

#### XIV.—REPORT ON THE PROPAGATION OF PENOBSCOT SALMON IN 1886-'87.

BY CHARLES G. ATKINS.

The number of salmon purchased for breeding purposes at the Penobscot Station in 1886 was limited to 205, which were received between May 29 and June 8. By collecting them thus early it was hoped that we might avoid in great measure the losses that annually decimate the stock of salmon during the transfer from the weirs to the inclosure, and also while confined during the summer months in Dead Brook. These hopes were only partially realized. There were, to be sure, no deaths in transit, but out of the 205 placed in the inclosure only 147 (or 72 per cent.) were recaptured in the fall. This is a less favorable result than in 1885, when the collection of salmon was continued till June 20, and when 72 per cent. of the whole number purchased and 82 per cent. of those actually placed in the inclosure were saved and made serviceable in the fall. The deaths in the inclosure occurred for the most part, as usual, soon after the salmon were inclosed, and thus before the height of the summer's drouth or heat. Of 48 whose remains were found 33 were discovered in June, 9 in July, and 6 in August, the last 6 bearing evidence of having been dead from ten to twenty days.

This was a year of large salmon in the Penobscot. The average of the estimates of the entire stock collected was 16.47 pounds. At the spawning season those remaining on hand were found to average 14.47 pounds in weight and 34 inches in length, including all the males and gravid females.

The spawn was taken at the usual date, and the 101 females recovered yielded a total of 1,158,776 eggs, an average of 11,473 each.

The development of the embryos up to the shipping point was attended with a loss of 59,776, or 5.2 per cent. The loss from non-impregnation was estimated at 21,035, or 1.8 per cent. Among the rejected eggs was an entire lot of very small and evidently worthless eggs which were thrown out in a mass soon after placing them in the hatchery. Leaving these out of the account, the total loss appears to have been but 3.9 per cent., a very satisfactory result.

The net stock of eggs available for division among the subscribers to the fund was 1,099,000, of which there were awarded to the State of

Massachusetts 320,000, and to the U. S. Commission of Fisheries 779,000. Out of the latter, 25,000 were reserved for experiments in rearing and feeding at the Bucksport Station, but were subsequently liberated (June 13) in Craig's Pond. The remainder were distributed as per following schedule :

TABLE I.—Statement of shipments of salmon eggs from the Penobscot Station in 1887, from the stock collected in 1886.

Date.	Consignee and address.	Belong- ing to Massa- chusetts.	Belong- ing to United States.	Total.	Number of cases.	Time en route.	Condition on unpacking.	Dead on un- packing.
1887.						Days.		
Feb. 1	F. Mather, Cold Spring Harbor, N. Y.		250,000	250,000	4	3	Excellent.	479
2	F. A. Walters, Bloomingdale, N. Y.		250,000	250,000	4	6	Good.	58
3	E. B. Hodge, Plymouth, N. H.	110,000	100,000	210,000	3	2	Good.	23
8	E. B. Hodge, Plymouth, N. H.	210,000		210,000	4	2	Good.	40
21	F. Mather, Cold Spring Harbor, N. Y.		40,000	40,000	1	3	Excellent.	38
23	F. Mather, Cold Spring Harbor, N. Y.		10,000	10,000	1	3	Excellent.	40
24	W. H. Munson, Grand Lake Stream, Me.		89,000	89,000	2	3	Good.	37
28	W. H. Munson, Grand Lake Stream, Me.		15,000	15,000	1	3	Good.	0
	Total .....	320,000	754,000	1,074,000	20			715

TABLE II.—Observations on temperature of Eastern River at Orland Lower Dam, June, 1886.

[During the period while brooding salmon are usually collecting.]

Date.	Hour.	Temper- ature.	Date.	Hour.	Temper- ature.
1886.		° F.	1886.		° F.
June 1	6 p. m.	60	June 14	8 a. m.	69
2	8 a. m.	65	14	5½ p. m.	70
2	6 p. m.	64	15	8 a. m.	68
3	8 a. m.	62	16	8 a. m.	69
3	5½ p. m.	64	17	7½ a. m.	69
4	8 a. m.	63½	17	6½ p. m.	71
4	5 p. m.	66	18	8 a. m.	70
5	8 a. m.	65	18	5½ p. m.	71
5	5 p. m.	66½	19	8 a. m.	70
6	No observation		19	5½ p. m.	71
7	8 a. m.	66	20	8 a. m.	70
7	5½ p. m.	68	20	5½ p. m.	71
8	8 a. m.	67	21	8 a. m.	71
8	5½ p. m.	68	21	5½ p. m.	72
9	7 a. m.	67	22	7 a. m.	72
10	7 a. m.	67	25	5 p. m.	70
11	8 a. m.	68	26	8 a. m.	71
12	8 a. m.	68	28	4½ p. m.	71
13	No observation				

TABLE III.—Observations on temperature of Dead Brook (at the salmon inclosures), 1886.

[NOTE.—These observations were taken between 5 and 6 a. m.]

Day of month.	June.	July.	August.	September.	October.	Day of month.	June.	July.	August.	September.	October.
	° F.	° F.	° F.	° F.	° F.		° F.	° F.	° F.	° F.	° F.
1		54	64	56	52	17	60	60	52	52	35.
2		58	64	54	50	18	62	62	52	52	36
3	57	64	63	54	44	19	56	62	52	54	52
4	54	62	58	54	44	20	56	58	66	52	37
5	55	60	58	55	40	21	56	58	52	48	37
6	54	60	58	55	45	22	57	68	58	44	40
7	53	65	57	62	43	23	60	52	58	42	37
8	56	60	60	61	47	24	61	55	52	44	36
9	56	63	60	60	48	25	59	55	52	44	36
10	56	63	59	62	47	26	58	62	58	48	35
11	58	63	59	62	47	27	60	62	58	54	34
12	60	59	60	63	48	28	60	62	60	50	40
13	58	58	62	61	48	29	58	63	60	52	40
14	55	58	60	60	47	30	55	62	54	52	.....
15	55	60	60	60	45	31	.....	65	60	.....	.....
16	56	62	58	56	55	.....	.....	.....	.....	.....	.....
	58	60	56	51	45						

TABLE IV.—Observations on temperature of water in the hatchery at Craig's Brook, October, 1886, to June, 1887.

[Taken in the morning.]

Day of month.	1886.			1887.					
	October.	November.	December.	January.	February.	March.	April.	May.	June.
	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.
1		51	39	34	33	32	34	.....	54
2		52	36	34	33	32	34	30	56
3		52	36	33	32	33	34	38	56
4		52	32	32	32	33	34	38	55
5		52	33	34	32	33	34	38	54
6		52	34	34	32	33	34	42	56
7		50	33	34	32	33	34	43	58
8		40	34	35	32	33	33	42	58
9		44	30	32	33	34	34	44	58
10		48	33	32	33	34	35	44	57
11		50	30	32	34	33	34	42	57
12		46	30	34	34	33	34	43	57
13		42	30	33	33	33	34	43	57
14		44	34	31	33	34	34	44	.....
15		41	34	32	34	34	34	47	.....
16		41	33	32	34	34	34	48	.....
17		42	32	31	34	34	34	48	.....
18		42	32	32	34	34	34	50	.....
19		43	34	32	33	34	34	52	.....
20		42	34	31	33	34	35	54	.....
21		42	34	32	34	34	35	54	.....
22		42	34	34	32	34	34	53	.....
23		40	34	34	34	34	36	56	.....
24		40	34	34	34	33	36	56	.....
25		44	34	34	33	33	36	56	.....
26		40	34	34	34	33	35	56	.....
27		40	33	34	33	33	35	56	.....
28		38	34	32	33	34	35	54	.....
29		48	36	32	33	34	36	54	.....
30		50	36	34	33	34	36	55	.....
31		52	42	34	.....	34	36	55	.....
		50	.....	32	.....	34	.....	50	.....
Mean	59	44.3	34	33	33.1	33.4	34.5	48	56.4

BUCKSPORT, ME., November 8, 1887.