

### COLOR

The color of the gulf was measured by percentages of yellow<sup>25</sup> during the summers of 1912 and 1913.

As is well known, the water is, as a whole, bluest outside the edge of the continent, greenest alongshore. With only 2 per cent yellow, the water at our outermost station off Nantucket on July 8, 1913 (station 10060), closely approached the pure sapphire blue characteristic of the so-called "Sargasso Sea," of the Mediterranean, and of certain regions in tropical Indian and Pacific Oceans. In our experience the water has never shown as small a percentage of yellow as this anywhere inside the edge of the continent, though with only 5 per cent of yellow off Nantucket Shoals on July 9, 1913, evidently only a slight overflow of tropic water would have been required to produce very blue water. This is the minimum percentage of yellow so far recorded for the Gulf of Maine proper, and three stations for 1913 point to 9 per cent yellow as about normal for the central basin of the gulf.

At the other extreme, we have invariably found the percentage of yellow greatest (27 to 35 per cent) in the coastal belt along the shore of Maine, out, roughly, to the 100-meter contour, with secondary smaller but very green areas (27 per cent of yellow) along the outer side of Cape Cod and in the German Bank region. The greenest water so far recorded has been in Casco Bay, though inclosed locations probably would prove equally green all around the coast line of the gulf. In the western, northern, and eastern parts of the gulf, including the Massachusetts Bay region on one side and the waters off the Bay of Fundy and west of Nova Scotia on the other, the percentage of yellow has usually ranged from 14 to 20.

The Gulf of Maine, like most coastal boreal waters, thus falls among the greener seas, its color agreeing fairly well with that of the English Channel and with the coast water of the Bay of Biscay (Schott, 1902, pl. 36). However, as I have noted in earlier publications (Bigelow, 1914, p. 81; 1915, p. 225), the distribution of color does not exactly parallel either the temperature or the salinity, for while low salinity is reflected in a high percentage of yellow, the most saline part of the basin has not been the bluest. The true key to local variations in color within the gulf is to be found more in variations in the density and character of the plankton and in the amount and nature of the silt which the water holds suspended.

The records for the two years combined show that the color of the gulf changes but little from July to August or from year to year at that season. No measurements of the color have been made at other times of year, but a browner hue is to be expected alongshore when diatoms are flowering actively in spring.

<sup>25</sup>The color of the sea usually is measured by the "Forel" scale, based on a combination of blue and yellow, the former being 5-gram copper ammonia sulphate + 0.5 cubic centimeter ammonia in 95 cubic centimeters water; the latter 15-gram potassium chromate in 100 cubic centimeters of water. The combinations used are as follows:

	1	2	3	4	5	6	7	8	9	10	11	12	13
Per cent blue.....	100	98	95	91	86	80	73	65	56	46	35	23	10
Per cent yellow.....	0	2	5	9	14	20	27	35	44	54	65	77	90

Various comparators have been devised for use on shipboard. For descriptions of the method employed on the *Grampus* see Bigelow, 1914, p. 38.

Date	General locality	Station	Color in percentage of yellow
1912			
July 10	Off Gloucester.....	10002	20
11	Near Gloucester.....	10004	20
13	Off Boston Harbor.....	10006	20
15	Basin off Cape Ann.....	10007	14
16	Ipswich Bay.....	10008	20
16	Northeast of Cape Ann.....	10009	14
16	Off Hampton, New Hampshire.....	10010	20
17	Near Isles of Shoals.....	10011	20
24	Off Kennebunkport.....	10013	27
24	do.....	10014	27
25	Casco Bay.....	10015	27
26	Near Seguin Island.....	10016	27
27	Casco Bay.....	10017	35
27	Orrs Island.....		44
29	Off Casco Bay.....	10019	20
Aug. 2	Off Monhegan Island.....	10021	27
3	Penobscot Bay.....	10021a	27
7	Off Cape Elizabeth.....	10022	27
7	Platts Bank.....	10023	14
8	Offing of Penobscot Bay.....	10025	20
8	Off Matinicus Island.....	10026	20
8	Near Seguin Island.....	10026a	20
14	Basin South of Mount Desert.....	10027	20
14	Basin, east side.....	10028	20
14	German Bank.....	10029	20
15	Off Lurcher Shoal.....	10031	24
16	Off Mount Desert Rock.....	10032	24
16	Off Machias, Me.....	10033	35
19	West end, Grand Manan Channel.....	10035	20
20	Offing of Machias, Me.....	10036	20
21	Near Mount Desert Island.....	10037	35
21	Off Isle au Haut.....	10038	20
1913			
July 8	Off Northern Cape Cod.....	10057	27
8	Southwestern part of basin.....	10058	9
9	West side of Georges Bank.....	10059	20
9	Offing of Nantucket Shoals.....	10060	5
10	Continental edge, off Nantucket Shoals.....	10061	2
Aug. 4	Off Chatham, Cape Cod.....	10085	27
5	Off northern Cape Cod.....	10086	27
9	Off Gloucester.....	10087	14
10	Center of basin.....	10090	9
11	Offing of Penobscot Bay.....	10091	20
11	East side of basin.....	10092	9
12	do.....	10094	27
12	German Bank.....	10095	27
12	Off Lurcher Shoal.....	10096	20
13	Off Machias, Me.....	10098	20
13	Near Mount Desert Island.....	10099	27
13	Near Mount Desert Rock.....	10100	27
14	Offing of Penobscot Bay.....	10101	35
14	do.....	10102	20
15	Near Isles of Shoals.....	10104	20
15	Offing of Ipswich Bay.....	10105	20

## SOURCES FROM WHICH THE GULF OF MAINE RECEIVES ITS WATERS

In few parts of the world is the coast water that bathes the continental shelf as sharply demarked from the oceanic water outside the edge of the continent as it is off the east coast of North America, from the Grand Banks on the north to Cape Hatteras on the south. Not only is the former much colder and much less saline than the latter, but the transition from the one type to the other is often remarkably abrupt. To see the warm sapphire blue of the so-called "Gulf Stream" give place to the cold bottle-green water over the banks is a familiar spectacle to mariners sailing in from sea. While it is unusual to meet as abrupt a transition as Smith (1923, pl. 5) describes for one occasion (March 27, 1922) south of the Grand Banks, where