MARS: 1975-1976

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A REPORT OF THE MARS SECTION
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The apparition of 1975 was the first of the present series of aphelic apparitions. Opposition occurred on 1975 December 15 when the planet was well placed for observation in Taurus. Its maximum apparent diameter was, however, only 16".5 as against 21".2 of the preceding apparition of 1973.

This Report is based on the observations contributed by the following members of the Section:

Observer	*Location*	*Instrument(s)*
Adamoli, G.	Verona, Italy	108 mm OG
Bailey, K.	Wallingford	215 mm reflector
Caunter, J.	Totnes	150 mm OG
Coates, J.	Burnely	200 mm reflector
Collinson, E. H.	Snape, Suffolk	250 mm reflector
Doherty, P. B.	Stoke-on-Trent	254 mm reflector
Dragesco, Prof. J.	Meudon and Pic du Midi	1 05 m and 260 mm reflectors
Ellis, E. L.	St Albans	90 mm OG
Foulkes, M.	Cleethorpes	254 mm reflector
Grant, C. P.	Marlborough	250 mm OG
Heath, A. W.	Long Eaton	300 mm reflector
Hitchens, D.	Stalmine, Lanes.	220 mm reflector
Johnstone, G. F .	Leamington Spa	150 mm reflector
Kidger, M.	Bristol	150 mm OG
Livesey, R. J.	Glasgow	220 mm reflector
Lyon, P.	Birmingham	310 mm reflector
Mackenzie, R. A.	Dover	75 mm OG
Paterson, R. A.	Oxford	320 mm reflector
Pattinson, S. C.	Croydon	215 mm reflector
Robinson, J. Hedley	Teignmouth	260 mm reflector
Rogers, J. H.	Cambridge and London	300 mm OG and 180 mm OG
Sturdy, K. M.	Helmsley	215 mm reflector

The observations extended from 1975 June to 1976 March, covering the martian summer and early autumn of the southern hemisphere of the planet (heliocentric longitude (η) 331°-130°). Mars was in perihelion on 1975 June 13d and the summer solstice of the southern hemisphere was on 1975 July 17d.

Surface features

The new dark area in the region of Claritas-Daedalia which appeared in 1973 was still very conspicuous and darker than Mare Sirenum. It survived the dust storm of that apparition. Its appearance in detail is well shown on a drawing by Professor Dragesco made with the 1.05 metre telescope of the Pic du Midi Observatory (see figure 1). For comparison a drawing by Professor Dragesco of the same region in 1971, before the new feature appeared to show its position and extent, is reproduced in figure 2. Rogers and Doherty also observed the new feature in December and a drawing by Doherty on December 29 is reproduced in figure 3. He recorded the feature as being the darkest on the disk estimating its intensity as seven on November 21. It appeared to have extended further towards the tip of Mare Sirenum than in 1973. Except in good seeing the new feature appeared to join with Mare Sirenum to form a dark band across the planet as it did in 1973.

Other features of interest were as follows. Nepenthes-Thoth, which in the past has sometimes appeared broad and dark, was narrow and very faint this apparition (see figure 4). The preceding side of Syrtis Major was seen by Dragesco and Doherty to be indented. Ganges was described by Rogers as dark between September 13-15 and faint in November, and by Foulkes as very dark and prominent on December 27. It was recorded by Doherty on November 20 as being a dusky band leading to Juventae Fons. (It will be remembered that Ganges was a prominent feature of the 1973 apparition.) Hellas was recorded as being brilliant pink in colour by Doherty on October 26 and December 7 and by Heath on January 8. Apart from the above no unusual features were noted.

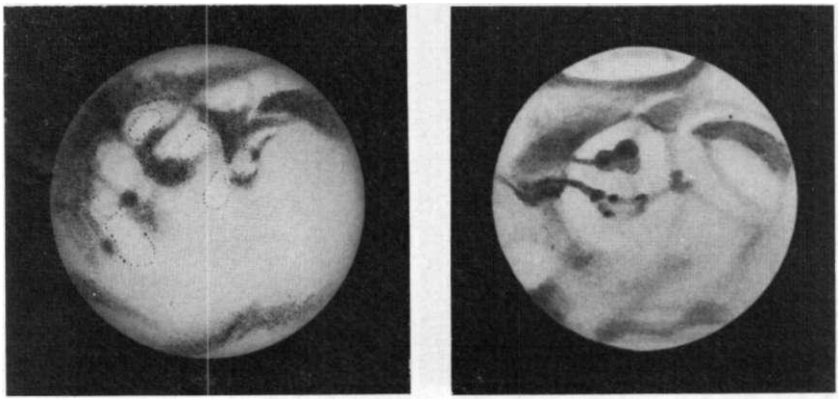

FIGURE 1 *(left).* 1975 Dec. 23d 21h 45m UT. x 800, 1 m reflector. New dark feature in Claritas-Daedalia. *J. Dragesco.*

FIGURE 2 *(right).* 1971 July 1d 02h 40m UT. 260 mm reflector. Same region as in figure 1 before appearance of new feature. *J. Dragesco.*

The Polar Caps. The South Polar Cap was first observed towards the end of June (η = 340°) when it was described by Doherty and Sturdy as large and brilliant. Sturdy recorded it as being somewhat west of the pole. It shrank rapidly during June and July. The extent of the cap and its rate of shrinkage, as recorded by Hitchens, did not differ very much from the average obtained by Antoniadi from 1856 to 1912 (see *Mem. Br. astron. Assoc.,* xx, 482-486). By mid-September (η = 330°) the South Polar Hood was seen by Hitchens to be developing. It became very extensive, sometimes covering Eridania, Hellas, Noachis and Phaethontis, i.e. to latitude —40°. As the autumnal equinox (η = 87°) of Mars approached the cap became very small and difficult to see.

There was an extensive and diffuse North Polar Hood visible in September and October. In November the North Polar Cap was observed which was described as having an icy whiteness and an irregular and indented south border which, in certain longitudes, gave the cap a double appearance (see figure 5). On January 8 (η = 95°) the cap was seen by Heath as a small dot with no sign ofhaze surrounding it which may well have accounted for the large appearance earlier in the apparition (see figure 6).

Heath reported that the north polar region appeared dull through a Wratten 25 red filter but bright through a Dufay blue filter.

Atmospheric phenomena

Observations made between July 27 and September 2 and again on October 14 and 18 indicated that there was then considerable obscuration of the surface features. On August 17 (ω = 287°), Rogers, observing with

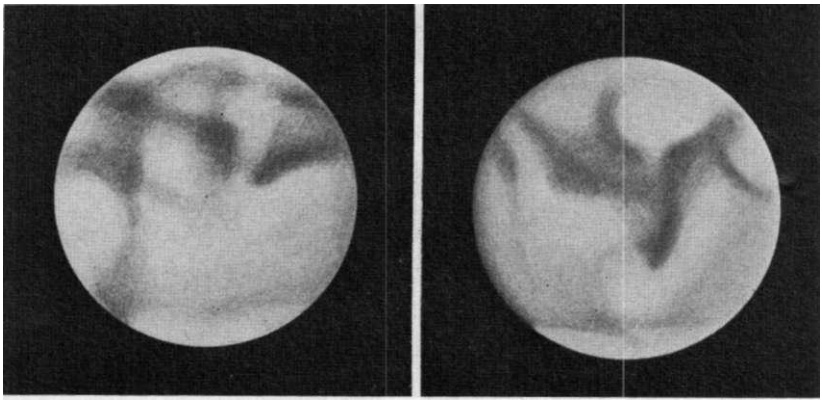

FIGURE 3 *(left).* 1975 Dec. 29d 00h 10m UT. x 280, 254 mm reflector. *P. B. Doherty.*

FIGURE 4 *(right).* 1975 Dec. 8d 00h 10m UT. x 350, 254 mm reflector. *P. B. Doherty.*

TABLE I

Feature	*Observers*					
	DOHERTY	GRANT	HEATH	HITCHENS	MACKENZIE	STURDY
Acidalium M.	7	5	6	6	5	9
Aurorae S.	5.5	5	4.5		5	6
Casius				6	3.5	
Cimmerium M. ..	5.5	5	5	5		6
Claritas-Daedelia	7					8
Erythraeum M. ..			4	4	6	6
lapigia		4	5	5	5	8
Ismenius L.	-	-	-	-	-	-
Margaritifer S.	4.5	4	4.5		7.5	6
Meridiani S.		5	5.5	5		8
Nepenthes	-	-	-	-	-	-
Nilokeras			3.5			
Pandorae F.		4	4.2		6	5
Sabaeus S.		5	5.5		5.5	6
Serpentis M.			3	5		8
Sirenum M.	7		5	5		7
Solis L. ..			5			8
Syrtis Major		5	6	6	6	8
Thoth	-	-	-	-	-	-
Trivium "Charontis	4.5		4.5	5		
Tyrrhenum M.	6.5		5	5	5.5	7

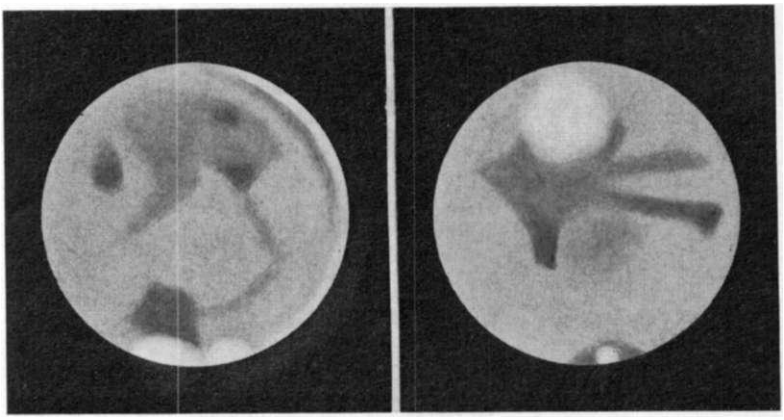

FIGURE 5 *(left).* 1975 Nov. 21d 22h 30m UT. x 318, 300 mm reflector. *A. W. Heath.*

FIGURE 6 *(right).* 1976 Jan. 8d 21h 45m UT. x 318, 300 mm reflector. *A. W. Heath.*

the 300 mm Northumberland refractor at Cambridge, observed a bright area covering Hellas-Noachis and on August 27-28 ($\omega = 159° - 214°$) he found the markings subdued and vague, particularly over Daedalia-Mare Sirenum but progressively clearer towards Hesperia. By September 13-15 ($\omega = 335° — 61°$) the surface features had cleared. It seems that a minor dust storm may have been in progress in July and August shortly after Mars was at perihelion on June 13 ($\eta = 334°$).

Observations with a Dufay Blue filter by Heath revealed no definite blue clearing during the apparition except for a suggestion on 1975 December 2 when a vague outline of Syrtis Major was seen.

Intensity estimates

Estimates of the intensity of the principal surface features were made by a number of observers and the following Table gives a selection of the results. The usual scale of 0 = the brightness of the South Polar Cap and 10 = the background of the night sky has been used as in previous Reports.