

XI.—STATISTICS OF THE LOFFODEN FISHERIES FOR 1878.

(From the official report of the Superintendent, First Lieutenant in the Navy, Niels Juel.)

Number of fishing-stations.....	56
Extent of fishing-district in nautical miles.....	12 $\frac{1}{2}$
Highest number of vessels in the district.....	722
Highest number of boats in the district.....	4,912
Highest number of men in the district.....	27,350

Number of telegrams.

Months.	Received.	Sent.	Total.
January.....	1,003	1,707	2,710
February.....	2,175	3,288	5,463
March.....	5,696	7,578	13,274
April.....	3,880	4,915	8,795
Total.....	12,724	17,488	30,212

Number of boats in the district at the end of each week.

Week ending January 19	
January 26	
February 2	2,227
February 9	2,549
February 16	3,087
February 23	4,003
March 2	4,180
March 9	4,357
March 16	4,400
March 23	4,670
March 30	4,673
April 6	3,010
April 13	

Number of men, boats, &c., grouped according to the different kinds of apparatus.

	Fisher-men.	Crews.	Boats.
Net-fishing.....	13,168	2,154	*2,430
Line-fishing.....	7,258	1,089	1,977
Deep-bait fishing.....	2,297	844	†844
Hired men.....	8,311		
Total.....	28,034	4,087	5,251

* 269 of these also occasionally used lines.

† 701 of these used no lines and 143 used lines.

There was an *increase* from last year of 2,542 in the number of net-fishermen, and an *increase* from last year of 417 in the number of deep-bait fishermen, and a *decrease* from last year of 1,504 in the number of line-fishermen.

The percentage of fishermen using different apparatus was as follows: 58 per cent. used nets, 32 per cent. used lines, 10 per cent. used deep-bait.

Number of vessels at the Loffoden March 16, 1878.—Steamers 5, schooners 59, sloops 26, yachts 376, other vessels 202, total 668, with 3,111 sailors, and a tonnage of 342,620.

Cargoes of these vessels.—Not specified 479, dry goods 19, groceries 18, flour 27, ham, lard, &c., 10, bait 14, notions 34, wooden ware 9, with a total value of \$70,400.

Number of days when no net or line fishing could be carried on.

Districts.	January.		February.		March.	
	Nets.	Lines.	Nets.	Lines.	Nets.	Lines.
Skroven	6	6	10	10	8	8
Svolvær	6	6	9	7	6	6
Vaagene	6	6	11	8	7	7
Hopen	6	6	11	11	10	8
Henningevær	7	7	14	10	11	8
Stamsund			14	13	10	9
Ure			15	13	10	6
Balstad			19	12	13	8
Sund			14	14	12	9
Sörvaugen			14	12	11	8

Temperature of the air at the station of Svolvær (in degrees Fahrenheit).

Week ending—	Average temperature.		Highest temperature.	Lowest temperature.
	At noon.	Average lowest temperature.		
January 19	34.16	31.64	39.20	28.94
January 26	31.04	24.44	30.02	21.02
February 2		26.24	35.06	23.
February 9	31.64	27.62	39.02	21.02
February 16	29.84	25.34	35.06	19.94
February 23	34.88	30.74	39.92	27.14
March 2	23.94	23.18	37.04	17.96
March 9	32.	22.46	37.94	17.06
March 16	32.36	25.88	41.	19.04
March 23	37.76	27.14		19.94
March 30	33.44	21.02	39.38	15.03
April 6	42.62	33.08	46.04	32.00
April 13	44.06	32.	48.92	28.94
Average for the season	34.16	26.60		

The average temperature last season was 33.08 F., and the average lowest temperature 24.98 F. It has therefore been a little warmer this year. January and the first part of February on the other hand were considerably colder. The average temperature from January 19 to February 9 was last season 35.6°, and this season 31.82 F. The cause of the early fishing this season can therefore not be the higher temperature, as some have supposed. During the fishing-season I have not been able to discover any connection between the fishing and the temperature of the air. At Hopen and Henningsvær there was good fishing all through February and March, no matter whether the thermometer rose or fell. The few good fishing-days which the East Loffoden fishermen had during February were from the 12th till the 16th, when the average temperature was 28.94 F. From the 11th March to 16th March on the other hand fishing at the East Loffoden was very poor, although the temperature had risen to an average of 32.36 F. Again there was good fishing from the 18th to the 23d of March, when the highest average temperature of March, 37.76 F., was reached. I have therefore come to the conclusion that the fisheries are entirely independent of the temperature of the air, and if Professor Sars and others think they have observed the contrary, they must have taken an exception for the rule.

Temperature of the water at the station of Svølvær in Fahrenheit.—The temperature of the water in the harbor of Svølvær has been observed every day from January 26 to March 2, both at the bottom and at a depth of 6 fathoms (bottom). The temperature at the bottom varied from 32 to 40.10 degrees F., and was generally higher in proportion when the temperature of the air was lower. The instrument used was a Casella-Miller thermometer.

Week ending—	Air.		Water.	
	Noon.	Lowest.	Surface.	Depth of 6 fathoms.
February 9	32.36	27.68	35.09	37.04
February 16	29.84	25.34	35.85	37.78
February 23	34.88	30.74	33.94	36.35
March 2	28.94	23.18	35.00	38.84

The fact of the water at the surface being colder when the temperature of the air was 34.88 F., than when it was colder, is probably caused by the melting of the snow-water. It seems less probable, however, that the effect of the snow-water should be felt at a depth of 6 fathoms, especially as no stream worth the name falls into the sea at this place, and as far as our knowledge goes nothing of the kind has been observed. Between the temperature of the water and the wind there seems to be a certain connection. We could not ascertain which was cause and which was effect as the weather was very changeable. The tide seemed to have no effect on the temperature.

Deep-water temperature.

Depth.	January—		February—							April 8.
	24.	26.	12.	14.	16.	20.	23.	25.	26.	
Surface	34.25	32.45	36.95	37.40	34.25	35.60	35.60	35.15	38.30	35.60
10 fathoms	35.60	35.60	38.30	38.30	35.60	36.05	36.50	41.90	43.25	38.05
20 fathoms			40.10			36.50	37.40	45.50	46.40	36.50
30 fathoms	37.40	39.20	42.80*	43.70	37.40	37.85	38.30	50.90	48.85	36.95
40 fathoms						38.30	39.20	51.80	42.80	
50 fathoms				45.50						39.20
60 fathoms	40.10	41.00				38.75	40.10	52.70	44.00	40.10
70 fathoms				46.40	39.20					

* Observations stopped on account of a storm.

All these observations were taken at the same place, about one-third mile south-southeast of the Svolvær light-house. The instrument was unfortunately broken on the 1st of March, and no further observations could be taken. The observations on the 8th of April were taken with another instrument, which, however, had no indicator, and the result was approximately calculated from data gathered at former observations.

As a general rule the temperature at a depth of 10 fathoms has been 35.60–36.50 F., at 30 fathoms 37.40–38.30 F., and at the bottom 39.20–41 F. There were, however, so many exceptions from this that there is every reason to doubt the correctness of the observations. No fault could be discovered in the instrument; when brought to the surface from the different depths it always fell to the same point at which it stood when lowered. The observation of the 14th of February corroborates the one of the 12th, and that of the 26th makes that of the 25th quite probable. If on the 25th February a current of 52.70 F. degrees warmth really entered the west fiord, it has during the twenty-four hours which elapsed whilst the observations were being taken, mingled with the cold water in the fiord, and this comparatively warm mixed water has risen to the surface; on the 26th it had reached to within 10 to 30 fathoms from the surface, whilst the temperature at the bottom had sunk to 44.60 degrees F. The temperature in the harbor of Svolvær at a depth of 6 fathoms also strangely favors the probability of the observations being correct, as on the 12th, 14th, 25th, and 27th February it was 39.65 to 40.10 degrees, a warmth which was only reached once during the course of the winter, viz, on the 3d February. It is therefore quite possible that there are really very strange currents. No conclusions, however, can be drawn as to their influence on the fisheries until the existence of these currents is fully proved. If instruments can be obtained, the observations will be continued next year.

Proportion of spawners and milters.

Apparatus used.	February.			March 1-18.			From March 19.		
	Average percentage.								
	Spawners.	Maximum.	Minimum.	Spawners.	Maximum.	Minimum.	Spawners.	Maximum.	Minimum.
Bottom-nets	54	66	47	46	54	40	52*	70*	35*
Floating-nets				43	46	40	40	43	36
Bottom-lines	64	77	43	48	59	36	43*	50*	40*
Floating-lines	63	69	57	53	70	46	45	67	31

*Observations of 1877.

As far as the bottom-apparatus is concerned this year's observations agree with those of last year, and may therefore be considered closed. They agree, moreover, with those natural conditions which the superintendent considers as the cause of the statistical data as far as the spawners are concerned. The floating-lines show during the first half of March a larger percentage of spawners than the bottom-lines. More accurate observations, however, would have but little practical significance as far as the statistical data of spawners are concerned, and they will therefore not be continued. The discrepancy between the results of the two kinds of apparatus may possibly be caused by the small number of observations (only 80), as there is no cause to suppose that there is any difference between the bottom and the floating apparatus as regards the spawners and milters. As Professor Sars has made entirely different observations and has given his reason for them, I shall endeavor briefly to refute his views.

Professor Sars says in his report (p. 55): "Those boats which had used bottom-nets had almost exclusively caught milters, whilst more spawners had been caught by those who had employed floating nets or lines. That the proportion between spawners and milters must be such, I could, even without palpable proof, have told people beforehand from my observations of the full-grown roe." The observations made by me and my assistants show that the majority of fish caught in bottom-apparatus may be milters, but they likewise show that occasionally the majority may be spawners, and that on an average an equal number of both kinds are caught. It is both improbable and impossible, that milters should be caught exclusively in bottom-apparatus and spawners in floating-apparatus. It is improbable, because the floating-net is 12-40 fathoms from the bottom, and if the professor's observations were correct a similar extent of water must intervene between the milters and spawners. It is impossible, because floating-nets are not used very extensively, viz, only by the fishermen at the stations east of Sörvaagen, and where should the large proportion of spawners come from, if the bottom-nets caught only milters?

Number of livers to the barrel.

Week ending-	Stroven.		Svolvær.		Vaagene.		Høyen.		Henningsvær.		Stamsund.		Ure.		Balstad.		Sund.		Sörvaagen.		Værø.		
	Nets.	Lines.	Nets.	Lines.	Nets.	Lines.	Nets.	Lines.	Nets.	Lines.	Nets.	Lines.	Nets.	Lines.	Nets.	Lines.	Nets.	Lines.	Nets.	Lines.	Nets.	Lines.	
Jan. 26	.....	.....	.....	.....	250	300	360	420	.....	400	.....	300	.....	.....	.....	380	.....	.....	.....	360	480	.....	.....
Feb. 2	.....	.....	.....	400	250	300	360	420	300	400	300	350	.....	.....	.....	380	300	350	360	480	.....	.....	.....
9	300	400	300	400	250	300	360	420	300	400	300	350	.....	.....	.....	380	300	350	360	480	.....	.....	.....
16	300	400	300	400	300	380	350	450	300	400	300	350	.....	.....	.....	360	300	350	360	480	.....	.....	.....
23	300	460	300	500	300	380	350	450	300	400	300	350	.....	.....	.....	480	300	350	360	480	250	300	.....
March 2	300	460	300	500	300	380	430	520	300	400	350	400	800	350	480	500	350	400	380	440	250	300	.....
9	360	500	360	500	400	500	430	520	350	450	380	430	300	400	480	600	350	400	360	440	350	450	.....
16	360	500	400	500	470	520	480	580	400	500	400	460	300	400	480	500	350	400	300	400	350	450	.....
23	400	500	400	600	400	550	480	580	500	600	400	460	300	400	500	740	350	500	380	480	350	450	.....
30	400	500	450	650	450	520	480	580	500	650	430	600	450	600	500	740	350	500	360	480	450	600	.....
April 6	360	400	450	650	450	580	480	580	500	650	500	650	300	600	500	740	350	450	360	480	400	500	.....
13	.....	.....	.....	.....	.....	450	600	.....	.....	.....	.....	.....	.....	.....	460	700	.....	.....	550	700	.....	.....	.....

Highest number of livers from line-fishing, week ending April 13.. 700
 Highest number of livers from net-fishing, week ending April 13.. 550
 Lowest number of livers from line-fishing, week ending January 26.. 300
 Lowest number of livers from net-fishing, week ending January 26.. 250

Both in 1876 and last year there was a period from the middle of February till March when the fish increased in fatness; and as the number of fish generally increased about the same time, I concluded that new schools had come in. This year no increase of fatness was observed except about the middle of March in the district of Sörvaagen, but on the other hand it was observed that this year the fish were fatter than last year from the beginning of the fisheries. Fishing also commenced early and promised well at all the stations. From the middle of February the fatness gradually decreased, so that probably no new schools arrived after that time with the exception of the district extending from Henningsvær to Ure, where the proportion of liver kept unchanged longest, and where there was steady and good fishing all the time. Although the proportion of liver kept unchanged for a long time west of Nufsfjord, there was no fishing from the middle of February till the middle of March, and no net-fishing till the end of March. The unfavorable weather was probably the cause of this, as the fishermen could not reach their usual fishing-places as often as was desirable.

Price of fish (not stated per what quantity).

	Net-fishing.		Line-fishing.		Deep-bait fishing.	
	Absolute.	Average.	Absolute.	Average.	Absolute.	Average.
Highest.....	\$6 34	\$6 03	\$5 62	\$5 86	\$7 77	\$5 09
Lowest.....	8 75	6 00	3 48	4 55	4 02	4 55

Price of liver, roe, and bait (per barrel), and of heads (per 100).

Fresh liver	per barrel..	\$4 28 to 7 50
Old liver	do.	4 28 to 4 82
Roe	do.	2 14 to 5 36
Fresh herring for bait.....	do.	2 54 to 4 28
Salt herring for bait.....	do.	2 14 to 4 82
Cuttlefish for bait.....	do.	3 21 to 6 43
Muscles for bait	do.	2 14 to 4 28
Heads	per hundred.	8 to 32

This year's fishery has been the second largest ever known; and if the weather had not been so very unfavorable during February and March, the number of fish would—in spite of the total failure of the fisheries in April—have been as large as last year; for it is my opinion that the schools on the banks were much larger. In January and February 4,500,000 were caught; in April, 2,500,000; and in March, 17,750,000; whilst last year (1877) the number was 16,000,000 in March. The first of the two following tables shows the result of the Loffoden-fisheries for every week from 1869 to 1877, and the second shows the result per month, calculated for the last and the first week of the month according to the days when fishing was going on and the number of fish caught during the week. According to these data an average Loffoden-fishery ought to yield about 20,500,000, of which 4,300,000 (21 per cent.) are taken in January and February, 12,300,000 (60 per cent.) in March, and 4,000,000 (19 per cent.) in April. This year (1878) the percentage was as follows: January and February, 18.2 per cent.; March, 71.7; and April, 10.1.

Month.	1869.		1870.		1871.		1872.		1873.		1874.		1875.		1876.		1877.			
	Date.	Thou- sands.	Date.	Thou- sands.	Date.	Thou- sands.	Date.	Thou- sands.	Date.	Thou- sands.	Date.	Thou- sands.	Date.	Thou- sands.	Date.	Thou- sands.	Date.	Thou- sands.		
February																1	200			
			5	1,000											5	600	3	130		
			13	1,500	13	2,000								13	2,500	11	1,500	10	500	
			19	2,400			18	3,500	15	2,000	15	1,000	20	3,750	19	2,500	17	1,500		
			27	4,200	27	3,600	28	2,500	25	5,000	22	2,000	22	2,000	28	6,000	26	4,200	24	3,000
March									1	3,500	1	3,700							3	4,750
	7	8,400	6	6,600	5	4,000	3	6,250	9	5,500	8	5,000	7	9,000	5	7,500	10	8,250		
	14	11,400	12	9,600	12	6,000	10	8,000	16	8,500	17	7,500	14	13,500	12	9,000	17	11,500		
	21	16,800	20	13,200	18	8,000	17	10,500	23	10,500	22	12,000	21	16,600	19	11,750	24	17,000		
	27	18,000	27	10,200	26	11,500	24	12,000	30	14,000	29	14,000	28	18,500	26	15,500	31	20,250		
April	3	19,200	3	18,000	2	14,500	1	13,000	6	18,000	5	15,000	4	21,000	2	20,250				
	11	20,400	10	20,400	10	16,800	7	15,000					11	23,000	9	21,250	7	24,250		
	16	20,700	14	21,600	14	17,500	14	17,000	14	19,500	14	16,000			15	22,000	14	23,000		
Corrected according to medicinal tax		20,500,000		22,000,000		17,500,000		20,000,000		20,000,000		20,000,000		23,000,000		23,000,000		28,000,000		
Caught after April 14th						1,000,000		250,000		60,000		55,000				500,000		1,500,000		

*These figures indicate the number of fish caught up to the date mentioned.

Month.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.
Caught in January and February	4,200,000	3,600,000	3,100,000	5,700,000	2,500,000	3,700,000	6,000,000	6,000,000	4,000,000
Caught in March	14,100,000	13,200,000	9,400,000	7,300,000	12,100,000	11,000,000	13,400,000	13,600,000	16,250,000
Caught in April	2,400,000	4,800,000	5,000,000	4,000,000	4,900,000	1,300,000	3,600,000	2,400,000	7,750,000
Total	20,700,000	21,600,000	17,500,000	17,000,000	19,500,000	16,000,000	23,000,000	22,000,000	28,000,000

TOTAL RESULT OF THE FISHERIES, 1878.

Number of fish caught.....	24, 660, 000
Number of heads sent to the guano factories.....	16, 500, 000
Liver (barrels).....	53, 150
Medicinal oil (barrels).....	3, 044
Roe (barrels).....	26, 130

Upwards of 14,000,000 fish were caught with nets, 9,250,000 with lines, and 1,250,000 with deep-bait.

Gross receipts of the Loffoden-fisheries, 1878, \$1,742,000.

Number of fish and quantity of roe, liver, and oil per week.

Week ending—	Total number caught.	Salted.	Number caught during each week.	Liver.	Medicinal oil.	Roe.	Fishing-days.			
							Thousands.	Barrels.	Whole.	In part.
January 26	160		158	400	13	350	4	.....	
February 2	300		200	900	20	750	1	1		
February 9	700		340	1, 900	55	1, 500	1	2½		
February 16	2, 500		1, 800	6, 800	350	5, 200	2	8		
February 23	3, 000		500	7, 800	480	6, 000	2	2		
March 2	5, 500	3, 500	2, 500	15, 000	925	11, 200	3	.....	
March 9	8, 500	6, 000	3, 000	22, 000	1, 650	10, 500	3	1		
March 16	11, 750	9, 000	8, 250	28, 000	2, 000	19, 000	.....	.....
March 23	17, 750	14, 500	0, 000	30, 000	2, 700	24, 000	.....	1	
March 30	22, 250	18, 750	4, 500	48, 000	8, 000	25, 000	.....	.....
April 6	23, 500	19, 750	1, 250	50, 000	.....	.....	.....	.....
April 13	24, 750	21, 000	1, 250	53, 000	.....	.....	5	4
Total .....	.....	.....	.....	.....	.....	.....	25	*11

* Against 32 and 21 in 1877.

The largest number of fish caught, in proportion to the number of fishing-days and the number of men engaged, was in the week March 23 to March 23. The result all through March was unusually even. It is estimated that after the 14th of April 120,000 fish were caught. About half a million of fish were consumed during the fisheries, as well as 1,000 barrels of liver. About 20,000 cod were salted in barrels for sale. The quantity of bait used was as follows: Nine hundred barrels fresh herring; 12,000 barrels salt herring; 3,500 barrels cuttlefish; 900 barrels muscles; with a total value of upwards of \$67,000. Most of the salt bait was prepared by the fishermen at their homes.

The treasurer of the "Medical Fund" reports that the taxes on fish in the districts of Nordland and Tromsø in 1877 amounted to \$43,682, distributed as follows:

Dried codfish	\$16, 913.
Salt codfish.....	12, 946
Oil.....	7, 431
Roe.....	615
Herrings.....	5, 777

254 REPORT OF COMMISSIONER OF FISH AND FISHERIES.

Result of the fisheries in the districts of Nordland and Tromsø, 1875, '76, and '77.

Fisheries.	1875.				1876.				1877.			
	Fish.		Oil.	Roe.	Fish.		Oil.	Roe.	Fish.		Oil.	Roe.
	Salt.	Dried.			Salt.	Dried.			Salt.	Dried.		
	Millions.	Barrels.	Millions.	Barrels.	Millions.	Barrels.						
Loffoden-fisheries.....	15½	7½	35,000	21,000	17	5½	35,000	22,000	25½	4½	40,000	29,000
Other winter fisheries....	1½	6	13,000	8,500	2½	6	14,500	12,000	2½	8½	19,000	16,000
Summer and autumn fisheries.....		9½	8,000	1,000	½	9½	8,000	1,000	½	12½	10,000	1,000
Total.....	18½	23	56,000	30,500	20	20½	57,500	85,000	28½	25½	69,000	46,000

FISHERMEN'S EARNINGS.

Gross average earning for each <i>fishing-day</i> in February.....	\$1 87
Gross average earning for each <i>fishing-day</i> in March.....	4 35
Average receipt per day, counting <i>all</i> the days of the season...	93
Highest total sum earned by a net-fisherman.....	214 40
Lowest total sum earned by a net-fisherman.....	48 24
Highest total sum earned by a line-fisherman.....	120 60
Lowest total sum earned by a line-fisherman.....	32 16
Highest total sum earned by a deep-bait fisherman.....	85 76
Lowest total sum earned by a deep-bait fisherman.....	42 88

Hired men earned from \$32.16 to \$40.73 besides board and lodging.