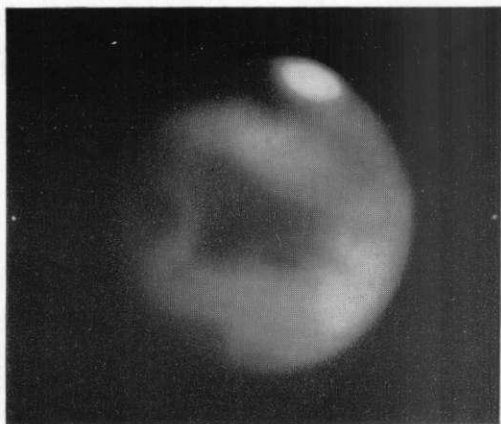
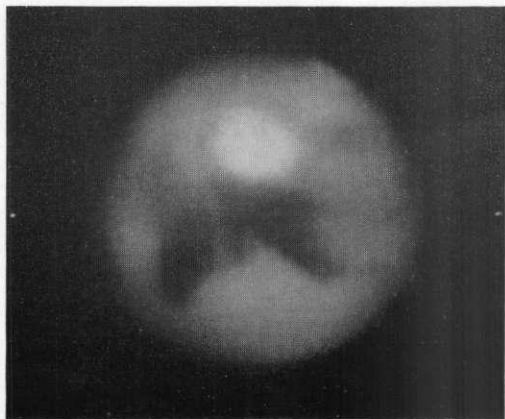


Aug. 24^d 21^h 22^m U.T. $\omega = 49^\circ$ Aug. 25^d 20^h 48^m U.T. $\omega = 31^\circ$ Aug. 29^d 20^h 39^m U.T. $\omega = 354^\circ$ Aug. 30^d 21^h 56^m U.T. $\omega = 4^\circ$ Aug. 31^d 22^h 4^m U.T. $\omega = 357^\circ$ Sept. 7^d 22^h 57^m U.T. $\omega = 308^\circ$

Photographs by Dr W. S. Finsen with the 26½-inch refractor of the Union Observatory, Johannesburg, showing the development of the great yellow cloud over Noachis and Argyre and the obscuration of the South Polar Cap.

(Photographs kindly presented to the Director of the Mars Section)

[To face page 129]

REPORT OF A SECTION

MARS IN 1956

Mars was in perihelion on August 21 and in opposition on September 10. It was nearest to the Earth on September 7 when it was at a distance of only 35 162 000 miles, its disk then having an apparent diameter of $24''.8$. The apparition was a particularly favourable one for members of the Section in the Southern Hemisphere, but owing to its declination of -10° the planet was rather too low in the sky in England for full advantage to be taken of its near approach to the Earth.

Throughout the apparition the southern hemisphere was presented to the Earth, the latitude of the centre of the disk being -19° at opposition.

The vernal equinox of the southern hemisphere occurred on May 4 and the summer solstice on September 27.

Observations were contributed by forty-nine members of the Association whose names, together with particulars of their place of observation and their instruments, are given in the following table:—

<i>Observer</i>	<i>Locality</i>	<i>Instruments</i>
L. Abbey	Decatur, U.S.A.	8-inch spec.
F. J. Acfield	Forest Hall, Newcastle	10-inch spec.
G. E. D. Alcock	Peterborough	4-inch O.G.
R. Barker	Cheshunt	$12\frac{1}{2}$ -inch spec.
J. D. Bestwick	Leek, Staffs	12-inch spec.
R. A. Blackett	Newcastle	5-inch O.G.
R. W. Boggis	Como, W. Australia	12-inch spec.
J. H. Botham	Johannesburg	9-inch O.G.
I. R. H. Brickett	Johannesburg	26 $\frac{1}{2}$ -inch O.G.
W. W. Buckeridge	Maidenhead	6 $\frac{1}{2}$ -inch spec.
B. Burrell	Doncaster	10-inch spec.
P. J. Cattermole	E. Grinstead	6 $\frac{1}{2}$ -inch spec.
W. B. Caunter	Billinghurst, Sussex	3-inch O.G.
E. H. Collinson	Ipswich	6-inch O.G.
A. C. Curtis	Winchester	10-inch spec.
P. G. Darvill	Aylesbury	12-inch spec.
C. R. Edwards	Como, W. Australia	12-inch spec.
E. L. Ellis	Gerrards Cross	12-inch spec.
V. A. Firsoff	Shepton Mallet	3 $\frac{1}{2}$ -inch O.G.
K. W. Foord	Brighton	6 $\frac{1}{2}$ -inch spec.
W. E. Fox	Newark	24-inch spec.
W. A. Granger	Peterborough	10-inch spec.
M. W. Hartford	Brockenhurst	6-inch O.G.
A. W. Heath	Long Eaton, Notts	6-inch O.G.
M. B. B. Heath	Kingsteignton	8-inch spec.
F. M. Holborn	Peaslake, Surrey	10-inch spec.
G. A. Hole	Brighton	12-inch spec.
H. C. Hunt	Aylesbury	24-inch spec.
H. Joy	Reading	12-inch spec.
A. Longton	Preston	10-inch spec.
Col. W. Maffett	London	6-inch spec.
D. W. Miller	Crewkerne	10-inch spec.
		5 $\frac{1}{2}$ -inch spec.

<i>Observer</i>	<i>Locality</i>	<i>Instruments</i>
P. A. Moore	E. Grinstead	12½-inch spec.
R. R. de Freitas Mourao	Rio de Janeiro	8-inch O.G.
R. A. McIntosh	Auckland, N.Z.	14-inch spec.
T. J. E. Palmer	Mill Hill	8-inch O.G.
O. C. Ranck	Milton, Penn., U.S.A.	4-inch O.G.
J. H. Robinson	Teignmouth	8½-inch spec.
D. Sinden	Billingham, Co. Durham	6-inch spec.
J. R. Smith	Sevenoaks	8-inch spec.
R. J. Smith	Solihull	9½-inch spec.
C. A. Swindin	Bristol	12½-inch spec.
H. Sykes	Taiping, Malaya	9-inch spec.
G. Turner	Sandbach	10-inch spec.
J. Youdale	Billingham, Co. Durham	6-inch spec.
B. Warner	Crawley Down	7-inch spec.
H. Welsh	Port Elizabeth, S.A.	8-inch O.G.
R. L. Waterfield	Ascot	6-inch O.G.
F. C. Wykes	Tunbridge Wells	6-inch O.G.

Observing conditions in England were most disappointing; the weather was generally very unsettled and consequently nights giving really good seeing were very few and far between. The Director was therefore glad to have observations from members in latitudes further south, where conditions were much better, particularly from Messrs R. W. Boggis and C. R. Edwards of Como, Perth, Western Australia, R. A. McIntosh of New Zealand, and J. H. Botham and I. R. H. Brickett at Johannesburg. The latter, through the kindness of Dr van den Bos, had the use of the 9-inch and, at times, the 26½-inch refractors of the Union Observatory. In addition to visual observations, four members, namely Messrs J. H. Botham, H. E. Dall, A. W. Heath, and F. C. Wykes, obtained photographs of the planet. The series taken by J. H. Botham with the 9-inch refractor at Johannesburg deserves particular mention. It consists of twenty-one photographs taken between July 12 and October 21. They were taken through a yellow filter on Adox K.B. 14 35-mm film and show the relative intensity of the maria and the changing appearance of the south polar cap and its surroundings very well.

The most remarkable feature of this apparition was the unusual cloudiness of the Martian atmosphere. Even early in the apparition the planet's features were very pale, owing no doubt to the presence of yellow cloud or haze. Thus, M. B. B. Heath, observing in May, noticed that the markings were not clear-cut but had a diffuse, woolly appearance, and Brickett at Johannesburg remarked that between September 22 and October 4 the surface features were almost completely hidden by yellow haze, which covered the whole visible surface, and that on numerous occasions no details could be observed even with the 26½-inch refractor. The Martian atmosphere did not clear until November. It is interesting to note that at the perihelic opposition of 1909 similar conditions were observed.

Orange or red filters increased the contrast and were used extensively by Boggis, Brickett, Edwards, Firsoff, and Robinson. The last two observers have contributed a paper to the Association giving the results of their observa-

tions with colour filters (*J.B.A.A.*, 67, 320). Attempts were also made by several members to observe white clouds with deep-blue filters, but without much success.

Apart from the general haze, during August and September, yellow clouds frequently obscured the dark areas. Owing to their colour the full extent of these clouds could not be adequately observed visually, but they were well shown on photographs. Sinus Sabaeus, Furca, and Aurorae Sinus were particularly affected. A very extensive cloud developed over Noachis and Argyre at the end of August and was probably responsible for the sudden obscuration of the south polar cap on August 30. The cap was more or less invisible until September 9th.

A chart showing the extent and movement of these clouds, prepared by B. Burrell, is given on Plate 11. It has been compiled from photographs by Botham and Dr Finsen and from drawings by Alcock, Brickett, Burrell, Cattermole, Fox, Moore, Waterfield, Youdale, and the Director.

Region I: ω 250° to 10°—Syrtris Major to Furca

Hellespontus: Broad and dark in May, June and July, but much less conspicuous later in the apparition. *Hellas*: Circular or slightly oval in shape, this large bright area was a fairly conspicuous object throughout the apparition. A dusky marking was observed in its centre by Brickett on September 4 and by Botham on September 7. On November 9 it was noted by Brickett as being the brightest part of the planet, apart from the polar cap. *Syrtris Major*: Except for a bright spot in its southern part observed by Boggis on August 27 and 30 it was rather featureless. Its following side was better defined and darker than the rest, as was its northern extremity. Nilosyrtris was seen faintly by several observers. *Thoth-Nepenthes* was very faint throughout the apparition, some observers not seeing it at all. *Mare Serpentis* was very broad and dark in 1956, in marked contrast to the 1954 apparition. This change is one of the peculiarities of the 1956 apparition and is well shown on the drawings by Botham and Brickett for both apparitions. It is confirmed by their photographs and Dr Finsen's. The region became less dark as the season progressed until, according to Brickett, it could hardly be distinguished from the surrounding areas. *Sinus Sabaeus and Furca*: The northern edge generally appeared darker and better defined than the southern edge. Portus Sigeus was fairly conspicuous and often seen double by Burrell. Furca was frequently obscured by cloud, particularly at the end of August and seldom showed its characteristic prongs. The chart on Plate 11 shows the movement of this cloud between August 29 and 31. *Deucalionis Regio*: Brickett remarks that at times this region appeared to form a 'channel' for yellow clouds passing between Pandoraae Fretum and Sinus Sabaeus. *Pandoraae Fretum*: Fainter than Sinus Sabaeus. Well shown on drawings in August and September, particularly by Boggis. Photographs in August show this feature merged with Sinus Sabaeus into a broad band. *Noachis*: A dusky streak was observed traversing this area from M. Serpentis in a south following direction on several dates in August and September by Boggis,

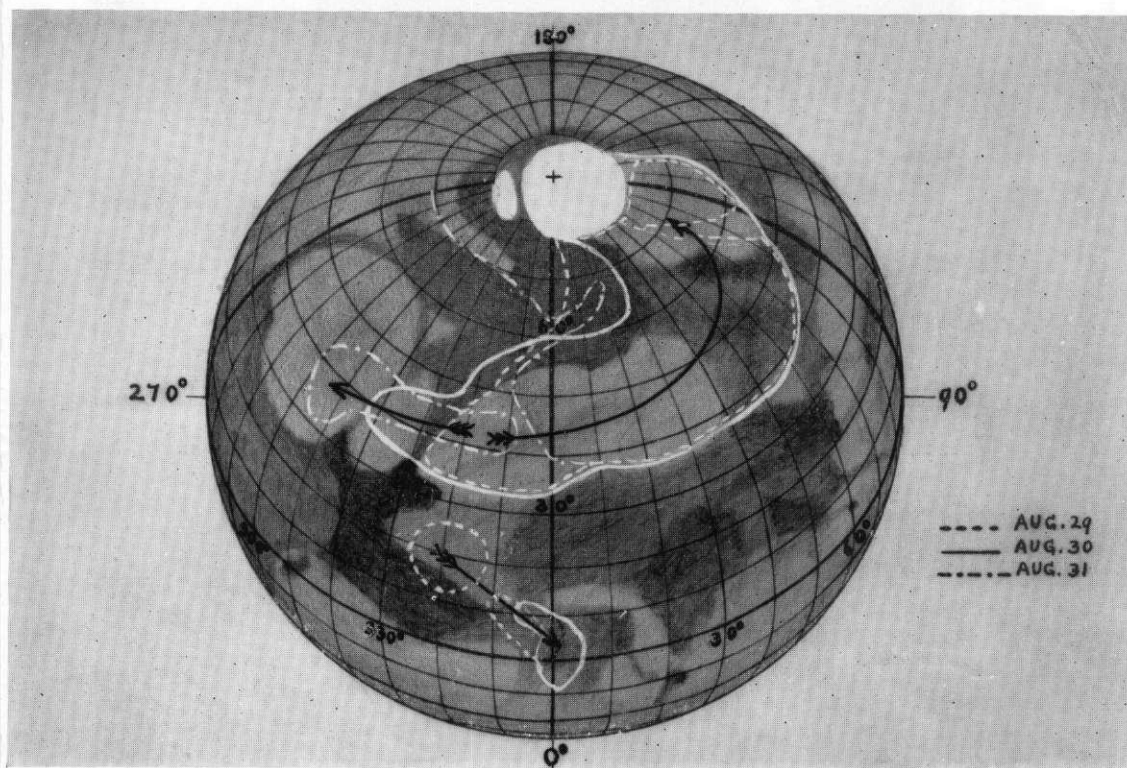
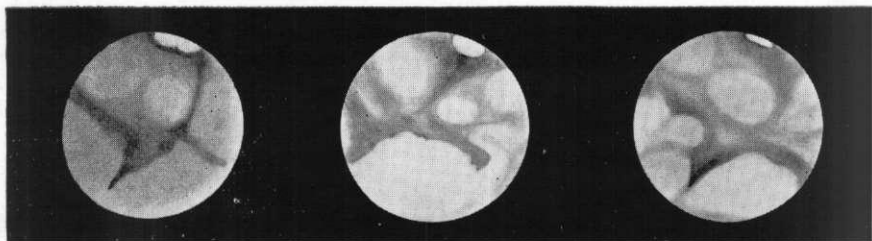


Chart of the yellow clouds in the southern hemisphere of Mars 1956 August 29 to 31 showing the direction of their movement. Compiled by B. Burrell.

MARS IN 1956

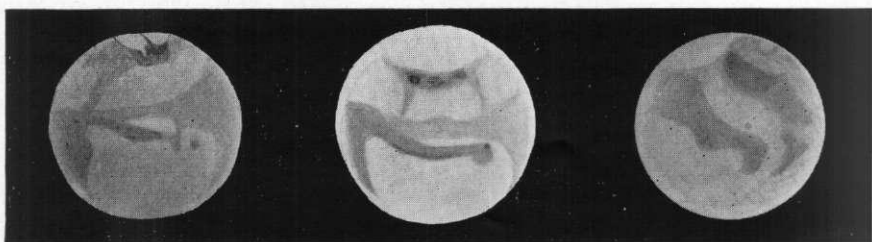
Region I



Aug. 5 $\omega = 286^\circ$
M. B. B. Heath 10 $\frac{1}{4}$ -inch.
Spec.

Aug. 23 $\omega = 320^\circ$
C. E. Edwards, 12-inch.
Spec. (Orange filter)

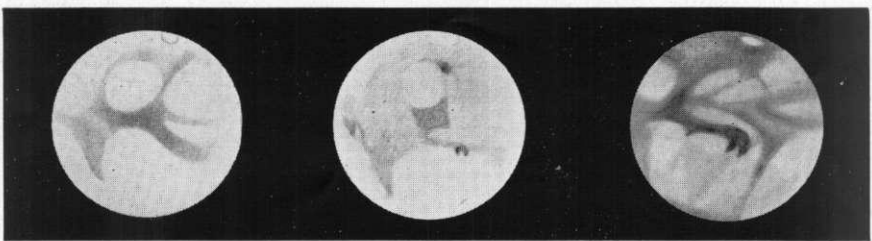
Aug. 27 $\omega = 290^\circ$
R. W. BOGGIS, 12-inch Spec.
(Red filter)



Aug. 29. $\omega = 346^\circ$
I. R. H. Brickett 9-inch
O.G.

Sept. 1. $\omega = 346^\circ$
I. R. H. Brickett, 26 $\frac{1}{2}$ -inch
O.G.

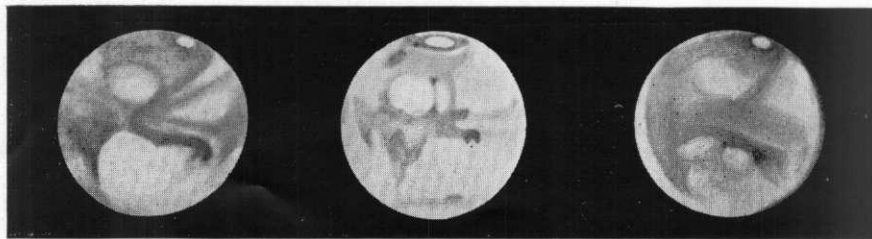
Sept. 3. $\omega = 343^\circ$
E. H. Collinson, 10-inch
Spec.



Sept. 7. $\omega = 300^\circ$
H. C. Hunt, 12-inch Spec.

Sept. 7. $\omega = 320^\circ$
B. Burrell, 10-inch Spec.

Sept. 26. $\omega = 355^\circ$
R. W. Boggis, 12-inch Spec.
(Red filter)



Oct. 1. $\omega = 333^\circ$
R. W. Boggis, 12-inch Spec.
(Yellow filter)

Oct. 11. $\omega = 317^\circ$
B. Burrell, 10-inch Spec.

Oct. 13. $\omega = 325^\circ$
W. E. Fox, 10-inch Spec.
(Red filter)

MARS IN 1956

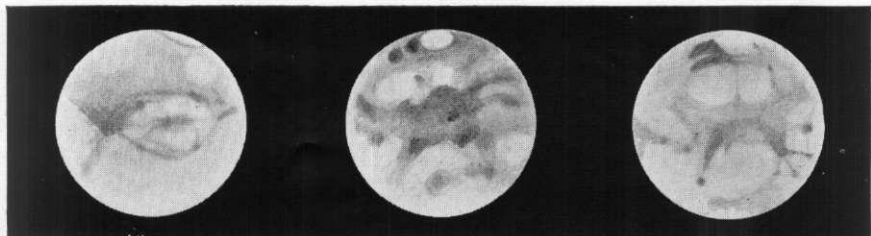
Region II



Aug. 19. $\omega = 361^\circ$
C. R. Edwards, 12-inch
Spec.

Aug. 24. $\omega = 45^\circ$
I. R. H. Brickett, 9-inch
O.G.

Aug. 27. $\omega = 42^\circ$
R. L. Waterfield, 6-inch
O.G.



Aug. 27. $\omega = 75^\circ$
M. B. B. Heath, 10 $\frac{1}{4}$ -inch
Spec.

Aug. 28. $\omega = 29^\circ$
G. E. D. Alcock, 4 $\frac{1}{2}$ -inch
O.G.

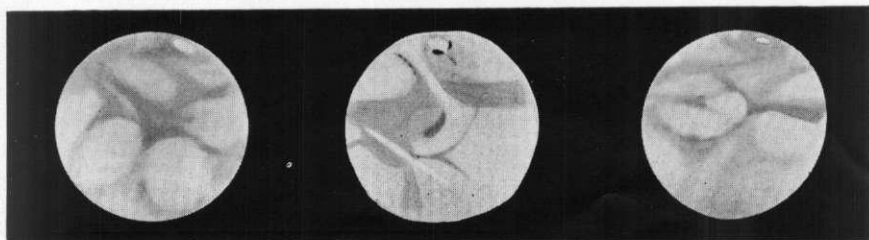
Aug. 29. $\omega = 28^\circ$
B. Burrell, 10-inch Spec.



Aug. 30. $\omega = 19^\circ$
B. Burrell, 10-inch Spec.

Aug. 30. $\omega = 43^\circ$
P. Moore, 12 $\frac{1}{2}$ -inch Spec.

Sept. 19. $\omega = 64^\circ$
R. W. Boggis, 12-inch Spec.
(Orange filter)



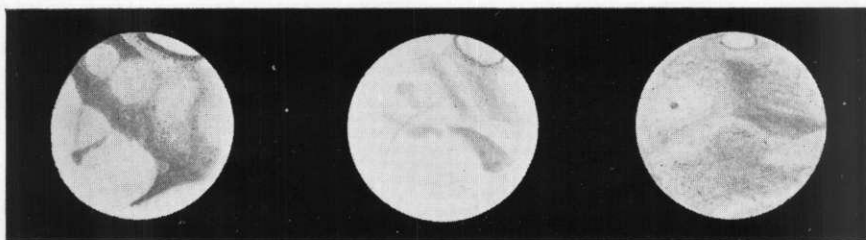
Sept. 22. $\omega = 44^\circ$
R. W. Boggis, 12-inch Spec.
(Orange filter)

Sept. 26. $\omega = 84^\circ$
I. R. H. Brickett, 26 $\frac{1}{2}$ -inch
O.G.

Oct. 20. $\omega = 125^\circ$
R. W. Boggis, 12-inch Spec.
(Red filter)

MARS IN 1956

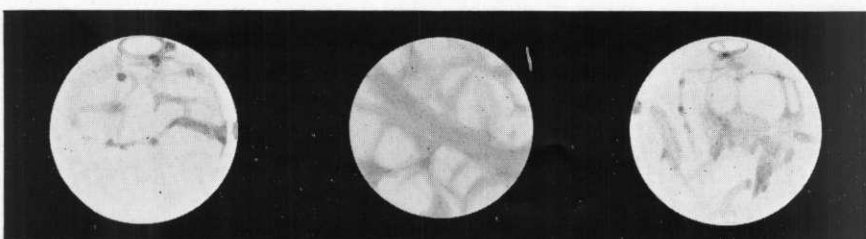
Region III



Aug. 11. $\omega = 237^\circ$
M. B. B. Heath, 10 $\frac{1}{4}$ -inch
Spec.

Aug. 20. $\omega = 123^\circ$
R. L. Waterfield, 6-inch
O.G.

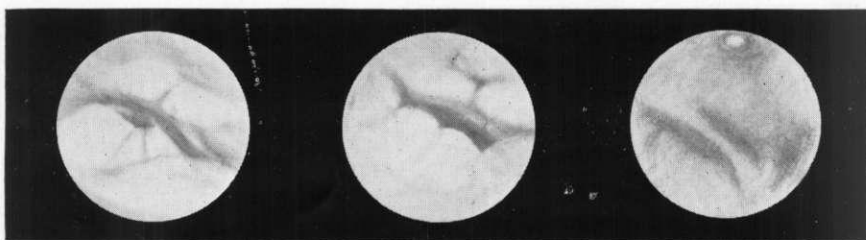
Aug. 21. $\omega = 123^\circ$
P. Moore, 12 $\frac{1}{2}$ -inch Spec.



Aug. 21. $\omega = 110^\circ$
B. Burrell, 10-inch Spec.

Aug. 31. $\omega = 231^\circ$
C. R. Edwards, 12-inch
Spec.

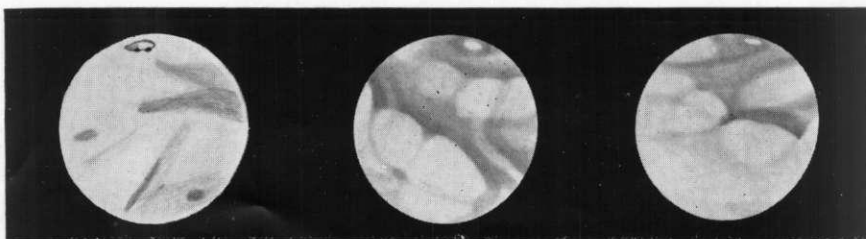
Sept. 9. $\omega = 272^\circ$
B. Burrell, 10-inch Spec.



Sept. 9. $\omega = 197^\circ$
R. W. Boggis, 12-inch Spec.

Sept. 11. $\omega = 158^\circ$
R. W. Boggis, 12-inch Spec.

Sept. 13. $\omega = 198^\circ$
H. Wildey, 6-inch O.G.



Sept. 26. $\omega = 118^\circ$
I. R. H. Brickett, 26 $\frac{1}{2}$ -inch
O.G.

Oct. 10. $\omega = 211^\circ$
R. W. Boggis, 12-inch Spec.
(Orange filter)

Oct. 19. $\omega = 132^\circ$
R. W. Boggis, 12-inch Spec.
(Amber filter)

Edwards, and Burrell, in roughly the same position as the conspicuous dark streak which appeared in 1928. The very large yellow cloud which developed over Noachis on August 24 and spread in a following direction over Argyre has been previously mentioned.

Region II: 10° to 130°—Margaritifer Sinus to Solis Lacus

Margaritifer Sinus: Shown rather faint by all observers. Oxia Palus was frequently seen and photographed. *Mare Erythraeum* was described as generally having a well defined and rather dark border to Noachis and Argyre by Botham and Brickett. Shown rather dark by Alcock on August 27. *Argyre* appeared bright and circular to Botham, Brickett, and Alcock, at end of August. A series of dark spots along its following edge was observed by Brickett on September 26. *Aurorae Sinus*: Alcock, Botham, Brickett, and Burrell recorded some internal detail. On September 26 Brickett observed a long narrow cloud extending across it from Juventae Fons to Eos. *Agathodaemon* was well shown on drawings by Boggis, Botham, Brickett, Heath, and Waterfield. *Tithonius Lacus* was seen more as a Y-shaped extension to Agathodaemon by Botham and Brickett than as a distinct object, but on August 27 both M. B. B. Heath and Waterfield show it in its normal shape. *Solis Lacus* shown on most of the drawings as a rather ill-defined spot. Brickett, however, noted that its following end curved sharply southwards and he and Botham observed two dark internal spots on several occasions, one of which was seen by M. B. B. Heath on August 27. A double 'nucleus' was also observed by Burrell on October 3. Boggis observed three condensations on October 20. On September 26 and 29 Brickett, observing with the 26½-inch O.G., found Solis Lacus the darkest feature on the disk. This is confirmed by photographs by Botham and Dr Finsen. *Thaumasia*: Photographs by Botham on September 26 and drawings by Burrell show this region dark giving it a most unusual appearance. *Phoenicis Lacus* and *Araxes*: Shown on drawings by Boggis, Burrell, and Heath, but generally inconspicuous.

Region III: 130° to 250°—Mare Sirenum to Mare Tyrrhenum

Mare Sirenum: Generally of normal shape, the 'beak', however, was not always seen. Described as dark and very conspicuous in mid-August by Moore and M. B. B. Heath. None of our members observed the cloud formations over this mare recorded by Dr Kuiper at the end of August because the region was not well placed for observation. *Amazonis*: A featureless region to all observers. Brickett, however, observing with the 26½-inch O.G. on September 26, in excellent seeing, observed a prominent unidentified dark spot and, surrounding it, a great number of faint spots, streaks, and general diffuse markings. *Mare Cimmerium*: Generally rather featureless, but Laestrygonum S. was well shown by Boggis on September 9 in excellent seeing. *Trivium Charontis*: Too far north for satisfactory observation but well shown by Boggis on September 9.

Region IV: South Polar Cap and its Surroundings

This region was the main centre of interest during the apparition and an account of the changes observed is given in greater detail than the other regions. These changes are best recorded in chronological order.

May	Cap bright but of a dullish off-white tint on May 20 (M. B. B. Heath) and surrounded by a distinct dark band.
June	Cap large and bright with dark band (Fox and M. B. B. Heath).
July	Bright, white, and of uniform intensity with irregular edge (Botham, Brickett, and Moore). Dark fringe recorded by all observers and described by Moore as 'very obvious'; on July 30 the Director noted it as being the darkest feature of the planet, twice as dark as Sinus Sabaeus and irregular in width.
August 1 to 15	Indentations observed at ω 220°, 210°, 116°, 150° by Botham and Brickett.
August 16 and 18	Small detached part of cap at ω 145°. M. Australe very dark against the cap.
August 22 to 29	Rima Augusta seen at ω 55°. Dark fringe visible occasionally. Depressiones Hellesponticae very dark, being the darkest feature of the planet. (Botham, Brickett, Alcock, Fox, Burrell, and Waterfield). Very prominent dark streak from Dep. Hellesponticae to Thaumasia ω 10° to 70° (Brickett, drawings and photograph).
August 30	Cap obscured by cloud.
August 31 to September 2	Cap faintly seen by Botham and Brickett through yellow haze. It was yellowish white with lighter patches. M. Australe near Depressiones Hellesponticae very dark, surrounding the cap at about latitude 75°. As dark as S. Sabaeus (Moore and the Director). This feature is well shown on Botham's photographs.
September 4	M. Australe of moderate intensity, equal to Syrtis Major, showing considerable internal structure (Botham and Brickett).
September 6	M. Australe much fainter (Brickett).
September 7 and 8	Cap clearly visible in moments of good seeing, but very small (Waterfield). Dull and difficult (Burrell). Invisible at ω 227° (Boggis).
September 9	In excellent seeing Burrell saw the cap 'clear with a narrow dark band and a rift dividing cap in half'. Cap also seen by Brickett as a small bright white spot at ω 257°.
September 10	Cap clearly visible at ω 114° (McIntosh).

September 14 to 17	Cap described by Burrell as small and bright with a dark border.
September 26	Cap well shown on Botham's photographs at ω 73° and 105° . From August 25 to September 25 the diameter of the cap decreased by about 50 per cent.
September 29 to October 5	Rima Augusta clearly visible to Brickett.
October 13 to November 17	Cap appeared small, bright and circular to Botham and Brickett.

The dark areas surrounding the south polar cap showed rapid changes in shape between August 29 and September 5, *Depressiones Hellesponticae* being covered and uncovered in a very complex manner. These changes were probably caused by the spreading of the cloud which covered the polar cap. The approximate position and movement of this cloud are shown in the chart on Plate 11. It is interesting to speculate whether this cloud was related to the melting of the polar cap, which may have been more rapid than usual at that time.

Characteristics of the Apparition

1. The unusual pallor of the Maria.
2. The darkness of *Hellespontus* in May, June, and July.
3. The darkness of *Mare Serpentis*.
4. The great yellow cloud which developed over *Noachis* and *Argyre* at the end of August.
5. The obscuration of the south polar cap.
6. The cloud formations over *Deucalionis Regio* and *Furca*.
7. The darkness of *M. Australe* and *Depressiones Hellesponticae*.
8. The faintness of *Thoth-Nepenthes*.
9. The darkness of *Thaumasias* in September.

E. H. COLLINSON, *Director*