

## X.—REPORT ON THE PROPAGATION OF SCHOODIC SALMON IN 1885-'86.

BY CHARLES G. ATKINS.

On my first visit to the station, September 15, I found everything in good order and the preparation for fall work in a satisfactory stage. Mr. Munson, the foreman, who had been at work without help since September 1, had among other items of work set the stakes for the main nets, and gathered 190 bushels of moss, of which 175 bushels had been dried in the sun. The addition of 15 bushels more of green moss would give us an ample store for packing purposes. The approach of the spawning season was heralded by the appearance on the 15th of three salmon at the bridge across the stream. Two days later the setting of the nets across the stream was completed.

Excavations in the gravel by female salmon were to be seen as early as October 22, and from that date forward in increasing numbers. On the 24th the fishing pounds were completed, being five days earlier than in 1884, and six days earlier than in 1883. The plan of previous years was followed without material change.

For the first five nights the catch was small, the aggregate being 121. On the night of October 29, we took 56 salmon, and the next night 107. The latter number was the maximum for this season, the nearest approach to it being 99 taken on the night of November 8. As early as November 1 it had become apparent from the relative number of female fish (aggregating 195, against 123 males), that the season was far advanced and was likely to yield less than an average number of fish, and on the 18th we closed operations with an aggregate catch of 611 females, 199 males, and 1 salmon of unknown sex, a total of 811, the smallest catch since the organization of the station. Considered by itself this fact might reasonably cause apprehension as to the future supply of fish and eggs, but it is offset by the well-attested abundance of young salmon of several stages of growth in Grand Lake Stream and about the outlet of the lake for several years past.

The fish caught were equal in length to those of 1884, and exceeded those of 1883 by a little more than an inch. In weight and fecundity

there was a falling off from 1884, but a gain as compared with 1883. The data for the three years afford the following comparison :

Year.	Average length.		Average weight.		Fecundity, average number of eggs per gravid female.
	Males.	Females.	Males.	Females.	
	Inches.	Inches.			
1883 .....	20.00	19.2	3.20	3.40	1,620
1884 .....	21.03	20.3	4.06	4.11	2,350
1885 .....	21.05	20.6	3.65	3.61	1,720

The fish were, in general, healthy, there being a remarkable absence of external sores, which are sometimes to be seen. Out of 578 female salmon manipulated, 97 were afflicted with the ordinary ovarian disease, which displays itself in the presence of white or otherwise discolored and plainly defective eggs when extruded from the fish.

The total number of eggs obtained, as fixed by a computation based on the number rejected and the number packed for shipment, was 994,355. The ratio of impregnation, as later computed from the known number picked out from time to time up to March 4 (35,304), and more especially those picked out after concussion (92,351), was very nearly 90 per cent. This is an unusually low ratio, even for Schoodic salmon. It may be attributed in part to the scarcity of males, which led on several occasions to an insufficient milting of the eggs. The record shows, for instance, that the eggs taken November 9, numbering 110,967, on which there was a loss of 24,553, or 22 per cent, through lack of impregnation, were milted by using the milt repeatedly, straining it off from one lot of eggs, much dilated with mucus and water, and applying it in that condition to the next lot. Experimentally, I have sometimes obtained excellent results in this way, but it is evident that great care must be exercised, and that repeated use of the milt should only be resorted to when the live fish fail.

The weather was remarkably mild all through October and November. The record of air temperature shows no figure lower than 29° F., until November 18, when the mercury fell to 26°. The lowest water temperature observed previous to November 17 was 42½°. This contributed largely to the comfort of the force, and enabled us to move all the fish after the conclusion of the spawning to a point well up the lake without the interference of ice, which has some seasons closed in upon us before the conclusion of the work. It is probable, also, that the high temperature of the water hastened the maturity of the fish, though they were in fact more backward than was expected, a small proportion of them being ripe when first caught and many remaining unripe for a long time in the inclosures.

The entire crop of eggs was placed for development in the river hatchery instead of being divided as usual between the river and cove

houses. In spite of the high temperature prevailing in November, the water was, by the first week in December, cooled down to 34° F., and the general development of the eggs was not so greatly accelerated as had been anticipated. All the eggs remained in the river house till February 15, when a portion of them were moved to the cove house in anticipation of packing and shipment.

The removal of the defective eggs (127,655 in all) reduced the stock to 866,700, of which 641,000 were shipped to the order of the parties contributing, as follows:

Party.	Amount of contribution.	Computed share.	Eggs actually delivered.
United States .....	\$578 01	222,000	222,000
Maine .....	500 00	182,000	182,000
Massachusetts .....	300 00	115,000	115,000
New Hampshire .....	300 00	115,000	115,000
	1,678 01	644,000	641,000

A detailed statement of the transfer will be found in Table IV, subjoined.

From the reserved 225,700, which was 9,005 in excess of the legal minimum, there were lost but 428 eggs and 463 fry, and the remaining 224,809 were liberated in Grand Lake between June 14 and 23, 1886.

TABLE I.—Record of fishing at Grand Lake Stream, Maine, during October and November, 1885.

Day (24 hours) ending at 7 a. m.	Day weather.	Night weather.	Height of Grand Lake.	Temperature at 7 a. m.		Adult Schoodie salmon.								Brook trout.	Remarks.		
				Air.	Water.	Daily catch.			Daily summary.				Farr.			Togoe.	
						Males.	Females.	Unknown.	Total.	Males.	Females.	Unknown.					Total.
1885.			Pt. In.	°	°												
Oct. 25	Mostly clear; wind light, NW.	Clear and calm	1 11	34	50½	10	6	.....	16	10	6	.....	16	2	1	1	All gates open except one. Chubs and suckers; a few dally.
26	Clear; wind light, W. and NW.	Clear and calm; toward morning foggy.	.....	30	50	17	12	.....	29	27	18	.....	45	3	.....	2	
27	Clear, warm; wind light, southerly.	Clear till 1, after that cloudy; wind southerly, not felt at fishing ground.	.....	43	51	14	4	.....	18	41	22	.....	63	.....	1	2	
28	Clear, warm; wind light, southwesterly.	Calm; clear in evening, cloudy toward morning.	.....	41	51	14	16	.....	30	55	38	.....	93	2	3	1	
29	Cloudy, threatening; wind light, E.	Cloudy; wind light, southerly.	1 10	50½	51½	11	17	.....	28	68	55	.....	121	2	8	1	
30	Cloudy, threatening; wind light, southerly.	Rain from 8 p. m. nearly all night; evening calm, morning variable winds.	2 0	48	51	20	36	.....	56	86	91	.....	177	.....	2	.....	
31	Rain, with moderate to strong northerly wind all day.	Cloudy; moon and stars occasionally visible; wind strong N., all night; no rain.	2 0	31	46½	24	83	.....	107	110	174	.....	284	.....	2	1	Two pickerel.
Nov. 1	Cloudy with strong N. wind all day; a little snow in a. m.	Clouds break at 10½ p. m., clear till morning; wind at sunset N., strong; at 10½ N., light, and so continuing all night.	2 0	29	44	13	21	.....	34	123	195	.....	318	1	6	.....	
2	Clear; wind N., gentle.	Evening clear with gentle north wind; after midnight cloudy with south-easterly wind.	2 0	36½	45	7	5	.....	12	130	200	.....	330	1	.....	1	Five pickerel.
3	Cloudy; slight rain; wind E. to SE., gentle.	Rain from dark till 12½ with slight intermissions with E. or SE. wind; cleared at 2; cloudy again at 4; wind dead after 2. Light SE. in morning.	2 1	44½	46	11	10	.....	21	141	210	.....	351	2	2	2	Several pickerel.
4	Light clouds; wind W., light.	Cloudy, calm	2 2	34	45	10	16	.....	26	151	226	.....	377	3	2	1	

5	Mostly clear; wind W., light	Half clear till 4 a. m.; wind W. and NW., very light	2	2½	35½	45	5	29	.....	34	156	255	.....	411	1	2	.....	
6	Mostly cloudy; wind SE., light	Cloudy; rain after 12; nearly calm	.....	.....	37	.....	6	28	.....	34	162	283	.....	445	1	2	.....	All gates shut except sluice-gate and one other.
7	Cloudy, some rain; wind NE., light	Cloudy; calm; foggy toward morning	2	2	38	45	10	41	.....	51	172	324	.....	496	2	2	4	Drop-net set.
8	Light rain intermittent; wind E., light	Rainy all night; wind E....	.....	.....	52	47	5	54	.....	59	177	378	.....	555	.....	1	.....	
9	Rainy; wind light, variable	Rainy all night with occasional heavy gushes; wind uncertain, light	2	4	43½	47	7	92	.....	99	184	470	.....	654	4	3	.....	One eel, 3 pounds 4 ounces.
10	Rain all day; wind E., S., and NW.	Evening rainy with brisk NW. wind till midnight; thereafter calm and clear till morning	2	6½	31	46	2	70	1	73	166	540	1	727	.....	3	.....	One whitefish.
11	A. m. clear with gentle W. wind; p. m. cloudy, wind inconstant, S. and NW.	Cloudy, except from 10 to 3; wind strong NW. all night	2	6	33	44	4	38	.....	42	190	578	1	769	2	.....	.....	
12	Slight snow in morning; a. m. cloudy; p. m. mostly clear; wind strong NW. all day, moderating toward night	Clear all night; very light variable winds in evening, most of night calm; ground froze some	.....	.....	29	42½	3	6	.....	9	193	584	1	778	.....	.....	.....	
13	Mostly clear; wind W. and SW.; light	Evening clear and calm.....	2	6½	36	43	4	14	.....	18	107	598	1	796	.....	2	1	
14	Cloudy; wind E.....	Cloudy, rain after 1; wind E.	2	7	39	43½	0	0	.....	6	197	604	1	802	.....	3	.....	
15	Light rain; wind NE..	Cloudy, wind SW. and W...	2	7	40	44	1	2	.....	3	198	608	1	805	.....	.....	.....	
16	Clear; wind W., light..	Clear; wind W., light.....	.....	.....	30	43	1	4	.....	5	199	610	1	810	.....	.....	.....	
17	Clear; wind W.....	Clear; wind W.....	.....	.....	.....	.....	0	0	.....	0	199	610	1	810	.....	.....	.....	
18	.....do.....	.....do.....	2	9½	28	40	0	1	.....	1	199	611	1	811	.....	.....	.....	

TABLE II.—Summary of spawning operations at Grand Lake Stream, Maine, during October and November, 1885.

Date.	Fish at first handling.							Females spawned.			Eggs taken.	
	Total.	Males.	Females.				Sex unknown.	First time.	Second time.	Females yielding some defective eggs.	Weight.	Number.
			Total.	Unripe.	Ripe.	Spent.						
1885.												
Oct. 27....	61	41	20	15	2	3	0	1	-----	1	Lbs. 1	Oz. 5½
29.....	57	25	33	33	0	0	0	0	-----	-----	-----	-----
30.....	58	20	38	36	0	0	0	0	-----	-----	-----	-----
31.....	107	24	83	80	3	0	0	5	-----	1	3	5
Nov. 2.....	40	20	26	17	0	0	0	0	19	6	11	14
3.....	19	11	10	8	2	0	0	0	8	18	4	8
4.....	26	10	16	12	4	0	0	0	9	9	6	12
5.....	34	5	29	13	13	3	0	0	26	9	13	1
6.....	34	6	28	11	16	1	0	0	47	21	28	0
7.....	77	13	64	30	31	3	0	0	67	81	14	50
8.....	63	6	57	38	19	0	0	0	48	27	7	33
9.....	69	3	66	35	30	0	0	0	57	46	11	45
10.....	73	2	70	30	34	4	1	1	65	56	7	50
11.....	42	4	38	15	22	1	0	0	94	60	28	71
12.....	9	3	6	0	3	3	0	0	66	94	17	50
13.....	18	4	14	7	4	3	0	0	25	64	7	24
14.....	8	0	8	6	0	5	1	0	26	25	0	18
16.....	3	1	5	0	0	0	1	0	14	26	0	11
17.....	0	0	0	0	0	0	0	0	0	8	0	1
18.....	1	0	1	0	1	0	0	0	1	0	0	6
	806	198	608	380	198	26	4	1	578	546	97	430
											12	994,355

TABLE III.—Measurements of Schoodic salmon at Grand Lake Stream, Maine, 1885.

Date.	Number weighed and measured.	Males.						Gravid females.						
		Weight.			Length.			Weight.			Length.			
		Average.	Heaviest.	Lightest.	Average.	Longest.	Shortest.	Average.	Heaviest.	Lightest.	Average.	Longest.	Shortest.	
1885.														
Oct. 27.....	41	3.26	5.06	1.50	21.0	24.0	14.5	17	3.42	4.62	2.44	19.8	24.0	15.0
29.....	25	4.08	5.12	2.12	21.9	24.0	17.5	31	3.54	5.50	2.12	20.2	23.5	18.0
30.....	23	3.81	5.00	1.62	21.5	24.0	18.0	36	3.50	5.00	2.44	20.5	23.0	17.5
31.....	24	3.57	5.00	1.37	20.8	24.0	15.5	83	3.51	5.75	1.87	20.4	24.0	15.5
Nov. 2.....	20	3.70	5.37	2.25	21.4	24.0	18.5	28	3.78	5.12	2.50	21.3	25.0	18.5
3.....	11	3.45	5.25	2.25	20.4	25.0	18.0	10	3.20	3.87	2.50	20.0	21.0	10.5
4.....	10	3.71	5.06	2.75	21.4	23.5	20.0	16	3.34	5.56	2.75	19.0	23.5	18.0
5.....	5	3.72	4.19	2.94	20.9	22.0	19.5	20	3.70	5.50	2.75	21.0	23.0	18.5
6.....	5	3.78	4.84	2.25	21.4	23.5	18.0	27	3.81	6.10	2.50	20.7	24.5	18.0
7.....	13	3.74	0.87	1.94	21.1	25.5	16.5	61	3.00	5.60	2.25	20.0	23.0	18.0
8.....	5	3.15	4.81	2.06	20.2	23.0	17.0	57	3.59	5.00	1.50	20.8	23.0	17.5
9.....	3	3.03	4.19	1.12	20.0	23.5	15.5	66	3.84	5.19	2.37	20.8	23.0	18.0
10.....	12	3.55	5.19	3.00	20.4	23.0	20.5	64	3.55	5.44	2.25	20.4	24.0	18.5
11.....	4	3.66	4.81	2.50	21.1	22.5	18.0	37	3.89	6.12	2.31	21.5	24.0	19.0
12.....	3	3.20	5.19	2.31	20.0	23.5	18.0	4	3.77	3.37	2.44	19.6	20.0	19.0
13.....	4	3.02	4.50	3.00	21.2	22.5	19.5	11	3.76	5.12	3.00	21.8	22.5	19.0
14.....	-----	-----	-----	-----	-----	-----	-----	5	3.05	3.56	2.09	20.2	22.0	18.5
16.....	2	3.81	4.00	3.62	22.2	22.5	22.0	-----	-----	-----	-----	-----	-----	-----
	108	3.65	6.87	1.12	21.05	25.5	14.5	577	3.61	6.19	1.50	20.6	25.0	15.0

TABLE IV.—Statement of the transfer of Schoodic (landlocked) salmon eggs from Grand Lake Stream, Maine, in 1886.

Date.	Consignee.	Number of eggs.					Date of arrival.	Condition on unpacking.	Dead on unpacking.
		Share of United States.	Share of Maine.	Share of Massachusetts.	Share of New Hampshire.	Total.			
1886.									
Feb. 22	E. A. Brackett, Winchester, Mass.			80,000		80,000		Excellent.	40
22	George A. Seagle, Wythoville, Va.	23,000				23,000	Feb. 27	Good	37
22	Dr. R. O. Sweeny, Saint Paul, Minn.	10,000				10,000			
22	Walter D. Marks, Paris, Mecosta County, Michigan.	14,000				14,000	Feb. 26	Good	0
Mar. 8	E. B. Hodge, Plymouth, N. H.				80,000	80,000	Mar. 11	do	28
8	Frank Gibbs, Bridgton, Me.		20,000			20,000	Mar. 10	do	15
8	William Baller, Corry, Pa.	10,000				10,000	Mar. 11	do	12
8	John Pierce, Denver, Colo.	14,000				14,000	Mar. 14	do	10
9	E. B. Hodge, Plymouth, N. H.	*20,000			35,000	55,000	Mar. 12	do	13
9	David Masterman, Weld, Me.		73,000			73,000	Mar. 12	do	10
9	F. Mather, Cold Spring Harbor, New York. †	40,000				40,000	Mar. 12	do	43
10	A. J. Darling, Enfield, Me.		48,000			48,000	Mar. 11	do	25
10	E. A. Brackett, Winchester, Mass.			35,000		35,000	Mar. 12	Excellent.	22
15	O. A. Dennen, Kineo, Me.		48,000			48,000	Mar. 19	Good	55
15	E. G. Blackford, Fulton Market, New York city. †	34,000				34,000	Mar. 18	do	70
15	F. N. Clark, Northville, Mich.	29,000				29,000	Mar. 19	First-class	100
15	Otto Gramm, Laramie, Wyo.	10,000				10,000			
		222,000	189,000	115,000	115,000	641,000			

\* 10,000 of these were for the State of Vermont, the remainder for New Hampshire.

† These eggs were to be reshipped, 20,000 to Herr Von Behr for the German Fischerel-Verein, and 20,000 to the National Fish Culture Association, South Kensington, England.

‡ Forwarded to Cold Spring Harbor, New York.

TABLE V.—Observations on temperature, &c., at Grand Lake Stream, Maine, from September 2, 1885, to June 20, 1886.

Date.	Temperature at 7 a. m.					Height of Grand Lake.	Rain.		Snow.	
	Air.	Water.					Hour when measured.	Inches in rain-gauge.	Hour when measured.	Inches of new snow.
		River or lake.	River house.	West aqueduct.	South aqueduct.					
Sept. 2. 1885.	°	°	°	°	°	<i>Ft. In.</i>				
2.	61	63		53		2 6				
3.	53	62½		53						
5.	54½	63½		53			7 a. m.	0½		
6.	49	61		53						
7.	47			53						
8.	52	62½		53		2 5½				
9.	52½	63		53						
10.	47	60½		52½		2 4½	7 a. m.	0½		
12.	45	61		51½		2 4				
13.	55	62		52	51½					
14.	62	62		52		2 3				
15.	66	62½		52	51½					
17.	54	62		53	52	2 2				
18.	55	61		53						
19.	55½	62		53	53	2 1½				
20.	53			52½	53					
21.	44	61		52	52½					
22.	55	62		52	52	2 0				
23.	60	62		52	52		10 a. m.	2½		
24.	38	58½		52	51	2 1				
25.	37	56			56					
27.	56	56½		49½	50½	2 1				
28.	46	58		50	50½					
29.	55	60		50	50½					
30.	46	60		50	51					
Mean...	58.9	62.5		52.1	51.6					
Oct. 1.	50	60		50	51					
2.	51	60		50	51	2 1				
3.	55	61		50	51					
4.	60	60½		51	52		7 a. m.			
5.	50	60		51	52		7 a. m.			
6.	42	58½		50	51					
7.	38	56		50	51		8 a. m.	½		
8.										
9.	35	54		48	49	1 11				
10.	31	52		47½	48½					
11.	31½			47	48					
12.	32	47½		47	48	1 11				
13.	30									
14.	45	48		46	47					
15.	50	50		47	47		7 a. m.	1½		
16.	44	51		47	48					
20.	53	53½		48	48	1 10½				
21.	50	52		48	48					
22.	56	54		48½	49		7 a. m.	½		
23.	39			48	49					
24.										
25.	34	50½		47	47	1 10½				
26.	30	50		46	46½					
27.	43	51		46½	46	1 10				
28.	41	51	51	46½	46½					
29.	50½	51½	51½	47	47	1 10				
30.	48	51	51	47	47	2 0	7 a. m.	1½		
31.	31	46½	46½	46	46	2 0	7 a. m.	½		
Mean...	43.2	53.5	50	48	48.6					
Nov. 1.	29	44	44	45	45	2 0				
2.	36½	45	45	44	44	2 0				
3.	40	46	46	44½	44½	2 1				
4.	34	45	44½	44½	44½	2 2				
5.	35½	45	44½	44	44½	2 2	7 a. m.	½		
6.	37		45			2 2½				
7.	38	45	45							
8.	52	47	47							
9.	43½	47	47	46	46	2 4	5 p. m.			
10.	31	46	46			2 5½				
11.	32	44	43½			2 0				
12.	29	42½								



TABLE V.—Observations on temperature, &c.—Continued.

Date.	Temperature at 7 a. m.					Height of Grand Lako.	Rain.		Snow.	
	Air.	Water.					Hour when measured.	Inches in rain-gauge.	Hour when measured.	Inches of new snow.
		River or lake.	River house.	West aqueduct.	South aqueduct.					
1885.	o	o	o	o	o	Ft. In.				
Nov. 13	36	43	43		44	2 0 $\frac{1}{2}$				
14	39	43 $\frac{1}{2}$	43 $\frac{1}{2}$	44	44	2 2	7 a. m.	$\frac{1}{8}$		
15	40	44	44			2 7	7 a. m.	$\frac{1}{8}$		
16	40									
17	30	43								
18										
19	26	40	40	42	42	2 9 $\frac{1}{2}$				
20	34	40	40			2 10	5 p. m.	$\frac{7}{8}$		
21	22	38 $\frac{1}{2}$	38							
22	22 $\frac{1}{2}$	38	37 $\frac{1}{2}$			2 11				
23	31	38	38					7 a. m.	$\frac{1}{8}$	
24	21	38	38							
25	18	38	38							
26	23									
27	25 $\frac{1}{2}$	36 $\frac{1}{2}$	37	42	39 $\frac{1}{2}$	3 1 $\frac{1}{2}$				
28	20	36	36	40	39					
29	19	36 $\frac{1}{2}$	36	40	39					
30	18	36	36	40	39					
31	20 $\frac{1}{2}$	35 $\frac{1}{2}$	35	30	38 $\frac{1}{2}$	3 2				
Mean	30.5	41.8	41.4	43.2	42.0					
Dec.										
1	14 $\frac{1}{2}$	35	35	40	39 $\frac{1}{2}$					
2	23									
3	21	35	35	40	38 $\frac{1}{2}$	3 1 $\frac{1}{2}$				
4	17		34 $\frac{1}{2}$					7 a. m.	1	
5	16	34 $\frac{1}{2}$	34					11 a. m.	1 $\frac{1}{2}$	
6	14 $\frac{1}{2}$		34					7 a. m.	$\frac{3}{8}$	
7	15		34			3 2		7 a. m.	5	
8	3 $\frac{1}{2}$	33	33	38	39			7 a. m.	2 $\frac{1}{2}$	
9	20		33 $\frac{1}{2}$							
10	50	34	34			3 3 $\frac{1}{2}$		7 a. m.	$\frac{1}{2}$	
11	30	34					7 a. m.	1		
12	13		33 $\frac{1}{2}$							
13	14		33							
14	34	33 $\frac{1}{2}$	33				11 a. m.	$\frac{1}{8}$	7 a. m.	
15	26 $\frac{1}{2}$		33 $\frac{1}{2}$							
16	7		32 $\frac{1}{2}$	38 $\frac{1}{2}$	38	3 4				
17	2		32 $\frac{1}{2}$							
18	— 3 $\frac{1}{2}$		32 $\frac{1}{2}$							
19	29		32 $\frac{1}{2}$							
20	26 $\frac{1}{2}$	33 $\frac{1}{2}$	33			3 4 $\frac{1}{2}$		7 a. m.	4	
21	6		33							
22	22	33								
23	38		33 $\frac{1}{2}$				7 a. m.	$\frac{1}{8}$		
24	8		33							
25	6	32 $\frac{1}{2}$	32 $\frac{1}{2}$			3 6				
26	11		32 $\frac{1}{2}$	37	36			4 p. m.	4 $\frac{1}{2}$	
27	15		32 $\frac{1}{2}$							
28	23 $\frac{1}{2}$		33							
29	13		33 $\frac{1}{2}$							
30	20	33 $\frac{1}{2}$	34	38	37	3 7 $\frac{1}{2}$				
31										
Mean	17.9	33.8	33.5	33.6	38					
1886.										
Jan. 1	36 $\frac{1}{2}$		34							
2	34						7 a. m.	$\frac{1}{8}$		
3	32	34 $\frac{1}{2}$	34	38	36	3 8				
4	34		34							
5	30		34							
6	40 $\frac{1}{2}$	34 $\frac{1}{2}$	34 $\frac{1}{2}$			3 10	8 a. m.	1 $\frac{1}{2}$		
7	17		33 $\frac{1}{2}$							
8	— 3 $\frac{1}{2}$		33							
9	4		32 $\frac{1}{2}$					5 p. m.	7	
10	16 $\frac{1}{2}$	33 $\frac{1}{2}$	33	34 $\frac{1}{2}$	35					
11	— 8		32 $\frac{1}{2}$							
12	— 18		32 $\frac{1}{2}$							
13	— 30		32 $\frac{1}{2}$							
14	0	33 $\frac{1}{2}$	32 $\frac{1}{2}$	35 $\frac{1}{2}$	34 $\frac{1}{2}$					
15	1 $\frac{1}{2}$		32 $\frac{1}{2}$							
16	6		33							

TABLE V.—Observations on temperature, &c.—Continued.

Date.	Temperature at 7 a. m.					Height of Grand Lake.	Rain.		Snow.		
	Air.	Water.					Ft. In.	Hour when measured.	Inches in rain-gauge.	Hour when measured.	Inches of new snow.
		River or lake.	River house.	West aqueduct.	South aqueduct.						
1886.	°	°	°	°	°						
Jnn. 17	29		35½								
18	16		33½								
19	5		34								
20	21		34						7 a. m.	0	
21	7	34	34	37	35½						
22	26		34						7 a. m.	2½	
23	28		34						5 p. m.	1½	
24	-13		33								
25	-20		33								
26	23		33						7 a. m.	6	
27	9		33								
28	22		33								
29	20	34½	33½	37	38				8 a. m.	5½	
30	27		33½								
31	20½		33						7 a. m.	6	
Mean	14.6	33.7	33.3	36.5	35.8						
Feb. 1	28		32½								
2	8		32½								
3	-8		32½								
4	-13		32½								
5	-18		32½	30½	38						
6	-15½		33								
7	-7		33								
8	4		33								
9	11		33								
10			33½	37	37½						
11	10½		33½								
12	19		34								
13	42		34								
14	37		34	34½	33½		7 a. m.	2			
15	31		34								
16	28½	34	34	33½	34	4 4					
17	8		34	34	34½						
18	18										
19	12½		34	34	34½	4 4½					
20	32	34	34	34½	35				7 a. m.	4	
21	-2		33½	35	35						
22	-9		33½	35	35						
23	19½		34	35	35				8 a. m.	½	
24	-6		33½	35	35						
25	-10		33	35½	35				8 a. m.	17	
26	23		33½	36	35½						
27	4		33	36	35½						
28	4		33	36	35						
Mean	9.4	34	33.4	35.2	35.2						
Mar. 1	-7½		33	36	35						
2	9		33½	36	35						
3	19		33½	36½	35						
4	20		34	37	35½						
5	28½		34	37	35½						
6	23	34½	34	37	35						
7	9		34	37	35						
8	-2		33½	37	35						
9	10		33	37	35						
10	-17		32½	37	35½						
11	-1		33	37	35½						
12	30	34	34	37½	36½	4 0					
15	4		34	37½	36						
16	24		34½	37½	36						
17	18½		33½	37½	36						
18	3	34	33½	37	36						
19	17		33½	37	36				7 a. m.	5½	
20	26		34	39½	35½						
21	23		33½	36	35						
22	28		33½	36	35	4 0					
23	27½		34	36	35						
24	21		34½	36	35				7 a. m.	10	

TABLE V.—Observations on temperature, &c.—Continued.

Date.	Temperature at 7 a. m.					Height of Grand Lako.	Rain.		Snow.		
	Air.	Water.					Ft. In.	Hour when measured.	Inches in rain-gaugo.	Hour when measured.	Inches of new snow.
		River or lake.	River house.	West aqueduct.	South aqueduct.						
Mar. 1886.	°	°	°	°	°						
25	11	34½	34½	35½	30						
26	29		34½	36	30½						
27	27			36½	37						
28	20			30½	37						
29	18			30½	37½						
30	31			39½	37						
31	34½			35½	36½	4 0½					
Mean	17	34.2	33.7	36.0	35.7						
Apr.											
1.	45	35		36	36	4 7					
2.	21			35½	35½						
3.	27			36½	35						
4.	26			35	35						
5.	29	35½		35½	35	4 6½					
6.	31			35	35						
7.	35			35	35						
8.	30			35	35				7 a. m.	1	
9.	28			35	35						
10.	24½			35	35						
11.	26			35	35	4 7					
12.	21			35½	35						
13.	38	35		35	35						
14.	40			35	35						
15.	32			34½	34½						
16.	34			34½	34½	4 8½					
17.	36½			34½	34½						
18.	40			35	34½						
19.	42	36		35½	34½	4 10					
20.	41½			30½	34½						
21.	30½	30		37½	35	5 ½					
22.	40			39	30						
23.	41			40	36½	5 8					
24.	44			40	30½						
25.	28½	38½		39½	30½						
26.	29			40	37½	5 8					
27.	27			40	38						
28.	41			40½	38	5 9					
29.	41½	40½		41½	39½						
30.	42			41½	30½	5 10					
Mean	33.0	35.2		36.8	35.4						
May											
1.	39½	41		42	40	5 11½					
2.	44			42	40						
3.	47			42	40½	6 ½					
4.	46			42½	41						
5.	47½			42½	41½						
6.	51	41½		43½	42	6 1½					
7.	50			43½	42						
8.	51			43½	42						
9.				43½	42			10 a. m.	1½		
10.	39	44		43	42	6 2½					
11.	45			43	42						
12.	45			43	42						
13.	44½			43	42½						
14.	47			43	42½						
15.	40			43½	43						
16.	42½			43½	43½			5 p. m.	½		
17.	49	40		44	43½	6 3½					
18.	48			44	43½						
19.	48			44	43½						
20.	45			44	44						
21.	50			45	45			6 a. m.	½		
22.	53			45	44½						
23.	50			44½	44½						
24.	54½	47½		44½	44½	6 3					
25.	55			44½	44½						
26.	47			45	45			7 a. m.	½		
27.	46			45	45						
28.	54			44½	45			7 a. m.	½		

TABLE V.—Observations on temperature, &amp;c.—Continued.

Date.	Temperature at 7 a. m.					Height of Grand Lake.	Rain.		Snow.	
	Air.	Water.					Hour when measured.	Inches in rain-gauge.	Hour when measured.	Inches of new snow.
		River or lake.	River house.	West aqueduct.	South aqueduct.					
1886.	°	°	°	°	°	<i>Ft. In.</i>				
May 29.....	53	50	.....	44½	45	6 2½	.....	.....	.....	
30.....	60	.....	.....	45	45½	.....	.....	.....	.....	
31.....	54½	.....	.....	45½	45½	.....	.....	.....	.....	
Mean.....	51.5	45	.....	43.7	43.8	.....	.....	.....	.....	
June 1.....	58	54½	.....	46	46	6 ½	.....	.....	.....	
2.....	61	.....	.....	46	46	.....	4 p. m.	.....	.....	
3.....	56½	.....	.....	46	47	.....	.....	.....	.....	
4.....	54	57	.....	46	47	6	.....	.....	.....	
5.....	55½	.....	.....	46	47	.....	.....	.....	.....	
6.....	59	.....	.....	46	47½	.....	.....	.....	.....	
7.....	60	.....	.....	46½	47½	.....	.....	.....	.....	
8.....	61	.....	.....	46½	47½	.....	.....	.....	.....	
9.....	64	59	.....	46½	48	5 7½	.....	.....	.....	
10.....	58½	.....	.....	46½	48	.....	.....	.....	.....	
11.....	54	.....	.....	46½	48½	.....	.....	.....	.....	
12.....	53	.....	.....	46½	48½	.....	.....	.....	.....	
14.....	55	60½	.....	46½	48½	5 2	.....	.....	.....	
15.....	56	.....	.....	47	50	.....	.....	.....	.....	
19.....	57	62	.....	47½	50½	4 10½	.....	.....	.....	
20.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Mean.....	57.7	58.6	.....	47.7	47.8	.....	.....	.....	.....	

BUCKSPORT, ME., August 20, 1886.