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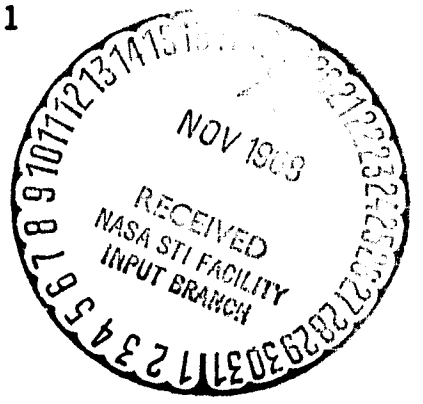
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JUPITER'S RED SPOT IN 1967-68

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ABSTRACT

Photographic observations of Jupiter's Red Spot between 12 September 1967 and 17 July 1968 are reported. As the activity in the SEBs decreased, the Red Spot became larger and darker, finally regaining the prominence it had during early 1966.

INTRODUCTION

During the apparition of 1967-68, there was a marked decrease in the number of spots observed on the SEBs, and the Red Spot regained much of the prominence it had lost as the result of activity in the SEBs during the preceding two apparitions (Solberg, 1968). The increasing prominence of the Red Spot during the apparition is shown in Fig. 1. During the early months of the apparition, the Red Spot had much the same appearance as it had during the previous apparition, although it was somewhat fainter than before. Then, about January 1968, a reddish ring formed in the Red Spot Hollow, with red material in the southern part of the ring. By May, the ring had been filled with red material, and the Red Spot appeared much as it had two years earlier.

METHOD

All the photographs used in this study were made on blue sensitive plates, using a 61-cm Cassegrain reflector at its 46-m, all-mirror focus. Images were measured to an accuracy of one micron using a Mann measuring machine; nine images per plate were measured for longitude, and four images per plate were measured for latitude.

The mean probable error was ±0°.18 for longitude measurements and ±0°.15 for latitude measurements.

POSITION OF THE RED SPOT

The three month oscillation of the Red Spot's longitude was observed for the fifth consecutive apparition (Fig. 2); it will be discussed in detail in another paper. Except for a large (almost 10° in 4 months) decrease in the longitude of the preceding end, the longitudinal motion of the Red Spot was unremarkable during the apparition. The drift of the Red Spot during short intervals and the mean drift for the apparition are presented in Table I.

As the Red Spot lengthened, it also became wider--the latitude of the north edge decreased 5° during the apparition, while the south edge remained nearly stationary (Fig. 3). The mean latitude during the apparition was -23°.0.

DIMENSIONS OF THE RED SPOT

The size of the Red Spot increased greatly during the apparition; the length increased from 15° to almost 26° (Fig. 4), while the width increased from 7°.5 to 12°.5 (Fig. 5). Mean values were 19°.8 for the length and 10°.0 for the width.

This increase in size was probably caused by a lessening of activity in the SEBs. Prior to opposition, 14 long-enduring SEBs spots were observed, while only 4 were seen after opposition. During the previous apparition, when the Red Spot's length decreased to 14°.5, 69 long-enduring SEBs spots were measured.

ACKNOWLEDGMENTS

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REFERENCES

Solberg, H. G. (1968). Jupiter's Red Spot in 1966-67. Icarus 9, 212-216.

Table I

RED SPOT ROTATION RATES, 1967-68

	Limiting Dates	Limiting Longitudes	Drift °/day	Std. Dev.	Rotation Period	Std. Dev.	Number of Plates
1967	12 Sep-27 Oct	28°.0-29°.2	+0°.027	±0°.019	$41^{s}.7$	$\pm 0^{s}.8$	8
	27 Oct-27 Nov	29.2-26.9	-0.075	0.044	37.5	1.8	7
	27 Nov- 9 Jan	26.9-31.1	+0.097	0.021	44.6	0.9	12
1968	9 Jan-11 Feb	31.1-25.6	-0.168	0.035	33.7	1.4	13
	11 Feb-29 Feb	25.6-26.9	+0.069	0.025	43.5	1.0	15
	29 Feb- 7 Apr	26.9-26.9	+0.000	0.024	40.7	1.0	15
	7 Apr-28 May	26.9-25.0	-0.038	0.008	39.1	0.3	13
	28 May-17 Jul	25.0-26.7	+0.035	0.019	42.1	0.8	7
Mean During Apparition	12 Sep 67-17 Jul 68	28.0-26.7	-0.004	0.002	40.5	0.1	90
Mean Between Successive Oppositions	20 Jan 67-20 Feb 68	28.6-26.2	-0.007		40.4		

Caption for Fig. 1:

During 1967-68, the Red Spot became darker and longer. The South Tropical Zone became brighter as the Red Spot became more prominent.

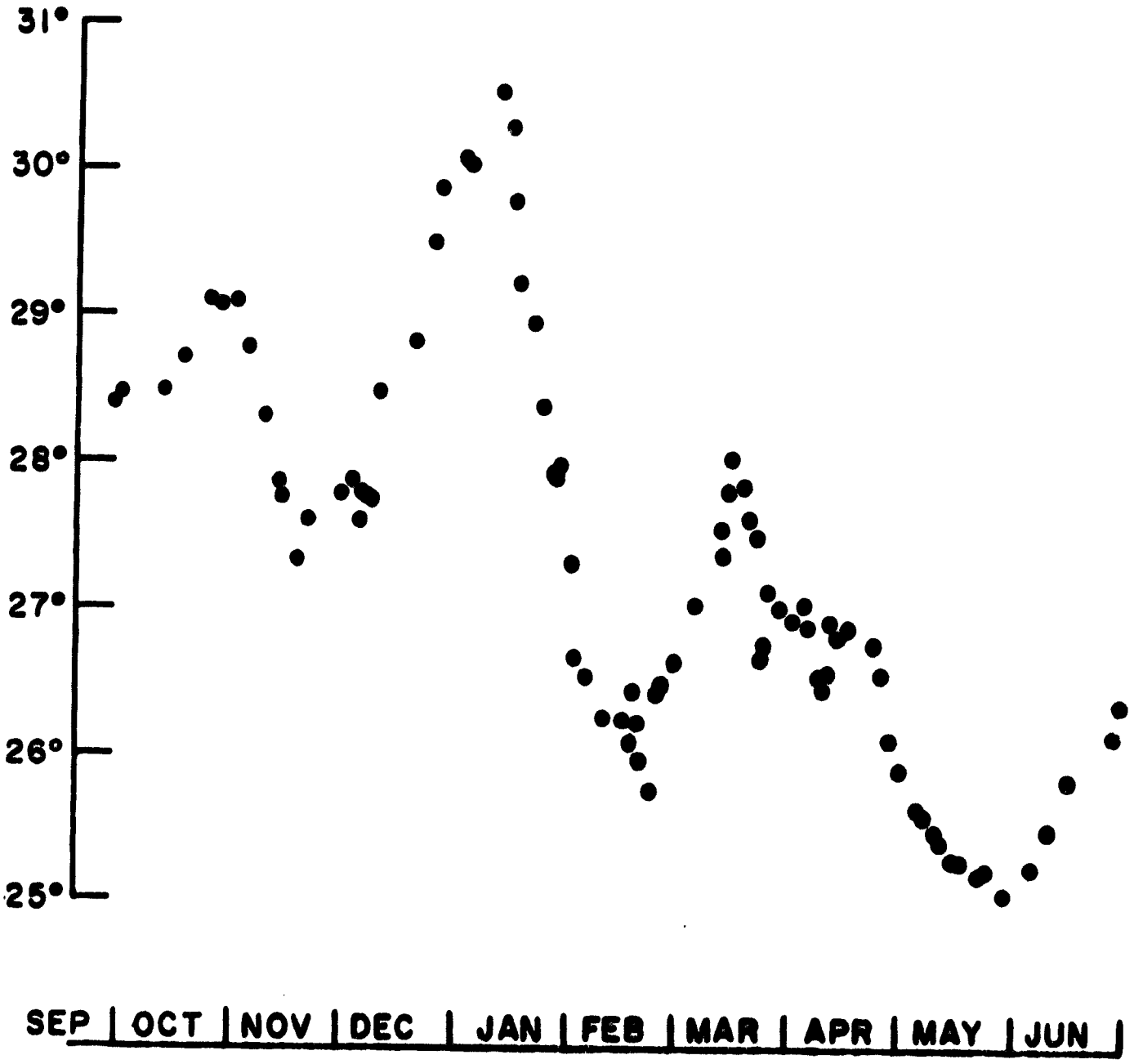


Figure 2. Smoothed Red Spot Longitude, 1967-68; five-plate means.

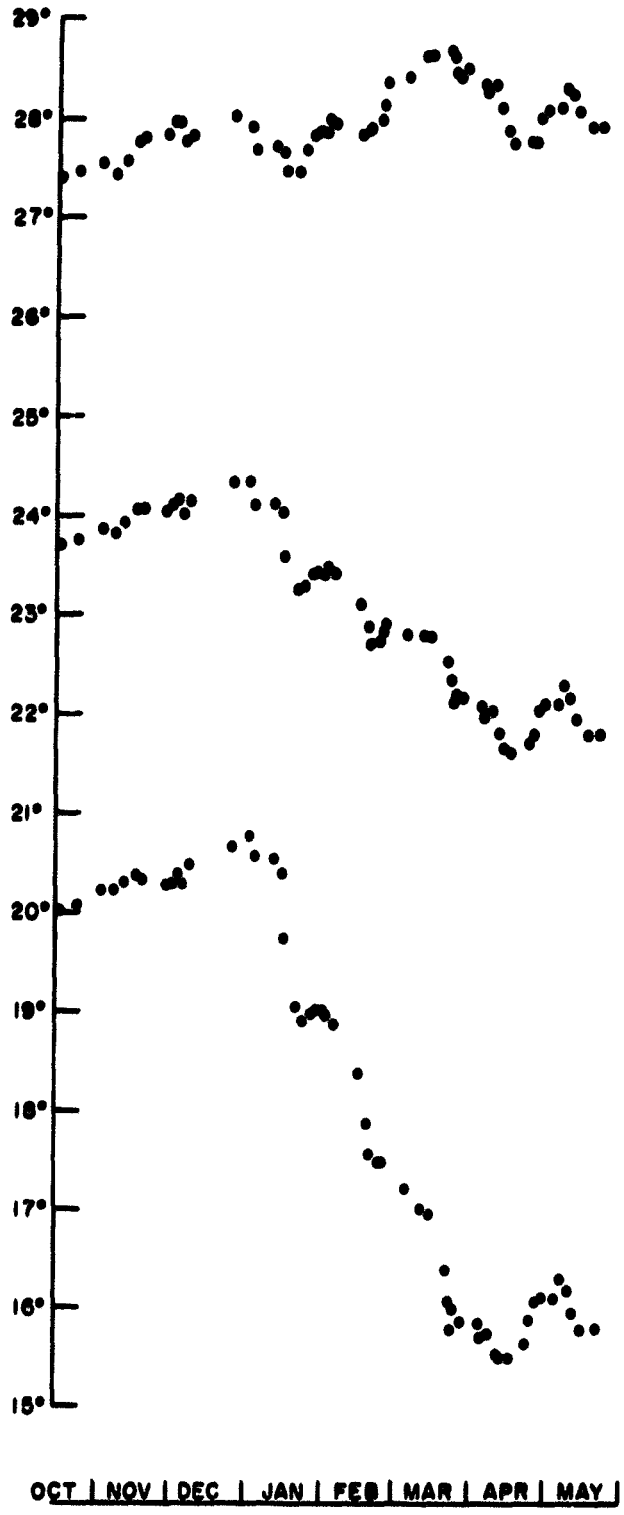


Figure 3. Red Spot Latitude, 1967-68; five-plate means.

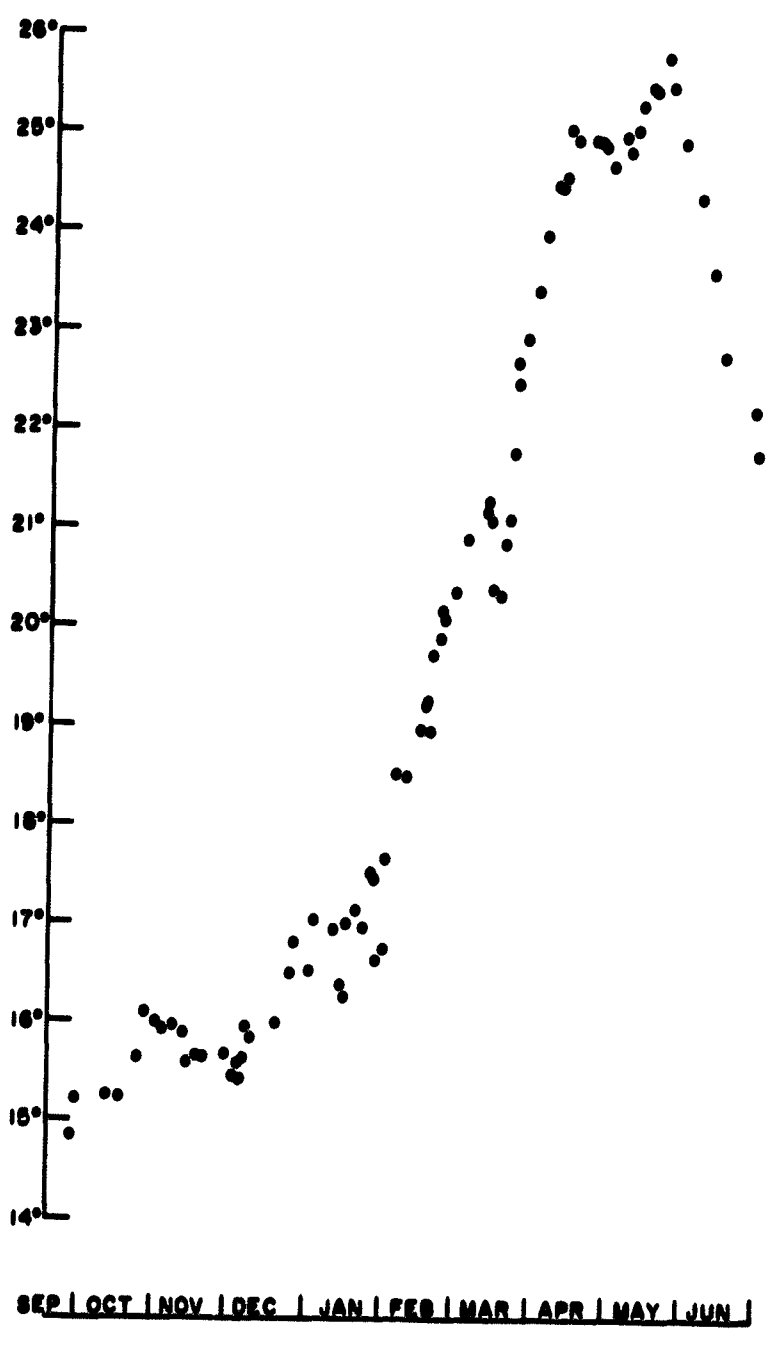


Figure 4. Red Spot Length, 1967-68; five-plate means.

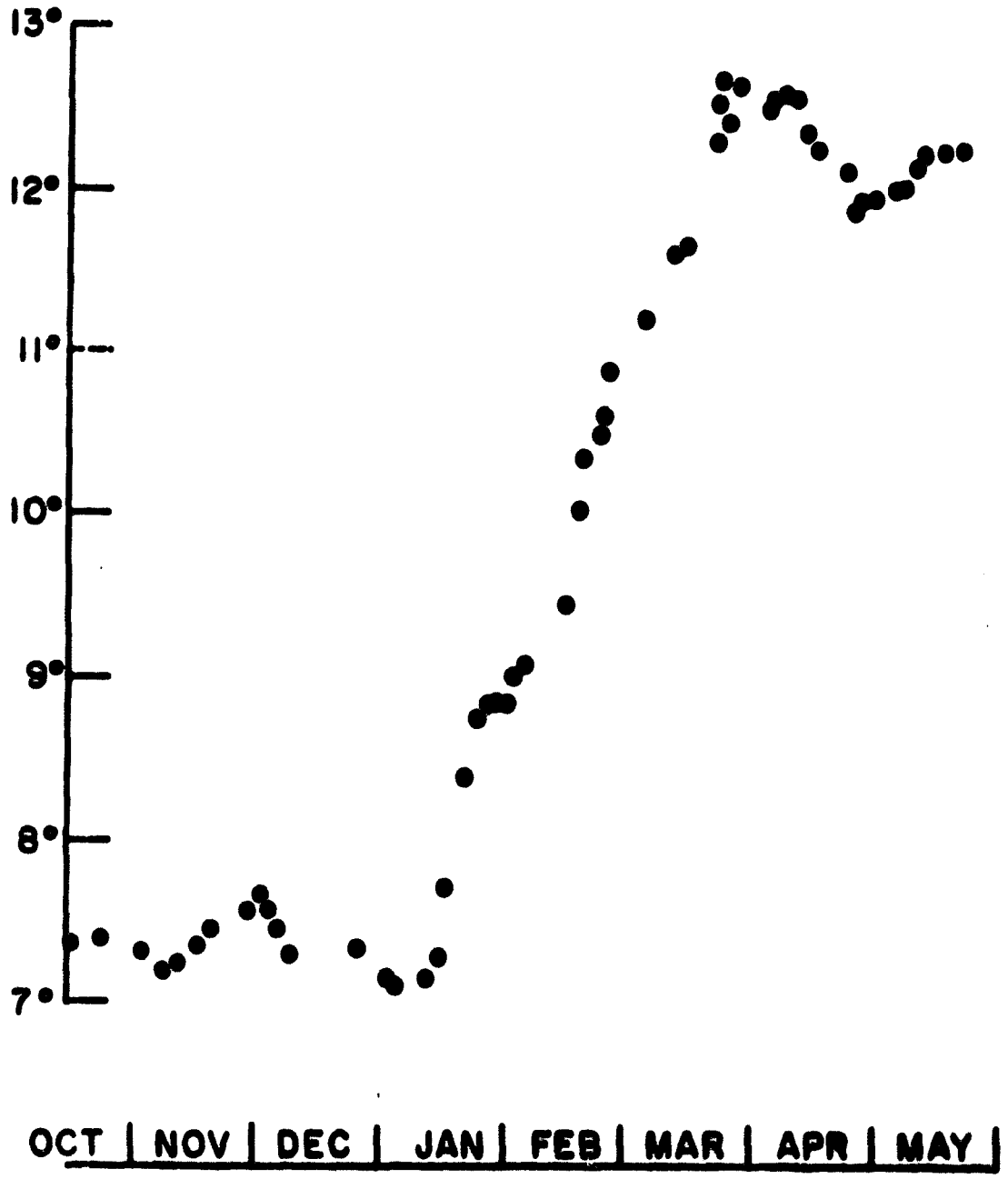


Figure 5. Red Spot Width, 1967-68; five-plate means.