

Reports on the Progress of Astronomy

SOLAR ACTIVITY

SUNSPOTS

Despite considerable fluctuations during the year, the overall level of solar activity dropped slightly in 1969, the definitive Zürich sunspot number being 105.5 (against 105.9 for 1968), the monthly means ranging between 135.8 in March and 91.3 in September.

Marked activity in March was compensated by a progressive decrease as the year advanced.

Sunspot groups with maximum corrected areas exceeding 500 millionths of the visible hemisphere numbered 42 (against 50 observed in 1968), of which 12 attained areas exceeding 1000 millionths.

The largest group of 2700 millionths crossed the disk between October 19 and November 1 (Central Meridian Passage October 26.1) in 10° North.

Two groups observed in March also had maximum areas of some 2000 millionths. The solar flares associated with these and other

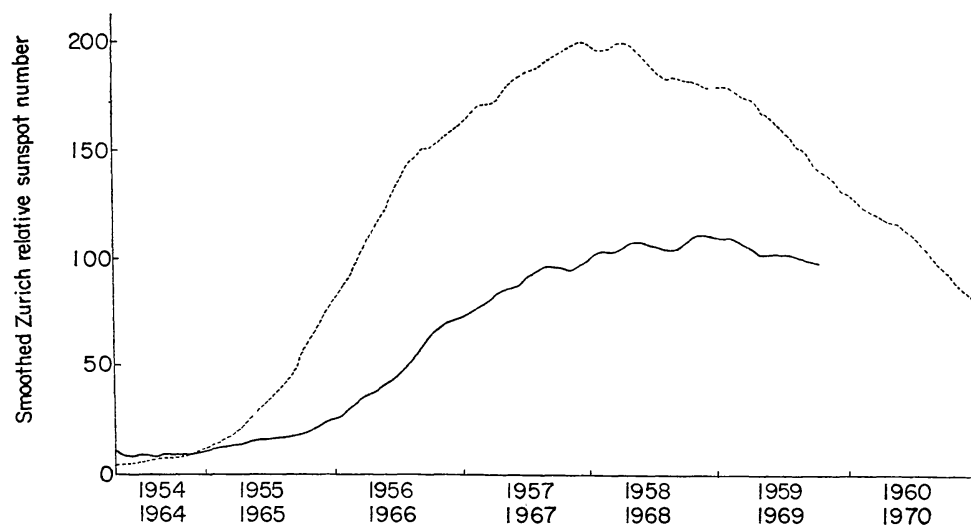


FIGURE 1

medium-sized sunspots gave rise to the above-mentioned activity in the first quarter of the year.

Preliminary international reports of flare observations indicate a decrease of some 12 per cent from the 600 flares \geq class I observed in 1968, but in spite of this, the 43 S.I.D.s reported by Cable and Wireless Limited and the 49 S.E.A.s recorded on 25.5 kHz at Herstmonceux represent in each case an increase of more than 50 per cent compared with the previous year's totals.

The determination of the epoch of maximum phase of this solar cycle presents considerable difficulty, but if the customary criterion of smoothed relative sunspot numbers is adopted, maximum occurred at 1968.9, with a smoothed sunspot number of 111. At the previous maximum of 1957.9, the corresponding relative number reached 201.

The accompanying graphs, separated by 10 years, show cycle 19 (broken line) and the progress to date of Cycle 20 (solid line).

P.S.LAURIE

PROMINENCES

The following table gives the mean daily areas and numbers of calcium prominences at the limb, derived from spectroheliograms obtained at Kodaikanal during 1969.

1969	Area (sq. minutes)					Numbers				
	N	S	E	W	Total	N	S	E	W	Total
January–June	3.90	3.32	3.58	3.64	7.22	6.21	5.45	5.74	5.92	11.66
July–December	2.92	2.98	3.07	2.83	5.90	6.75	5.83	6.32	6.26	12.58
Whole year (weighted mean)	3.57	3.20	3.40	3.37	6.77	6.40	5.58	5.94	6.04	11.98

Compared to the previous year, there was no appreciable variation in activity of numbers, whereas the areas show a decrease of 7 per cent. The distribution of areas in five-degree ranges of latitude in the northern hemisphere shows a peak of activity in the belt 20° – 25° . In the southern hemisphere, the maximum is between 35° and 40° .

The mean daily areas and numbers of hydrogen absorption markings on the disc as obtained from Kodaikanal records are as follows:

1969	H-alpha dark marking area (in millionths of the Sun's visible hemisphere uncorrected for foreshortening)					Numbers				
	N	S	E	W	Total	N	S	E	W	Total
January–June	2704	2481	2578	2607	5185	23.16	23.72	23.46	23.42	46.88
July–December	2964	2508	2875	2597	5472	22.53	21.77	23.47	20.83	44.30
Whole year (weighted mean)	2801	2490	2687	2604	5291	22.93	22.99	23.46	22.46	45.92

Compared to the previous year, there is a decrease of activity, the decrease being 12·2 per cent in the case of areas and 9 per cent in the case of numbers. The predominant activity is in the latitude belt 20° – 25° in the northern hemisphere and in the latitude belt 30° – 35° in the southern hemisphere.

M.K.VAINU BAPPU

COMETS

The year 1969 was a rather typical one, with five new comets discovered and four periodic comets recovered on the basis of predictions. All but one of these comets were announced during the second half of the year. In addition, observations were reported of the 'annual' comet Schwassmann-Wachmann 1, six of the comets of 1968 (although one identification is unconfirmed) and two of those of 1967. What made the year unusual, however, was that around the month of October no fewer than seven comets were bright enough to be observed by amateur astronomers, and four of these were, in fact, short-period comets.

P/Schwassmann-Wachmann 1 was photographed by K.Tomita with the Tokyo Astronomical Observatory's 188-cm reflector at Okayama in mid-January and with the 91-cm reflector at Dodaira on March 24. On each occasion the appearance was normal, the cometary images being of magnitude 17 and centrally condensed. The comet's appearance was also rather normal on plates exposed by Elizabeth Roemer with the 154-cm $f/13\cdot5$ Cassegrain reflector at the Catalina station of the Lunar and Planetary Laboratory (near Tucson, Arizona) on March 16 and May 17. On the former date there was an essentially stellar nucleus of magnitude 18·6, with a semicircular coma of radius 0·3 to the east and a weak, narrow jet to the north-east. The comet was not found on a 30-min exposure with the 183-cm Perkins reflector of the Lowell Observatory on June 9. Albert Jones, using a 32-cm reflector at Nelson, New Zealand, has patrolled the comet visually for outbursts: his failure to identify the comet in July and August suggests that it was then fainter than magnitude 11 if cometlike or fainter than magnitude 13 if stellar.

1967 i, P/Schwassmann-Wachmann 2, was observed by Roemer in March, April and May. On March 15 the comet appeared as a well-condensed nucleus of magnitude 19·3, with a trace of a narrow tail 0·3 long slightly to the north of west. On April 20 the comet was a nearly stellar object of magnitude 19·1, with a weak trace of coma, and when last observed four weeks later it was again well condensed and of magnitude 19·0.

Observations 1967 August 8 to 1969 May 18