

MARS: 1977-1978

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A REPORT OF THE MARS SECTION

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A report of the 1977-78 apparition of Mars, when the planet had a maximum apparent diameter of only 14".3.

The apparition of 1978 was the second of the present series of aphelic apparitions. Opposition occurred on 1978 January 22. Although the planet was well placed for observation on the borders of Gemini and Cancer, its maximum apparent diameter was only 14".3.

Observations were contributed by the following members of the Section :

<i>Observer</i>	<i>Location</i>	<i>Instrument(s)</i>
Adamoli, G.	Verona, Italy	108 mm OG
Bell, J.	Long Eaton	216 mm reflector
Bryant, N.	Ilfracombe	254 mm reflector
Caunter, J.	Totnes	150 mm OG
Coates, J.	Burnley	75 mm OG
Collinson, E. H.	Snape, Suffolk	250 mm reflector
Doherty, P. B.	Stoke-on-Trent	419 mm and 254 mm reflectors
Dragesco, Prof. J.	Cotonou, W. Africa	203 mm reflector
Gallon, M.	Newcastle	115 mm reflector
Grant, C.	Cambridge	320 mm OG*
Heath, A. W.	Long Eaton	300 mm reflector
Hitchens, D.	Stalmine, Lanes.	220 mm reflector
Hollis, A. J.	Northwich	200 mm reflector
Livesey, R. J.	Glasgow	220 mm reflector
Lord, C. J. R.	St Anne's-on-Sea	160 mm OG and 250 mm reflector
Lyon, P.	Cambridge and Birmingham	320 mm OG* and 314 mm reflector
Mackenzie, R. A.	Dover	75 mm OG
McKim, R. J.	Colchester	215 mm reflector
McLeish, T.	Sevenoaks	300 mm reflector
Moore, P. A.	Selsey	320 mm and 380 mm reflectors
Parish, P. W.	Gillingham	102 mm OG
Robinson, J. H.	Teignmouth	260 mm reflector
Rogers, J. H.	Los Angeles and Cambridge	320 mm reflector and 320 mm OG*

*Northumberland refractor of Cambridge University.

<i>Observer</i>	<i>Location</i>	<i>Instrument(s)</i>
Stott, D. J.	Brighton	298 mm reflector
Sturdy, K. M.	Helmsley	215 mm reflector

The observations extended from 1977 October to 1978 April [heliocentric longitude (η) 70° - 155°] covering spring of the northern hemisphere and autumn of the southern hemisphere of Mars. The northern hemisphere was presented to the Earth this apparition, the tilt of the planet's axis being $+12^\circ$ at opposition.

The very small apparent diameter of Mars throughout the apparition made the observation of all but the main features of the planet very difficult and was also hindered in England by poor weather and generally bad seeing. Much better conditions were, however, experienced by Professor Dragesco in West Africa and by J. H. Rogers in California, both of whom contributed an extensive and valuable series of observations. Dragesco used a 203 mm Celestron and Rogers the 320 mm reflector of University College, Los Angeles, and the 320 mm refractor of Cambridge University when in England.

Surface features

The interesting region between M. Erythraeum and M. Sirenum which was so well presented during the 1973 and 1975 apparitions was much foreshortened during this apparition owing to the tilt of the planet's axis, and so was not well observed in England. Dragesco and Rogers were, however, able to record that the Claritas-Daedalia feature which first appeared during the 1973 apparition was still prominent (figure 1). Rogers noted that it was not so dark as Solis Lacus.

In the report of the 1975-76 apparition comment was made on the faintness of the Nepenthes-Thoth feature. This was again very incon-

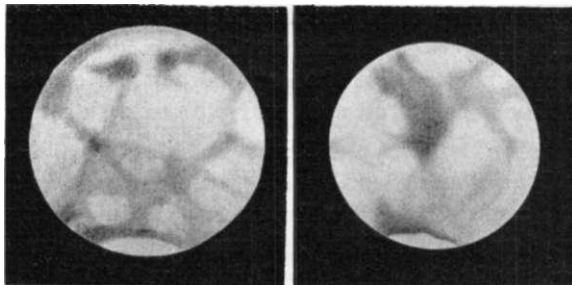


FIGURE 1 (*left*). 1978 January 15d 1h 38m UT. $\omega = 98^\circ$, x 350, 203 mm reflector. *J. Dragesco*.

FIGURE 2 (*right*). 1978 January 26d 21h 40m UT. $\omega = 295^\circ$, x 300, 419 mm reflector. *P. B. Doherty*.

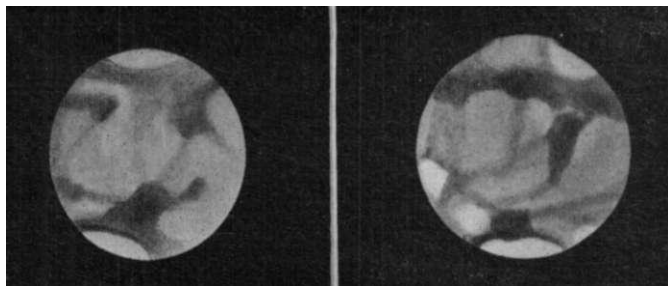


FIGURE 3 (*left*). 1977 December 18d 3h 30m UT. $\omega = 13^\circ$, x 350, 203 mm reflector. *J. Dragesco*.

FIGURE 4 (*right*). 1977 December 30d 3h 30m UT. $\omega = 260^\circ$, x 350, 203 mm reflector. *J. Dragesco*.

spicuous and, to most observers, invisible this apparition. It was seen by Dragesco on 1977 December 30 ($\eta 110^\circ$) and in part faintly by Doherty on 1978 January 26 ($\eta 124^\circ$), see figure 2. Dragesco reported that Margaritifer Sinus was very faint (figure 3).

Syrtris Major and Minor, M. Acidalium and Boreosyrtris appeared very dark and conspicuous. The 'canals' Ganges, Cerberus, Gehon, Protonilus and Deuteronilus were recorded by Dragesco and some other observers (figure 4).

The Polar Caps. The North Polar Cap first observed in November ($\eta 90^\circ$) became a prominent feature of the planet throughout the apparition, gradually diminishing in size. It exhibited a very conspicuous dark border (intensity 6-7) with no irregularities which merged into the dark areas of the north polar regions. Hitchens and Doherty had intended to record the rate of shrinkage of the Cap to compare it with the average obtained by Antoniadi from 1856 to 1912 as mentioned in the report of the 1975 apparition; poor seeing, cloudy weather and the small disk prevented this investigation. Heath reported that the Cap was always seen through a Wratten 47 blue filter as was the dark border and appeared brightest through a Dufay Tricolour green filter. No blue clearing was observed.

Observations by Dragesco and Rogers in October ($\eta 70^\circ$ - 80°) revealed an extensive South Polar Hood but the true polar cap was not visible. It was, however, seen by Rogers in December as a tiny white spot. Rogers recorded the South Polar Hood as varying in extent and tone from yellowish white to bright white over Ausonia and Hellas in January but shrinking and fading in early February ($\eta 131^\circ$).

Atmospheric phenomena

The most interesting feature of the apparition was the appearance of extensive clouds or dust storms over the regions Tempe and Aethiopsis-

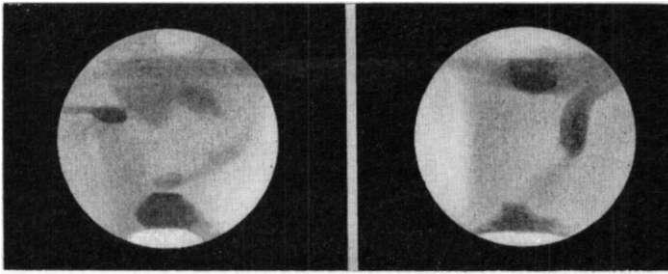


FIGURE 5 (left). 1978 February 2d 7h 50m UT. $\omega = 31^\circ$, x 320 mm reflector. Note cloud over Tempe. *J. H. Rogers.*

FIGURE 6 (right). 1978 February 11d 4h 30m UT. $\omega = 263^\circ$, χ 320 mm reflector. Note cloud over Aethiopsis-Aetheria. *J. H. Rogers.*

Aetheria. The cloud over Tempe was first reported (*IAU Circular No. 3164*) by O'Meara (Harvard Observatory) on 1978 January 17, and described as "a dust storm bordering on M. Acidalium and M. Boreum extending into Tempe". Unfortunately this region was not visible from the British Isles at that time but the cloud was well observed by Rogers in Los Angeles. He saw it first on February 1-2 "as a major, quite bright, white cloud on the f. (morning) limb". It did not encroach upon M. Acidalium or Lunae Palus. The cloud was seen again on the following two nights (figure 5).

The cloud over Aethiopsis-Aetheria was first seen by Rogers "as a very extensive, quite bright, white cloud on the p. (evening) limb" on February 6-7. This observation was confirmed on the night of February 10-11 when it was seen to extend further onto the disk. It was then no longer white but was seen as a light yellowish area covering the p. quarter of the disk and possibly extending as far south as M. Cimmerium (figure 6). By February 14-15 the cloud had disappeared.

Although the Tempe cloud was not visible in England, Sturdy recorded that on February 15 and 17 M. Acidalium and Niliacus Lacus were obscured, but by February 20 the region was clear of cloud. Whether these clouds were dust storms or ordinary white clouds is not clear. If they were dust storms it would have been unusual for them to have occurred so long after perihelion. Small white clouds were also observed over Argyre and Claritas.

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 North Polar Cap and 10 = the background of the night sky has been used as in previous reports.

TABLE I

INTENSITY ESTIMATES

<i>Feature</i>	<i>Observers</i>						
	<i>Gallon</i>	<i>Heath</i>	<i>Hitchens</i>	<i>Lord</i>	<i>Mackenzie</i>	<i>Rogers</i>	<i>Sturdy</i>
Acidalium M.	5	6	6	6	6	8	8
Aurorae S.	2	5				5	7
Boreum M.				4.5	3.5		
Boreosyrts	4			4	6	7	8
Casius				2		3	
Cerberus			3				
Cimmerium M.	6	5	6	5	5		7
Claritas-Daedalia						4.5	
Deuteronilus				3.5			
Erythraeum M.	3			5.5	4	5	6
Iapigia		5	7	5.5		5	6
Ismenius L.			4				
Lunae P.		4					6
Margaritifer S.		3				4	
Meridiani S.		6	7		7	6	8
Nepenthes				3		2	
Niliacus L.				5		4.5	7
Nilokeras	3			3.5		4	5
Pandorae F.				4.5	2		7
Phoenicis L.				2.5			
Propontis				2			
Sabaeus S.	4	5.5	6	5	6		6
Serpentis M.		4.5	5.5	4.5	3		7
Sirenum M.		4.5		5	5		6
Solis L.		6			5		8
Syrtis M.	6	6	7	6	4	6	7
Syrtis Minor						7	8
Trivium Charontis		3	4.5	3			5
Tyrrhenum M.	4	5.5	7	5	4	5	7
Utopia					6	2	9