the main criteria for distinguishing flares[3]. We now see that the radio evidence lends support to this point of view.

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## Distribution of Flares on the Solar Disk Associated with Noise

The association of solar noise bursts at 48 Mc./s. and solar flares has been examined for the periods June 20–July 31, 1957, September 1–October 1, 1957, and June 1–July 31, 1958. The noise burst data were obtained from the Resolute auroral radar film records. Resolute was the northern station (75° N., 95° W.) of the National Research Council's International Geophysical Year Auroral Radar Chain[1]. For the purpose of this analysis, bursts are defined as solar radio noise events with durations of the order of 30 seconds or less (probably due to spectral type III bursts). Association with a particular flare was assumed probable if the burst occurred during an interval of 2 minutes preceeding, to 3 minutes following the flare commencement. This is a more stringent requirement than that usually used[2,3]. During the periods listed above, a total of 535 such events were recorded with 12 per cent of the noise-producing flares occuring within $\pm$ 5° of the central meridian, while for the same periods 8 per cent of all flares occurred in the same interval.

Hey and Hughes have found an east-west asymmetry for the period 1947–1950 where both the number and intensity of flares associated with noise at 73 Mc./s. were greater in the eastern half of the solar disk[2]. They also observed a reduction in the number of such flares near the central meridian. The data summarized in Fig. 1 indicate a definite peak in flares associated with noise near the central meridian. Of a total of 3,671 flares considered in the analysis, 54·5 per cent occurred east of the central meridian, while only 47·4 per cent occurred east of the central meridian. The dip in the curves at 10° W. will require the analysis of more data before its validity can be established, but it does appear to be common to the data for each of the 3 periods so far analysed.

The north-south distribution for the same periods was examined for both total number of flares and flares associated with noise. The great preponderance of flares in the northern hemisphere shown in Fig. 1 was unexpected. Newton and Milsom have observed a shift in the 'spottedness' of the northern and southern hemispheres from cycle to cycle over many sunspot cycles[4]. Their results indicate that the present cycle has a definite increase in spot activity in the northern hemisphere. An increase in flares associated with noise in the northern solar hemisphere has also been observed in Japan[5].

The results presented here indicate that the present conditions in the solar corona favour the emission of radio noise at very high frequencies from flares occurring in the north-west quadrant of the solar disk.

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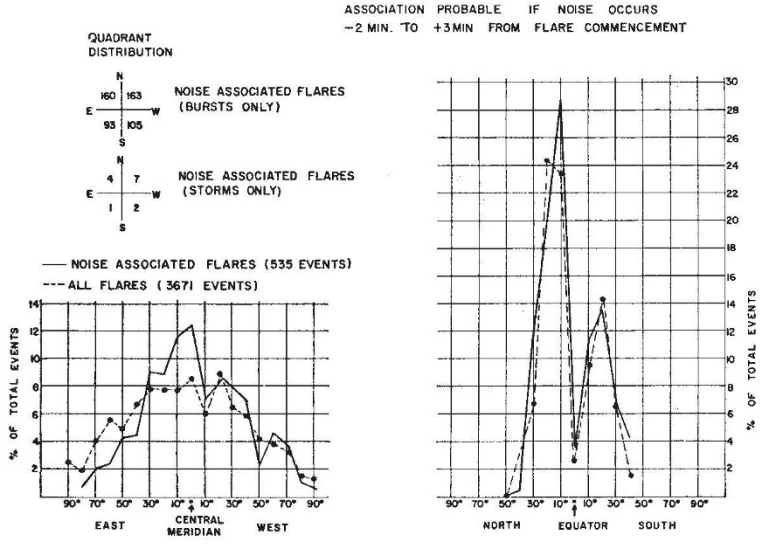


Fig. 1. Distribution of noise-associated flares for periods June 20–July 31, 1957; September 1–October 31, 1957; and June 1–July 31, 1958. Noise data from Resolute 48 Mc./s. auroral radar records.

## Observations of 'Whistlers' and Very Low Frequency Phenomena at Godhavn, Greenland

As part of the research programme for the International Geophysical Year, recording of very low-frequency phenomena was initiated at Godhavn, Greenland, on July 19, 1957. The geomagnetic co-ordinates for Godhavn are 79·8 N., 32·5 E. The station is situated 950 km. south-east of the geomagnetic pole and approximately 1800 km. north-east of the dip-pole.

A little more than one year's recordings of whistlers have now been scaled and analysed. These cover the period from July 19, 1957, to the end of July, 1958. On July 21, 1957, the first possible whistler was heard but it was too faint to analyse. Whistlers have also been recorded on October 10 and 11, November 26, December 12 and 21, 1957, and on January 11, 1958. Maximum activity was observed on October 11, when 7 consecutive hourly recordings contained whistlers at a rate of up to 30 per two minutes. The total number of whistlers observed during one year is nearly 125, of which about 50 have been analysed.

It is difficult to find the whistlers by listening directly to the record, mainly because of lack of low frequencies in the whistlers, but the interpretation is facilitated by listening to the tape at half speed. This