XXXI.—TEMPERATURES IN THE GULF OF MEXICO.

[For the following article on the temperatures and depths of the Gulf of Mexico, with reference to the abode therein of shad and salmon, I am indebted to Capt. C. P. Patterson, Superintendent of the United States Coast-Survey. It is probable that the earlier observations do not give a sufficiently low indication of the temperature; all indications prior to the introduction of the encased-bulb thermometers of Negretti and Miller being liable to this error.—S. F. BAIRD.]

United States Coast-Survey report for 1854, *p.* 72.—"Between latitude 28° to 26° 40′, and within 30′ of longitude of Pass à Loutre, (the latitude of the entrance of the pass being 29° 10′,) the temperature of the water at the surface was found to be from 77° to 78° Fahrenheit, the air being from 72° to 77°. At 30 fathoms, within the same limits, the temperature was about 77°, but the subsurface temperatures were very irregular. These observations were made on the 5th, 6th, and 7th of April, 1854. North of latitude 28° 40′, 1° east of Pass à Loutre, the temperatures at the surface were 70°, 69°, and 68° on the 8th and 9th of April, the air being 71° and 70°, and the temperature at 15 fathoms 70°.5 and 68°, showing, within forty nautical miles, a fall in the temperature of the surface and below of some 8° Fahrenheit. This remarkable change requires further investigation."—(From the Hydrographic Work of Lieutenant Sands relating to Deep-Sea Soundings and Temperatures.)

United States Coast-Survey report for 1855, *p.* 89.—"Late in December, while the temperature of the air was from 61° to 73°, surface temperatures in the Gulf were found as high as 77° Fahrenheit, and that at the depth of about 230 fathoms the lowest temperature measured was 50° Fahrenheit."—(Reported by Lieutenant-Commander Sands.) Several stations off the mouth of the Mississippi, at depths from 15 to 50 fathoms, as given on his sketch, make the surface and subsurface temperatures nearly the same, but some stations were warmer than others, varying from 68° to 78°.

United States Coast-Survey report for 1856, *p.* 75.—(From Commander Sands' work. He ran lines of soundings between Key West and the Mississippi Delta, &c.)—"The interesting results as to the deep-sea temperatures developed along this line are shown in the diagram of sketch No. 40. Between latitudes 27° 06′ and 28° north and longitudes 85° 20′ and 86° 39′ west, in the Gulf, at the depths of 421, 610, and 790 fathoms, temperatures as low as 35° and 36° Fahrenheit were reached in the mouth of April. The lowest temperature in winter belonging to this region is about 52°, at a depth of 230 fathoms."

United States Coast-Survey report for 1857, *p.* 102.—(From the work of Commander Sands on Deep-Sea Soundings between the Delta and Key West.)—"At the bottom, the temperature in the month of May was 38° Fahrenheit, the air being 78° and the surface-water 77½°."

United States Coast-Survey report for 1858, *p.* 89.—"The highest temperature observed at 50 fathoms was 78° Fahrenheit, and the lowest obtained 38°, at the depth of 802 fathoms, at the position 9, five miles from Havana."

"On the line from the mouth of the Mississippi to the Tortugas, Commander Sands found the temperature at the bottom, at the depth of 1,133 fathoms, to be 28° Fahrenheit. This position is in latitude 27° 16′ north, longitude 86° 57′ west."

Same volume, p. 106: "From the Southwest Pass of the Mississippi, Commander Sands, in the steamer Walker, carried a line for depths and temperatures across the Gulf in the direction of the Tortugas. The greatest depth found on the line (1,710 fathoms) was in a position nearly south of one in which a deep cast (1,511 fathoms) was made in the previous year. At the next station eastward, 2,000 fathoms of line were payed out without indicating bottom. This was in a position north of the passage between the western end of Cuba and Yucatan."

The temperatures were observed at the surface, at 50, and at 100 fathoms, and at the bottom, in 22 different positions, the lowest (34°) being obtained at a depth of 896 fathoms, about one hundred and twenty miles from the Delta. The surface temperature in the same position was 77°.

United States Coast-Survey report for 1859, *p.* 80.—The above results were verified by Lieutenant-Commander Huger, and something added to the data for the Gulf Stream between Cuba and Florida, where temperatures are found of 38° at a depth of 600 fathoms.

United States Coast-Survey report for 1860, *p.* 84.—Lieutenant Wilkinson, in returning from Mobile to Key West, "observed with the deep-sea thermometer and recorded the temperature found in the Gulf water to a depth of 200 fathoms. Besides the record of the air-thermometer and the register at the depth just stated, the temperature was noted in twenty-three positions, at the surface also, and at 10, 30, and 100 fathoms. In latitude 24° 05½′ north, longitude 82° 52′ west, (see sketch No. 27,) the temperature found at 190 fathoms was 38° by the Saxton thermometer, that of the surface being at the same time 83°."

In 1872, lines of soundings were run by Lieutenant-Commander J. A. Howell, from the records of which enough have been selected to afford some knowledge of the temperatures met with. The maximum and minimum temperatures were obtained with a deep-sea registering-thermometer.

Table of temperatures.

	Number of soundings.	Position.		Depth, in fathoms. (L=line; R=registered.)	Temperatures.			
		Latitude.	Longitude.		Air.	Water. Surface.	Water. Subsurface. Max.	Water. Subsurface. Min.
		° ′	° ′		°	°	°	°
February 17, 1872:								
1 51 p. m.	5	25 03 N	82 0.9 W	10¼ L	68	69	72	68
3 5 p. m.	10	25 03 N	82 6.2 W	10¼ L	69	69	67	68
4 19 p. m.	15	25 03 N	82 11.7 W	12 L	67	69	67	67
5 45 p. m.	20	25 03 N	82 17.8 W	13 L	66	69	67	67
7 19 p. m.	25	25 03 N	82 23.6 W	15 L	67	69	69	68
8 37 p. m.	30	25 03 N	82 30.4 W	16 L	66	69	68	66
9 45 p. m.	35	25 03 N	82 36.6 W	19 L	67	68	68	66
10 56 p. m.	40	25 03.1 N	82 42.5 W	22 L	67	70	68	66
February 18, 1872:								
0 15 a. m.	45	25 03.2 N	82 49.2 W	22½ L	66	69	67	68
1 49 a. m.	50	25 03.2 N	82 56 W	25½ L	67	69	69	65
3 3 a. m.	55	25 03.3 N	83 2.6 W	27 L	67	66	68	67
4 16 a. m.	60	25 03.4 N	83 8.8 W	30 L	67	70	67	66
6 13 a. m.	65	25 03.5 N	83 15.5 W	33½ L	66	69	67	63
7 24 a. m.	70	25 03.6 N	83 21.7 W	34½ L	69	68	67	65
9 0 a. m.	75	25 03.6 N	83 30 W	36 L	69	69	67	67
10 24 a. m.	80	25 03.7 N	83 36.5 W	39 L	73	70	70	68
11 50 a. m.	85	25 03.9 N	83 42.2 W	40 L	74	70	70	68
1 21 p. m.	90	25 03.9 N	83 49 W	46 L	75	71	69	67
3 5 p. m.	95	25 04 N	83 55.1 W	60 L	73	70	68	64
4 41 p. m.	100	25 02.8 N	84 3 W	78 R.	74	78	71	61
8 51 p. m.	105	24 56.5 N	84 14 W	169 R	76	78	74	55
9 40 p. m.	106	24 55.1 N	84 15.5 W	183 R	76	77	75	52
10 24 p. m.	107	24 53.9 N	84 17.1 W	191 R	77	77	80	47
11 17 p. m.	108	24 52.5 N	84 19 W	335 R	77	77	77	43
February 19, 1872:								
0 23 a. m.	109	24 50 N	84 23.3 W	305 R	77	78	77	43
1 43 a. m.	110	24 47 N	84 26.3 W	350½ R	75	78	77	43
7 28 a. m.	111	24 44 N	84 30 W	472 R	75	76	77	41
February 20, 1872:								
1 9 p. m.	1	25 50 N	84 33 W	109 R	70	78	73	62
2 7 p. m.	2	25 50 N	84 38 W	109 R	73	77	74	64
2 58 p. m.	3	25 50 N	84 43 W	118 R	72	77	73	64
3 56 p. m.	4	25 50 N	84 48 W	151½ R	73	75	73	62
4 51 p. m.	5	25 50 N	84 52.3 W	214½ R	72	75	75	54
5 54 p. m.	6	25 51.5 N	84 58.4 W	340 R	68	78	78	46
7 4 p. m.	7	25 54 N	85 1.8 W	403 R	69	76	71	42
8 30 p. m.	8	25 57.5 N	85 7.2 W	0 / 900 R	68	74	71	40
10 40 p. m.	9	26 3 N	85 6 W	0 / 1,000 R	69	74	75	40
April 20, 1872:								
0 35 a. m.	61	27 7.5 N	83 59 W	42 L	75	76	82	72
1 50 a. m.	63	27 7.5 N	84 5 W	44 L	76	76	92	73
3 7 a. m.	65	27 7.5 N	84 11 W	50 L	74	77	89	74
5 44 a. m.	68	27 7.5 N	84 20.2 W	70 L	74	77	83	77
8 8 a. m.	71	27 7.5 N	84 29 W	90 L	75	77	84	73
10 50 a. m.	73	27 8 N	84 36.6 W	100 L	78	80	.....	67
12 14 p. m.	74	27 8 N	84 43.9 W	105 L	78	80	80	66
1 30 p. m.	75	27 8 N	84 49.3 W	134 R	78	85	85	68
2 55 p. m.	76	27 8 N	84 55.4 W	178 R	78	79	84	65
4 15 p. m.	77	27 8 N	85 3.1 W	370 R	77	79	82	55
6 10 p. m.	78	27 8 N	85 8.9 W	515 R	77	78	85	53
7 54 p. m.	79	27 8 N	85 16.1 W	815 R	76	78	.....	41
April 22, 1872:								
1 18 a. m.	1	26 17.5 N	85 20.5 W	1,708 R	76	80	88	40
7 10 a. m.	2	26 17.5 N	85 15.9 W	1,224 R	75	80	79	41
2 16 p. m.	5	26 17.5 N	85 15.9 W	1,116 R	83	84	77	46
3 59 p. m.	6	26 17.5 N	85 7.7 W	1,821 R	79	82	76	41
10 0 p. m.	7	26 17.4 N	84 53.2 W	748 R	77	81	80	41
April 23, 1872:								
0 25 a. m.	8	26 17.4 N	84 47.4 W	403 R	76	80	76	43
2 9 a. m.	9	26 17.4 N	84 42 W	180 R	77	80	72	57
3 26 a. m.	10	26 17.4 N	84 37 W	133 R	75	80	72	56
3 47 a. m.	11	26 17.4 N	.....	132 R	75	80	72	56
6 51 a. m.	13	26 17.4 N	84 31.4 W	123 R	73	80	72	57
9 0 a. m.	15	26 17.3 N	84 26.5 W	113 R	77	80	75	60
11 30 a. m.	18	26 17.2 N	84 19.1 W	100 R	79	81	80	57
12 57 p. m.	20	26 17.2 N	84 14 W	93 R	75	80	82	58
3 37 p. m.	25	26 17 N	84 2.5 W	73 R	75	78	73	61
6 49 p. m.	30	26 17 N	83 50 W	61 R	73	77	85	74
11 31 p. m.	36	26 16.8 N	83 35.6 W	37.4 R	74	78	72	67

Table of temperatures—Continued.

	Number of soundings.	Position.		Depth, in fathoms. (L=line; R=register.)	Temperatures.			
		Latitude.	Longitude.		Air.	Water.		
						Surface.	Subsurface.	
							Max.	Min.
		° ′	° ′		°	°	°	°
April 24, 1872:								
1 12 a. m.	39	26 16.8 N	83 28.1 W	35 R	77	78	76	65
3 59 a. m.	44	26 16.6 N	83 16.1 W	30 R	74	78	79	67
6 41 a. m.	48	26 16.6 N	83 6.2 W	27 R	73	79	75	49
9 29 a. m.	53	26 16.5 N	82 55 W	21 R	72	74	75	71
7 2 p. m.	89	26 16 N	82 21.9 W	8 R	71	78	85	83
April 27, 1872:								
5 22 a. m.	1	25 2 N	84 2.5 W	83 R	73	78	.....	71
6 1 a. m.	2	25 2 N	84 5.5 W	86 R	73	78	78	64
7 24 a. m.	3	25 2 N	84 12.5 W	169 R	75	78	78	52
8 50 a. m.	4	25 2 N	84 17.6 W	278 R	77	78	80	46
10 19 a. m.	5	25 2 N	84 23.8 W	868 R	76	79	79	41
11 40 a. m.	6	25 1.9 N	84 28.8 W	871 R	76	81	73	39
3 2 p. m.	7	25 1.8 N	84 30 W	1,446 R	76	81	79	39
6 32 p. m.	8	25 1.7 N	84 36 W	1,664 R	75	81	77	41
May 13, 1872:								
8 5 a. m.	7	24 30.6 N	83 2.8 W	15 L	74	78	86	85
8 51 a. m.	8	24 29.1 N	83 5 W	24 L	76	78	85	84
10 15 a. m.	10	24 25 N	83 13.5 W	63 L	78	79	85	68
12 15 p. m.	13	24 21.2 N	83 21 W	190 R	80	78	82	53
3 38 p. m.	16	24 16 N	83 30 W	380 R	77	78	86	55
5 11 p. m.	17	24 12.5 N	83 36.2 W	521 R	75	78	91	47
7 0 p. m.	18	24 5.7 N	83 41 W	646 R	78	79	85	46
9 25 p. m.	19	23 59 N	83 45.5 W	728 R	74	77	82	42
May 14, 1872:								
0 3 a. m.	20	23 50.9 N	83 49 W	892 R	74	79	83	45
3 37 a. m.	21	23 42 N	83 52 W	1,101 R	76	80	82	45
7 5 a. m.	22	23 33 N	83 52 W	826 R	78	81	84	42
10 30 a. m.	23	23 33 N	83 52 W	1,170 R	84	80	82	41
12 36 p. m.	24	23 28 N	83 55 W	1,313 R	83	82	85	41
4 30 p. m.	25	23 22 N	83 58 W	1,362 R	84	82	90	40
May 15, 1872:								
4 57 a. m.	26	23 18.7 N	84 41.5 W	1,140 R	79	80	84	40
9 3 a. m.	27	23 24.4 N	84 40 W	1,382 R	79	81	84	42
12 30 p. m.	28	23 29.5 N	84 39 W	1,694 R	84	82	85	41
4 10 p. m.	29	23 31.7 N	84 32 W	1,505 R	82	82	84	40
8 55 p. m.	30	23 35.1 N	84 23 W	1,383 R	80	81	84	41
May 16, 1872:								
0 59 a. m.	31	23 39.3 N	84 15 W	1,528 R	77	81	85	41
4 48 a. m.	32	23 43 N	84 10.6 W	1,308 R	77	81	84	40
8 40 a. m.	33	23 47 N	84 1 W	1,199 R	79	82	85	41