

SEA SURFACE TEMPERATURES AT MILLPORT

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Sea surface temperatures have been taken daily at Keppel Pier, Millport ($55^{\circ} 44' 55''$ N. lat.; $4^{\circ} 54' 20''$ W. long.), for the past 10 years (1949-58), the data being included in returns to the Meteorological Office. The records are not given in their standard publication and they are, therefore, presented here to supplement those of Cooper (1958) for inshore waters at Plymouth some 400 miles farther to the south. For some years the samples were drawn in a specially constructed container fitted with a Fahrenheit thermometer which was read to the nearest whole degree; more recently the bucket method has been used, and a centigrade thermometer graduated in degrees and read to an estimated tenth of a degree. The two methods were checked against each other before the change was made and the results found to be consistent. All readings were taken at 09.00 h G.M.T., irrespective of the state of the tide. The results are shown in Table 1.

The form of the annual temperature regime is typical of boreal waters; there are, however, considerable variations from year to year, not only in the mean values but also in the temperature pattern and these variations are of ecological significance. For example, in a long cold spring the spawning of some species is delayed. In some years the temperature, after falling steadily during the autumn and winter, remains almost constant from January to April; e.g. in 1952 and 1953 when the value remained close to 7° C. during these months. In other years the temperature continues to fall during the early part of the year; in 1956, for example, this fall continued until late March, whereas in 1949 the temperature began to rise gradually in early March. In both 1954 and 1955 the temperature fell until early February, but whereas in 1954 this was followed by a slow rise, in 1955 the minimum was maintained throughout March. In 1950 the minimum was reached late in January.

Apart from day-to-day fluctuations due to local heating in shallow waters there are also, during the summer, periods of low temperature extending over 2-3 weeks; these may be the result of up-welling in the deeper basins and could be of considerable importance in the destruction of warmer water species carried into the area during the warmer months of the year.

REFERENCE

- COOPER, L. H. N., 1958. Sea temperatures in Plymouth Sound. *J. mar. biol. Ass. U.K.*, Vol. 37, pp. 1-3.

TABLE 1. MEAN MONTHLY SEA SURFACE TEMPERATURES (° C.) FOR MILLPORT, 1949-58, TOGETHER WITH MAXIMA AND MINIMA ATTAINED IN EACH MONTH

Year	Jan.			Feb.			Mar.			Apr.			May			June			Annual Mean
	Mean	Max.	Min.	Mean	Max.	Min.	Mean	Max.	Min.	Mean	Max.	Min.	Mean	Max.	Min.	Mean	Max.	Min.	
1949	7.9	8.4	7.2	7.4	7.8	6.7	7.2	7.8	6.1	8.2	9.0	7.5	9.8	11.1	8.6	11.7	14.4	10.6	
1950	8.1	9.1	6.4	7.1	7.7	5.5	7.6	8.4	6.9	8.2	8.8	7.6	9.2	10.2	8.1	12.0	13.4	9.7	
1951	6.3	6.9	5.3	6.2	6.8	4.8	6.6	7.2	5.2	7.1	8.1	6.4	8.4	9.6	7.0	10.5	12.0	9.1	
1952	7.4	8.4	6.7	7.1	8.0	5.9	7.3	7.9	6.8	8.1	8.9	7.0	9.3	10.8	7.9	10.6	12.9	9.0	
1953	7.4	7.8	7.0	7.0	7.6	6.3	7.3	7.8	7.0	7.4	8.2	6.8	9.4	11.0	7.7	11.3	13.5	9.5	
1954	8.7	9.9	7.2	7.0	7.6	6.4	6.5	7.0	6.0	7.5	8.2	7.0	8.7	10.1	7.5	11.0	12.3	9.8	
1955	7.7	8.9	6.1	6.8	7.5	6.0	6.1	6.4	5.8	7.4	8.9	6.3	8.9	9.8	7.9	10.7	12.8	9.2	
1956	7.5	8.4	6.8	6.3	6.7	5.9	6.2	6.9	5.8	7.1	7.9	6.5	9.0	11.7	7.9	10.3	11.3	9.3	
1957	7.3	8.0	6.5	6.4	7.2	5.9	6.9	7.6	6.0	8.0	9.3	7.2	8.9	10.2	7.8	11.2	12.9	9.8	
1958	7.2	8.0	6.4	6.4	7.0	6.0	5.9	6.5	5.2	6.3	7.3	5.5	8.1	9.8	7.1	9.7	11.4	8.4	
10-year average	7.55	—	—	6.77	—	—	6.76	—	—	7.53	—	—	8.97	—	—	10.90	—	—	
Year	July			Aug.			Sept.			Oct.			Nov.			Dec.			Annual Mean
	Mean	Max.	Min.	Mean	Max.	Min.	Mean	Max.	Min.	Mean	Max.	Min.	Mean	Max.	Min.	Mean	Max.	Min.	
1949	12.7	14.2	11.4	13.1	15.0	13.1	14.3	15.3	13.4	13.2	13.9	11.4	11.0	12.0	10.0	9.2	10.7	8.2	10.48
1950	14.0	15.5	12.1	14.7	15.3	13.8	13.4	14.2	12.2	11.7	12.5	10.7	10.3	11.2	9.0	8.1	9.7	6.6	10.37
1951	12.5	14.0	10.9	13.1	14.8	11.1	12.9	13.5	12.2	12.0	12.9	10.8	10.7	11.5	9.7	8.9	10.1	7.4	9.59
1952	12.9	14.6	11.2	13.5	15.1	12.6	12.4	13.6	11.7	11.2	12.2	10.4	10.0	10.7	9.2	8.4	9.7	7.2	9.85
1953	13.1	14.2	11.6	14.3	15.0	13.5	13.5	14.1	13.0	12.6	13.9	11.7	10.6	11.8	9.8	9.9	10.8	9.2	10.31
1954	12.4	14.0	11.3	13.2	14.8	11.9	12.8	14.0	11.5	11.5	12.1	9.8	9.9	10.8	8.6	9.1	9.9	8.3	9.86
1955	12.8	14.7	10.5	13.6	15.1	12.3	13.5	14.5	12.9	11.8	13.0	10.8	10.6	11.0	9.9	9.0	10.0	7.8	9.91
1956	12.6	13.3	12.0	12.3	12.8	11.7	12.1	12.5	11.7	11.5	12.2	10.4	10.4	11.0	9.3	8.6	9.8	6.9	9.49
1957	12.5	13.7	11.2	12.9	13.9	12.3	12.3	13.0	11.4	11.5	12.2	10.5	10.2	10.7	9.3	8.9	9.9	7.9	9.75
1958	11.8	13.7	9.9	13.2	14.6	11.7	13.2	14.5	12.2	11.8	12.8	11.0	10.8	11.5	9.9	9.5	10.9	8.4	9.49
10-year average	12.73	—	—	13.39	—	—	13.04	—	—	11.88	—	—	10.45	—	—	8.96	—	—	9.91