3.55	4.75	3.10	2.60	2.50	2.80	2.80	3.10
3	3.10	2.90	2.75	3.00	3.50	4.70	3.05	2.60	2.60	2.70	2.80	3.10
4	3.10	2.90	2.70	2.95	3 60	4.50	3.00	2.60	2.60	2.70	2.80	3.20
5	3.10	2.90	2.70	3.10	4.05	4.35	3.00	2.60	2.65	2.80	2.80	3.20
6	3.10	2.90	2.70	3.15	3.95	4.35	2.90	2.60	2.70	2.90	2.80	3.35
7	3.10	2.90	2.60	3.05	4.15	4.35	2.90	2.60	2.85	2.85	2.70	3.35
8	3.10	2.90	2.60	3.00	4.15	4.25	2.80	2.60	3.10	2.80	2.70	3.25
9	3.10	2.90	2.75	2.95	4.40	4.20	2.80	2.60	3.00	2.80	2.60	3.05
10	3.10	2.90	2.75	2.90	4.45	4.15	2.80	2.60	2.90	2.80	2.60	3.10
11	3.10	2.90	2.75	2.90	4.75	4.10	2.80	2.60	2.90	2.80	2.60	3.15
12	3.10	2.90	2.75	2.90	4.90	4.00	2.80	2.60	2.90	2.80	2.60	3.15
13	3.10	2.90	2.85	2.85	4.65	3.95	2.80	2.50	2.90	2.80	2.60	3.15
14	3.10	2.90	2.85	2.85	4.55	3.95	2.80	2.50	2.90	2.80	2.60	3.15
15	3.10	2.90	2.85	3.00	4.65	3.90	2.80	2.50	2.80	2.80	2.70	3.40
16	3.10	2.90	2.95	3.10	4.85	3.90	2.70	2.50	2.80	2.80	2.75	3.15
17	3.10	2.90	2.95	3.10	5.00	3.85	2.70	2.50	2.70	2.80	2.80	3.05
18	3.10	2.90	3.05	3.20	5.05	3.85	2.70	2.50	2.70	2.80	2.90	3.05
19	3.10	2.80	2.95	3.25	5.05	3.85	2.70	2.60	2.70	2.80	3.00	2.95
20	3.10	2.80	2.95	3.40	4.80	3.80	2.70	2.60	2.60	2.90	3.10	2.95
21	3.00	2.80	2.95	3.55	4.45	3.75	2.70	2.55	2.60	2.80	3.10	2.90
22	3.00	2.80	2.95	3.60	4.70	3.65	2.70	2.50	2.60	2.80	2.95	2.85
23	3.00	2.80	2.90	3.60	4.95	3.50	2.70	2.50	2.65	2.80	2.85	3.00
24	3.00	2.80	2.90	3.45	4.95	3.50	2.60	2.50	2.95	2.80	2.80	*a* 3.00
25	3.00	2.80	2.90	3.40	5.00	3.50	2.60	2.50	3.15	2.80	2.70	*a* 3.00
26	3.00	2.80	2.90	3.40	4.90	3.40	2.60	2.40	2.95	2.80	2.70	*a* 3.00
27	3.00	2.80	2.90	3.45	4.95	3.30	2.60	2.40	2.85	2.80	2.80	*a* 3.00
28	3.00	2.80	2.85	3.50	5.00	3.25	2.60	2.40	2.80	2.80	2.80	*a* 3.00
29	3.00	.....	2.80	3.45	5.05	3.20	2.60	2.40	2.80	2.80	2.90	*a* 3.00
30	3.00	.....	2.90	3.40	4.95	3.20	2.60	2.40	2.80	2.80	3.00	*a* 3.00
31	3.00	.....	2.95	.....	5.00	.....	2.60	2.45	.....	2.80	.....	*a* 3.00

a Estimated.

SAN JUAN RIVER.

San Juan River rises in the San Juan Mountains, the small streams at the head flowing westerly, the opposite of the direction taken by the branches of the Conejos. The country is generally mountainous and rough, and but little irrigation is practiced along the river, except in the bottom lands adjacent to the channel. The stream flows a short distance through Colorado and then enters New Mexico, through which Territory it flows for about 100 miles, then crosses the southwest corner of Colorado again, and flows through Utah to its junction with the Colorado at Henry Mountain. The principal tributaries flowing from Colorado into this river are the Piedra, Los Pinos, Florida, Animas, La Plata, and Mancos rivers, all of which flow through comparatively natural valleys, crossing the line into New Mexico before they unite with the San Juan. A large portion of this country remained a part of the Southern Ute Indian Reservation until 1899, when the western half of that reservation was thrown open to settlement, and a number of tracts have been taken. A very considerable portion of the most desirable lands, however, were taken by the Indians in severalty. There are a number of excellent mesas of good farming land which will without doubt eventually be irrigated; a number of surveys have already been made of canal lines to cover these tracts, which will be pushed to a speedy conclusion.

The only stations maintained in this basin in 1900 are at Ignacio

on Los Pinos River, at Durango on Animas River, and at Mancos on Mancos River, the stations at Arboles on the San Juan and the Rio Grande and at Durango on Florida River being abandoned, their objects having been accomplished.

LOS PINOS RIVER AT IGNACIO, COLORADO.

This stream derives its supply from the western end of the San Juan Mountains and from the southern slope of the Needle Mountains in Colorado. It flows in a southerly direction for about 50 miles, crossing the Colorado line about 5 miles south of La Boca, on the Denver and Rio Grande Railroad. The valley is generally wider than the valleys of the Piedra and the San Juan, and more irrigation is practiced along the borders of the stream. Several Government canals have been constructed for the benefit of the Indians located on the bottom lands. A number of irrigation canals have been projected and surveys made for the purpose of taking out water upon the adjacent benches. The station was established April 22, 1899, at the request of the Commissioner of Indian Affairs, for the purpose of ascertaining the quantity of water available for irrigation along the stream. Unfortunately, records have not been sent in regularly. The gage rod is fastened to the middle pier of the bridge crossing the river at Ignacio, the subagency of the Southern Ute Indian Reservation, 2 miles south of the station of the Denver and Rio Grande Railroad. The channel is fairly stable, being of gravel and bowlders, and has suffered little change since the station was established. The rod is a vertical 2-inch by 4-inch timber 10 feet long, spiked to the bridge, the marks being strips of brass securely nailed to the post. The 8-foot mark on the gage rod is level with the top of the lower end of a 6-inch by 8-inch timber protruding from the downstream side of the pier on the right-hand side. The banks, although not high, are not subject to overflow. The station is an important one, as all of the waters of the stream will undoubtedly be used for irrigation before many years. Already large reservoirs are contemplated near the head of the river, where there are a number of beautiful lakes. The observer is the clerk at the agency. A description of the station was published in Water-Supply Paper No. 38, page 309. The results of measurements for 1899 will be found in the Twenty-first Annual Report, Part IV, page 299. During 1900 the following measurements were made by A. L. Fellows:

March 26: Gage height, 2.60 feet; discharge, 137 second-feet.
May 8: Gage height, 3.50 feet; discharge, 604 second-feet.
August 14: Gage height, 2 feet; discharge, 25 second-feet.

Daily gage height, in feet, of Los Pinos River at Ignacio, Colorado, for 1900.

Day.	Jan.	Feb.	Mar.	Apr.	May.	Day.	Jan.	Feb.	Mar.	Apr.	May.
1	2.50	2.30	2.30	2.50	.....	17	2.40	2.30	2.50	.....	4.50
2	2.50	2.30	2.30	2.55	.....	18	2.40	2.30	2.50	.....	4.55
3	2.50	2.30	2.30	2.65	.....	19	2.40	2.30	2.50	.....	4.50
4	2.50	2.30	2.30	2.70	.....	20	2.40	2.30	2.50	.....	4.25
5	2.50	2.30	2.30	2.70	.....	21	2.40	2.30	2.55	.....	4.05
6	2.45	2.30	2.30	2.70	.....	22	2.40	2.30	2.60	.....	3.90
7	2.40	3.30	2.30	2.70	.....	23	2.40	2.30	2.60	.....	4.00
8	2.50	2.30	2.30	(a)	.....	24	2.40	2.30	2.60	.....	4.70
9	2.50	2.30	2.30	.....	3.85	25	2.30	2.30	2.60	.....	4.60
10	2.50	2.30	2.30	.....	4.05	26	2.30	2.30	2.60	.....	4.90
11	2.50	2.30	2.30	.....	4.05	27	2.30	2.30	2.60	.....	.....
12	2.50	2.30	2.35	.....	4.15	28	2.30	2.30	2.55	.....	.....
13	2.45	2.30	2.40	.....	4.20	29	2.30	.....	2.50	.....	.....
14	2.40	2.30	2.50	.....	4.00	30	2.30	.....	2.50	.....	.....
15	2.40	2.30	2.50	.....	4.15	31	2.30	.....	2.50	.....	.....
16	2.40	2.30	2.50	.....	4.35						

a No readings from April 8 to May 8.

ANIMAS RIVER AT DURANGO, COLORADO.

This stream is the largest tributary of the San Juan, and derives its water from the high mountains above Silverton, draining portions of the Needle and La Plata mountains in addition to those at its source. It flows in a southerly direction for about 60 miles, crossing the Colorado line about 15 miles south of Durango. Most of its course is through a very mountainous country, but in the vicinity of Hermosa it issues from the canyon into a broad valley, which is extensively irrigated. A canal line has been projected from the lower part of the stream, for the purpose of irrigating lands in New Mexico, but the canal has not yet been finished. The station was first established June 20, 1895, and has been maintained during the greater part of each year since. It is at a wagon bridge a quarter of a mile west of the depot of the Denver and Rio Grande Railroad. The rod, which is a vertical piece of timber marked in feet and tenths, is fastened to the central pier of the bridge. On June 25, 1900, it was checked against a bench mark—a point chiseled on the lower side of the left-hand abutment of the bridge 16.84 feet above the zero of the rod. Lightner Creek enters the river from the right, about 100 feet below the bridge. The channel at the station is straight, the bed is of gravel and bowlders, and the banks are sufficiently high so that there is little danger of overflow. The observer is C. G. Graden, of Durango. A description of the station was published in Water-Supply Paper No. 38, page 310. The results of measurements for 1899 will be found in the Twenty-first Annual Report, Part IV, page 301. During 1900 the following measurements were made by A. L. Fellows:

March 26: Gage height, 6.60 feet; discharge, 246 second-feet.
May 9: Gage height, 8.65 feet; discharge, 1,614 second-feet.
June 25: Gage height, 8.80 feet: discharge, 1,740 second-feet.
August 13: Gage height, 6.45 feet; discharge, 169 second-feet.

Daily gage height, in feet, of Animas River at Durango, Colorado, for 1900.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	6.60	.....	.....	6.60	7.25	10.30	7.70	6.60	6.30	6.50	.....	6.50
2	.....	.....	.....	6.80	7.20	9.95	7.60	6.60	6.30	6.60	.....	.....
3	.....	6.30	6.20	6.80	7.20	10.00	7.60	6.50	6.30	6.60	6.60	.....
4	.....	.....	.....	6.80	7.35	9.90	7.50	6.50	6.40	6.70	.....	6.50
5	.....	.....	.....	6.80	7.75	9.70	7.50	6.50	6.40	6.70	6.50	.....
6	6.40	.....	6.20	6.70	7.80	9.70	7.30	6.50	6.40	6.70	.....	.....
7	.....	.....	.....	6.60	7.85	9.85	7.20	6.50	6.50	.....	.....	.....
8	.....	.....	.....	6.80	8.10	9.70	7.10	6.50	6.80	6.80	.....	.....
9	6.50	.....	.....	6.80	8.55	9.60	7.10	6.50	7.00	.....	.....	.....
10	.....	6.30	6.30	6.70	9.05	9.30	7.10	6.50	7.00	.....	6.50	.....
11	.....	.....	.....	6.70	9.20	8.95	7.10	6.50	6.90	6.70	.....	6.50
12	.....	.....	6.50	6.70	9.15	8.70	7.10	6.50	6.80	.....	.....	.....
13	6.40	.....	6.50	6.70	8.95	8.70	7.00	6.50	6.70	6.60	.....	.....
14	.....	.....	6.60	6.70	8.95	8.95	7.00	6.50	6.60	6.60	6.50	.....
15	.....	.....	6.60	6.70	9.10	8.95	7.00	6.50	6.60	6.60	.....	6.70
16	6.50	.....	6.60	6.70	9.60	9.00	6.90	6.50	6.60	.....	.....	.....
17	.....	6.20	6.50	6.70	9.90	9.10	6.90	6.40	6.60	6.60	6.50	.....
18	.....	.....	6.60	6.70	10.15	8.90	6.90	6.40	6.50	.....	.....	.....
19	.....	.....	6.60	6.70	9.90	8.70	6.80	6.40	6.50	.....	.....	6.50
20	6.30	.....	6.70	6.80	9.60	8.65	6.80	6.40	6.50	6.60	6.50	.....
21	.....	.....	6.70	6.90	9.05	8.65	6.80	6.40	6.50	.....	.....	.....
22	.....	.....	6.70	7.10	9.05	8.65	6.80	6.30	6.50	.....	.....	6.60
23	6.40	.....	6.70	7.10	9.65	8.65	6.70	6.30	6.50	.....	.....	.....
24	.....	6.20	6.70	7.10	10.30	8.70	6.70	6.30	6.50	6.70	6.50	.....
25	.....	.....	6.60	7.10	9.80	8.65	6.70	6.30	6.60	.....	.....	6.50
26	.....	.....	6.60	7.10	10.05	8.50	6.70	6.30	6.70	.....	.....	.....
27	6.30	.....	6.60	7.10	10.50	8.20	6.70	6.30	6.70	6.70	6.50	.....
28	.....	.....	6.70	7.10	10.55	8.00	6.70	6.30	6.60	.....	.....	.....
29	.....	.....	6.50	7.20	10.30	7.90	6.60	6.30	6.50	.....	.....	6.50
30	.....	.....	6.50	7.15	10.30	7.70	6.60	6.30	6.50	.....	6.50	.....
31	.....	.....	6.60	.....	10.30	.....	6.60	6.30	.....	6.60	.....	.....

MANCOS RIVER AT MANCOS, COLORADO.

This stream, an important tributary of the San Juan, drains a portion of the southwestern corner of Colorado. It rises on the western slope of the La Plata Mountains, and flows in a southwesterly direction, through a mountainous country, for about 12 miles, to the Mancos Valley, a broad and fertile tract irrigated by water taken from the river. The next 12 miles of its course is through Mancos Valley. It then enters Mancos Canyon, cut through the Mesa Verde, through which it flows for about 40 miles, or to its junction with the San Juan. The normal supply of the river is exhausted, but sufficient water goes to waste in the flood season to irrigate all of the available land along its borders.

The station at Mancos was established April 9, 1898, for the purpose of determining the amount of water going to waste during high-water periods. The rod, which is a 2-inch by 4-inch timber marked in feet and tenths, is fastened to a tree about 100 feet below the wagon bridge crossing the river in the center of the town. The channel is of bowlders and gravel, and the banks are sufficiently high so that there is little danger of overflow. During 1900 the bed of the stream shifted to such an extent that a rating table for that year is impossible. The observer is Mrs. W. H. Kelley, of Mancos. A description of the station was published in Water-Supply Paper No. 38, page 312. The results of measurements for 1898 and 1899 will be found in the Twenty-first Annual Report, Part IV, page 285.

During 1900 the following measurements were made by A. L. Fellows:

March 23: Gage height, 1.05 feet; discharge, 4 second-feet.
May 7: Gage height, 1.80 feet; discharge, 82 second-feet.
June 26: Gage height, 1.70 feet; discharge, 16 second-feet.
August 12: Gage height, 1.40 feet; discharge, 2 second-feet.

Daily gage height, in feet, of Mancos River at Mancos, Colorado, for 1900.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1	1.00	1.90	2.90	1.60	1.40	1.30	2.00	1.60
2	1.00	1.90	2.90	1.60	1.40	2.00	2.00	1.60
3	1.00	2.00	2.80	1.60	1.40	1.90	1.80	1.60
4	1.00	2.05	2.80	1.60	1.40	1.90	1.80	.....
5	1.10	2.20	2.50	1.60	1.50	1.80	1.90	.....
6	1.10	2.20	2.50	1.60	1.60	1.80	2.00	.....
7	1.10	2.40	2.50	1.50	1.60	1.90	2.00	.....
8	1.10	2.70	2.50	1.50	1.50	2.10	1.80	.....
9	1.10	2.70	2.50	1.50	1.50	2.00	1.80	.....
10	1.10	2.70	2.40	1.50	1.50	2.00	1.80	.....
11	1.20	2.70	2.30	1.40	1.40	2.00	1.80	.....
12	1.20	2.70	2.30	1.40	1.40	1.80	1.80	.....
13	1.20	2.70	2.20	1.40	1.40	1.80	1.80	.....
14	1.20	2.70	1.90	1.40	1.40	1.60	1.70	.....
15	1.20	2.70	1.90	1.40	1.50	1.50	1.60	.....
16	1.20	2.70	1.90	1.40	1.50	1.50	1.60	.....
17	1.30	2.70	1.80	1.30	1.50	1.50	1.60	.....
18	1.30	2.80	1.80	1.30	1.50	1.50	1.60	.....
19	1.40	2.80	1.70	1.30	1.50	1.50	1.60	.....
20	1.60	2.85	1.70	1.40	1.65	1.50	1.80	.....
21	1.70	2.90	1.70	1.40	1.70	1.50	1.70	.....
22	2.00	2.80	1.70	1.20	1.50	1.40	1.60	.....
23	2.05	2.80	1.80	1.20	1.40	1.60	1.60	.....
24	2.00	2.85	1.70	1.10	1.40	1.80	1.60	.....
25	2.00	2.90	1.70	1.10	1.40	2.00	1.60	.....
26	2.00	2.85	1.70	.70	1.40	2.00	1.70	.....
27	1.90	2.95	1.80	.70	1.30	1.80	1.70	.....
28	1.90	2.90	1.70	.70	1.20	1.80	1.60	.....
29	1.90	2.90	1.70	.70	1.20	1.80	1.60	.....
30	1.90	2.90	1.60	1.20	1.10	1.80	1.60	.....
31	.....	2.90	.....	1.30	1.20	.....	1.60	.....

GILA RIVER AT SAN CARLOS, ARIZONA.

This station was established by C. C. Babb on July 11, 1899, in connection with an investigation of Gila River with reference to a supply of water for the Gila River Indian Reservation and arid lands in the vicinity. Results of this investigation were published in Water-Supply Paper No. 33, entitled, Storage of Water on Gila River, Arizona, by J. B. Lippincott. The station is a half mile south of the Indian agency at San Carlos, below the mouth of San Carlos Creek, and about 6 miles above the proposed dam site. It is described in Water-Supply Paper No. 38, page 313. Results of measurements for 1899 will be found in the Twenty-first Annual Report, Part IV, page

332. During 1900 the following measurements of discharge were made by Stephen Janus:

Discharge measurements of Gila River at San Carlos, Arizona.

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
1900.	*Feet.*	*Sec.-ft.*	1900.	*Feet.*	*Sec.-ft.*
May 1	1.50	7.0	August 18	2.25	230
May 12	1.30	6.2	August 19	2.50	384
May 19	1.30	4.0	August 20	1.80	139
May 26	1.30	2.5	August 26	1.00	14
June 9	1.10	.8	September 3	1.85	175
June 16	1.10	1.5	September 7	3.60	2,840
June 23	*a*.25	.9	Do	.....	141
June 30	*a*.20	.5	September 11	3.40	1,952
July 7	*a*.15	.3	September 18	1.80	194
July 14	*a*.15	.3	October 6	1.30	64
July 21	*a*.25	.8	October 25	1.30	55
July 28	*a*.30	4.7	November 18	1.60	67
August 3	2.50	320.3	November 20	3.60	1,927
August 7	0.00	29.7	December 21	1.65	106
August 12	*a*.30	2.3	December 31	1.75	67

a Dry at gage; figures indicate depth, not gage height.

Daily gage height, in feet, of Gila River at San Carlos, Arizona, for 1900.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	1.45	1.30	(*a*)	(*a*)	1.50	1.60	1.25	1.50
2	.....	1.40	1.30	(*a*)	(*a*)	1.95	1.50	1.25	1.50
3	.....	1.40	1.20	(*a*)	2.60	1.85	1.40	1.25	1.60
4	1.50	1.40	1.20	(*a*)	(*a*)	1.20	1.35	1.25	1.70
5	1.60	1.40	1.20	(*a*)	(*a*)	.....	1.40	1.25	1.70
6	1.60	1.35	1.20	(*a*)	(*a*)	.....	1.40	1.20	1.70
7	1.60	1.35	1.20	(*a*)	(*a*)	3.70	1.50	1.20	1.65
8	1.60	1.30	1.10	(*a*)	(*a*)	3.45	1.45	1.15	1.60
9	1.60	1.30	1.10	(*a*)	(*a*)	4.95	1.30	1.15	1.60
10	1.60	1.30	1.10	(*a*)	(*a*)	4.70	1.30	1.10	1.60
11	1.55	1.30	1.10	(*a*)	(*a*)	3.20	1.30	1.10	1.60
12	1.55	1.30	1.10	(*a*)	(*a*)	2.60	1.20	1.10	1.60
13	1.60	1.30	1.10	(*a*)	(*a*)	2.30	1.30	1.00	1.60
14	1.60	1.30	1.10	(*a*)	(*a*)	2.10	1.30	1.00	1.70
15	1.60	1.30	1.10	(*a*)	(*a*)	2.00	1.30	.95	1.70
16	1.60	1.30	1.10	(*a*)	(*a*)	1.90	1.20	.90	1.70
17	1.60	1.35	(*a*)	(*a*)	4.00	1.85	1.20	.90	1.70
18	1.50	1.35	(*a*)	(*a*)	3.30	1.75	1.15	1.75	1.70
19	1.40	1.35	(*a*)	(*a*)	2.80	1.50	1.10	2.85	1.70
20	1.40	1.35	(*a*)	(*a*)	2.00	1.40	1.50	3.95	1.70
21	1.40	1.35	(*a*)	(*a*)	1.60	1.40	1.50	2.20	1.70
22	1.40	1.35	(*a*)	(*a*)	1.30	1.45	1.40	1.75	1.70
23	1.40	1.30	(*a*)	(*a*)	1.20	3.15	1.40	1.65	1.70
24	1.40	1.30	(*a*)	(*a*)	1.20	3.35	1.40	1.60	1.70
25	1.40	1.30	(*a*)	(*a*)	1.20	2.90	1.35	1.60	1.70
26	1.40	1.30	(*a*)	(*a*)	1.10	2.45	1.30	1.55	1.70
27	1.40	1.30	(*a*)	(*a*)	1.10	2.20	1.30	1.55	1.70
28	1.50	1.30	(*a*)	(*a*)	1.10	1.85	1.25	1.55	1.70
29	1.50	1.30	(*a*)	(*a*)	1.10	1.80	1.25	1.55	1.70
30	1.50	1.30	(*a*)	(*a*)	1.10	1.70	1.25	1.55	1.75
31	.....	1.30	.....	(*a*)	1.10	.....	1.25	.....	1.75

a River dry at gage rod.

SALT RIVER AT McDOWELL, ARIZONA.

This station, established April 20, 1897, is a half mile above the mouth of Verde River. It is described in Water-Supply Paper No. 38, page 321. Results of measurements for 1899 will be found in the Twenty-first Annual Report, Part IV, page 386. The station was discontinued November 30, 1899, and was not resumed during 1900.

Observations will be maintained here, however, during 1901, in connection with an investigation of the river with reference to a water supply for arid lands in the vicinity.

VERDE RIVER AT McDOWELL, ARIZONA.

This station, established April 20, 1897, is three-fourths of a mile above the mouth of the river. It is described in Water-Supply Paper No. 38, page 323. Results of measurements for 1899 will be found in the Twenty-first Annual Report, Part IV, page 387. The station was discontinued November 11, 1899, and was not maintained during 1900. Observations will, however, be resumed during 1901.

COLORADO RIVER AT YUMA, ARIZONA.

This station was established in April, 1878, by the Southern Pacific Railway Company, who have maintained daily readings since that time. It is through the courtesy of that company that the records are furnished to the Geological Survey. The station is described in Water-Supply Paper No. 38, page 324. No measurements of discharge were made during 1900.

Daily gage height, in feet, of Colorado River at Yuma, Arizona, for 1900.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	17.8	18.3	17.7	19.4	19.7	24.6	23.0	17.6	16.9	17.0	17.6	17.8
2	17.8	18.3	17.8	19.3	19.7	24.8	22.8	18.0	16.8	16.9	17.6	17.7
3	17.7	18.3	17.8	19.3	20.5	25.0	22.7	17.4	16.7	16.8	17.5	17.4
4	17.5	18.2	17.8	19.3	20.5	25.2	22.3	17.3	16.6	16.7	17.4	17.7
5	17.4	18.1	17.7	19.3	20.5	25.3	22.0	17.3	16.5	16.8	17.5	17.7
6	17.3	18.0	17.7	19.4	20.1	25.5	21.7	17.2	16.6	16.8	17.4	17.7
7	17.2	18.1	17.6	19.5	20.3	25.7	21.6	17.1	16.5	16.8	17.4	17.7
8	17.2	18.0	17.7	19.4	20.3	25.8	21.3	17.2	16.5	16.9	17.4	17.7
9	17.2	18.0	17.8	19.3	20.5	26.0	21.2	17.2	16.5	17.3	17.4	17.7
10	17.2	17.9	17.8	19.3	20.5	26.0	20.7	17.2	16.4	17.3	17.5	17.7
11	17.3	17.9	17.7	19.4	20.7	26.0	20.5	17.2	16.4	17.2	17.5	17.7
12	17.3	17.8	17.7	19.4	21.0	25.9	20.3	17.3	16.6	17.2	17.5	17.7
13	17.4	17.7	17.7	19.3	21.3	25.7	20.2	17.2	17.3	17.2	17.5	17.7
14	17.4	17.8	17.8	19.2	21.4	25.5	19.8	16.9	18.0	17.3	17.5	17.7
15	17.4	17.8	17.8	19.2	21.6	25.4	19.7	16.8	17.7	17.3	17.5	17.7
16	17.7	17.7	18.0	19.2	21.7	25.3	19.6	16.9	17.5	17.3	17.5	17.7
17	17.8	17.8	18.0	19.5	22.3	25.2	19.5	16.7	17.7	17.3	17.5	17.6
18	18.1	17.8	18.1	19.5	22.9	24.8	19.2	16.7	17.4	17.3	17.6	17.4
19	18.2	17.8	18.2	19.4	23.4	24.7	19.0	16.7	17.7	17.4	17.5	17.4
20	18.3	17.8	18.3	19.5	23.7	24.5	18.9	16.8	18.1	17.3	17.6	17.4
21	18.3	17.8	18.3	19.8	23.8	24.2	18.8	16.8	17.8	17.3	17.7	17.4
22	18.3	17.7	18.5	20.3	24.0	24.2	18.8	16.8	17.7	17.3	17.7	17.4
23	18.3	17.7	18.5	20.2	24.0	24.0	18.5	16.8	17.4	17.6	17.7	17.5
24	18.2	17.7	18.5	20.3	24.2	23.9	18.4	16.8	17.3	17.6	18.1	17.5
25	18.2	17.7	18.6	19.9	24.4	23.8	18.3	16.9	17.2	17.7	18.3	17.5
26	18.2	17.7	18.6	19.8	24.7	23.7	18.3	16.9	17.2	17.8	18.6	17.5
27	18.2	17.8	18.7	19.7	24.7	23.4	18.2	16.8	17.0	17.8	18.7	17.5
28	18.2	17.8	19.2	19.7	24.5	23.3	18.0	16.9	17.0	17.7	17.9	17.4
29	18.3	.....	19.8	19.7	24.2	23.1	17.9	16.7	17.0	17.6	17.6	17.3
30	18.3	.....	19.7	19.7	24.2	23.1	17.8	16.7	17.0	17.6	17.7	17.2
31	18.3	.....	19.6	.....	24.4	.....	17.7	16.7	.....	17.6	.....	17.1

[Continued in Water-Supply Paper No. 51.]

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