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The Effects on Foliage in Bermuda of the gales of the
Severe Winter of 1939 - 1940.

Bermuda is situated in latitude 32 North, longitude 64 West, and is subject, in late summer, to the occasional visitation of a West Indian hurricane, and, in winter, to the gales accompanying depressions forming off the southeast coast of the United States of America.

One hurricane and two severe storms were experienced in Bermuda between October 1939 and February 1940. The severity of these storms is shown by the following figures:

	Oct. 16th 1939.	Jan. 24th 1940.	Feb. 15th 1940.
Mean velocity of wind Midnight to midnight.	51 mph.	44 mph.	53 mph.
Highest maintained speed	100 mph. from N.	66 mph. from W.	62 mph. from
Maximum gust	131 mph.	89 mph.	87 mph.
Rainfall measured at 8 am.	51.9 mm.	7.8 mm.	1.9 mm.
Rainfall measured at 8 pm.	67.0 mm.	14.9 mm.	1.9 mm.
Hours of rain Midnight to midnight.	17.8 hrs.	2.7 hrs.	1.2 hrs.

In the first storm heavy and almost continuous rain fell up to 6pm. and then ceased during the period of highest wind. In the second, the rain fell between 6 a.m. and noon and then ceased for 8 hours, after which two slight showers were recorded. In the third, there were only scattered showers, there being several periods of 4-5 hours without rain.

As these storms occurred during the growing season which extends from Sept. to May, the effects on local agriculture were disastrous.

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The following vegetables and plants are known to have been affected:

Potatoes :	Leaves blackened, in some cases down to the ground.
Tomatoes :	Leaves blackened but immature tomatoes eventually ripened when plant survived.
Beans :	Leaves browned; plants also blown out of ground.
Peas :	Leaves browned, pods and even the peas in the pods shrivelled.
Lettuce :	All outside leaves browned.
Radish :	Leaves browned.
Sage Bush :	Leaves blackened and blown off; bushes looked dead.
Bermuda Cedar:	Needles browned.

As to the cause of this destruction, the evidence seems to point to a combination of the two most accepted theories mentioned by S.E.Ashmore(1), those of T.Willcocks(2) and S.Ashmore(3). The first ascribes the blackening and browning to the mechanical stresses in the leaves caused by the high winds and the second to the action on the leaves of the salt raised by the high winds.

The first would well account for the following case of a patch of potatoes. The patch was about twenty yards long by ten wide, and ran in a NE direction away from a wall and line of trees. The plants near the wall were protected from the west wind of the third gale and were not blackened. Those at the other end of the plot were blackened to the ground. It may be that the plants near the wall received little salt either, and unfortunately no examination of the plants was made, but it would be expected that salt would be carried there by back whirls and gusts.

On the other hand the discoloration of the stalks of the potato right down to the ground and of the leaves of tightly-hearted lettuce, requires the second reason to explain it.

It is hoped next season to note if discoloration of leaves begins to occur while the heavy rain which often accompanies the beginning of a gale is still falling, and whether plants in protected places have an appreciable amount of salt on their leaves.

- References: (1) S.E.Ashmore, Met.Mag., 74, 1939, 257.
 (2) T.Willcocks. Gard. Chron., 104, 1938, 315.
 (3) S.Ashmore, Gard. Chron. 100, 1936, 341.

N.E.Davis.

Meteorological Station. BERMUDA.

Solar Phenomena seen at Gillingham, Kent on March 7th, 1940.

The first appearance noticed was at 10h. G.M.T; at this time a short arc, apparently centred at the zenith, was showing faintly. It was estimated that it would have been tangential to the 46° halo, although the latter was not visible.

At 10h20m. G.M.T my attention was attracted by a number of bright arcs and mock suns. A theodolite was erected hastily, and a series of measurements were made until 10h35m. G.M.T, when some of the arcs began to fade, while others were obscured by the large cumulus clouds which were building up rapidly. In the accompanying diagram I have grouped all the phenomena seen during the total period of three and a half hours in their positions relative to the sun at the time when they were observed, but the position of the sun is shown as at 10h.25m. G.M.T.

Between 10h.20m G.M.T. and 10h.35m we observed the complete sun ring which passed slightly below the sun, whose elevation was 30° ; a nearly complete halo, the radius of whose convex side was 24° ; another arc intersecting the halo which appeared to be centred at the zenith. The least distance of this arc from the sun was $20\frac{1}{2}^{\circ}$; another arc whose connection with the other arcs was not obvious was observed to the ENE, but unfortunately it was weaker than the rest, and faded before any accurate measurements could be made. However it was seen to be approximately 25° long and sloped from 45° elevation at the southern end to 50° elevation at the northern end. The convex side of this arc was facing downwards, and its curvature was not very pronounced. It seemed to be part of an arc of fairly large radius, centred between the sun and the zenith, and that this circle would intersect the sun ring. On the sun ring four mock suns were seen, distant 28° and 120° on each side of the sun.

From 10h.30m. until 11h. the sky became heavily clouded with cumulus making observations impossible. Later however, the clouds became fewer, allowing an occasional observation. At 11h.40m. the nearer mock suns were found to be 30° from the sun.

At 11h.45m. another arc appeared. This was tangential to the halo, above the sun, and intersected the sun ring approximately at right angles at points 40° from the sun. This arc was still visible at 1215h.

At various times between 11h.50m. and 12h.20m two broad patches of light were seen in corresponding positions on each side of the sun whenever clouds permitted. Only once were measurements possible; then, at 11h.55m. the sun's elevation was 31° . The centre of the eastern patch was 48° east of the sun, and its elevation was $15\frac{1}{2}^{\circ}$. The length was approximately 4° , and the width 1° . These patches were too short and indefinite in outline to show any curvature, but they appeared to be perpendicular to the lines joining them to the sun. Their most striking feature was the brilliancy of their colouring, from red nearest the sun, through orange and yellow to green on the further side.

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A LUNAR PILLAR OBSERVED ON JULY 17th 1940.

A lunar pillar was observed from Brynteg, to the north-west of Wrexham, on July 17th, from 21h.7m to 21h.29m. No other halo phenomena were visible, although the moon was shining through a veil of cirrostratus clouds. The pillar extended both above and below the moon for a distance of about 3° in each direction, and the phenomenon was still bright when it was hidden by masses of nimbus cloud which, driving in a stormy WNW wind, caused very heavy showers soon after.

11 Percy Road,
Wrexham,
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S.E. ASHMORE.
19th July, 1940.

NOCTILUCENT CLOUDS.

Mr. J.L. Bennett of Colgate, Sussex observed noctilucent clouds on July 1st 1940 at 22h.30m. G.M.T. The cloud patch was of great length, one end overhead and the other far away on the north-western horizon. It appeared to be of great height and to be stationary. Mr. Bennett describes it as "quite bright, resembling moonlight, yet the stars could be seen through it!"

* A CLOUD-PENDANT OBSERVED ON JULY 21st 1940.

Flying-Officer H.V. Fortescue Long, R.A.F.V.R. reports a well-developed cloud-pendant seen to the northward from Crewe on July 21st 1940, lasting from 13h. to 13h.10m. G.M.T.

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METEOROLOGICAL STATIONS AND OBSERVERS.

Aneroid barometers with special inscriptions are being presented to the following observers as an acknowledgment of their long services to meteorology:-

Mr. John Dover of Totland Bay, 1888-1939.

Mr. Murray T. Foster of Cullompton 1907-1939

Mr. A.Lander of Canterbury 1901-1939.

Recipients in previous years were:

Mr.Charles Webster of Gordon Castle, 1891-1936.

Dr.T. Edmondston Saxby of Baltasound, 1904-1937.

Mr.J. Baxendell of Southport 1887-1936.

Mr.George Reid of Crieff 1907-1938.

Mr.C.L.Brook of Meltham 1881-1938.

Mr.C. Dales of Bournemouth 1901-1938.

Mr.A.W. Shadick of Clacton 1902-1939.

Dr.C.C. Vigurs of Newquay 1903-1939.

The following stations have been closed as a consequence of the war; in most cases the observations will be resumed.

Health Resorts:

Felixstowe.	Folkestone.	Jersey.
Llandrindod Wells	Mablethorpe	St.Ives.
Sheerness.		

Climatological Stations: Ascot, Crieff.

Crop Weather Stations: Chadacre, Cirencester.

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OBITUARY.

Mr. Neville Holden who was responsible for the meteorological station at Lancaster from 1909-1939, died on March 12th 1940. Reports from Lancaster were received from 1893 until June 1939 when the Town Council decided that the Observatory should be handed to a local school. It is understood that records are continued for local use.

Mr. W. Vaux Graham, F.R. Met. S. who died on May 23rd 1940, was well known as a consulting engineer and was a director of the Sutton District Water Company. He was responsible for a number of rainfall records in Surrey from 1899 onwards.