

XXIV.—THE ATLANTIC SALMON (*SALMO SALAR*).

A—REPORT ON THE COLLECTION AND DISTRIBUTION OF PENOBSCOT SALMON IN 1873-'74 AND 1874-'75.

BY CHARLES G. ATKINS.

1.—METHODS.

The modes employed in the collection of salmon-eggs at Bucksport in 1873 and 1874, and in their development and distribution, have been so closely like those of 1872-'73, fully described in the report for that season, that it will be simply necessary to specify the changes and new features introduced.

No changes were made in the mode of collecting breeding-fish from the weirs, save the larger use of boxes in bringing them together from the several weirs where they were caught to the boat wherein they were to be brought to Bucksport, and some improvement in the fittings of the transporting-boats and in the materials of the dipping-bags. The latter were at first made of cotton-duck, pierced by brass grommet-holes. Hemp was found to be superior to cotton, having greater flexibility, strength, and durability, but the brass grommets are still used.

At the pond, a much larger inclosure was made than in 1872, embracing about twelve acres at time of high water, and probably nine acres at low water, with an area of at least six acres 5 to 9 feet deep at the lowest stage. The 650 salmon inclosed in 1873 had therefore very nearly a square rod of deep water for each. For the brush-hedge, which proved so ineffectual in 1872, there was substituted a strong net, its top suspended on stakes and its lower edge held down by a heavy chain. Owing to the favorable natural contour of the pond, this large inclosure required a net only 640 feet long and about 13 feet deep. Within this inclosure, the arrangements for catching the salmon at the breeding-season were the same, with some extension, as before, and in 1874 nets were stretched along all the inclosed shores with the view of shutting them off from gravel to spawn on, that they might be more certain to enter the brook or the pounds and thus come within reach.

In the brook itself there was built a board sluice about 20 inches wide, rising and falling with the water, to lead the salmon directly from

the outlet-gate to the pens at the spawning-shed. This contrivance, for which we are indebted to Mr. Alfred Swazey, effected a great saving in the labor of collecting the fish, and in the eggs, of which a good many were formerly lost here when the fish had access to the gravelly bottom of the brook.

The arrangement of the hatching-house and apparatus has remained as shown in the cuts of the previous report.

In the mode of packing eggs for transportation, some change has been made. The apparatus which received the preference the former season consisted of tin boxes 5 or 6 inches in diameter and the same in depth, in which the eggs were placed in alternate layers with damp meadow-moss, disks of mosquito-net or similar material being placed above and beneath each layer of eggs to separate them from the moss and facilitate unpacking, the tins to be inclosed in boxes of sawdust to protect against frost. These tins have latterly been superseded by wooden trays, which afford a more expeditious and economical mode of packing. The trays mostly used have been 3 inches deep, and in length and breadth either 24 inches by 18 or 18 by 12. The larger size was found to be objectionable because it afforded room for the eggs to get out of place by the sliding of the mass of eggs and moss from side to side, when, as is often the case in transport, the boxes are carelessly allowed to ride upon their sides. This was remedied by dividing the trays by a partition in the middle; and in the smaller trays no serious trouble of that sort was experienced. The depth adopted was found to be sufficient to admit three or four layers of eggs in moss, separated, as before, by mosquito-net. When filled, the trays were placed in stacks, four or five deep, and secured together by strips of wood tacked on the sides, making a rectangular package easily fitted with an outside case and an intermediate space for sawdust. This package, when all complete, ready for shipment, holds from 5,000 to 10,000 eggs per cubic foot, and is at once the cheapest and most compact consistent with the safety of the eggs.

2.—PURCHASE OF BREEDING-SALMON.

3 (The run of salmon in the Penobscot in 1873 was better than average, though hardly so good as that of 1872. The weather prevailing in June was very favorable, and the catch of the weirs from which I was buying salmon was so large that the requisite number of breeders was secured in a very short time. The work of collection began June 7 and closed June 24; in the intervening sixteen working-days, 650 salmon were collected, being something over 40 per day. The best day's work was on the 16th, when 105 salmon were received and placed in the pond.

3 (In 1874, however, the weather and the supply of salmon were both against us, and we were engaged from June 9 to July 21, including

thirty-seven working-days, in collecting 601 salmon. In quality, however, the salmon of 1874 were superior to any received since the establishment was founded, being uncommonly stout and fat. This was more noticeable among those of the smaller class, which may be held to include all those under 15 pounds in weight. Among this class, the most common weights are, in ordinary seasons, 10 and 11 pounds, a few exceeding 12 or falling below 10 pounds. This year a very large number weighed 13 or 14 pounds apiece; while of 10-pound salmon and smaller there were far fewer than usual. This superiority in weight was also characteristic in a less degree of the salmon of 1873. The general average weight for three years was as follows:

Year.	Size of salmon.		
	When bought.	When used in spawning.	
	Weight.	Weight.	Length.
	<i>Pounds.</i>	<i>Pounds.</i>	<i>Inches.</i>
1872	12.3		
1873	13.28	12.23	32.24
1874	14.03	12.73	32.19

The weight at time of purchase was estimated; in the fall, it was obtained by weighing. It will be seen that the results correspond.

The extension of the period of collecting salmon to so late a date as July 24 was not from choice but from necessity. It was thought that there was a larger proportion of males among the salmon in the later than in the earlier part of the season; and since, at the best, we should have a surplus of that sex, it was considered very undesirable to increase their proportion. The result of the examination at the spawning-season, however, dispelled all fears on that score. The ratio of male fish was no larger than usual. Thus we had—

	Males, per cent.	Females, per cent.
In 1872	36.6	63.4
In 1873	33.9	66.1
In 1874	34.2	65.8

The mortality of salmon during and after transportation has become less each season. This is to be attributed largely to improved apparatus and modes of handling and greater care and skill on the part of the fishermen. As in the first season, the deaths of salmon occurred almost wholly immediately on arrival at the pond or within ten days thereafter. There is no evidence that the extreme heat of the water in the pond has had an injurious effect, though the observations show a much higher temperature than has been considered compatible with the

healthy existence of salmon. Between the 28th day of June and the 13th day of August, 1873, there were only five days when the water at the bottom of the pond stood below 70° Fahrenheit, and on one occasion, July 31, it rose as high as 76° Fahrenheit. Not only did no salmon die during this heated term, but at the succeeding spawning-season they came out in perfect condition, and yielded eggs of the highest degree of health and vigor.

The weather has been less favorable to spawning-operations than in 1872. There was less rain, and the water in the pond and brook was at a lower stage in 1873 and still lower in 1874. One of the results was that the salmon found the descent into the brook more difficult, and were more reluctant to try it. We were therefore compelled to resort more to pounds and seines for catching them. These were so far successful that a larger proportion of the salmon were caught than the first season. In 1873, the number unaccounted for was 111, quite a serious loss; but, in 1874, this number was reduced to 40, which is a very satisfactory result.

The process of spawning was conducted in the usual way, the dry method of impregnation being exclusively employed with the usual success. In 1873, a careful examination of the eggs showed the rate of impregnation to be 97 per cent. The following year the examination was less thorough, but indicated about the same rate. There was no material variation in the season. Spawning began in 1873 on the 27th of October, and in 1874 on the 31st of October. Each year the most of the eggs were taken before November 20, but small lots as late as the first week in December.

3.—DEVELOPMENT AND DISTRIBUTION.

In the winter of 1873 and 1874, the development of the eggs proceeded in a manner highly satisfactory. Up to the time of distribution, there were taken out, by count, 160,963 white eggs, or about 6½ per cent. of the entire stock. Since the unimpregnated eggs amounted to only 3 per cent., or 73,000, and some remained among those that were sent away, it is probable that about 100,000 of the white eggs had been impregnated. The cause of this death of impregnated eggs is not well understood. Rough handling will cause it, but when handled in the most careful manner there is still a percentage of white eggs. The shipment of the eggs was commenced February 11, and closed March 30. Including those retained at Bucksport to be hatched for the State of Maine, there were distributed 1,300,000 eggs on account of the United States Commission, and 991,675 on account of the several States interested, making a total of 2,291,675. If to this sum we add the total of the bad eggs rejected, 160,963, we find the original number to have been 2,453,638. At the time of taking them, however, they were estimated at only 2,321,934.

In 1874 and 1875, the eggs gave no sign of any defect until packing

for shipment was begun. It was then discovered that they did not resist the action of the atmosphere as well as usual. In a few hours after being taken from the water, even though enveloped in very damp moss, the outer shell was found to have shrunk. Some of the recipients of the packages remarked that the eggs were shrunk like raisins. In many cases, even on short journeys, a good many of the eggs burst open prematurely, and even of those that held together many were so injured that they died before hatching or soon after.* Nearly all the lots of eggs that were sent away suffered severely, and in the end so many of the young fish perished that the number set free in the rivers was but 56 per cent. of the number of eggs taken. Those that remained in the house at Bucksport until hatched succeeded much better than those sent away. About 266,000 eggs were left there, and 234,000 healthy young fish obtained from them; and the loss would have been smaller still had not there been among the eggs a few thousand that had been packed for shipment and afterward returned to the troughs.

So generally were the eggs affected that the malady cannot be attributed to any local cause in the hatching-house. The cause must have been one that operated on all the eggs this season and not at all in other seasons. Our observations show that the water used in the hatching-house, in which all the eggs developed, was, in November of this year, in an unusually low and turbid condition,—turbid with microscopic vegetation and saturated with solutions from the muddy bottom and shores of the pond,—was, in short, entirely unlike the clear new water that the autumn rains usually bring in before the close of October. In the action of this water on the eggs, either after spawning or before it had left the ovaries of the mother fish, it seems most reasonable to look for an explanation of the imperfect condition of the shells.† In all other respects, so far as known, these eggs had the same treatment as those of other years when they turned out healthy.

Measures were taken to guard against a similar misfortune the next season, by preparations for the development of the eggs in another place, commanding a supply of better water, should circumstances demand it; but fortunately the water was renewed by the wonted rains, and at the time of this writing it is late enough to say that the eggs and young fry of 1875 and 1876 were perfectly healthy.

The eggs taken in 1874 were estimated, when they were measured into the troughs, at 3,056,500; but the measurement at time of distribution showed 2,842,977 divided among the subscribers, and previous to that

* In examining some of these weak eggs that had been standing at rest, I discovered that the weakest place in the shell was in each case just over the eyes of the embryo, and at that point the shell gave way on application of pressure. I do not know how to explain this phenomenon, unless it be that the shell of the egg is in normal cases softened by some secretion of the embryo at the proper time for birth, and that in the defective specimens the secretion was simply exuded prematurely.

† It is to be noted that the parent fish showed no signs of disease at any time, being in the fall remarkably fine.

division there had been picked out 263,479 bad eggs, which would make the original number 3,106,456. I am inclined to think the former estimate is nearest to the truth; but as the latter has been used by all the recipients of eggs in estimating their balances, I have used it in the statement of hatching and distribution, to be given below.

4.—MARKING SALMON FOR FUTURE IDENTIFICATION.

At your suggestion, I undertook, in 1872, to mark the salmon that had been used as breeders and set free again in the river, so that something might be ascertained in relation to the length of their absence from the river, their rate of growth, &c.

The first mode adopted was the use of an aluminum tag about half an inch long and a quarter of an inch wide, stamped with a number which corresponded with a record showing the sex, length, and weight of the fish, and the date of liberation. This tag was at first attached to a rubber band that slipped on over the tail of the fish. This mode was quite defective, and led to no favorable results. Those bands that were loose probably slipped off, and those that were tight enough to stay on cut through the skin of the fish, and produced a wound that probably resulted in death. When the impracticability of this mode became manifest, it was abandoned, and the tag was attached to the rear margin of the first dorsal fin, where it would least interfere with the motion of the fish, and where the action of the latter in swimming would give it the least lateral motion, and it would therefore be least likely to wear out of its place. The attachment was by means of a piece of fine platinum wire passed through a hole in the tag, and by means of a needle through the edge of the fin, the ends being carefully twisted together and trimmed with scissors. This mode was exclusively employed in 1873, and was partially successful. The tags, to be sure, did not stay so long as was desired. Five or six months after the liberation of the salmon in the river, a good many specimens were taken with the tag still adherent, but of those that were taken a year and a half afterward not one was found with the tag on. Probably it was attacked by some destructive acid in the water and so softened that the wire on which it swung cut its way out and let it fall off. Some of the tags on salmon turned into the fresh pond were found after a while to be in a soft and brittle condition. The wire, however, remained in a good many cases, and the kind of wire and mode of attachment served to identify a number of salmon afterward caught as of the number marked and liberated in 1873.

The first marking was, as stated above, in 1872. In the spring of 1873, a reward was offered and thoroughly advertised among the fishermen, for the return of any tagged salmon, with statements of the time and place of capture. Not one was brought. In 1874, the offer was repeated, and was so far successful that twenty of the salmon turned out the preceding autumn were returned to me between the first of Janu-

ary and the first of June, mostly in April and May. These were, without exception, poorer than when turned out. They had evidently not been to their feeding-grounds, and had not even left the river. Twelve of them were caught above Bucksport, and nine of them at Veazie, above Bangor, 25 miles above Bucksport, at the head of the tide, and at the foot of the first dam, which alone, it seems, had prevented their ascending the river still higher. Only four out of the twenty had lost the tags, and those retained the wire. Of nine that were weighed, one had lost only eight ounces since November; the others had lost from one to two pounds. The males still retained the hook on the lower jaw, but it was smaller than in the autumn; the red spots on their sides, and the oculated spots on their backs were a good deal faded, but still distinctly visible; in their spermaries appeared to be the remains of last year's milt. The females were almost as bright and silvery as when in prime condition; in almost every case, they carried in their abdomens a few remaining eggs of the last litter, and in their ovaries appeared the germs of the next litter already well established, though exceedingly small. No food could be found in the stomachs of either sex.

In the autumn of 1874, no salmon were marked. In the spring of 1875, the offers of reward for the return of marked salmon were renewed. Any that could be returned at this time would have been absent for a year and a half. We were partially successful. Eight salmon were brought in and examined. They weighed from 16 to $24\frac{1}{2}$ pounds, and were from $34\frac{1}{2}$ to $40\frac{1}{2}$ inches long. There were four females, two males, and two not determined. All were in prime condition. One of the females was placed alive in the pond, and yielded in the fall about 11,500 eggs. As explained above, the tag itself had fallen off, so that we could not trace the individual salmon back to the record of liberation, but the wire was still there, and proved beyond doubt that these were the salmon liberated in November, 1873. In addition to these eight, there was a large male, weighing 24 pounds, found among the salmon in the pond at the spawning-season, making the whole number known to have been caught *nine*. There were reports of others having been taken and sent to market; and from the fact that a very close scrutiny was necessary to detect the presence of the wire, I am quite confident that a good many more were actually taken and escaped notice. However, enough were caught to establish the fact of their return this season, the second season since their liberation; and as none did return in prime condition or in breeding condition the first season, we may consider it pretty well established that the Penobscot salmon enter the river to breed only once in two years.

This experiment will be renewed with the substitution of a platinum tag for that of aluminum.

5.—SUMMARIES.

The following statement shows the number of salmon bought for breeding stock, and the number brought to hand in the spawning-season, for three years past :

Year.	Salmon bought.	Salmon brought to hand at spawning season.		
		Males.	Females.	Total.
1872.....	692	130	225	355
1873.....	650	143	279	422
1874.....	601	178	343	521
Sums.....	1,943	451	847	1,298

The following exhibits the number of salmon-eggs taken, lost, and distributed at Bucksport, and the number of young set free as the result of their hatching, for three years :

Year.	Eggs taken.		Eggs lost by count.	Eggs distributed.	Young salmon set free.
	First estimate.*	Second estimate.*			
1872.....	1,560,044	.....	.....	1,241,800	876,000
1873.....	2,321,934	2,453,638	160,963	2,291,175	2,064,445
1874.....	3,056,500	3,106,479	263,479	2,842,977	1,726,668
Sums.....	6,938,478	.....	.....	6,375,952	4,667,113

* The first estimate was obtained by measurement of the eggs at the time they were taken and placed in the hatching-troughs. The second estimate is obtained by adding the number known to have been thrown out to the number distributed among the subscribers. The discrepancy between the two estimates is, in 1873, nearly 6 per cent. of the original estimate; in 1874, less than 2 per cent.

TABLE I.—Statement of salmon bought alive at Bucksport in 1873.

Date.	Hour.	Whence received.	No. of salmon.	Weight of salmon.				Daily summary.				
				Several weights.				A. RETORATO.	A. AVERAGE.	Weights.		Date.
										Aggregate.	Average.	
				Pounds.	Lbs.	Lbs.	Lbs.	Lbs.	1873.			
1873.												
June 7	p.m.	J. W.	6	24, 12, 11, 11, 10, 9	77	12.83						
7	p.m.	A. H. W.	17	24, 22, 20, 20, 18, 14, 14, 12, 12, 11, 11, 11, 11, 10, 10	242½	14.25						
7	p.m.	A.	4	20, 18, 11, 9	58	14.50						
							27	377½	15.98	June 7		
9	a.m.	J. W.	4	19½, 12, 11½, 10	46	11.50						
9	a.m.	A. H. W.	5	20, 15, 14, 12, 11	72	14.40						
							9	118	13.11	June 9		
10	a.m.	J. A. W.	4	12, 15, 15, 12	60	15.00						
10	p.m.	J. A. W.	4	19, 15, 14, 11	59	14.75						
							8	119	14.67	June 10		
11	a.m.	A. H. W.	13	22, 20, 18, 19½, 19½, 12, 12, 11, 11, 11, 11, 11, 11	175	13.46						
11	a.m.	J. W.	6	18, 17, 17, 11½, 10, 6	77½	12.91						
11	a.m.	A.	11	17, 16, 13, 13, 12, 12, 10, 10, 10, 9	132	12.00						
							30	384½	12.82	June 11		
12	a.m.	J. A. W.	2	20, 12	32	16.00						
12	p.m.	J. A. W.	3	19, 12, 10	41	13.66						
12	a.m.	A.	6	16, 14, 10, 10, 10, 10	70	11.66						
12	a.m.	A. H. W.	16	21, 20, 20, 19, 12, 15, 15, 12, 12, 12, 11, 11, 11, 10, 10	229	14.31						
12	a.m.	J. W.	9	17, 12, 12, 12, 11½, 11, 11, 10	102½	12.06						
							36	480½	13.35	June 12		
13	a.m.	A.	11	22, 20, 19, 13, 13, 13, 12, 11, 10, 10, 9	152	13.82						
13	a.m.	A. H. W.	8	22, 18, 12, 11½, 11½, 11, 10, 9½	105½	13.19						
13	a.m.	J. W.	4	12½, 12, 11, 11	46½	11.62						
13	p.m.	J. A. W.	2	22, 12	34	17.00						
							25	398	13.52	June 13		
14	11 a.m.	A.	9	22, 21, 15, 14, 12, 10, 10, 10, 9	123	13.66						
14	12 m.	A. H. W.	14	22, 20, 15, 14, 12, 12, 11, 11, 11, 10, 10, 10, 10	178	12.71						
14	12 m.	J. W.	13	22, 21, 19½, 18½, 12, 12, 11½, 11, 11, 10½, 10, 8, 7	174	12.38						
14	6 p.m.	J. A. W.	6	20, 13, 12, 12, 10, 10	77	12.83						
							42	552	13.14	June 14		
16	8 a.m.	J. A. W.	10	20, 18, 14, 14, 12, 12, 12, 10, 10, 9	131	13.10						
16	1 p.m.	A.	36	23, 22, 21, 21, 20, 20, 20, 12, 14, 18, 14, 13, 13, 13, 13, 12, 12, 12, 12, 12, 12, 11, 11, 10½, 10, 10, 10, 9, 9, 8, 8, 8, 8, 7	482½	13.40						
16	2 p.m.	A. H. W.	25	21, 20, 20, 20, 18, 15, 13, 13, 12, 12, 11, 11, 11, 11, 10, 10, 10, 10, 10, 9½, 9, 9	317½	12.70						
16	2 p.m.	J. W.	21	23½, 22, 21, 20, 20, 15, 14½, 13, 12½, 12½, 12½, 12, 11½, 11½, 11, 11, 10, 8	306½	14.50						
16	3.30 p.m.	J. A. W.	13	20, 20, 20, 14, 13, 12, 12, 11, 11, 10, 10, 10, 9	171	13.15						
							105	1,406½	13.39	June 16		

THE ATLANTIC SALMON.

TABLE I.—Statement of salmon bought alive at Buckport in 1873—Continued.

Date.	Hour.	Whence received.	No. of salmon.	Weight of salmon.		Daily summary.				
				Several weights.		Aggregate.	Average.	Weights.		Date.
				Lbs.	Lbs.			Aggregate.	Average.	
1873.				<i>Pounds.</i>						
June 17	6 a.m.	J. A. W.	4	19, 16, 11, 10.	56	14.00				
17	2 30 p.m.	J. W.	19	19, 15, 14, 13, 13, 12, 12, 12, 12, 12, 12, 11, 11, 11, 11, 10, 10, 10.	236	12.42				
17	3 p.m.	A. H. W.	18	21, 20, 20, 18, 15, 13, 12, 12, 12, 12, 11, 11, 11, 11, 10, 10, 10.	230	12.78				
17	3 p.m.	A.	24	22, 18, 18, 18, 16, 14, 13, 13, 13, 12, 12, 12, 12, 11, 11, 11, 10, 10, 10, 10.	310	12.92				
18	5 30 a.m.	J. A. W.	6	17, 13, 12, 12, 10, 10.	74	12.33	65	841	12.94	June 17
18	3 p.m.	A.	18	22, 21, 21, 20, 20, 18, 15, 14, 14, 12, 12, 12, 12, 11, 11, 10.	277	15.39				
18	3 p.m.	J. W.	12	21, 13, 12, 12, 12, 12, 12, 12, 11, 11, 8.	140	12.46				
18	3 p.m.	A. H. W.	11	15, 13, 13, 13, 12, 12, 11, 11, 11, 10.	131	11.95				
19	a.m.	J. A. W.	2	13, 12.	25	12.50				
19	4 p.m.	A. H. W.	10	21, 20, 15, 13, 12, 10, 12, 11, 11, 10.	137	13.75				
19	4 p.m.	J. W.	6	22, 13, 12, 12, 11, 10.	81	13.52				
19	4 30 p.m.	A.	6	20, 20, 14, 14, 12, 11.	91	15.16				
20	5 p.m.	A. H. W.	9	15, 13, 12, 12, 12, 11, 10, 10, 10.	105	11.72	24	335	13.36	June 19
20	5 p.m.	J. W.	10	20, 14, 13, 13, 12, 11, 11, 10, 9.	125	12.50				
20	5 p.m.	A.	18	18, 14, 12, 12, 12, 12, 12, 11, 11, 11, 11, 10, 10, 10, 9.	208	11.55				
21	6 a.m.	J. A. W.	6	20, 18, 14, 14, 12, 12.	90	15.00				
21	7 a.m.	A. H. W.	25	21, 20, 18, 15, 15, 14, 14, 13, 13, 13, 12, 12, 12, 12, 11, 11, 11, 11, 10, 10.	329	13.16				
21	1 30 p.m.	J. A. W.	4	21, 20, 14, 14.	69	17.25				
21	3 p.m.	A.	21	22, 20, 20, 15, 12, 12, 12, 12, 12, 12, 11, 11, 10, 10, 10, 10.	206	12.66				
21	6 p.m.	A. H. W.	15	20, 18, 13, 13, 13, 12, 12, 12, 12, 11, 11, 10, 10, 10.	193	12.87				
21	6 p.m.	J. W.	16	24, 23, 15, 14, 13, 13, 13, 13, 12, 12, 11, 11, 10, 10.	224	14.00				
23	9 a.m.	A. H. W.	22	20, 16, 15, 15, 14, 14, 13, 13, 13, 12, 12, 12, 12, 11, 11, 11, 10, 10, 10.	280	12.72	67	1,171	13.46	June 21
23	9 a.m.	J. W.	7	14, 13, 12, 11, 11, 10.	83	11.86				
23	10 a.m.	A.	14	22, 18, 12, 12, 12, 12, 12, 11, 11, 10, 10, 10.	174	12.43				
23	4 p.m.	J. A. W.	2	20, 13.	33	16.50				
24	5 a.m.	J. A. W.	11	22, 20, 19, 15, 13, 12, 12, 12, 11, 10.	153	14.36				
24	11 a.m.	A. H. W.	37	22, 22, 18, 18, 15, 15, 15, 13, 13, 13, 12, 12, 12, 12, 12, 12, 12, 11, 11, 11, 10, 10.	487	13.16	43	570	13.26	June 23
24	11 a.m.	J. W.	2	19, 14.	33	16.50				
24	11 a.m.	A.	15	18, 18, 15, 14, 13, 12, 12, 11, 11, 11, 10, 10, 10.	188	12.53				
				Total	650	8,629	65	866	13.32	June 24

TABLE II.—Statement of salmon bought alive at Bucksport in 1874.

Date.	Hour.	Whence received.	No. of salmon.	Weight of salmon.		Daily summary.														
				Several weights.		Aggregate.	Average.	No. of salmon.	Weights.		Date.									
				Pounds.					Aggregate.	Average.										
1874, June 9					<i>Lbs.</i>	<i>Lbs.</i>														
10	p. m.	J. A. W.	6	26, 25, 14, 13, 13, 12½	103½	17.25	6	103½	17.25	1874, June 9										
10	p. m.	A. H. W.	14	24, 21, 13, 12½, 12, 12, 12, 11½, 11, 11, 11, 10½, 10, 10	181½	12.96														
10	p. m.	J. W.	6	24, 21, 16, 11½, 11½, 11	95	15.83														
10	p. m.	J. A. W.	2	23, 13	36	18.00														
11		A.	10	22, 13, 12, 12, 12, 11, 11, 10, 10, 9	132	12.20	22	312½	14.20	June 10										
11		A. H. W.	15	23, 20, 18, 13, 12½, 12, 12, 11½, 11, 11, 11, 11, 10, 10	197	13.13														
11		J. W.	2	20, 11	31	15.50														
11		J. A. W.	5	15, 14, 13, 12½, 11	65½	13.10														
11		A. H. W.	5	20, 13, 12½, 12, 10	67½	13.50														
11		J. W.	14	23, 18, 15½, 14½, 14½, 14, 13½, 13, 12, 12, 11½, 11½, 11, 10	194	13.86														
12		A. H. W.	5	25, 24, 13, 12½, 11	85½	17.10	51	77	13.27	June 11										
12		J. W.	3	20, 11½, 10½	42	14.00														
12		A.	8	17, 14, 14, 12, 12, 12, 11, 9	101	12.62														
13	a. m.	A. H. W.	9	25, 24, 22, 13, 12½, 10½, 10, 10, 10	137	15.22	16	222½	14.28	June 12										
13	a. m.	J. W.	4	19½, 11½, 10½, 10	51½	12.87														
13	4 p. m.	J. A. W.	2	12, 10½	23	11.25														
13	7 p. m.	A. H. W.	8	21, 14, 13, 12½, 11, 11, 10, 10	103½	12.94														
13	7 p. m.	J. W.	12	24, 23, 22, 20, 12½, 11½, 11, 11, 11, 10½, 10, 10	177½	14.79														
13	7 p. m.	A.	6	22, 21, 12, 12, 11, 10	88	14.67														
15	5 a. m.	J. A. W.	4	24, 21, 20, 14	79	19.75	41	560	14.15	June 13										
15	9.40 a. m.	A. H. W.	15	20, 16, 15, 15, 14, 13, 13, 13½, 12, 12, 12, 12, 11, 10½, 10	198	13.20														
15	9.40 a. m.	J. W.	6	13, 12½, 12, 11½, 11, 10½	70½	11.75														
15	10.10 a. m.	A.	6	22, 15, 14, 12, 11½, 11	85½	14.25														
16	10.30 a. m.	A.	10	23, 22, 15, 14, 14, 13, 12, 12, 12, 11	148	14.80	31	433	13.97	June 15										
16	11 a. m.	A. H. W.	7	25, 24, 23, 20, 12, 12, 11½	127½	18.21														
16	11 a. m.	J. W.	3	24, 12½, 10	45½	15.17														
16	6 p. m.	J. A. W.	7	25, 21, 20, 15, 12½, 12½, 10	116	16.57														
17	11 a. m.	A. H. W.	7	13, 12, 12, 12, 11½, 11, 10	81½	11.64	27	437	16.19	June 16										
17	11 a. m.	J. W.	13	21, 20, 20, 15, 14, 13½, 13, 12½, 12½, 12, 12, 12, 11½	182	14.77														
17	12 m.	A.	8	22, 20, 15, 14, 12, 12, 11, 9	116	14.50	28	369½	13.91	June 17										

THE ATLANTIC SALMON.

TABLE II.—Statement of salmon bought alive at Bucksport in 1874—Continued.

Date.	Hour.	Whence received.	No. of salmon.	Weight of salmon.				Daily summary.				
				Several weights.				Aggregate.	Average.	Weights.		Date.
				Pounds.						Aggregate.	Average.		Aggregate.	Average.
1874.					Lbs.	Lbs.	Lbs.	Lbs.	1874.			
June 18	12.30 p.m.	A.	12	23, 21, 20, 19, 13 $\frac{1}{2}$, 12 $\frac{1}{2}$, 12, 11, 11, 11, 9	175	14.58						
18	1 p.m.	A. H. W.	17	24, 24, 23, 20, 15, 14, 13, 13, 13, 13, 12 $\frac{1}{2}$, 12 $\frac{1}{2}$, 12, 12, 11, 10	254	14.94						
18	1 p.m.	J. W.	13	22, 21, 20, 20, 14, 13 $\frac{1}{2}$, 12, 12, 12, 11 $\frac{1}{2}$, 11, 11, 11	191	14.69						
18	8.30 p.m.	J. A. W.	4	23, 19, 12, 11	65	16.25						
18	8.30 p.m.	R. A.	1	18	18	18.00						
							47	703	14.95	June 18		
20		J. A. W.	6	27, 24, 14, 12 $\frac{1}{2}$, 10	99 $\frac{1}{2}$	16.58						
20		A. H. W.	13	24, 22, 21, 20, 18, 14, 13 $\frac{1}{2}$, 12, 12, 11 $\frac{1}{2}$, 11, 10, 10	198	15.23						
20		J. W.	8	27, 22, 21, 16, 14, 13 $\frac{1}{2}$, 13, 11	137 $\frac{1}{2}$	17.19						
20		A.	7	21, 21, 15, 14 $\frac{1}{2}$, 12 $\frac{1}{2}$, 11, 10	107	15.29						
							34	542	15.94	June 20		
22	12 m	J. A. W.	6	12 $\frac{1}{2}$, 12 $\frac{1}{2}$, 11, 10, 10, 9	65	10.83						
22	3.30 p.m.	A. H. W.	5	12 $\frac{1}{2}$, 12, 12, 12, 11	50 $\frac{1}{2}$	11.90						
22	3.30 p.m.	J. W.	2	25, 13	38	19.00						
							13	102 $\frac{1}{2}$	12.50	June 22		
23		A. H. W.	4	20, 13, 10, 9	52	13.00						
23		J. W.	5	18, 16, 14 $\frac{1}{2}$, 14 $\frac{1}{2}$, 13	76	15.20						
23		A.	8	19, 15, 14, 14, 13, 12, 11	111	13.87						
							17	239	14.06	June 23		
24		J. A. W.	4	22, 13, 12, 9	56	14.00		56	14.00	June 24		
25	7 a.m.	A. H. W.	9	22, 20, 15, 14, 13, 12 $\frac{1}{2}$, 12, 11 $\frac{1}{2}$	132	14.66						
25	7 a.m.	J. W.	7	22, 19, 18, 15, 12 $\frac{1}{2}$, 12, 11 $\frac{1}{2}$	110	15.71						
25	2 p.m.	J. A. W.	3	22, 19, 14	55	18.33						
							19	297	15.63	June 25		
26	9 a.m.	A.	10	16, 14 $\frac{1}{2}$, 14, 13, 12, 12, 11 $\frac{1}{2}$, 11, 10	127	12.70						
26	3 p.m.	J. A. W.	5	23, 21 $\frac{1}{2}$, 14, 12, 11	84 $\frac{1}{2}$	16.30						
							15	207 $\frac{1}{2}$	13.90	June 26		
27	9 a.m.	A. H. W.	12	15, 14, 13, 13, 12, 12, 12, 12, 11, 11, 9	146	12.17						
27	9 a.m.	J. W.	6	22, 13 $\frac{1}{2}$, 12, 11 $\frac{1}{2}$, 11 $\frac{1}{2}$, 10	80 $\frac{1}{2}$	13.42						
							18	236 $\frac{1}{2}$	12.58	June 27		
29	7 a.m.	J. A. W.	4	12 $\frac{1}{2}$, 12 $\frac{1}{2}$, 12, 10	47	11.75						
29	9.30 a.m.	A.	9	20, 15, 14, 13 $\frac{1}{2}$, 12 $\frac{1}{2}$, 12, 11, 10	120	13.33						
29	9.30 a.m.	A. H. W.	12	20, 16, 15, 13, 13, 13, 12 $\frac{1}{2}$, 12, 11, 11, 10, 10	156 $\frac{1}{2}$	13.04						
29	9.30 a.m.	J. W.	9	21, 13, 13, 12 $\frac{1}{2}$, 12 $\frac{1}{2}$, 12 $\frac{1}{2}$, 12, 11 $\frac{1}{2}$, 11	121	13.44						
							34	444 $\frac{1}{2}$	13.07	June 29		
30	10 a.m.	A. H. W.	4	19, 16, 16, 12	63	15.75						
30	10 a.m.	J. W.	5	15 $\frac{1}{2}$, 14, 13 $\frac{1}{2}$, 12 $\frac{1}{2}$, 11 $\frac{1}{2}$	67	13.40						
							9	130	14.44	June 30		

July 1	11 a.m.	A.	8	19, 16, 15, 14, 12, 12, 11, 10	108	13.50				
1	11 a.m.	A. H. W.	8	20, 20, 15, 13, 12, 12, 11	116	14.50				
1	11 a.m.	J. W.	6	23, 21, 19, 13, 12, 11, 8	101	16.83				
1	5 p.m.	J. A. W.	3	12, 12, 10	34½	11.50				
2	11.30 a.m.	A.	5	23, 20, 14, 12, 11	80	16.00	25	359½	14.38	July 1
3	12 m.	A.	8	16, 12, 12, 12, 11, 11, 10, 10	97	12.12	5	80	16.00	July 2
3	12 m.	J. W.	9	22, 13, 13, 12, 11, 11, 11, 8	114½	12.72				
3	12 m.	A. H. W.	14	19, 16, 15, 14, 12, 13, 13, 13, 12, 12, 11, 11	188	13.43				
4	12 m.	A. H. W.	5	22, 16, 14, 13, 12	77	15.40	31	360½	12.59	July 3
4	12 m.	J. W.	5	23, 22, 15, 12, 12	84½	16.30				
6		J. A. W.	2	12, 8	20	10.00				
6		A. H. W.	6	16, 13, 12, 12, 11, 11	76	12.66				
6		J. W.	6	13, 12, 12, 11, 10, 10	69½	11.58				
7	3 p.m.	A. H. W.	1	14	14	14.00				
7	3 p.m.	J. W.	10	23, 14, 13, 12, 12, 12, 11, 11, 11	133	12.30				
7	3 p.m.	J. A. W.	1	12, 8	12½	12.50				
7	4 p.m.	A.	6	14, 12, 12, 11, 11, 10	70½	11.75				
8		A. H. W.	9	22, 15, 14, 13, 13, 12, 12, 11, 11	123	13.66				
8		J. W.	8	13, 12, 12, 11, 11, 10, 10, 10	91	11.37				
10		J. W.	3	20, 13, 11	44	14.66				
10		A. H. W.	4	22, 13, 12, 9	56	14.00				
10		A.	5	12, 13, 11, 10, 10	63	12.60				
14		J. A. W.	4	23, 16, 13, 11, 11	63	15.75				
14		A. H. W.	3	19, 18, 11	48	16.00				
15		J. W.	3	22, 18, 11, 11	51½	17.16				
15		A.	9	12, 12, 12, 11, 11, 10, 10, 10, 9	97	10.77				
18		A. H. W.	5	12, 13, 12, 12, 11	67	13.40				
18		J. W.	4	12, 12, 12, 12	49	12.25				
18		A.	3	17, 13, 11	41	13.83				
21		A. H. W.	5	13, 12, 12, 11, 11	59	11.80				
21		J. W.	1	10, 8	10½	10.50				
Total					601	8,429½	14.03			

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TABLE III.—Statement of salmon examined and eggs obtained in October, November, and December, 1873.

Date.	Salmon caught.			Condition of females.				Eggs obtained.	
	Males.	Females.	Total.	Unripe.	Ripe.	Spent.	Total examined.	Weight.	Approximate number.
1873.								Lbs. oz.	
Oct. 20.....	4	5	9						
21.....	4	8	12						
27.....				8	5		13	4 14	41,000
28.....	1	4	5		4		4	17 0	45,300
29.....	1	3	4		3		3	9 3	27,000
30.....	5	9	14		9		9	35 2	104,500
31.....	15	20	35	1	19		20	59 9	174,400
Nov. 1.....	6	6	12		6		6	29 3	84,600
3.....	3	8	11		8		8	26 15	80,600
4.....	0	8	8		8		8	30 8	84,200
5.....	0	7	7		7		7	19 5	56,700
6.....	1	8	9		8		8	25 13	74,800
7.....	4	5	9		5		5	5 13	16,500
8.....	28	64	92		65	2	67	214 0	603,300
9.....	2	5	7						
10.....	1	8	9		11	1	12	43 3	118,900
11.....	1	10	11		8		8	23 14	71,400
12.....	4	21	25		19	2	21	58 2	158,000
13.....	36	34	70		27	4	31	85 7	243,200
14.....	5	9	14		14	3	17	39 14	109,000
15.....	1	6	7		4	1	5	13 6	37,800
17.....								2	400
18.....	5	7	12		5	2	7	17 7	46,000
19.....	10	9	19		2		2	8 12	24,700
20.....	1	4	5		10		10	24 0	70,000
22.....	2	2	4		1		1	2 0	5,300
25.....	2	2	4		1	2	3	3 2	9,500
26.....	1	5	6		2		2	10 3	28,000
Dec. 3.....	0	2	2		1	2	3	3 13	10,600
4.....								1	234
Sums.....	143	279	422	9	249	19	277	820 15	2,321,934

TABLE IV.—Statement of salmon examined and eggs obtained in October, November, and December, 1874.

Date.	Salmon caught.			Condition of females.				Eggs obtained.	
	Males.	Females.	Total.	Unripe.	Ripe.	Spent.	Total examined.	Weight.	Approximate number.
1874.								<i>Lbs. oz.</i>	
Oct. 31	44	80	124	23	52		80	157 6	431,700
Nov. 2	37	51	88	9	42		51	122 3	342,000
3	8	18	26	1	17		18	64 4	170,000
4	32	42	74		42		42	122 84	351,000
5	7	12	19		12		12	145 14	375,000
6	4	12	16		12		12	47 11	126,000
7	11	31	42		31		31	110 3	282,000
9	8	21	29		21		21	87 13	222,000
10	10	12	22		12		12	55 04	150,000
11	10	17	27		16	1	17	66 24	189,300
12	1	16	17		15	1	16	21 7	59,000
13	1	11	12		11		11	78 9	196,000
14	0	1	1		1		1		
15	1		1						
16	1		1						
17	0	3	3		3		3	15 2	38,000
18	0	1	1		1		1		
19	1	2	3		2		2		
20	0	4	4		4		4	10 1	24,500
21	0	3	3		3		3		
22	2	2	4		2		2		
23	0	1	1		1		1	26 4	60,500
25	0	1	1		1		1	3 14	9,000
28	0	1	1		1		1	2 10	7,000
Dec. 1	0	1	1						
2					1		1	4 64	12,000
8								2 0	5,500
Sums	178	343	521	38	303	2	343	1,147 104	3,056,500

TABLE V.—Statement of measurement of salmon in October, November, and December, 1873.

Date.	Measurement of males.								Measurement of females.													
	Number measured.	Weight in pounds.				Length in inches.				Number measured.	Weight before spawning, in pounds.*				Weight after spawning, in pounds.†							
		Aggregate.	Average.	Heaviest.	Lightest.	Aggregate.	Average.	Longest.	Shortest.		Aggregate.	Average.	Heaviest.	Lightest.	Aggregate.	Average.	Heaviest.	Longest.	Shortest.			
Oct. 23	1	15½	15.25	15½	15½	39	39.	39	39	5	63.3	12.66	17.7	9.4	147½	9.50	13½	7	162	32.4	35½	29
29	1	6	6.50	6½	6½	31½	31.5	31½	31½	3	35.7	11.97	18.6	8.2	26½	8.83	14	6	58	32.7	37	26
20	4	52	13.	20½	9	19½	31.6	40½	31	11	134.1	12.19	19.4	9.	99	9.	14½	61	352	32.5	38	30
31	21	26½	13.67	21½	10	716	34.1	39½	31	20	257.1	12.81	19.2	8.7	193½	9.92	14½	64½	640	32.3	37½	26
Nov. 1	6	77	12.83	15	10½	159	33.2	34½	34	9	110.5	13.81	21.4	10.5	87½	10.91	16	63	200	32.5	37	26
3	5	50½	10.10	12	8	160	32	33½	29½	9	98.1	10.90	17.2	8.9	73½	8.39	12½	69	128	31.4	36	26
4										9	106.5	11.63	17.4	8.6	74½	8.72	12½	68	92½	31.4	36	26
5										7	72.9	10.41	11.9	8.9	51	7.71	8½	7	215½	30.8	32½	26
6	1	10½	10.50	10½	10½	33	33.	33	33	8	97.0	12.12	19.4	8.8	73	9.12	15	64	25½	32.2	36	26
7	2	21½	10.75	11½	10	64½	32.2	33½	31	2	21.3	10.65	10.7	10.6	15½	7.75	8	73	61½	30.7	31½	26
8	27	316½	11.72	23	8	883½	32	36½	24½	66	296.5	13.61	22.2	12.2	68½	10.37	16½	61	2,145	32.5	32	26
10	4	47	11.75	20	8	133	31.2	40	30	12	119.7	9.97	14.8	7.9	82	7.33	10½	5	306	30.5	33½	26
11	1	9½	9.5	9½	9½	32	32.	32	32	8	29.9	11.24	17.8	8.9	66	8.25	13½	64	250½	31.7	37	26
12	4	32½	9.62	11	8	127½	31.9	31	30½	21	238.1	11.34	19.1	7.9	189	8.57	14½	6	672	32.0	37	26
13	30	320½	12.66	23½	8	957½	33.2	40½	29½	31	360.0	11.61	12.6	7.3	274½	8.65	14	6	960½	31.3	36½	26
14										17	174.8	10.28	12.6	7.1	142	8.35	10	7	1144	30.3	32	26
15	1	12½	12.5	12½	12½	33½	33.5	33½	33½	5	61.9	12.38	21.4	9.1	49½	9.70	15½	7	160½	32.1	37	26
18										7	90.4	12.91	20.2	7.8	73	10.43	15½	7	233	31.3	37	26
19										2	32.0	11.	11.5	10.5	15½	7.75	8	73	62½	31.2	31½	21
20										10	111.5	11.15	14.9	9.	87½	8.75	13	7	318	31.8	37	21
23										1	9.	9.	9.0	9.	7	7.	7	7	30½	30.5	30½	30
25										3	27.1	9.03	10.1	8.2	24	8.	8½	73	9½	31.2	33	30
26										2	37.7	18.85	18.2	18.2	27½	13.75	14	13½	75	32.5	37½	24
Dec. 3										3	25.8	8.60	11.4	7.3	22	7.33	8	6	89½	29.8	31	28
Sums	108	1,334½	12.36	23	6½	3,576½	33.13	40½	24½	270	3,262.9	12.08	22.2	7.9	12,495½	10.24	16½	5	8,608	31.88	33	28

*On November 8, and on nearly every day from that date to the close of the season, there were among the females examined some that had dropped a portion of their eggs. These are included in the measurements, and of course somewhat reduce the aggregate and average weight before spawning for those dates and in the summary. The figures for all dates previous to November 8 represent the true gross weights for that period, and their average is found to be 12.14.

†The figures given as "Weight after spawning" represent the weight immediately after the first or main spawning. A very small quantity, averaging not far from 1½ ounces of eggs, remained in the ovaries of each female, to be taken out at a subsequent manipulation. Strict accuracy requires, therefore, that an allowance should be made on this account. The total weight of these residual eggs during the season was about 30 pounds, which indicates a reduction of about 12 thousandths on all the figures in the columns of weight after spawning. This gives us a general average of 9.13 pounds instead of 9.21 pounds.

‡The females thus marked had dropped part of their eggs, and the figures given are therefore less than their true gross weights.

TABLE VI.—Statement of the measurement of salmon in October, November, and December, 1874.

Date.	Measurement of males.								Measurement of females.													
	Number measured.	Weight in pounds.				Length in inches.				Number measured.	Weight before spawning, in pounds.*				Weight after spawning, in pounds.							
		Aggregate.	Average.	Heaviest.	Lightest.	Aggregate.	Average.	Longest.	Shortest.		Aggregate.	Average.	Heaviest.	Lightest.	Aggregate.	Average.	Heaviest.	Lightest.				
1874.																						
Oct. 31.....	44	582½	13.24	26½	9	1,422	32.5	41	29	52	679.2	13.06	21.7	9.1	525	10.09	16	7	1,642½	31.7	39	29
Nov. 2.....	37	501	13.54	22	9½	1,216	32.9	40	29½	42	553.4	13.70	23.9	9.6	449	10.66	18	4	1,336	31.8	37	25
3.....	5	504	10.10	12½	9	1,594	31.9	34	31	17	199.4	11.73	20.3	8.4	146½	8.62	15½	6	568	31.6	35½	24½
4.....	32	372	11.62	24	9	1,642	32.6	41	30½	42	477.5	11.37	21.4	7.4	355	8.45	15½	5½	1,300	30.9	37	26½
5.....	4	424	10.62	12½	9½	1,28	32	35	30	40	527.1	13.12	22.3	7.4	392	9.80	15½	5½	1,304½	32.7	38	28½
6.....	4	514	12.47	22	9½	1,33	32.2	39	31	12	167.1	13.92	22.1	9.9	124½	10.29	16½	7½	394	32.5	39	29
7.....	11	121½	11.05	18	8½	355½	32.3	38	30½	31	401.7	12.96	22.5	8.4	291½	9.40	10½	6	996	32.2	38	28½
9.....	8	169	12.50	21	9	270½	33.8	40	31	21	297.6	14.17	23.9	9.1	216½	10.31	18	7	624	32.6	38	28½
10.....	8	74	9.44	11	8	233½	31.7	33	31	12	207.5	11.53	19.7	8.2	152½	8.47	14½	6	572½	31.8	38	29
11.....	10	164½	10.45	11½	9½	354½	32.3	33½	30½	19	241.6	12.71	21.5	8.7	180½	9.53	15½	6½	611½	31.6	38	29½
12.....	1	11	11	11	11	33	33	33	33	5	80.9	16.12	21.2	9.9	59½	11.90	15½	7	174	34.8	38	21
13.....										21	252.8	13.61	20.6	6.6	202½	9.90	15	5	691	32.9	38	27½
17.....	3	30	10.	11½	7½	94	32.8	34	32	5	51.4	10.42	12.2	7.7	31	7.70	9	6½	154	30.9	23½	29
20.....	1	6	6.	6	6	29	21.5	20½	20½	4	49.	12.50	13.5	9.4	39½	9.87	13½	7½	130½	32.6	37	30
21.....	2	29½	14.75	19	10½	71½	35.7	39	32½	10	118.7	11.27	18.6	7.3	92½	9.25	15	6	323	32.3	37	29½
25.....										1	16.4	16.40	16.4	16.4	12½	12.50	12½	12½	38	32	38	38
28.....										1	15.1	15.10	15.1	15.1	15½	12.50	12½	12½	36	36	36	36
Dec. 2.....										1	17.9	17.90	17.9	17.9	13½	13.50	13½	13½	37	37	37	37
Sums.....	171	2,078	12.15	26½	6	5,544½	32.4	41½	29	342	4,409.3	12.29	23.9	6.6	13,309	10.67	18	5	10,922½	32.1	38	27½

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* On November 11, and on nearly every day from that date to the close of the season, there were among the females examined some that had dropped a portion of their eggs: these are included in the measurement, and of course somewhat reduce the aggregate and average "weight before spawning" for those dates and in the summary. The figures for all dates previous to November 11 represent the true gross weights for that period, and their average is found to be 12.53 pounds.

† The weight of spawn taken from these fish after this weighing was, for the whole season, 40 pounds 2½ ounces. Deducting this, we have, for the corrected average weight after spawning, 9.56 pounds instead of 9.67 pounds.

TABLE VII.—Statement of hatching and distribution of Penobscot salmon, winter and spring of 1874.

State.	Place of hatch- ing.	In charge of hatching.	Number of eggs received.			Number of young salmon distributed.	Waters stocked.	Tributaries in which young salmon were placed.	Locality.	Number of fish set free.						
			Allotted by United States.	From other sources.	Total.											
Maine	Bucksport	C. G. Atkins	131,000		131,000	165,000	Penobscot River	{ Baskahegan River ...	Eaton and Danforth ...	50,000						
								{ Passadumkeag River.	Passadumkeag ...	10,000						
								{ Salmon Stream ...		25,000						
								{ Sebouis Stream ...	{ Whitney Ridge ...	25,000						
									{ Howland ...	25,000						
	Sebec Lake	H. L. Leonard	50,000		50,000	45,000	do	{ Pleasant River ...	{ Milo ...	15,000						
									{ Brownville ...	15,000						
									{ Piscataquis River ...	Dover ...	25,000					
									{ Ship Pond Stream ...		25,000					
											25,000					
Dobois Stream	G. L. F. Ball	11,000	14,000	25,000	22,000	Saint Croix River	{ Dobois Stream ...		2,000							
							Pembroke	J. N. Whitman	10,000	10,000	8,613	Penmaquan River	{ Penmaquan Lake ...	Charlotte ...	8,613	
														{ Waldoborough ...		23,000
														{ Saint George River ...	Warren ...	24,000
Waldoborough	F. M. Everleth	93,300	93,300	76,000	do	Androscoggin River	{ Swift River ...	Dixfield ...	30,000							
								{ Self ...	do	65,832						
New Hampshire	Meredith	W. W. Fletcher	50,000	211,500	261,500	250,000	Connecticut River	{ Headwaters ...	In New Hampshire	250,000						
									{ White River ...	Royalton, Vt. ...	15,000					
Vermont	Charlestown, N. H.	L. Stone	125,000	36,000	161,000	150,000	do	{ Lamoille River ...	Georgia, Vt. ...	70,000						
									{ Dog River ...	Northfield, Vt. ...	60,000					
									{ Self ...	Charlestown, N. H. ...	5,000					
Massachusetts	Winchester	E. A. Brackett	100,000	173,500	273,500	270,000	do	{ Headwaters and tribu- taries.	In New Hampshire	270,000						
Rhode Island	Ponaganset	J. H. Barden	75,000	142,775	217,775	189,000	{ Blackstone River ... Paucatuck River ... Pawtuxet ...	{ Slakersville Branch ...	14 places ...	12,000						
										18 places ...	45,000					
										28 places ...	132,000					
Connecticut	Westport	E. M. Lees	175,000	180,000	355,000	318,000	Connecticut River	{ Passumpsic tributa- ries.	{ Wheelock, Vt. ...	20,000						
									{ Concord, Vt. ...	10,000						
									{ Barnet, Vt. ...	60,000						
									{ Melndoe's Falls ...	50,000						
									{ Newbury, Vt. ...	50,000						
									{ Bradford, Vt. ...	8,000						
									{ Saxton River ...	10,000						
									{ Quohaug River ...	Palmer, Mass. ...	60,000					
									{ Delaware River ...	Delaware ...	12,000					
									{ Musconetcong ...		65,000					
New Jersey	Bloomsbury	Dr. J. H. Slack	200,000		200,000	168,000	Raritan River			31,000						
								Hackensack River			30,000					
									Passaic			50,000				

Pennsylvania	Maricitta	J. P. Creveling	150,000	150,000	137,000	Delaware River	Bushkill Creek	Northampton County	55,000						
						Susquehanna River	Swarata Creek	Dauphin County	30,000						
							Chippes-Salunga Creek		25,000						
							Donegal Creek		12,000						
						Michigan	Pokagon	G. H. Jerem	153,000	33,000	165,000	Calumet River	Codorus Creek		15,000
													Kensington, Ill.	10,000	
												Maistee River	Wildwood		8,000
													South Lawn		7,000
													Gun Lake	Barry County	8,000
													Metcalf Lake	Calhoun County	1,000
Pine River		40,000													
Boardman River	Salmon Creek		40,000												
Muskegon River	Higgins Lake	Roscommon County	7,000												
Saint Mary's River		25,000													
Saint Joseph's River	Diamond Lake	Cass County	8,000												
	Lime Lake	Branch County	3,000												
	Salmon Lake	Berrien County	5,000												
	Dowagiac Creek		2,000												
Wisconsin	Waterville	H. F. Dousman	20,000	20,000	15,000	Rock River	Madison Lake		7,500						
						Illinois River	Geneva Lake		7,500						
Totals			1,360,000	991,675	2,291,175				2,064,445						

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TABLE VIII.—Statement of hatching and distribution of Penobscot salmon, winter and spring of 1875.

State.	Place of hatching.	In charge of hatching.	Number of eggs received.			Number of young fish distributed.	Waters stocked.	Tributaries where young fish were placed.	Locality.	Number of fish set free.		
			Allotted by United States.	From other sources.	Total.							
Maine	Bucksport	C. G. Atkins	82,377	185,000	267,377	224,698	Penobscot River	Seboois River	Howland	30,000		
								Madacencuk Stream		15,000		
								Salmon Stream		5,000		
								Mattawamkeag River	Bancroft	46,000		
								do	Danforth	45,000		
	do	Kingman	94,598									
	Sebec Lake	H. L. Leonard		201,600	201,600	120,000	do	Wilson Stream, Sebec Lake		25,000		
								Ship Pond Stream, Sebec Lake		35,000		
	Dobsis Stream	G. L. F. Ball		25,000	25,000	20,000	Saint Croix River	Salmon Stream	Foxcroft	45,000		
								Sebec Lake		15,000		
	Pembroke	J. N. Whitman	160,000		160,000	55,300	Denny's River	Penmaquan River	Penmaquan Lake	Charlotte	45,000	
								Crocker's Lake		do	5,000	
								Little River		Meddychemps	5,000	
Machias	Ellis Hanscomb		25,000	25,000	1,000	Machias River	Denysville		15,000			
							Waldoborough	F. M. Everleth	50,000	50,000	5,000	Boyden's Lake	Perry	20,300
Dixfield	H. O. Stanley		42,000	42,000	43,000	Androscoggin River	Longfellow Stream	Machias	1,000			
							Norway	F. H. Holmes	50,000	50,000	47,570	Medomak River	Brook tributary to Medomak Pond	North Waldoborough	5,000
Vermont	Charlestown, N. H.	L. Stone	368,000	42,000	416,000	191,000	Hudson River	Androscoggin River	Dixfield	43,000		
								Lake Champlain		do	40,000	
								do		do	7,570	
								do		do		
Massachusetts	Winchester	E. A. Brackett	120,000	225,000	345,000	245,000	Merrimack River	Androscoggin River	Little Androscoggin River	Norway	7,570	
								Contoocook River				
Rhode Island	Ponaganset	J. H. Barden	20,000	150,000	200,000	125,000	Blackstone River	Battenkill River	Manchester, Vt	47,500		
								Pawtucket River		Lewis Creek	Ferrisburgh, Vt	48,500
								Connecticut River		Saranac River	West Plattsburgh, N. Y.	36,500
Connecticut River	Westport	E. M. Lees	135,000	225,000	360,000	320,000	East River	Salmon River	Peru, N. Y.	10,000		
								Tham's River		Chazy River	Ellenburgh, N. Y.	42,500
								Mill River		Pennebec River	Near Plymouth, N. H.	215,000
								Saugatuck River		Contoocook River		30,000
								do		Slatersville Branch	10 places	15,000
								do		do	31 places	110,000
								do		do	New Hartford	200,000
do		do	Butter Brook	New Milford	50,000							
do		do	East River	Guilford	20,000							
do		do	Tham's River	Shetucket	30,000							
do		do	Mill River	Sontport	10,000							
do		do	Saugatuck River	Westport	10,000							

New York	Caledonia	Seth Green	80,000	80,000	30,000	Lake Ontario	Allen's Creek	10,000		
						Hudson River	Mohawk River	Rome	20,000	
New Jersey	Bloomsbury	Mrs. J. H. Slack	80,000	80,000	70,000	Passaic River	Whippang River	Morristown	1,000	
						Raritan River	Rockaway River	Dover	1,000	
						Delaware River	South Branch	South Branch	3,000	
							Delaware River	Panlinskill River Musconetcong River (Pobatsong River)	74,000	
Pennsylvania	New Hope	Jas. B. Thompson	10,000	10,000		(North Branch	Fort Pendleton	16,000		
Maryland	Baltimore	Alex. Kent	60,000	60,000	72,600	Potomac River				
						Patusent River				
						Gunpowder River				
Michigan	Pakagon	G. H. Jerome	330,000	330,000	5,000	Susquehanna River	Deer Creek			
						Saint Joseph River	Dowagiac River	5,000		
Illinois	Elgin	W. A. Pratt	20,000	20,000	19,000	Illinois River	Fox River	Elgin	19,000	
Wisconsin	Boscobel	A. Palmer	25,000	25,000	12,800		Cedar Lake	Fond du Lac County	5,000	
							do	do	1,300	
							Devil's Lake	Sauk County	1,000	
							Madison Lake	Madison	300	
							Rock Lake	Jefferson County	5,000	
							(Dubuque Creek	Dubuque	3,000	
							Cedar River	Cedar Rapids	4,000	
							do	Waverley	25,000	
							Mississippi River	Turkey River	West Union	15,000
								Iowa River	Marshall	5,000
Iowa	Anamosa	B. F. Shaw	80,000	80,000	70,000		Maquoketa River	Manchester	2,000	
							do	Worthington	2,000	
							Bear Creek		4,000	
							Missouri River	Council Bluff	10,000	
Totals			1,550,377	1,262,000	2,812,977			1,726,668		

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TABLE IX.—Observations on temperature at Bucksport, from June 1, 1873, to May 31, 1875, inclusive.

Date.	Temperature.						Wind.	Remarks.
	Air at H. H.		Water at pond.					
			Surface.		Bottom.			
	7 a. m.	1 p. m.	7 a. m.	1 p. m.	7 a. m.	1 p. m.		
1873.								
June 1	43	75					Westerly	Clear.
2	50	88					do	Do.
3	46	60					Southwesterly	Do.
4	50	49					Southeast	Rain.
5	50	64					Southwest	Cloudy.
6	52	72					Easterly	Rain.
7	49	56					do	Do.
8	55	66					Northerly	Clear.
9	52	68					do	Do.
10	54	77					do	Do.
11	51	68					Southerly	Rain a. m. ; clear p. m.
12	62	68					Northerly	Clear.
13	53	70					Southwesterly	Do.
14	52	68					Westerly	Do.
15	52	66					Northerly	Do.
16	62	80					Southwest	Do.
17	65	66					Northerly	Do.
18	54	69					Northwest	Do.
19	58	77					Northerly	Do.
20	56	86					Westerly	Do.
21	58	77	68	70	63	68	do	Partly clear.
22	57	71	66	70	66	68	Northerly	Clear.
23	51	80	67	70	66	66	Westerly	Do.
24	54	78	68	68	66	66	Southwest	Do.
25	62	83	69	72	67	67	do	Do.
26	62	88	70	71	68	68	Southerly, light	Do.
27	66	86	71	72	69	68	Westerly, light	Do.
28	65	84	71	75	69	70	do	Cloudy and showery.
29	70	84	73	74	70	71	Southwest, light	Clear.
30	60	70	72	72	70	70	Southerly, light	Cloudy ; showery a. m.
Sums ...	1684	2194	695	714	679	682		
Means ...	56.13	73.13	69.5	71.4	67.9	68.2		

TABLE IX.—Observations on temperature at Bucksport, &c.—Continued.

Date.	Temperature.						Wind.	Remarks.
	Air at H. H.		Water at pond.					
	7 a. m.	1 p. m.	Surface.		Bottom.			
			7 a. m.	1 p. m.	7 a. m.	1 p. m.		
1873.								
July 1	63	69	72	71	71	71	Southeast, light	Rain most of day.
2	63	69	70	78	70	71	Easterly a. m.; west- erly p. m.	Cloudy a. m.; clear p. m.
3	66	86	72	73	70	71	Southeast a. m.; south- west p. m.	Do.
4	68	87	73	74	72	72	Southeast	Clear.
5	63	80	74	76	72	73	Southerly	Foggy in a. m.; partly clear p. m.
6	68	80	74	77	72	74	Northerly, strong breeze.	Clear.
7	58	77	73	78	73	75	Northerly, light	Do.
8	57	76	72	74	71	72	Southwest, strong	Partly clear; cloudy p. m.
9	60	82	72	71	71	72	Southerly, light	Cloudy a. m.; partly clear p. m.
10	70	82	73	74	71	72	do	Clear.
11	57	78	72	74	71	72	Southwest	Foggy a. m.; clear p. m.
12	59	74	72	73	70	72	Northerly, strong	Clear.
13	59	80	72	71	70	70	Southwest, fresh	Partly clear.
14	60	80	70	72	70	70	Southwest, light	Partly clear; showery p. m.
15	70	89	73	75	72	74	Northerly	Clear.
16	60	75	72	73	72	72	do	Do.
17	60	78	71	74	70	72	Northerly, light	Clear and cloudy p. m.
18	60	77	70	72	70	70	Easterly a. m.; south- erly p. m.	Cloudy and partly clear.
19	55	52	69	69	69	68	Southeast	Rain all day.
20	58	78	67	70	67	68	Northerly, light	Mostly clear.
21	57	84	68	71	67	69	do	Cloudy part of day.
22	61	81	69	74	64	70	do	Clear.
23	66	92	71	77	69	70	Westerly	Do.
24	72	84	72	75	70	73	Northerly	Do.
25	64	81	73	72	72	70	Southerly, fresh	Partly clear.
26	68	82	73	73	71	71	Southerly, strong	Clear.
27	63	67	72	73	72	72	Southeast	Rain most of day.
28	64	84	73	80	72	73	Westerly	Clear.
29	61	72	74	71	71	73	Southerly, light	Foggy all day.
30	62	87	72	74	72	72	do	Foggy a. m.; clear afterward.
31	70	90	75	80	74	76	Northerly	Clear.
Sums ...	1950	2482	2225	2295	2193	2220		
Means ...	62.9	80.06	71.77	74.03	70.74	71.61		

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TABLE IX.—Observations on temperature at Bucksport, &c.—Continued.

Date.	Temperature.						Wind.	Remarks.
	Air at H. H.		Water at pond.					
	7 a. m.	1 p. m.	Surface.		Bottom.			
			7 a. m.	1 p. m.	7 a. m.	1 p. m.		
1873.								
Aug. 1	61	66	75	74	74	74	Southerly, light.....	Foggy.
2	71	83	73	77	73	74	Northeast a. m.; south- west p. m.	Cloudy a. m.; clear p. m.
3	62	86	73	75	72	74	Southerly.....	Clear; showery p. m.
4	65	76	74	75	73	74	Northerly, fresh.....	Clear.
5	57	73	74	75	73	74	Northerly, light.....	Do.
6	55	85	73	76	73	73	Southerly, light.....	Clear; cloudy p. m.
7	63	76	72	72	72	72	do.....	Clear.
8	63	83	73	76	71	72	Northerly, light.....	Do.
9	62	84	72	74	72	73	Westerly, light.....	Do.
10	60	78	71	72	71	71	Northerly, light.....	Do.
11	57	75	70	72	70	71	do.....	Do.
12	54	80	70	76	70	70	Northwest, light.....	Do.
13	52	80	70	71	69	68	Southerly, light.....	Do.
14	55	80	70	70	68	68	do.....	Cloudy.
15	64	67	69	69	69	69	Easterly.....	Rain.
16	57	75	68	70	68	68	Southerly, fresh.....	Clear.
17	64	77	68	70	68	69	Northerly.....	Do.
18	57	82	69	70	69	68	Northwest.....	Do.
19	58	67	69	70	68	68	Easterly.....	Rain; cloudy p. m.
20	62	73	68	70	68	68	Easterly, light.....	Cloudy.
21	58	80	68	76	68	68	do.....	do.
22	58	72	68	68	68	68	Southerly, light.....	Cloudy.
23	59	81	65	70	68	68	Southwest, light.....	Clear; showery p. m.
24	56	60	66	66	66	66	Northeast, very strong	Cloudy.
25	52	65	60	62	58	61	Northerly, fresh.....	Clear.
26	52	66	62	63	62	62	Easterly, light.....	Mostly cloudy.
27	52	71	62	65	62	64	Northerly.....	Clear.
28	46	78	63	69	63	65	Northerly, light.....	Do.
29	49	82	64	66	63	63	Southwest, light.....	Do.
30	58	77	64	66	63	64	do.....	Mostly clear.
31	63	80	66	70	64	66	Variable.....	Showery in p. m.
Sums ...	1806	2361	2131	2195	2116	2133		
Means ..	58.26	76.16	68.74	70.8	68.26	68.8		

TABLE IX.—Observations on temperature at Bucksport, &c.—Continued.

Date.	Temperature.						Wind.	Remarks.
	Air at H. U.		Water at pond.					
			Surface.		Bottom.			
	7 a. m.	1 p. m.	7 a. m.	1 p. m.	7 a. m.	1 p. m.		
1873.								
Sept. 1	53	70	66	66	65	65	Southerly, light.....	Rain 4 p. m.
2	60	77	64	66	64	65	Variable.....	Showery.
3	56	70	64	66	61	64	Northerly, fresh.....	Clear.
4	51	59	64	64	63	63	Southerly, light.....	Rainy.
5	60	75	63	65	62	64	Southerly, fresh.....	Cloudy a. m.; clear p. m.
6	54	65	64	66	63	64	Northerly, fresh.....	Clear.
7	41	65	63	66	63	63	Southerly.....	Clear a. m.; cloudy p. m.
8	57	59	63	63	62	63	Southerly a. m.; north- erly p. m.	Rainy a. m.; clear p. m.
9	43	66	62	62	62	63	Southerly, light.....	Clear.
10	46	67	62	63	60	62	do.....	Do.
11	52	63	62	65	61	62	Southwest.....	Foggy a. m.; clear p. m.
12	51	69	62	64	62	62	Southerly, light.....	Do.
13	55	69	63	64	62	63	Southwest, fresh.....	Clear.
14	52	49	64	62	62	62	Northeast.....	Rainy.
15	40	58	60	61	60	61	Southerly, light.....	Clear.
16	57	57	60	60	59	59	Southerly, fresh.....	Cloudy; showery in p. m.
17	42	57	53	60	57	58	Northerly, light.....	Mostly clear.
18	37	64	58	58	58	57	Southerly, fresh.....	Mostly cloudy.
19	56	64	58	59	58	59	do.....	Cloudy a. m.; rain at 4 p. m.
20	48	57	58	59	58	59	Northerly, fresh.....	Mostly clear.
21	45	58	57	58	57	57	do.....	Clear.
22	37	61	56	58	57	57	Southerly, light.....	Do.
23	46	55	56	57	57	57	do.....	Rainy.
24	52	57	57	57	57	57	do.....	Rainy in a. m.; clear in p. m.
25	43	62	56	60	56	57	do.....	Mostly clear.
26	52	69	57	59	57	57	Northerly, light.....	Do.
27	41	67	58	59	58	58	Southwest, light.....	Clear.
28	57	84	59	58	59	61	do.....	Do.
29	58	70	59	62	59	61	Southwest, fresh.....	Foggy a. m.; clear p. m.
30	48	56	59	60	59	60	Northerly.....	Clear.
Sums ...	1495	1919	1812	1850	1802	1829		
Means ..	49.83	63.97	60.4	61.67	60.07	60.67		

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TABLE IX.—Observations on temperature at Bucksport, *§c.*—Continued.

Date.	Temperature.						Wind.	Remarks.
	Air at H. II.		Water at pond.					
	7 a. m.	1 p. m.	Surface.		Bottom.			
			7 a. m.	1 p. m.	7 a. m.	1 p. m.		
1873.								
Oct. 1	31	52	58	59	57	57	Southerly, light.....	Clear.
2	37	58	57	59	57	57	Westerly, light.....	Do.
3	39	57	56	57	56	56	Southerly, light.....	Cloudy a. m.; clear p. m.
4	34	50	54	54	54	54	Southerly, fresh.....	Cloudy.
5	56	57	54	54	54	54	do.....	Rainy.
6	57	69	54	56	54	55	Southwest, light.....	Cloudy a. m.; clear p. m.
7	41	44	56	55	54	55	Northeast, light.....	Rainy.
8	39	54	52	53	52	52	Northerly, fresh.....	Mostly clear.
9	39	52	46	52	51	52	do.....	Clear.
10	36	60	51	57	50	52	Northerly, light.....	Do.
11	34	65	51	56	50	52	do.....	Do.
12	49	64	53	57	52	54	do.....	Wind southerly in p. m.
13	46	50	54	54	53	53	Northerly, fresh.....	Mostly clear.
14	40	58	52	54	52	53	Variable.....	Partly clear.
15	35	53	52	53	52	52	Northerly, light.....	Clear.
16	32	55	52	52	51	53	Southwest, fresh.....	Do.
17	42	49	52	52	51	52	Northeast, fresh.....	Do.
18	27	52	50	51	50	50	Southwest, fresh.....	Cloudy in a. m.; clear in p. m.
19	52	62	51	51	51	51	Southerly, light.....	Cloudy.
20	59	67	52	54	53	54	Southerly, fresh.....	Partly clear.
21	55	57	54	54	54	55	do.....	Rainy.
22	38	54	54	56	54	54	Southerly, light.....	Clear.
23	46	54	51	56	54	54	do.....	Do.
24	48	61	53	54	52	53	do.....	Cloudy in a. m.; clear in p. m.
25	42	52	52	53	52	52	Northerly, light.....	Clear.
26	30	49	50	52	51	51	Variable.....	Mostly cloudy.
27	49	56	51	52	50	52	Southerly, fresh.....	Rainy.
28	33	53	50	51	50	49	Southerly, light.....	Mostly cloudy.
29	32	45	49	50	48	49	Southwest, fresh.....	Cloudy in a. m.; clear in p. m.
30	30	40	47	48	47	48	Northerly, light.....	Clear.
31	36	42	47	47	47	47	Easterly, light.....	Rainy.
Sums ...	1267	1691	1618	1663	1613	1632		
Means ..	40.87	54.54	52.19	53.65	52.03	52.65		

TABLE IX.—Observations on temperature at Bucksport, &c.—Continued.

Date.	Temperature.								Wind.	Remarks.
	Air at H. II.		Water at pond.				Water at H. II.			
	7 a. m.	1 p. m.	Surface.		Bottom.		7 a. m.	1 p. m.		
			7 a. m.	1 p. m.	7 a. m.	1 p. m.				
1873.										
Nov. 1	39	45	46	46	46	44	47	48	Westerly, light ...	Showery a. m.; clear p. m.
2	33	46	44	45	44	44	45	48	Southerly, light...	Clear.
3	46	48	44	44	44	44	45	48	Westerly, fresh...	Showery a. m.; clear p. m.
4	22	41	42	42	42	42	42	45	Westerly, light...	Clear.
5	38	34	42	42	42	42	43	45	Northerly, fr. sb...	Do.
6	21	31	39	40	39	39	40	42	Northerly, light...	Do.
7	17	32	38	38	39	38	38	41	Westerly, light...	Do.
8	38	40	38	38	38	38	40	40	Easterly, light...	Rainy.
9	37	45	38	38	38	38	39	41	Northerly, light...	Mostly cloudy.
10	28	31	38	38	38	38	37	38	Northeast, fresh...	Cloudy; snow p. m.
11	20	28	37	36	37	36	35	37	Northerly, light...	Clear.
12	28	36	34	35	36	36	36	37	Easterly, light...	Snow a. m.; rain p. m.
13	31	37	32	34	36	36.5	36	37	...do	Clear a. m.; cloudy p. m.
14	15	24	32	34	.....	.....	35	36	Northerly, light...	Clear.
15	17	26	32	32	.....	.....	34	36	Northwest, light...	Do.
16	14	24	32	32	.....	.....	35½	36	Easterly	Snow.
17	21	30	32	32	.....	.....	34	35	Northeast	Cloudy.
18	31	38	32	32	.....	.....	34½	35	Northeast, light...	Rainy.
19	26	32	32	.....	.....	.....	35	35	Northwest, light...	Clear.
20	18	28	.....	.....	.....	.....	35	36	Northerly, light...	Do.
21	12	27	.....	.....	.....	.....	35½	37	Westerly, light...	Do.
22	14	31	.....	.....	.....	.....	36	36	...do	Mostly clear.
23	5	23	.....	.....	.....	.....	35	36	...do	Snow a. m.; clear p. m.
24	16	23	.....	.....	.....	.....	35	35	Easterly, light...	Snow.
25	20	30	.....	.....	.....	.....	35½	36	...do	Cloudy.
26	17	22	.....	.....	.....	.....	36	35	Northwest, light...	Clear.
27	-2.5	22	.....	.....	.....	.....	35	34	Southeast, light...	Cloudy a. m.; snow p. m.
28	2	20	.....	.....	.....	.....	33	34	Northerly, light...	Clear.
29	-1	15	.....	.....	.....	.....	33	33	...do	Do.
30	3	12	.....	.....	.....	.....	33	33½	Northerly, fresh...	Do.
Sums ...	625½	921	704	678	519	515½	1113	1145½		
Means ...	20.85	30.7	37.05	37.66	39.92	39.65	37.1	38.18		

TABLE IX.—Observations on temperature at Bucksport, &c.—Continued.

Date.	Temperature.				Wind.	Remarks.	
	Air at H. H.		Water at H. H.				
	7 a. m.	1 p. m.	7 a. m.	1 p. m.			
1873.							
Lec. 1	—	7	6	33	33½	Northerly, light	Clear.
2	—	22	8	33	33	Northeast, light	Cloudy; snow 5 p. m.
3		23	38	33	34	Easterly, light	Foggy.
4		42	44	34	34	Southerly, fresh	Fog a. m.; rain in p. m.
5		33	37	34	34	Southerly, light	Mostly cloudy.
6		20	24	33½	34	Northerly, light	Clear.
7		12	23	33½	34	Northwest, light	Do.
8		6	26	34	34	Southwest, light	Do.
9		36	38	34½	34½	Southerly, fresh	Cloudy a. m.; rainy in p. m.
10		28	28	34	34	Northerly, fresh	Clear.
11		6	24	34	34	Southwest, light	Mostly cloudy; snow at 3 p. m.
12		30	34	35	35	do	Cloudy.
13		26	22	34½	34	Northeast, light	Snowing all day.
14		15	22	33	34	Northerly, light	Clear.
15		12	13	34	34	Southwest, light	Do.
16		12	33	34	34	do	Mostly clear.
17		4	30	34	34	Westerly, light	Do.
18		30	33	34	34	Calm	Foggy.
19		24	35	34	34	do	Do.
20		23	29	34	34	Northeast, light	Snow.
21		4	17	33	33½	Northwest, light	Clear.
22		18	31	33	34	Westerly, light	Partly cloudy.
23		10	28	33	33	do	Clear.
24		4	22	33	33	do	Do.
25		27	31	33	33	Northerly, light	Cloudy a. m.; clear p. m.
26		5	16	33	33	do	Cloudy.
27		12	18	33	33	Northeast, light	Cloudy, some snow.
28		18	20	33	32½	Northerly, fresh	Snow all day.
29		20	32	33	33½	Southwest, light	Cloudy with snow.
30		19	27	33	33	Westerly, light	Mostly clear.
31		13	31	33	33	Southerly, light	Clear a. m.; cloudy p. m.
Sums ...	481	820	1040	1044½			
Means ...	15.52	26.45	33.54	33.69			

TABLE IX.—*Observations on temperature at Bucksport, &c.—Continued*

Date.	Temperature.				Wind.	Remarks.
	Air at H. H.		Water at H. H.			
	7 a. m.	1 p. m.	7 a. m.	1 p. m.		
1874.						
Jan. 1	10	31	33	33 $\frac{1}{2}$	Southerly, light.....	Mostly clear.
2	30 $\frac{1}{2}$	35	33	33 $\frac{1}{2}$	do	Snow at 10 a. m.
3	17	34	33	33	do	Foggy.
4	36	40	34	34	do	Do.
5	45	32	34	34	Northerly, light.....	Cloudy a. m.; rain and snow p. m.
6	14	16	33	33	Northeast, light.....	Rain most of the day.
7	31	34	33	33	Southerly, light.....	Do.
8	41	50	33	34	Southerly, fresh.....	Rain all day.
9	30	39	33	34	Southwest, light.....	Clear.
10	30	38	33	34	Southerly, light.....	Clear a. m.; rainy p. m.
11	24	34	33	34	Southwest, light.....	Clear.
12	20	24	33	34	Northwest, light.....	Do.
13	6	16	33	33	do	Do.
14	12	15	33	33	Northeast, light.....	Snow.
15	— 4	13	33	33 $\frac{1}{2}$	Northerly, light.....	Clear.
16	3	9	33	33 $\frac{1}{2}$	Northwest, light.....	Do.
17	0	16	33	33	do	Do.
18	— 9	31	33	33	Southwest, light.....	Do.
19	34	40	33 $\frac{1}{2}$	34	Southerly, light.....	Rain.
20	16	16	33	53	Northerly, fresh.....	Clear.
21	— 4	14	33	33	Easterly, light.....	Cloudy a. m.; snow p. m.
22	25	26	33 $\frac{1}{2}$	34	Southerly, light.....	Foggy.
23	33	40	34	34	do	Do.
24	19	24	33 $\frac{1}{2}$	34	Northeast, light.....	Clear.
25	16	9	33 $\frac{1}{2}$	33 $\frac{1}{2}$	Northerly, fresh.....	Do.
26	—13	—13	33	33 $\frac{1}{2}$	do	Do.
27	—12	4	33 $\frac{1}{2}$	34	Northeast, light.....	Snow.
28	6	14	33 $\frac{1}{2}$	34	do	Cloudy, with snow and rain.
29	8	20	33	34	Northwest, light.....	Clear in a. m.; cloudy and snow p. m.
30	2 $\frac{1}{2}$	1	33 $\frac{1}{2}$	34	Northerly, fresh.....	Clear.
31	—12	2	33 $\frac{1}{2}$	33 $\frac{1}{2}$	Northeast, light.....	Snow.
Sums ...	460	701	1029	1041 $\frac{1}{2}$		
Means ..	14.84	22.71	33.19	33.59		

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TABLE IX.—Observations on temperature at Bucksport, &c.—Continued.

Date.	Temperature.				Wind.	Remarks.
	Air at H. H.		Water at H. H.			
	7 a. m.	1 p. m.	7 a. m.	1 p. m.		
1874.						
Feb. 1	— 7	2	34	34	Northerly, light.	Clear.
2	—21	— 2	33	33	do	Do.
3	24	16	33½	33	Northeast, light.	Snowing all day.
4	22	23	33	33½	Northeast, fresh	Snowy a. m.; cloudy p. m
5	— 14	7	33	33	Northerly, light.	Clear.
6	— 6	9	32½	33	do	Do.
7	— 8	10	33	33	Westerly, light	Do.
8	— 3	19	33½	33	Northerly, fresh	Do.
9	6	30	33	33½	Northerly, light.	Do.
10	8	30½	33	34	Northeast, light.	Cloudy.
11	16	22	33	34	Northerly, fresh	Cloudy a. m.; clear p. m.
12	5	21	33½	34	Westerly, light	Clear.
13	— 2	39	33	34	Southerly, light.	Cloudy; rain at 5 p. m.
14	41	45	34	34	Westerly, light	Cloudy a. m.; clear p. m.
15	13	31	34	34½	Southerly, light.	Clear.
16	24	33	33½	34	Variable	Cloudy; snow in a. m.
17	22	29	33½	34	Northwest, fresh	Clear.
18	9	23	33½	34	Northerly, fresh	Do.
19	0	34	33½	34½	Southerly, light.	Clear a. m.
20	32	37	34	34½	do	Rain a. m.; cloudy p. m.
21	24	38	34	34½	do	Snow and rain.
22	31	34	34	34½	Northerly, light.	Cloudy.
23	27	33	34	34	Southeast, light	Snow and rain.
24	22	28	34	34	Northwest, light	Clear in a. m.; cloudy in p. m.
25	— 2	27	33½	34	Easterly, light	Cloudy.
26	12	27	33	34	Southwest, light	Mostly clear.
27	18	32	33½	34	Northerly, fresh	Partly clear.
28	5	22	33	34	Northerly, light.	Clear.
Sums ...	295	704½	936	947½		
Means ...	10.54	25.16	33.43	33.83		

TABLE IX.—*Observations on temperature at Bucksport, &c.—Continued.*

Date.	Temperature.				Wind.	Remarks.
	Air at H. II.		Water at H. II.			
	7 a. m.	1 p. m.	7 a. m.	1 p. m.		
1874.						
Mar. 1	2	30	33	34	Southwest, light	Clear a. m.; cloudy p. m.
2	32	46	33½	34½	do	Clear.
3	31	44	33½	34½	Southwest, fresh	Partially clear.
4	40	42	33½	34	Southerly, fresh	Rain.
5	19	28	33	33½	Northerly, fresh	Clear.
6	9	25	33	33½	do	Do.
7	12	30	33	33½	Southerly, light	Mostly clear.
8	25	27	34	34	Northeast, light	Snow all day.
9	7	44	33	34	Southerly, light	Clear a. m.; cloudy p. m.
10	22	36	33	33½	Northeast, light	Snowing all day.
11	14	30	33	31	do	Clear.
12	8	26	33	34	Northerly, light	Cloudy.
13	8	25	32½	33½	Westerly, light	Partially clear.
14	20	31	33	34	Northerly, fresh	Clear.
15	15	32	34	36	Northerly, light	Do.
16	20	40	34	36	Calm	Do.
17	27	40	34	35½	Southerly, light	Clear a. m.; cloudy and rain p. m.
18	37	42	34	35	do	Rain most of the day.
19	37	44	34	35	do	Foggy; thunder-shower.
20.	36	36	34	36	Westerly, fresh	Clear.
21	30	41	34	36	Southwest, fresh	Do.
22	30	36	34	36	Northeast, light	Snow a. m.; squalls from north p. m.
23	24	30½	34	35	Variable	Snow a. m.; cloudy p. m.
24	1	12	33½	36	Northerly, fresh	Clear.
25	18	37	34	35	Westerly, fresh	Cloudy a. m.; clear p. m.
26	35	41	34	36	Scatherly, light	Cloudy a. m.; rainy p. m.
27	27	30	34	36	Northerly, fresh	Clear.
28	25	36	34	36	Easterly	A little snow a. m.; clear p. m.
29	20	24	34½	37	Northwest, fresh	Clear.
30	16	39	34	36½	Westerly, fresh	Do.
31	23	25	35	37½	Northwest, fresh	Do.
Sums . . .	670	1043.5	1043	1085		
Means . .	21.61	33.36	33.64	35		

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TABLE IX.—Observations on temperature at Bucksport, §c.—Continued.

Date.	Temperature.				Wind.	Remarks.
	Air at H. H.		Water at H. H.			
	7 a. m.	1 p. m.	7 a. m.	1 p. m.		
1874.						
April 1	5	21	34½	37	Westerly, light	Clear.
2	17	33	35	38	Southwest, light	Do.
3	30	36	35½	36½	Southerly a. m., west- erly p. m., light.	A little snow a. m.; clear p. m.
4	17	27	35½	36½	Northerly, fresh	Clear.
5	20	32	36	39	Northerly a. m., south- erly p. m.	Do.
6	30½	40	35½	38	Southeast a. m., south- west p. m.	Snow a. m.; clear p. m.
7	34	39	36½	38	Southerly, light	Cloudy.
8	31	35	36½	37	do	Do.
9	32	36	36	37	Northeast, light	Do.
10	29	31	35½	35½	Northeast, fresh	Snowing all day.
11	22	36	35	37	Southerly, light	Cloudy a. m.; snow p. m.
12	15	23	35	38	Northerly, fresh	Clear.
13	26	34	35	38	Variable, light	Mostly clear.
14	31	46	35	38	Southerly, light	Clear a. m.; cloudy p. m.
15	40	53	34½	37½	do	Rain 9 a. m.; afterward mostly cloudy.
16	38½	42	35	38½	Northerly, fresh	Clear.
17	30	37	35	36	Variable, light	Cloudy; snow at 4 p. m.
18	33	42	34½	38½	Southerly, light	Clear.
19	36	45	34½	39	Southerly, fresh	Do.
20	33	46	35½	38	Southeast, light	Cloudy; snow at 5 p. m.
21	34	39	35½	37	Southerly, light	Cloudy.
22	33	47	36	39½	Northerly, fresh	Clear.
23	33	43	36	39	Southerly, light	Mostly cloudy.
24	35	45	36½	39	do	Do.
25	29	47	36½	42	do	Clear a. m.
26	30	34	36	36	Northeast, fresh	Snowing all day.
27	32	44½	34	38	Northerly, light	Clear.
28	32½	47	36	41	do	Do.
29	35½	35	37½	37½	Easterly, light	Raining all day.
30	33½	36	36½	39	Westerly, fresh	Snow a. m.; cloudy p. m.
Sums ...	877.5	1151.5	1066	1139		
Means ...	29.25	38.38	35.53	37.97		

TABLE IX.—Observations on temperature at Bucksport, &c.—Continued.

Date.	Temperature.						Wind.	Remarks.
	Air at II. II.		Water at II. II.		Water at pond.			
					9 a. m.			
	7 a. m.	1 p. m.	7 a. m.	1 p. m.	Surface.	Bottom.		
1874.								
May 1	35½	44	38	39	.....	.....	Northerly, light.....	Cloudy.
2	34½	42	37½	39½	.....	.....	Northeast, light.....	Clear a. m.; cloudy p. m.
3	40	48	38	41	.....	.....	Northerly, light.....	Clear.
4	42	60	40	44	41	40	do.....	Do.
5	38	52	43	47	43½	42½	Northeast, fresh.....	Clear a. m.; cloudy p. m.
6	35	53	44½	46½	46	44	Southwest, fresh.....	Do.
7	38	51	44	49	45	44	Variable, light.....	Cloudy a. m.; clear p. m.
8	37	51	45	48	47	46	Southerly, light.....	Cloudy.
9	38½	44	45	46½	47	46	do.....	Cloudy and rainy.
10	43	47	46	48	47	46½	Northeast, light.....	Cloudy; rain at 3 p. m.
11	41	58	47½	51½	48	47	do.....	Clear.
12	42	65½	48	51	50½	48½	Variable, light.....	Do.
13	44	64	48½	53	52	48½	Southerly, light.....	Do.
14	55	74	52	57	54	49	Northerly, fresh.....	Do.
15	46	60	54	56	56	52	Southerly, fresh.....	Do.
16	45	44	54	54½	55	52	Southeast, light.....	Rainy.
17	48	64	52	55	54	52	Southwest, light.....	Cloudy.
18	52½	66	54	57	56	53	Southerly, light.....	Clear.
19	47	55	57	57	57	53	do.....	Rain.
20	42	61	55½	58	57	53	Southerly fresh.....	Clear.
21	52	59½	55	58	57½	53	Southerly, light.....	Clear a. m.; rain 4 p. m.
22	44	55	55	57½	56½	52½	Variable, light.....	Rain a. m.; cloudy p. m.
23	45	63½	57	60	56½	55½	Northerly, fresh.....	Clear.
24	48	66	56	61	58	56½	Variable, light.....	Do.
25	48	62½	57	57	58	56	Southerly, light.....	Rain all day.
26	52	66	56	58	57	55½	Southwest, light.....	Clear.
27	56	74½	58	62	59½	56	Northerly, light.....	Do.
28	52	67	59	63	60½	56½	Southerly, light.....	Do.
29	61	69	62	64	62	58	Variable, light.....	Do.
30	56	76	62½	64½	66	58	Southerly, light.....	Do.
31	62	66	61	63	63	56½	Southerly, fresh.....	Clear a. m.; thunder shower p. m.
Sums ..	1420	1827.5	1582	1765.5	1510.5	1431		
Means ..	45.81	58.94	51.03	53.38	53.95	51.11		

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TABLE IX.—Observations on temperature at Bucksport, &c.—Continued.

Date.	Temperature.						Wind.	Remarks.
	Air at H. H.		Water at H. H.		Water at pond.			
	7 a. m.	1 p. m.	7 a. m.	1 p. m.	9 a. m.			
					Surface.	Bottom.		
1874.								
June								
1	52	56	61	63½	62	52	Northeast, fresh Cloudy.	
2	45	60	59½	63	61½	60	Northeast, light Clear.	
3	50	67	60	63	62	60	Southerly, fresh Do.	
4	47	56	59	60½	61	60	Southerly, light Rain a. m. ; cloudy p. m.	
5	54½	70	60	62	62	60	..... do Foggy and clear.
6	57	64	62	64	63	60	Easterly, light Rain most of day.	
7	63	64	63	64	64	60	Southerly, light Rain and fog.	
8	54	74	61	65½	62½	60½	Variable, light Foggy and clear.	
9	54	64	63½	67	64	60½	Northeast, light Mostly clear.	
10	47½	57½	62	63	63½	60	Variable, light Clear a. m. ; cloudy p. m.	
11	46	64½	60½	67	62	61	Northerly, light Clear.	
12	46	45	60½	60	61	60	Easterly, light Rain.	
13	48	64	59½	63½	61½	59½	Northerly, light Mostly clear.	
14	60	72	60	66	62	59	Southwest, light Clear a. m. ; showery p. m.	
15	56	74	62	69	64	59½	Northerly, light Clear.	
16	66	78	64	65	68	59	Southerly, light Mostly cloudy.	
17	54	55	59	60	63	59	..... do Rainy.
18	54	59½	59	62	61	60	Northeast, fresh Do.	
19	48½	47	56	59	59½	59½	Easterly, fresh Do.	
20	48	50	56	57	57	57	..... do Cloudy a. m. ; rain p. m.
21	52	64	56	59	57	57	Northeast, light Mostly clear.	
22	60	79	59½	63½	63	58½	Southerly, light Clear.	
23	57	84	60½	64½	64	59	..... do Mostly clear.
24	57	64	62	67½	64	61	Northerly, fresh Clear.	
25	54½	72	58	6½	62½	61	Northwest, fresh Do.	
26	64	77½	62	70½	64	62	Northwest, light Do.	
27	54	82	63½	74	67	62	Southwest, light Do.	
28	59	79	62	71	67	63	Southerly, light Do.	
29	64	74	66	70	69	62	Variable Shower a. m. ; cloudy p. m.	
30	58	75	62½	72½	67	62	Variable, light Clear.	
Sums ...	1630	1992	1819.5	1945	1889	1800		
Means ..	54.33	66.4	60.65	64.83	62.97	60		

TABLE IX.—Observations on temperature at Bucksport, &c.—Continued.

Date.	Temperature.						Wind.	Remarks.
	Air at II. II.		Water at II. II.		Water at pond.			
	7 a. m.	1 p. m.	7 a. m.	1 p. m.	9 a. m.			
					Surface.	Bottom.		
1874.								
July 1	57	71½	66	70	67½	64	Northeast, light.....	Mostly clear.
2	57	69	67	68½	67	64	Southerly, light.....	Cloudy a. m.; rain p. m.
3	50	52	62	63	64	64	.....do.....	Rain all day.
4	54	70	62	65	63	63	Variable, light.....	Mostly cloudy.
5	52	56	62	63	63	63	Easterly, light.....	Rainy.
6	55	74	62	68	65	63	Variable, light.....	Clear.
7	51	62	60½	64	62	60½	Southerly, fresh.....	Cloudy.
8	61	78½	62	67	64	62½	Southwest, light.....	Clear.
9	66	80½	65½	74	68	63½	Northerly, light.....	Do.
10	64	81	68	72	71	64	Southerly, light.....	Clear a. m.; cloudy p. m.; rain at 5 p. m.
11	66	80	67	74	70	63½	.....do.....	Mostly cloudy.
12	62	59	68	69	70	64	Easterly, light.....	Rain all day.
13	56	69½	64	68	68	64	Southerly, light.....	Cloudy.
14	64	84	64½	75	69	64	Westerly, light.....	Clear.
15	64	69½	69½	70½	72	64	Southerly, fresh.....	Do.
16	67	89½	.....	.....	73	64	Variable, light.....	Cloudy a. m.; clouds with showers p. m.
17	68½	77	.....	.....	72	66	Northerly, light.....	Clear.
18	62½	80	.....	.....	75	66	Southerly, light.....	Do.
19	64	76½	.....	.....	73	66	Southerly, fresh.....	Clear a. m.; cloudy p. m.
20	60	69	.....	.....	70	65½	Southerly, light.....	Cloudy.
21	63	75	.....	.....	70	68	Northerly, light.....	Cloudy a. m.; clear p. m.
22	58½	78	.....	.....	70½	70	.....do.....	Clear.
23	57	78	.....	.....	72	69	Southwest, light.....	Do.
24	60	79½	.....	.....	71½	69	Southerly, light.....	Foggy and clear.
25	65½	77	.....	.....	72	68½	Southwest, fresh.....	Clear.
26	62	70	.....	.....	71	70	Southerly, fresh.....	Foggy a. m.; clear p. m.
27	61	73	.....	.....	70	69½	.....do.....	Cloudy most of day.
28	62	81	.....	.....	70	69½	Southerly, light.....	Do.
29	62½	73	.....	.....	70	69	Southerly, fresh.....	Cloudy a. m.; rain p. m.
30	64	71	.....	.....	70	69	Northerly, light.....	Partly clear.
31	60	76	.....	.....	72	68½	Southwest, fresh.....	Do.
Sums ...	1882½	2279	970	1031	2145.5	2039.5		
Means ..	60.73	73.52	64.67	68.73	69.21	65.73		

TABLE IX.—Observations on temperature at Bucksport, &c.—Continued.

Date.	Temperature.				Wind.	Remarks.
	Air at H. H.		Water at pond.			
	7 a. m.	1 p. m.	9 a. m.			
			Surface.	Bottom.		
1874.						
Aug. 1	63	71	70½	68½	Southerly, light.....	Rainy a. m.; shower at 4 p. m.
2	60	82	70	69	Westerly, light.....	Clear a. m.; showery p. m.
3	56	68	69½	68	Northerly fresh.....	Clear.
4	52½	69	68	68	Variable, light.....	Do.
5	58	72	68	68	Northerly, light.....	Do.
6	60	69½	68	68	Northeast, light.....	Partly clear.
7	59	76	71	69	Westerly, light.....	Clear.
8	58	60	68	66	Southerly, light.....	Rain all day.
9	61	67	65	62	Southeast, light.....	Do.
10	65	71½	64	62	Northeast, fresh.....	Cloudy and rainy a. m.; partly cloudy p. m.
11	63	79	66	62½	Southerly, light.....	Clear.
12	62½	72	67	62½	Southwest, light.....	Foggy and clear.
13	64½	66	69	64	Northeast, light.....	Rainy all day.
14	57	56	66	62½	do.....	Cloudy a. m.; Rainy p. m.
15	57½	69	64½	64	Northerly, light.....	Do.
16	55½	72	65	64	do.....	Clear.
17	54½	70	65½	64	Southwest, fresh.....	Do.
18	57	74	66	64½	Southerly, light.....	Hazy.
19	55	72½	68	66½	Northerly, light.....	Clear.
20	57	72	67	66	Southeast, light.....	Rain p. m.; Clear p. m.
21	63	75½	67	66	Northeast, light.....	Partly cloudy.
22	56	66	68	67	Northerly, light.....	Clear.
23	44	72	67	66	Variable, light.....	Clear a. m.; cloudy p. m.
24	51	66½	66	64½	Westerly, light.....	Clear.
25	48	71	67	65½	North west, light.....	Clear a. m.; cloudy p. m.
26	48	68	66	64½	Northerly, light.....	Clear.
27	48	72	66	64	do.....	Do.
28	50	74½	66	64½	do.....	Clear a. m.; hazy p. m.
29	55	74	68	64½	Variable, light.....	Hazy.
30	64	74	69	65	Southwest, light.....	Clear.
31	57	77	68	64½	Southerly, light.....	Foggy and clear.
Sums ..	1760	2199	2084	2025		
Means .	56.84	70.94	67.23	65.32		

TABLE IX.—Observations on temperature at Bucksport, f.c.—Continued.

Date.	Temperature.				Wind.	Remarks.
	Air at H. H.		Water at pond.			
	7 a. m.	1 p. m.	9 a. m.			
			Surface.	Bottom.		
1874.						
Sept. 1	56	69	67	65	Northerly, fresh	Clear a. m. ; cloudy p. m.
2	56	68½	66	66	Northerly, light	Partly cloudy.
3	52	70½	66	65½	Southwest, fresh	Hazy a. m. ; rain at 5 p. m.
4	45	64	64½	63½	Northerly, light	Clear.
5	50	63	64½	63½	Southwest, fresh	Do.
6	57	65	64½	63½	Southerly, light	Cloudy.
7	58	72	64	63½	Northerly, light	Mostly clear.
8	59½	68	64½	64	do	Cloudy a. m. ; showery p. m.
9	58	69½	65	64	Variable, light	Cloudy and clear.
10	56½	81½	65½	64	do	Clear.
11	54	66½	65½	64	Northerly, fresh	Do.
12	44	60	64	64	Northeast, fresh	Do.
13	48½	69	66	64	Southwest, light	Do.
14	52	66	64	63	Southerly, light	Clear a. m. ; hazy p. m.
15	57½	65	63	63	Southerly, fresh	Cloudy.
16	60	71	64½	63½	Southerly, light	Do.
17	56	58	64	64	Northeast, light	Do.
18	50	53½	61½	60½	do	Cloudy a. m. ; rain p. m.
19	54	59	60	60	Easterly, light	Rain.
20					do	Rain all day.
21	56½	62	60½	60	Northerly, light	Cloudy a. m. ; clear p. m.
22	42	58	60	59½	Northwest, light	Clear.
23	40	60	60	58½	Southerly, light	Do.
24	47	65	61	58½	do	Do.
25	54	64	60	58½	do	Cloudy.
26	53½	60	60	59	Calm	Do.
27	52½	56	59½	58½	Southerly, light	Cloudy a. m. ; clear p. m.
28	48½	62	59½	58½	Northeast, light	Cloudy ; rain at 4 p. m.
29	61	58½	60½	59½	Southerly, light	Cloudy a. m. ; rainy p. m.
30	60	60	60	60	Southerly and westerly, light	Cloudy and rain a. m. ; clear p. m.
Sums . .	1530	1667.5	1825	1799		
Means .	53.07	64.38	62.93	62.04		

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TABLE IX.—Observations on temperature at Bucksport, &c.—Continued.

Date.	Temperature.				Wind.	Remarks.
	Air at H. H.		Water at pond.			
	7 a. m.	1 p. m.	9 a. m.			
			Surface.	Bottom.		
1874.						
Oct. 1	40	51	50	58	Northwest, fresh.....	Clear a. m.
2	45	55½	57	56	Southerly, fresh.....	Cloudy and rainy.
3	43	53½	56	55½	Northerly, light.....	Cloudy.
4	34½	50	54	54	.....do.....	Clear a. m.; cloudy p. m.
5	42	54½	53½	53½	.....do.....	Mostly clear.
6	45	60	54	53½	.....do.....	Mostly cloudy.
7	39½	57	54	53	Southwest, light.....	Hazy.
8	41½	59	54	53	Westerly, light.....	Foggy and clear.
9	48	56	53½	53	Southwest, light.....	Rainy a. m.; cloudy p. m.
10	45	59	54	53½	.....do.....	Foggy and rain at 4 p. m.
11	50	60	54	53½	Northwest and variable, light.	Clear a. m.; cloudy p. m.
12	41	57	53½	52½	Westerly, light.....	Showers.
13	40	50	52	52	Northerly, light.....	Clear.
14	40½	49	51	51	.....do.....	Mostly clear.
15	33½	52½	50	50	.....do.....	Clear.
16	38	58½	50	50	Southwest, light.....	Do.
17	33	57	50	49½	.....do.....	Clear a. m.; cloudy p. m.
18	50	52	50	50	Variable, light.....	Rainy a. m.; cloudy p. m.
19	34½	47	48	47½	Northerly, fresh.....	Clear.
20	36	52	47	46	Northwest, light.....	Do.
21	40½	48	47½	47	Variable, light.....	Hazy a. m.; clear p. m.
22	33½	58	48	48	Northwest, light.....	Clear.
23	28	47½	48	48	Southwest, light.....	Do.
24	30	52	48	47½	.....do.....	Do.
25	44	57½	48	47½	Calm.....	Foggy and clear.
26	32	57½	49	48	Southwest, light.....	Clear.
27	48	53½	48½	48	.....do.....	Foggy all day.
28	49	58	50	49	Variable, light.....	Cloudy a. m.; clear p. m.
29	37	50	50	50	Northerly, light.....	Mostly cloudy.
30	52	52	50	50	Variable, light.....	Cloudy a. m.; clear p. m.
31	42	50	50	50	.....do.....	Mostly clear.
Sums ...	1262	1674½	1591.5	1578		
Means ...	40.71	54.02	51.34	50.90		

TABLE IX.—Observations on temperature at Bucksport, &c.—Continued.

Date.	Temperature.						Wind.	Remarks.
	Air at H. H.		Water at H. H.		Water at pond.			
					9 a. m.			
	7 a. m.	1 p. m.	7 a. m.	1 p. m.	Surface.	Bottom.		
1874.								
Nov. 1	36	41			50	49	Southwest, light	Cloudy.
2	23	42			48	48	Northeast, light	Mostly cloudy.
3	25	46	42	45½	47	46½	Southwest, fresh	Clear.
4	25	48	42	45	46	45½	Southerly, light	Do.
5	42	50	43	47	46	45½	Southerly, fresh	Hazy.
6	43	50	43	46	46	45½	do	Rain a. m.; cloudy p. m.
7	41	42	43	44	45	45	Northerly, fresh	Cloudy.
8	28	45	39	42	44	44	Southerly, light	Do.
9	42	43	43	43	45	44½	Easterly, light	Cloudy; rain at 4 p. m.
10	36	44	41	44	44	43½	Northerly, fresh	Clear.
11	29	47	40	44	44	43½	Northerly, light	Mostly clear.
12	25	34	38	41	41	41½	Northerly, fresh	Clear.
13	25	31	37	38	40	40	Northeast, light	Mostly cloudy.
14	26	30	34	37	37	38	Northerly, fresh	Clear.
15	16	31	34	36	34	37½	Southwest, light	Cloudy.
16	29	34	35	36			Northerly, light	Do.
17	19	34	34	36			Variable, light	Do.
18	41	47	36	39			Northwest, light	Cloudy till 9 a. m.; then clear.
19	16	22	33	35			Northerly, fresh	Cloudy in a. m.; clear p. m.
20	9	28	34	35			Easterly, light	Cloudy; snow p. m.
21	29	35	35	35			Variable, light	Snow in a. m.; clear p. m.
22	13	17	34	35			Northwest, fresh	Clear.
23	11	28	34	35			Southeast, light	Snow all day.
24	36	39	31	35			Southwest, fresh	Partly clear.
25	29	31	31	31			Westerly, light	Clear a. m.; cloudy p. m.
26	19	28	34	35			do	Clear.
27	14	33	34	35			Southwest, light	Partly clear.
28	27	41	35	37			Southerly, light	Clear.
29	49	59	36	37			Southerly, fresh	Rain all day.
30	20	22	35	35			Westerly, light	Clear.
Sums ...	832	1113	1038	1085	657	657.5		
Means ...	27.73	37.27	37.07	38.71	43.8	43.83		

TABLE IX.—Observations on temperature at Bucksport, &c.—Continued,

Date.	Temperature.				Wind.	Remarks.
	Air at H. H.		Water at H. H.			
	7 a. m.	1 p. m.	7 a. m.	1 p. m.		
1874.						
Dec. 1	4	16	35	36	Variable, light	Clear.
2	18	30	35	36	Southwest, light	Hazy.
3	37	44	35	37	do	Cloudy.
4	33	30	35	36	Northerly, fresh	Clear.
5	10	26	35	35	Southwest, light	Hazy.
6	15	32	35	36	Easterly, light	Cloudy.
7	33	34	36	36	do	Cloudy and snow.
8	28	33	36	36	Northeast, light	Cloudy.
9	13	29	35	36	Southerly, light	Do.
10	25	30½	35	36	Northwest, light	Clear.
11	29	33½	35	36	Southerly, light	Snow.
12	3	15	35	35½	Northwest, light	Clear.
13	8½	19	35	35	Northerly, light	Do.
14	15	9	35	34½	Northeast, fresh	Snow all day
15	-11	1½	35	35	Northerly, fresh	Clear.
16	-8	14	35	35	Northwest, light	Do.
17	12	26	35	35	Easterly, light	Cloudy a. m.; snow p. m.
18	20	14	35	35	Northerly, fresh	Cloudy a. m.; clear p. m.
19	18	34½	35	35	Westerly, light	Mostly cloudy.
20	10	34½	35	35	Southerly, light	Cloudy.
21	3	8	34½	35	Northerly, fresh	Clear.
22	-8	26	34½	35	Southerly, light	Cloudy.
23	35	42	35	36	do	Cloudy mostly.
24	31½	38	35	35½	do	Cloudy a. m.; snow and rain in p. m.
25	26	30	35	35½	Northerly, fresh	Clear.
26	11	29	35	35½	Southwest, light	Mostly cloudy.
27	14	32	35	35	do	Cloudy.
28	34½	39½	35	36	Southerly, light	Commenced raining at 10 a. m.
29	34	39	36	36	Southerly a. m., northerly p. m., light	Squalls.
30	1	12	35	35½	Northwest, fresh	Clear.
31	-6	4	35	35½	do	Do.
Sums ...	488.5	805	1087	1101.5		
Means ..	15.76	25.97	35.06	35.53		

TABLE IX.—Observations on temperature at Bucksport, &c.—Continued.

Date.	Temperature.				Wind.	Remarks.
	Air at H. H.		Water at H. H.			
	7 a. m.	1 p. m.	7 a. m.	1 p. m.		
1875.						
Jan. 1	2	17½	35	36½	Northwest, fresh.....	Hazy.
2	10	19	36	37	Easterly, light.....	Cloudy a. m. ; snow p. m.
3	18	24½	36	37	Northerly, fresh.....	Clear.
4	— 2	30	35½	37	Southerly, light.....	Cloudy.
5	— 2	23	35	37	Easterly, light.....	Cloudy in a. m. ; snow in p. m.
6	—16	18	35	36½	Southwest, light.....	Clear in a. m. ; hazy in p. m.
7	17½	22	35½	36	Easterly, light.....	Snow all day.
8	13	20	35½	35½	Northeast, light.....	Cloudy a. m. ; clear p. m.
9	6	22½	35½	35½	Easterly, light.....	Snow.
10	— 1	7	35	35	Northwest, fresh.....	Clear.
11	—18	15½	35	35½	Westerly, light.....	Clouds till 9 a. m. ; then clear.
12	—22	15	35	35½	Northwest, light.....	Clear.
13	4	16	35	35½	Easterly, light.....	Cloudy ; snow at 4 p. m.
14	15	21½	35	35½	Northwest, fresh.....	Clear.
15	— 1	2	35	35½	Northerly, fresh.....	Do.
16	0	15	35	35½	Northerly, light.....	Hazy.
17	— 2	7	35	35	Northerly, fresh.....	Clear.
18	— 7½	3½	35	35	Northerly, light.....	Hazy.
19	—13½	14	35	35	do.....	Clear.
20	—28	8½	35	35	do.....	Do.
21	—14	9	35	35	do.....	Mostly cloudy.
22	8	19	35	35	Easterly, light.....	Snowing all day.
23	6	17	35	35½	Northwest, fresh.....	Clear.
24	— 3	18½	35	35	Northerly, light.....	Clear a. m. ; hazy p. m.
25	17	33	35	35½	Westerly, fresh.....	Clear.
26	1	11½	35	35	do.....	Do.
27	— 14	13	34½	35	Northwest, fresh.....	Do.
28	1	23	34½	35	Southwest, light.....	Clear a. m. ; hazy in p. m.
29	28	32½	35	35	Northeast, light.....	Mostly cloudy.
30	11	23	35	34½	do.....	Cloudy.
31	1	31	35	35	Southwest, light.....	Hazy.
Sums ...	31	550.5	1088.5	1101.5		
Means ..	1	17.76	35.11	35.53		

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TABLE IX.—Observations on temperature at Bucksport, &c.—Continued.

Date.	Temperature.				Wind.	Remarks.
	Air at H. H.		Water at H. H.			
	7 a. m.	1 p. m.	7 a. m.	1 p. m.		
1875.						
Feb. 1	20	25	35	34 $\frac{1}{2}$	Northeast, light	Mostly clear.
2	14	28	35	34 $\frac{1}{2}$	Southwest, light	Hazy.
3	20	32 $\frac{1}{2}$	35	35	Southerly, light	Cloudy a. m.; rain p. m.
4	27 $\frac{1}{2}$	24	34	35	Northwest, light	Mostly clear.
5	1	14	34 $\frac{1}{2}$	35	Northwest, fresh	Clear.
6	10	19	34 $\frac{1}{2}$	35	Westerly, fresh	Do.
7	12	4	34	35	Northwest, fresh	Do.
8	6	1	34	34	Northerly, fresh	Snowing all day.
9	16 $\frac{1}{2}$	4	33 $\frac{1}{2}$	34	Northerly, light	Clear.
10	3	11	34	34 $\frac{1}{2}$	do	Do.
11	9	30	34	34	Southerly, fresh	Snowing all day.
12	10 $\frac{1}{2}$	13	34	34	Northerly, fresh	Clear.
13	18	9	34	34	Northwest, fresh	Do.
14	17	9 $\frac{1}{2}$	33 $\frac{1}{2}$	33 $\frac{1}{2}$	Northerly, light	Do.
15	34	4	33 $\frac{1}{2}$	33 $\frac{1}{2}$	Northerly, fresh	Do.
16	6 $\frac{1}{2}$	14	33 $\frac{1}{2}$	34	Northerly, light	Do.
17	12 $\frac{1}{2}$	18	33 $\frac{1}{2}$	34	Southeast, light	Cloudy a. m.; snow p. m.
18	1	11	33 $\frac{1}{2}$	34	Northwest, fresh	Clear.
19	7	26	33 $\frac{1}{2}$	34	Southerly, light	Cloudy.
20	31 $\frac{1}{2}$	39	33 $\frac{1}{2}$	34	Northeast, light	Cloudy a. m.; rain p. m.
21	27	29	33 $\frac{1}{2}$	34	Northwest, fresh	Clear.
22	4	22 $\frac{1}{2}$	33 $\frac{1}{2}$	34	Westerly, light	Do.
23	34 $\frac{1}{2}$	41 $\frac{1}{2}$	33 $\frac{1}{2}$	34 $\frac{1}{2}$	Southerly, light	Mostly cloudy.
24	35	43	34	34 $\frac{1}{2}$	do	Rain a. m.
25	33	41	34	35	Easterly, light	Rain 10 a. m.
26	25	2 $\frac{1}{2}$	34	35	Westerly, fresh	Clear.
27	13	27	34	34	Northerly, light	Cloudy.
28	12	13	33 $\frac{1}{2}$	33 $\frac{1}{2}$	Northerly, fresh	Clear.
Sums ...	224	580.5	950	960		
Means ..	8	20.73	33.93	34.29		

TABLE IX.—Observations on temperature at Bucksport, &c.—Continued.

Date.	Temperature.				Wind.	Remarks.
	Air at H. H.		Water at H. H.			
	7 a. m.	1 p. m.	7 a. m.	1 p. m.		
1875.						
Mar. 1	- 2	17	33	33	Westerly, light	Mostly cloudy.
2	19	20	33	33	Northeast, light	Cloudy.
3	2	21½	33	33½	Easterly, light	Clear a. m.; cloudy p. m.
4	9½	19½	33	33	Easterly, fresh	Snow.
5	- 3	32	33	33½	Easterly, light	Mostly cloudy.
6	27	40	33	33½	Southerly, light	Cloudy; snow in p. m.
7	33	40	33	33½	Southwest, light	Cloudy.
8	22	31	33	33	Northerly, fresh	Mostly cloudy.
9	16½	37½	33	33	Southwest, light	Cloudy; snow at 4 p. m.
10	27½	34	33	33½	Southerly, light	Snowing all day.
11	33	41	33	33	Northeast, light	Mostly clear.
12	33	39½	33	33½	Southerly, light	Snow a. m.; cloudy p. m.
13	27	41	33	33½	Northeast, light	Clear.
14	11	41	33	33½	Variable, light	Do.
15	31½	42½	33	34	Easterly, light	Cloudy.
16	33	37½	33	33½	do	Do.
17	33½	39½	33	33	Southwest, light	Clear.
18	15	21	32½	33	Northwest, fresh	Do.
19	12½	25	32½	33	do	Do.
20	12	18	32½	33	Easterly, light	Cloudy a. m.; snow p. m.
21	11	28	32½	33	Northerly, light	Clear.
22	11½	18	32½	33	do	Do.
23	10	22	32½	33	do	Do.
24	4	32	32½	33	Southerly, fresh	Clear till 10 a. m.; snow in p. m.
25	29½	31½	32½	33	Northeast, fresh	Snowing all day.
26	17½	39	32½	33½	Southwest, light	Clear a. m.; hazy p. m.
27	35	47	32½	33½	do	Clear.
28	31	37	33	33½	Northerly, fresh	Do.
29	8½	41	32½	33½	Southerly, light	Do.
30	17	43	32½	33½	Westerly, light	Do.
31	28	41	32½	34	Southwest, light	Do.
Sums ...	569	1018	1016.5	1032		
Means ...	19.23	32.84	32.79	33.29		

TABLE IX.—Observations on temperature at Bucksport, &c.—Continued.

Date.	Temperature.				Wind.	Remarks.
	Air at H. H.		Water at H. H.			
	7 a. m.	1 p. m.	7 a. m.	1 p. m.		
1875.						
April 1	35	37½	33	33½	Southerly, fresh	Cloudy.
2	35	47	33	34	Southerly, light	Cloudy a. m.; mostly cloudy p. m.
3	40	43	33	34	do	Cloudy and rain.
4	35	38	33	33	Northeast, light	Rain a. m.; cloudy p. m.
5	34½	35	33	33	Northeast, fresh	Snow a. m.; partly clear p. m.
6	28½	36	33	33	Northerly, fresh	Clear.
7	22½	35	33	33½	Northerly, light	Do.
8	25	46	33	33½	Southerly, light	Clear a. m.; cloudy p. m.
9	26½	43	33	34½	Northerly, light	Clear.
10	38	48	33	34	do	Mostly clear.
11	41½	39	33	34	Northeast, light	Squalls.
12	29	38	33	34½	Northerly, light	Clear.
13	30½	35	33	34	Easterly, light	Cloudy.
14	25½	40	33	34	Northeast, light	Partly clear.
15	31	45	33	34½	Southwest, light	Clear a. m.; cloudy p. m.
16	40½	44	33½	34½	Southeast, light	Cloudy.
17	43½	41½	33½	34½	do	Rain a. m.; mostly cloudy p. m.
18	27	37½	33½	35	Northerly, light	Clear a. m.; cloudy p. m.
19	25	37	33½	35½	do	Clear.
20	19	29	33½	35½	Northerly, fresh	Cloudy a. m.; snow p. m.
21	21	33½	33½	35	Northeast, light	Snow a. m.; cloudy p. m.
22	31½	45	33½	39	Northerly, light	Clear.
23	39	55	33½	41	Northwest, light	Do.
24	41	60	35	41½	Westerly, light	Do.
25	42	56½	36	42	Northerly, fresh	Do.
26	41	49	36	40	Northeast, light	Cloudy a. m.; clear p. m.
27	33	48	36½	42½	Northwest, fresh	Clear.
28	31	47	38	44	Northeast, light	Clear a. m.; hazy p. m.
29	29	52	39	44	Southwest, light	Clear.
30	38	48½	38½	43	Southerly, fresh	Mostly clouds.
Sums ...	982	1289	1022	1094		
Means ..	32.73	42.97	34.07	36.47		

TABLE IX.—Observations on temperature at Bucksport, &c.—Continued.

Date.	Temperature.						Wind.	Remarks.
	Air at H. H.		Water at H. H.		Water at pond.			
	7 a. m.	1 p. m.	7 a. m.	1 p. m.	7 a. m.			
					Surface.	Bottom.		
1875.								
May 1	40	52	39½	43	39	39	Northerly, light.	Partly cloudy.
2	37½	39½	39	39	39	39	Southeast, light.	Rainy.
3	36	47	38½	41	39	39	Westerly, fresh.	Mostly cloudy.
4	41	52½	39	42½	39	39	Northerly, light.	Mostly clear a. m.; cloudy p. m.
5	39	53	39	43½	40	40	Variable, light.	Clear a. m.; cloudy p. m.
6	43½	58	41	45	42	41½	Southerly, light.	Partly clear a. m.; cloudy p. m.
7	44	61	42½	50	44	43	Variable, light.	Clear.
8	44½	54½	45	48½	46	45	Southerly, light.	Hazy a. m.; cloudy p. m.
9	39	41½	45	46	46½	45	do	Raining all day.
10	42	50	45½	47	47	46	do	Cloudy.
11	42	61	46	54	47	46	Southwest, fresh.	Clear.
12	46	57½	49	51	49½	48	do	Mostly cloudy.
13	46	61	49	57	50	49	Northwest, fresh.	Clear.
14	45	67½	51½	59	53	49½	Southwest, light.	Do.
15	48	49	52	53	53	50	Southeast, light.	Rainy from 9 a. m.
16	46	45	52	52	53	50	Northeast, light.	Rainy a. m.; cloudy p. m.
17	42	57	51	56	51	51	Northerly, fresh.	Clear.
18	41	59½	51½	57	53	51½	Northeast, fresh.	Hazy.
19	43	49	51	53	51½	51½	Easterly, light.	Rainy.
20	45	46	51	53	51½	51½	Southerly, fresh.	Cloudy a. m.; rain p. m.
21	49	66	51	57½	51½	51½	Northerly, fresh.	Clear.
22	50½	69	53	57½	54	52	Southwest, light.	Do.
23	55	63½	55½	69	55½	54½	Northerly, light.	Do.
24	51	64	56½	61	57½	54	Southwest, fresh.	Clear.
25	58	75	57	64	58½	57	Southwest, light.	Hazy.
26	61½	74	61½	69	62	57½	Northwest, fresh.	Clear.
27	54	68	61	67	61½	60	Northerly, fresh.	Do.
28	54	68½	60	67	61½	61	do	Clear.
29	58½	67½	61	67	62	61	Variable, fresh.	Cloudy.
30	50	62	59½	63	61	60½	Southerly, light.	Do.
31	55	63	59½	65½	61	60½	Variable, light.	Mostly clear.
Sums ...	1447	1802	1552.5	1699	1580	1544		
Means ..	46.68	58.13	49.74	54.80	50.97	50.13		

TABLE X.—General summary of observations on temperature at Bucksport, from June, 1873, to May, 1875, inclusive.

Date.	Air at hatching-house.				Water at hatching-house.				Water at the pond.										
									9 a. m.										
									Surface.		Bottom.								
	7 a. m.	1 p. m.	Max.	Min.	7 a. m.	1 p. m.	Max.	Min.	Surface.	Bottom.	Max.	Min.	Max.	Min.	7 a. m.	1 p. m.	Max.	Min.	
1873.																			
June.....	56.13	73.13	88	46										a69.5	a71.4	75	66	a67.9	a68.2
July.....	62.9	80.06	92	55										71.77	74.03	80	67	70.74	71.61
August.....	58.26	76.16	86	46										68.74	70.8	77	60	68.26	68.8
September.....	49.83	63.97	84	37										60.4	61.67	66	56	60.07	60.67
October.....	40.87	54.54	69	27										52.19	53.65	59	46	52.03	52.65
November.....	20.85	30.7	48	1	37.1	38.18	48	33						b37.65	b37.66	46	33	c30.92	c30.65
December.....	15.52	26.45	44	1	33.54	33.69	35	32½											
1874.																			
January.....	14.84	22.71	50	-13	33.19	33.39	34	33											
February.....	10.54	25.16	45	-21	33.43	33.83	34½	32½											
March.....	21.61	33.36	46	1	33.64	35.00	37½	32½											
April.....	29.25	33.38	53	5	35.53	37.97	42	34											
May.....	45.81	52.94	76	34½	51.03	53.38	64½	37½	53.95	51.11	66	41	58	40					
June.....	54.33	66.4	84	45	60.65	64.83	74	56	62.97	60	69	57	63	57					
July.....	60.73	73.52	89½	50	d64.67	d62.73	75	60½	68.21	65.73	75	62	70	60½					
August.....	56.84	70.94	82	44					67.23	65.32	71	64	69	62					
September.....	53.67	64.38	81½	40					62.93	62.04	67	59½	66	58½					
October.....	40.71	54.02	60	28					51.34	50.90	57	47	52	46					
November.....	27.73	37.27	50	9	f37.07	f32.76	47	33	g43.8	g43.3	50	34	49	37½					
December.....	15.76	25.97	44	-11	35.06	35.53	37	34½											
1875.																			
January.....	1	17.76	33	-28	35.11	35.53	37	34½											
February.....	8	20.72	43	-18	33.93	34.29	35	33½											
March.....	13.23	32.84	47	-3	32.79	33.29	34	32½											
April.....	32.73	42.97	60	19	34.07	36.47	44	33											
May.....	46.68	58.13	75	36	49.74	54.80	69	36½						50.97		62	39	h50.13	61

a Average of observations from June 21 to 30 inclusive.
 b Average of observations from Nov. 1 to 19 inclusive.
 c Average of observations from Nov. 1 to 13 inclusive.
 d Average of observations from July 1 to 15 inclusive.

e No observations made September 20.
 f Average of observations from Nov. 3 to 30 inclusive.
 g Average of observations from Nov. 1 to 15 inclusive.

B—THE SALMON OF LAKE CHAMPLAIN AND ITS TRIBUTARIES.

BY W. C. WATSON.

SIR: I take great pleasure in complying with your request "to prepare a paper on the salmon of Lake Champlain and its tributaries". I fear, however, that I shall not succeed in furnishing anything novel or interesting, or add essentially to the views I have already published.

I.—ABUNDANCE OF THE SALMON IN EARLY TIMES.

Since the receipt of your favor, I have sedulously tried to trace old residents, from whom I might derive some new facts or incidents, illustrating the prevalence of the salmon at the early stages of the settlement of the region, or for observations disclosing fresh or unfamiliar traits in their habits. My efforts have been attended with only trifling success. When I first engaged in the investigation of this interesting subject, nearly a quarter of a century ago, I secured information from many persons, whose recollections extended almost to the period when the fisheries of the country were in their normal condition, or of those who had received traditions of the salmon from their immediate ancestors, which imparted much valuable intelligence. I garnered up from such sources many important facts; but now, when I attempt to renew these inquiries, I find that few of that class of persons remain, and that the field of research is very limited.

One fact, which is fully established in the traditions of the salmon-fisheries, has, I conceive, important bearing on the scheme in which you are so deeply and efficiently interested, and presents most favorable auguries of the success of the undertaking. I refer to the wonderful exuberance of this fish when the country was first occupied. I base the opinion upon the idea that this exuberance indicates that the locality was congenial to their habits, and that they were attracted to these haunts by peculiar causes. I will venture to suggest a few speculations on the subject, although they may appear crude and unphilosophical to your great experience and attainments.

I believe that no other waters, not even the tributaries of the Onion,* ever exhibited so extraordinary a copiousness of these fish—and certainly they could not have exceeded it—as they appeared to the occupants of the Champlain Valley in the latter part of the last century and early in the nineteenth. The natural causes are very obvious which produced this result, and among them a few circumstances may be indicated. Lake Champlain was readily accessible to the salmon from the ocean by the way of the Saint Lawrence and Sorelle or Richelieu Rivers, and was also comparatively contiguous to the cold northern seas. The streams emptying into the lake have generally a short course, and usually with long reaches

* Now called Winooksi River.

of gravelly bottoms, are rapid in their currents, and start from cool lakes and ponds, and in their passages at that time were largely fed by cold springs, and shielded in their whole progress by the canopying of heavy umbrageous trees and bushes, which effectually shielded them from the influence of the sun's rays and the warm air. A coolness of the water not exceeding probably 45° , a temperature so delightful to the salmon, was thus maintained. Each of these qualities of the streams, impetuosity of the current, a gravelly bottom, a low temperature, to which may be added great purity, is a condition of nature eminently attractive to the salmon. They enjoyed repose and impunity amid the utter silence and seclusion they loved. They were not hunted by the ruthless sportsman, or even disturbed by the spears and nets of the Indian. They had easy and safe access to their favorite breeding-grounds. When Champlain entered the lake in 1609, he found its shores unpeopled and silent. The smoke of not a single wigwam arose in the atmosphere on either shore. The bloody and perpetual incursions, along the common highway it afforded, of the Mobawks and Algonquins in their reciprocal attacks, had driven the savages that once inhabited the beautiful territory into the recesses of the interior for security. The region bordering on the lake was a scene of total desolation, and continued in that condition to the middle of the succeeding century, and was but sparsely occupied until near its close. In the view I have embraced, this aspect of nature rendered the lake and its affluents singularly adapted to the habits of the salmon, and attracted them in the remarkable abundance which we shall see did exist.

The fact of the exuberance of the salmon in these waters when the environs were first occupied by civilized man is established by the most ample and satisfactory testimony, and appears to me worthy of perpetuation, as interesting in its relation to natural history, and as calculated to aid and illustrate the future researches of the student of nature.

The first historic notice of the prevalence of salmon in the region, I think, appears in the correspondence between William Gilliland, the pioneer of the Champlain Valley, and Arnold, who was cruising on the lake with the American flotilla in the summer of 1776. His letter states that on a single occasion Gilliland had presented seventy-five salmon to a petty-officer of Arnold, and asked the services of the ship's carpenters to repair his "salmon-crib and apparatus, which had been carried away by a great flood". He also affirms, in a memorial to Congress in 1777, that he "had complimented the American Army with fifteen hundred salmon in one year". When the writer first became a resident of the district in 1824, many of the original settlers of the country were yet living, who were men of respectability and position, and of undoubted veracity. Their tales of the abundance of the salmon which prevailed at that time demanded for their acceptance an exercise of the strongest faith in the truthfulness of the narrators. Coming from the unimpeachable sources they did, and corroborated by uniform

traditions and the current of universal testimony by actual observers or participants of the incidents, there was no hesitation in receiving the statements as authentic and true. I have heard the account from several of these individuals that when they immigrated many streams were so thronged by the salmon that it was unsafe at particular seasons to ride a spirited horse into them, for the reason that the fish were so abundant and bold that they would fearlessly approach the horse and strike him with great force by the powerful muscular action of their bodies. It was often represented that it was a common pastime, as well as a most desirable means of obtaining food at that time, to drive a team into some of the shallow tributaries of the river, and from the wagon spear the salmon with pitchforks, and thus obtain in a few minutes all the fish needed for consumption. Many of the salmon taken in this primitive method would reach twenty pounds in weight.

Among the various persons from whom I have received interesting information in aid of my inquiries, I am particularly indebted to Silas Arnold, esq., of Reeseville, for several facts which were communicated to him by his father, Hon. Elisha Arnold. This gentleman was one of the earliest prominent settlers, and subsequently attained high social and political standing in the district. Among these incidents, Mr. Arnold recalls the following circumstance, which coming from so intelligent and reliable an authority amply corroborates the almost incredible traditions of the former copious prevalence of the salmon in these waters. About the year 1800, or possibly a year or two previous, at any rate it was at so early a period in the occupation of the country that the pathway through the woods, leading from the residence of Judge Arnold, situated near the center of the present town of Peru, to Plattsburgh, was marked by a series of blazed trees. As he was proceeding to the latter place, in fording the Little Au Sable, a small shallow stream, near its mouth, the passage of his wagon was largely impeded by the throng of salmon which was in the stream, and he readily caught and threw upon the bank all he wished to take.

Mr. Arnold has called my attention to a familiar fact, which is observed among all gregarious fishes, and is peculiarly characteristic of the salmon family, and tends to relieve the marvelous tales of the early exuberance in the Champlain region of the salmon from their incredible aspect. He says that they ascended the streams in shoals, or schools, which intermitted in their progress, and that the flow of the fishes was not constant or continuous as might be inferred by the language of the traditions; that when encountered in the vast masses so often described, they were passing a particular locality, consolidated in one of these shoals, or schools.

Mr. Oscar F. Sheldon, formerly of Willsborough, Essex County, communicated to me a record, which he deems perfectly authentic, of five hundred salmon being taken in a single afternoon early in the present century, from the river Bouquet. The Bouquet is a tributary of Lake

Champlain, and may be regarded almost as an estuary up to the falls, a distance of about three miles, and is navigable to that point by vessels of light draught. It was therefore peculiarly adapted to the habits of the salmon, and beyond the falls I think they could not penetrate.

The record of the circumstance of capturing fifteen hundred pounds of salmon in the year 1823, at a single haul of the seine, near Port Kendall, in the town of Chesterfield, in the county of Essex, was said to have been among the papers of Levi Highby, esq., in 1852. He was a man of high character, and was, I understood, an actor in the achievement. This fact is not only memorable for the extraordinary quantity of the fish taken, but it also illustrates the singularly erratic and inscrutable habits of the salmon. In all my investigations on the subject, this is the only instance that I have learned of the salmon being taken in any great quantities except from the rivers and their branches. The facts connected with this incident seem to claim some attention, as calculated to throw a little light on the history of the fish. Between the Bouquet and Au Sable Rivers, no stream of any magnitude enters the lake except the brook that debouches at Port Kendall. This brook plunges over a sheer precipice of at least forty feet, directly into the waters of the lake, without any or scarcely any space intervening. The immense catch of salmon recorded could not therefore have been taken while they were attempting to reach their spawning-grounds, but were found near the shore, although in the open waters of the lake. They must necessarily wander through the lake in schools; but this is the only case which I have been able to trace where they have been captured except in streams or in the act of entering into them.

These facts, which might, I think, be accumulated by a large catalogue of similar incidents, are sufficient, in my judgment, to sustain the proposition that the waters and the tributaries of Lake Champlain were teeming at a former epoch with salmon to an extraordinary, if not unexampled, extent.

2.—THE DISAPPEARANCE OF THE SALMON, AND ITS CAUSES.

Unhappily, another fact, alike regretted by the sportsman and the political economist, is equally clear—the total disappearance for many past years of this prince of fishes from all the region. An event of such importance has elicited much inquiry and speculation, but it still remains a problem that will probably never receive a satisfactory solution. Various theories in regard to the agencies which have caused this singular revolution have been suggested and may claim investigation. If any physical condition of the country, or the waters, or their channels, formed allurements that attracted the salmon, the decay or removal of these conditions would necessarily dispel such attractions, and tend to the abandonment of the region by the fish. I have referred to the uncommon repose and seclusion, even in a wilderness region, that marked the borders of the lake, as one explanation of the original exuberance of salmon in these tranquil scenes. The first occupation of

the country began to disturb that repose; and, as the population increased, the solitude and quiet of the fish were more and more invaded, until ultimately the clangor of machinery, the tumult of business, and, with far greater effect than all the rest, the jarring of the engines of steamboats and their fierce disturbance, expelled the salmon from their ancient and loved haunts.

In regard to the effect of steamboats on the salmon-fishery, the Hon. Thomas B. Watson, of Peru, Clinton County, communicates to me the following statements, which he received from an aged man whose whole life has been devoted to fishing. He says that the salmon run from the lake into the rivers during the night, and that he has frequently seen them, when a steamer was merely crossing the mouth of a stream, so excited by alarm and panic at the noise and agitation as to rush impetuously over a shallow bar into the deep water of the lake. The same person informed Judge Watson that the opinion prevailed among old fishermen, when the decadence of the salmon-supply first began to be observed, that it was caused by their disturbance on the Richelieu River from the steamboats; and, in support of this idea, he said that he was engaged in 1838 in capturing between fifty and sixty salmon in the Au Sable River, and that no salmon had appeared in that stream for the fifteen preceding years, and by a singular coincidence, which confirmed in their minds this theory, the only steamer plying on the Richelieu had been burned the same season. However correct may be this conclusion, any impediment or disturbance which may have existed in that narrow and shallow stream may be enumerated among the possible causes of the expulsion of salmon from the lake. That all fishes (and the fact may be exhibited especially in a family so sensitive and shy in its nervous organization as the salmon) are frightened from their haunts by noise and agitation has been sufficiently demonstrated on Lake Champlain in the recent construction of the New York and Canada Railroad. This work was attended by heavy explosions near the waters, which fish had been accustomed to frequent in great copiousness. I have understood that immediately afterward these resorts were generally, at least for the time, abandoned by the fish. The quiet the salmon constitutionally delights in and its sense of security have been invaded, with consequences still more effective, by another agency, which became augmented by the increase of population. I refer to the persistent and inexorable hunting that not only assailed them by the net and the jack-light and spear, but pursued them to their gravelly beds and breeding-grounds, and there not only ruthlessly slaughtered the mothers and millions of the embryo, but drove innumerable multitudes in panic and alarm from the waters, probably never to return to their former haunts.

Another reason may be assigned, and I conceive with much force, for the salmon relinquishing localities which were once their favorite resorts. They love, as I have stated, to seek cool waters, and this gratification they attained in the normal condition of the region; but when

in the progress of improvement "the forests primeval" that embowered the streams, and aided in imparting a delightful coolness to the waters, were removed, and the waters exposed to the action of the sun and air, while the cold springs that fed them were desiccated, the temperature of the water was raised higher than to be congenial to the habits of the salmon. This condition may be discerned in nearly every stream that flows into the lake. Another qualification of the water which is essential to the comfort and enjoyment of the salmon is that it should be pure, and, in the words of Judge Watson, "highly aerated". The rapid erection of saw-mills, until they occupied almost every water-power, literally extinguished in almost every stream this native condition. The sawdust stained and polluted the water, and the sediments and *débris* of the mills settled largely on the gravelly bottoms, which had been so alluring to the salmon, changed their character, and revolted the cleanly habits of the fish. Mr. Arnold mentions another effect from this cause, which may have exerted a greater influence. He has observed, in his own experience, that the sawdust with which the water was charged was necessarily inhaled by the fish with the fluid, and that particles of it were not ejected, but remained adhering to the gills. This mechanical effect must have produced annoyance to the creature, with succeeding suffering and possible death.

The most formidable and indeed insuperable obstacle to the ascent of the salmon were the innumerable dams constructed on almost all the streams near their mouths. These were usually of a perpendicular height so great as to utterly repel the attempts of the fish to overcome them. This cause of the disappearance of the salmon is so paramount and obvious that the discussion of any other would be superfluous were it not that it seems appropriate in a paper like this to present every possible view of the question before us, and for the very conclusive reason that several streams, of which the Au Sable River is a striking instance, that have equally suffered with the others from the abandonment of the salmon, have never impeded the run of the fish by dams or any other artificial obstruction. Had the advent of the salmon in the rivers been coincident with the season of high water, their ascent of these impediments would have been immensely facilitated, but their run was precisely at the usual occurrence of the lowest flow of the streams. The volume of water was almost totally exhausted by the flumes, and at times scarcely trickling over the apron of the dam, without furnishing any supply to the slopes or sluices constructed in accordance with the statute. The popular excitement became at length so deeply inflamed by acts which were then regarded as encroachment on public immunities that the grand jury of Clinton County, New York, were impelled, in the year 1819, to present an indictment against the proprietors of the dam erected at the mouth of the Saranac River in Plattsburgh. The indictment, among other averments, alleged that previous to the erection of this dam "salmon were accustomed to pass, and actually did

pass, from Lake Champlain into and up the Saranac River for a distance of twenty miles; * * * that before the dam was built salmon were seen above the site;" and that "after it was built many were caught at the foot of the dam, but none above it;" "that salmon begin to ascend the river from the lake in June and July, but largely in August and September". It appeared that the dam was fourteen feet high, and the sluice-way forty feet long, and arranged at an angle of 30°.

This indictment was vehemently pressed, and resulted in a protracted and bitter trial in the circuit court. It was calculated to open a thorough investigation of the habits and movements of the salmon in connection with that particular stream. A great mass of witnesses, embracing most of the early settlers then living, were introduced, and, had the great volume of testimony taken on that occasion been preserved, we should now be in possession of all the essential facts and incidents necessary to form a history of the salmon-fishery of that period and locality. Although the case was elaborately argued in the supreme court (Johnson's Reports, 17, page 195) both on the merits and the law, the decision, which was in favor of the defendants, unfortunately rested purely on legal and technical views, and we have but slight references to the facts in the report. We detect, however, faint glimmerings of the evidence in the arguments of counsel. It seems to have been in proof that the water in the sluice-way was too shallow to admit the passage of the fish. It is worthy of remark that one point of Mr. Walworth, the future eminent chancellor, as counsel for the defense, and evidently based on some features of the testimony, was that "no fish visit the lake from the ocean; the salmon ascend from the lake, and are fresh-water fish".

And it appears from a point made by the opposing counsel that "the evidence in the case is that salmon abounded at the foot of the dam, and would ascend the river if not hindered by that obstacle".

We may perhaps appropriately refer, as a subordinate cause of these results, to the depredations of other fish upon the salmon by assailing them on their spawning-grounds, destroying the ova, killing the young fish on their passage to the sea, and frightening the salmon from their usual haunts. This cause, of course, always existed, but circumstances might have stimulated its development.

These changes in the physical condition of the region seem adequate to producing the abandonment by the salmon of the Champlain waters, but they were entirely local. The eccentric and capricious nature of all fish, which produces many strange phases in their movement, and from the general operation of which the salmon is not exempt, may be referred to as another possible cause of their disappearance from these waters. The idea is probably fanciful; but as my purpose is to unfold the whole subject, it may not be unworthy of a moment's inquiry. Is it wholly improbable that the abandonment of the Champlain waters by the salmon may be due to their finding more genial resorts and fresh and more attractive feeding-grounds? I will venture to present a few facts in support of this suggestion. During my

long residence on the borders of Lake Champlain, I have observed that a particular kind of fish will occasionally, through several successive seasons, be very abundant; that the supply gradually diminishes, until, in the end, they nearly disappear, while another variety becomes predominant, rapidly increases as the first decreases, and they also pass through the same changes. The smelt, a marine fish, was, until, a comparatively recent period, almost unknown to the fishermen of the lake; but in late years it is often taken in vast quantities through the ice, while in some seasons it is rarely seen. Such, also, has been largely the history of a choice fish known in this region as the lake-shad.

3.—TRAITS OF THE SALMON.

The pertinacity of the salmon in renewing, after repeated failures, their attempts to leap up falls too high for their powers, and the vast muscular force they exhibited, was witnessed by the settlers with equal wonder and admiration. I do not know that the myth, which once prevailed in the popular faith of England and Scotland, that the salmon taking the tail in its mouth formed a wheel and thus rolled up the cascade, ever obtained in this region; but the stories of the pioneers and old fishermen were almost equally marvelous. The fish ascended the precipice by the mere exertion of physical strength; but the method which it is said they adopted to secure a safe descent reveals a wonderful instinct or a rare exercise of sagacity and intelligence. They were accustomed, it is related, to approach very near the verge of a fall, and instead of allowing themselves to be precipitated headlong or rolled sideways down the current, with the imminent peril of being dashed upon the rocks below or drowned, they would deliberately turn their tails toward the cascade and by the vigorous action of their fins and motion of their bodies would maintain their position and be borne safely down the obstacle.

The progress of the salmon in their annual migration from the sea to the tributaries of the lake seems to have been singularly slow and methodical. Instead of diffusing themselves at once and promiscuously through the lake, the advance from the north was apparently controlled by a system or some law of instinct. The old fishermen all concur in the recollection that a considerable interval, varying in their statements from one week to a month, always occurred between the time of arrival of the fish in the Saranac and their appearance in the Au Sable, although the mouths of these streams are only separated by a space of about twelve miles. Incidents in the habits of the salmon, which came under my personal observation more than fifty years ago, expose some traits which possibly may be regarded in the measures in progress to rehabilitate the streams with these fish. A high bridge spanned the Saranac, near its mouth, in the village of Plattsburgh; a massive dam stood a few rods above, as it did at the commencement of the century; on the west end of the dam, the statutory trough or slope had been constructed, and on the opposite end was situated a large saw-mill,

which discharged a strong and impetuous volume of water through a race-way. I saw schools of salmon swimming below the bridge, and individuals speared from it at a height of fifteen or twenty feet. They seemed to be wandering in confusion, ascended to the foot of the dam and returned, paying no attention to the sluice-way, which was indeed impracticable for their ascent from the slight supply of water that passed down the slope. They were constantly attracted to the race-way, and plunged into it as if its rushing current was congenial to their habits, or perhaps in the vain hope of reaching by that channel their appropriate breeding-grounds. A weir was built in this race-way, in which, during the season, salmon were daily captured.

4.—THE AU SABLE RIVER.

The contemplated scope of this paper does not embrace any notice of the policy which has been initiated for restoring salmon to the waters of this region; but I will venture to express a regret that the experiment was not extended to the Au Sable River. The reasons for this view will best appear from a brief notice of the peculiarities of the stream and the salmon-fishery connected with it. It will be seen that it retains, more than any other tributary of the lake, its original qualities and conditions.

The river measures from the lake to a high vertical fall, which was never surmounted by the salmon, a distance of about six miles. Nearly one-half of this space is below the chasm, and occupied by heavy rapids or gentler ripples, with occasional short ranges of slackwater. A placid and deep pool lies immediately at the foot of the chasm, where the water seems to rest after its turbulent passage through the gorge. Above this point, the water rushes with impetuous violence, and in part of its course is compressed within a narrow natural canal, where a human foothold cannot be maintained for a moment, and which no fish but the salmon could ascend. In the short space between this canal and the falls, the stream somewhat expands and although rapid is less vehement than below. Through its whole course, with brief intervals, it is overshadowed by masses of trees and thick bushes, or it leaps and roars beneath lofty precipices that cast a perpetual shade, where the rays of the sun have never penetrated. At one period, the whole line of the river above this fall was studded with saw-mills; but to-day not one of any magnitude exists within twenty miles of the lake, while below this point no dam or other artificial obstruction has ever been erected on the river. Such is the present aspect of the Au Sable, and such was nearly its condition a hundred years ago. In the six miles I have described, it is as quiet and secluded as it is possible any stream can be in the midst of a populous and cultivated territory. The remarkable circumstance to which I have adverted of the appearance of the salmon in the Au Sable River in the year 1838, and long after they had abandoned all the waters of the Champlain system, while it is highly significant in

several respects, has an important bearing on the point we are examining. Were they allured back to the stream by its peculiar and exceptional condition? Were they an advance-party exploring their former haunts, with a purpose of recolonization by their tribe? The Au Sable never abounded with salmon to the extent that characterized other streams in the vicinity. No traditions exist of its having teemed with vast schools of the fish. They frequented it, however, in numbers to make the fishery highly satisfactory. The salmon, it is supposed, left this river simultaneously with their abandonment of all the other tributaries of the lake. We have seen that no dam or other artificial obstruction ever existed on the lower portion of the river, and therefore the disappearance of the fish from that particular stream cannot be imputed to the existence of any of these impediments. We must account for this result on some different theory. Modern improvement has created structures over the Au Sable which may affect the successful introduction of the salmon into the stream. The New York and Canada Railroad crosses the river not far from its mouth, and has constructed a bridge over both the branches, which form a delta of the river. The bridges are much elevated above the usual level of the water; I have felt apprehensive that these structures and their use might impair the value even of the common fisheries on the stream. The hunting of the salmon at that period in the Au Sable was by unusual methods and specially exciting. An aged man is still living who informed Dr. George F. Bixby, of Plattsburgh, that, in his boyhood, he was in the habit of carrying a torch or jack-light for a sportsman to spear salmon in this stream, and that they killed them, often weighing twenty pounds. They would descend the high bank and enter the river near the head of the natural canal, and, wading in the water toward the fall, found the fish lying upon the bottom, who, either dazzled by the light or careless in their refuge, would allow the spearsman to approach them sufficiently near to strike. He represented the fish as appearing, when the torch-light was reflected from their mottled backs, like bunches of hay sunken in the water.

The valued correspondent from whom I have frequently quoted, writes me that when a child he saw a man sitting in a boat at the head of one of the rapids I have described, and drawing in the salmon with great rapidity; that he cast a long line and a common hook baited with a piece of pork into the rapids, and that even before the hook touched the water the fish would seize it with the eagerness that is often displayed by the trout. This is the only instance that my inquiries have disclosed of salmon being taken in these waters by the hook. It was a common sport, fifty years ago, to seek the salmon on the falls, where they were speared in great numbers, as they attempted to leap up the precipice.