

In view of the fact that thermometers of this design are fairly widely used, it was thought desirable to bring the situation to the notice of as wide a group of interested people as possible: particularly those interested in using these instruments for studying long-term trends in earth temperature.

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Periodicity of the Laminariaceae around Scotland

DURING 1946-55, an extensive survey of the Laminariaceae growing around the coast of Scotland has been in continuous operation. The whole of the marine coast of Scotland—more than 6,000 miles—has been photographed (through the co-operation of the Royal Air Force) and, with the aid of these stereoscopic aerial photographs, quantitative assessments of the Laminariaceae have been made by using ecological factors which the data, collected from detailed sub-littoral surveys, have revealed¹.

Detailed surveying, using methods of quadrat sampling with calibrated spring grabs², was operated from boats on charter from the fishing fleet, during all times of the year.

Over sub-littoral areas of the north-east, north-west, south-east and south-west mainland of Scotland, the Orkney Islands and the Isle of Skye, eighty-six detailed surveys have been completed and analysed, and of these more than half have been re-surveys (for example, Girvan to Bennane, six times). This work has involved the measurement of 100,000 quadrats from more than 67,000 acres (27,000 hectares) of the sea bed.

It has been found that changes in the quantity as well as the ratio of species occurred over a number of years; it is now possible to indicate the trend. By far the greater quantity of the Laminariaceae was found above five fathoms (nine metres) and consisted of *Laminaria cloustoni* Edm., *L. saccharina* Lamour and *L. digitata* Lamour. Based on all quadrat values obtained from eighty-six surveys, mean fresh weight per unit area of the three

Laminariaceae, found between one and five fathoms, in each calendar year, from 1946 until 1955, was:

	lb./sq. yard ($\times 0.54$ for kgm./sq. metre)		lb./sq. yard ($\times 0.54$ for kgm./sq. metre)
1946	9.1	1951	5.4
1947	13.4	1952	3.7
1948	11.2	1953	2.8
1949	8.0	1954	3.4
1950	5.0	1955	4.7

These values when plotted logarithmically show the trend over the past ten years (Fig. 1).

Extrapolation of the graph backwards in time gives a trough in 1942 of the same level as 1953; and forwards in time gives a crest in 1958 of the same level as 1947. Ecological factors combining to produce an eleven-year cycle would appear to be controlling the reproduction, colonization and growth of the Laminariaceae around Scotland.

Mention of an eleven-year cycle brings to mind sunspot activity. The annual mean of monthly sunspot numbers, published by the Federal Observatory, Zurich, have also been plotted in Fig. 1. The Royal Greenwich Observatory finds there is a satisfactory parallelism between these mean sunspot numbers and the sunspot areas which they measure. It will be seen that the two graphs show a surprising degree of correlation.

The laminarian periodicity is not thought to be the direct consequence of sunspot activity, but rather the indirect result of such activity producing meteorological conditions which in turn are reflected in the marine environment.

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¹ Walker, F. T., *J. Conseil explor. Mer*, 20, 160 (1954).

² Walker, F. T., *J. Ecol.*, 35, 66 (1947).

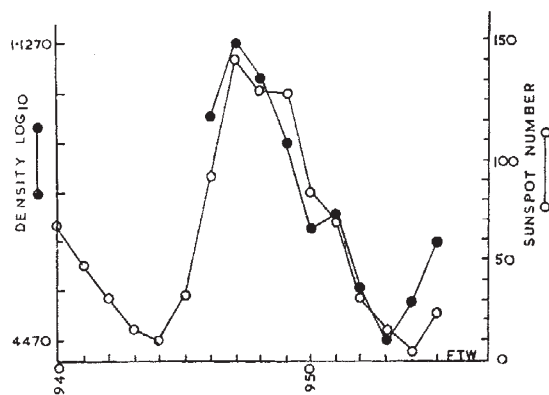


Fig. 1. Relationship of the fresh weight of Laminariaceae and the frequency of sunspots

A Marlin in Angola, with a Note on *Makaira herschelii* (Gray), 1838

MARLIN fishes of the genus *Makaira* Lacépède, 1801, in which the dorsal fin is lower than the body, are found over wide areas of the three main oceans in a broad equatorial belt, mostly within the 20° isotherms. In the Atlantic proper there has so far been found only the so-called 'blue' marlin, generally named *Makaira ampla* (Poey), 1860. This fish, doubtfully distinct by full specific rank from the Indo-Pacific 'black' marlin, *M. herschelii* (Gray), 1838, is said to occur also in the Pacific. In the Atlantic, the blue marlin has been recorded in scientific literature chiefly from the region of the West Indies, and from the north-western coastal areas of South America. It has also been reported from off south-western Europe, and from St. Helena (lat. 16° S., long. 5° 40' W.) in the south Atlantic. The other smaller marlin of the Atlantic, and confined to that ocean, *Lamontella*¹ *albida* (Poey), 1860, has a somewhat similar but less extensive distribution than *M. ampla*, while the 'mystery' marlin, *Orthocraeros*¹ *bermudae* (Mowbray), 1931, is known from only one specimen, photographed but regrettably destroyed.