

**MARS SECTION**E. H. COLLINSON, *Director***REPORT OF THE APPARITION OF 1973**

The apparition of 1973 was the last of the present series of perihelic apparitions commencing in 1969. Opposition occurred on October 25 when the planet attained an apparent diameter of  $21''.2$ . Its declination was then  $+10^\circ$  so the planet was much better placed for observation in the northern hemisphere than at the previous apparition of 1971, in spite of its somewhat smaller disk.

In all 49 observers contributed to the work of the Section and a list of them with their locations and telescopes is given below.

In addition reports of observations were received from members of the following Societies: Cambridge University Astronomical Society, Birmingham Astronomical Society, Hampstead Scientific Society, Portsmouth Astronomical Group and the Royal Astronomical Society of Antwerp. C. F. Capen of the Lowell Observatory kindly sent to the Director for the Section records a series of drawings made with the 300 mm and 600 mm Clark refractors. These were of particular interest in showing the development of the dust cloud which appeared in mid-October. A number of photographs of the planet by J. M. Gomez and L. L. Thomas with a 400 mm reflector on Tenerife and by M. Viscardy with a 520 mm Cassegrain reflector at St Martin de Peille were contributed by Professor J. Dragesco. Many of these photographs were of very high quality and show much detail. Photographs were also submitted by Daniels, Kennedy and Kaila.

As for the apparitions of 1969 and 1971, observations were directed to recording any changes in shape and intensity of the dark areas and the appearance, position, and movement of clouds in the martian atmosphere.

The favourable nature of the apparition enabled useful observations to be made from 1973 June to 1974 March. The Director hoped that over this relatively long period it would have been possible to detect any seasonal changes in the intensity of the dark areas, but the various, and at times extensive, dust clouds prevented this. A summary of the intensity estimates that were made is given later in this report.

The southern hemisphere of Mars was turned towards the Earth, the tilt of the pole being  $18^\circ$  at opposition. The martian summer solstice in the southern hemisphere occurred on August 25.

| <i>Observer</i> | <i>Location</i>   | <i>Instruments</i> |
|-----------------|-------------------|--------------------|
| A. Adamoli      | Verona            | 108 mm OG          |
| A. Appleyard    | Sheffield         | 400 mm spec.       |
| D. Bailey       | Wotton-under-Edge | 250 mm spec.       |
| K. N. L. Bailey | Wallingford       | 210 mm spec.       |
| R. Billington   | Manchester        | 200 mm spec.       |
| B. Burrell      | Doncaster         | 250 mm spec.       |
| A. Brown        | Dundee            | 250 mm OG          |

| <i>Observer</i>                         | <i>Location</i>  | <i>Instruments</i> |
|---|------------------|--------------------|
| C. F. Capen                             | Flagstaff, USA   | 300 and 600 mm OG  |
| J. Coates                               | Burnley          | 17.5 mm OG         |
| E. H. Collinson                         | Snape, Suffolk   | 250 mm spec.       |
| D. G. Daniels                           | Hampstead        | 414 mm spec.       |
| K. J. Delano                            | Taunton, USA     | 310 mm Cass.       |
| P. B. Doherty                           | Doncaster        | 254 mm spec.       |
| E. L. Ellis                             | St Albans        | 90 mm OG           |
| M. Foulkes                              | Cleethorpes      | 220 mm spec.       |
| W. E. Fox                               | Newark           | 250 mm spec.       |
| M. J. Gainsford                         | Nuneaton         | 210 mm spec.       |
| C. M. Gaskell                           | Edinburgh        | 150 mm OG          |
| R. T. Glynn                             | Cheltenham       | —                  |
| C. Grant                                | Marlborough      | 150 mm spec.       |
| A. W. Heath                             | Long Eaton       | 300 mm spec.       |
| T. Higginson                            | Rayleigh         | 75 mm OG           |
| D. Hitchens                             | Stalmine         | 220 mm spec.       |
| P. Jilks                                | Croydon          | 215 mm spec.       |
| K. Kaila                                | Helsinki         | 135 mm OG          |
| K. Kennedy                              | Dundee           | 215 mm spec.       |
| R. J. Livesey                           | Glasgow          | 210 mm spec.       |
| C. J. R. Lord                           | Fleetwood        | 160 mm OG          |
| D. Lunn                                 | Thame            | 65 mm OG           |
| A. Mackay                               | Edinburgh        | 150 mm OG          |
| R. A. MacKenzie                         | Dover            | 75 mm OG           |
| A. T. Marlow and D. Penfold             | Worthing         | 300 mm spec.       |
| J. P. Merrilees                         | Dawlish          | 250 mm Cass.       |
| P. A. Moore                             | Selsey           | 310 mm spec.       |
| H. C. Nightingale                       | Lilongwe, Malawi | 152 mm Mak. Cass.  |
| S. D. C. Ostler                         | Tonbridge        | 250 mm spec.       |
| R. Paterson                             | Oxford           | 310 mm spec.       |
| J. H. Robinson                          | Teignmouth       | 260 mm spec.       |
| J. H. Rogers                            | Cambridge        | 300 mm OG          |
| R. W. Stevens                           | Tonbridge        | 212 mm spec.       |
| K. Strudy                               | Helmsley         | 150 mm spec.       |
| R. Symonds                              | Neasden          | 212 mm spec.       |
| D. B. Taylor                            | Dundee           | 250 mm OG          |
| R. de Terwangne                         | Antwerp          | 200 mm Cass.       |
| A. Verschraegen and<br>A. Van der Jeugt | Gent             | 75 mm OG           |
| A. W. Wake                              | Teignmouth       | 400 mm spec.       |
| J. W. Wilson                            | Chester          | 216 mm spec.       |

#### SURFACE FEATURES

Observations made in the early days of the apparition revealed that the extensive dust storm of 1971 had not affected the main features of the planet (see figures 1 and 2).

The most interesting feature of the apparition was the appearance of a new dark area in the Claritas-Daedalia region between Mare Sirenum and Solis Lacus. It was observed by Foulkes on September 22 (see figure 3), and by Rogers and others in October with the 300 mm Northumberland refractor at Cambridge who reported it to be as dark as Solis Lacus. This feature is well

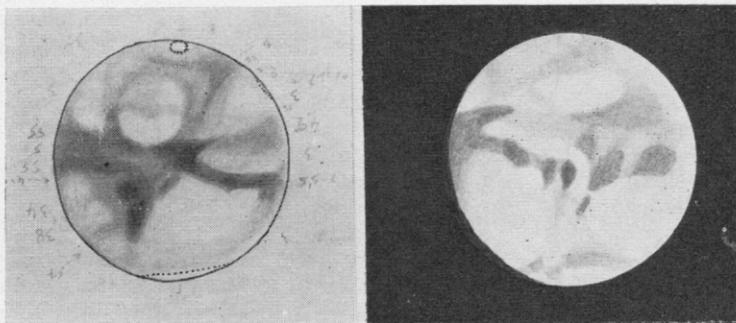


FIGURE 1 (*left*). 1973 October 5d. 20h. 40m.  $\omega = 311^\circ$ . 203 mm Cass. R. de Terwangne. FIGURE 2 (*right*). 1973 October 6d. 01h. 10m.  $\omega = 362^\circ$ . 300 mm OG. J. H. Rogers.

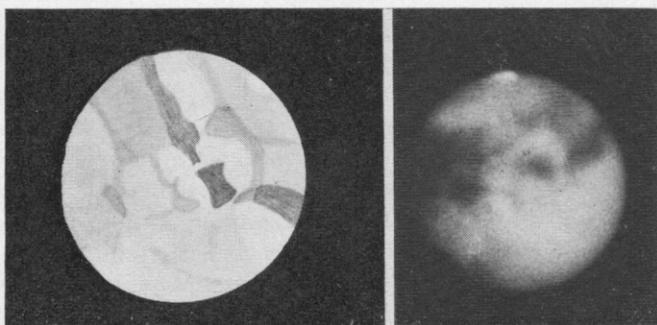


FIGURE 3 (*left*). 1973 September 23d. 23h. 0m.  $\omega = 78^\circ$ . 220 mm Spec. M. Foulkes. FIGURE 4 (*right*). 1973 October 11d. 08h. 57m.  $\omega = 72^\circ$ . 600 mm OG (photograph in red light). C. F. Capen.

shown on a photograph by Capen taken on October 11 in red light and reproduced in figure 4. Linking Mare Sirenum with Solis Lacus it produced the effect of a dark band across the planet's disk (see figure 5). This new dark area survived the October dust storm and was well shown on a drawing by Rogers on December 9 (see figure 6). It was last observed by him on 1974 January 11 and was recorded as the darkest marking on the disk. It will be interesting to see whether it is still visible at the next apparition in 1975.

There were a few other features of interest; the northern half of Hellas was particularly bright. Dragesco remarked on the darkness on the 'canal' Peneus which traverses the centre of Hellas (see figure 1). Rogers reported that in October Scamander, which divides Electris from Eridania, was very broad and as dark as Mare Sirenum (see figure 8). Ganges was seen as a conspicuous broad band and, on a photograph taken by Viscardy on September 29, was distinctly shown as double, the centre part possibly having faded. On December 9 Rogers observed a broad dark band (intensity 3.5) extending from

Solis Lacus over Thaumasia (see figure 6). Tithonius Lacus was less conspicuous than usual. Oxia Palus was seen dark and well defined on September 30 and October 5 by Doherty and Rogers respectively. Phoenicis Lacus was faint. The seasonal expansion of the east side of Syrtis Major was reported by Dragesco. As in 1969 and 1971, Thoth-Nepenthes was faint and often not visible.

*South Polar Cap.* The shrinkage of the South Polar Cap from early June to October, when it was obscured by the dust cloud, was observed. It was last seen by Rogers on November 22 as a minute white spot on the terminator. On 1974 March 16, Rogers observed a large white area south of Mare Sirenum and Mare Cimmerium which was probably the South Polar Hood.

#### ATMOSPHERIC PHENOMENA

As in 1971 the 1973 apparition was notable for the prevalence of yellow dust clouds. The first report of the obscuration of the surface features came from Foulkes and Rogers, both of whom found on July 23 and 24 that Sinus

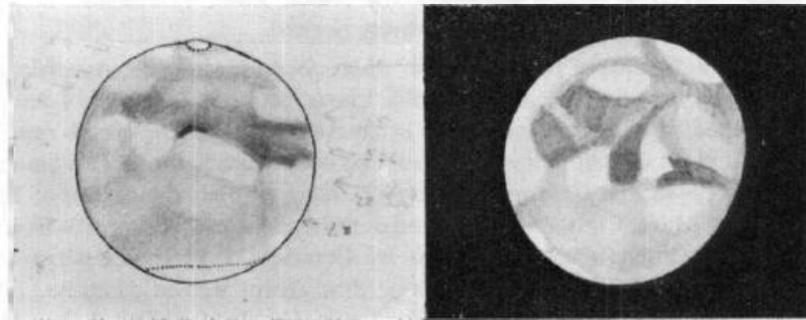


FIGURE 5 (left). 1973 September 16d. 22h. 30m.  $\omega = 134^\circ$ . 203 mm Cass. R. de Terwangne. FIGURE 6 (right). 1973 December 9d. 21h. 25m.  $\omega = 84^\circ$ . 300 mm OG. J. H. Rogers.

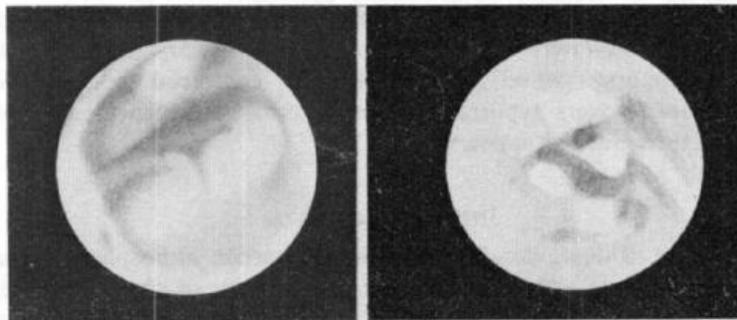


FIGURE 7 (left). 1973 October 16d. 20h. 04m.  $\omega = 189^\circ$ . 254 mm Spec. P. S. Doherty. FIGURE 8 (right). 1973 October 21d. 23h. 10m.  $\omega = 90^\circ$ . 300 mm OG. J. H. Rogers.

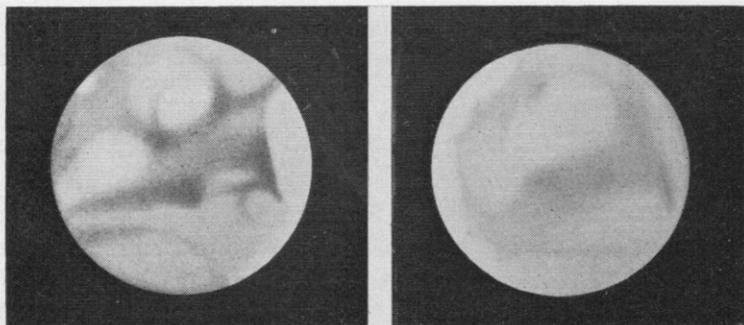


FIGURE 9 (left). 1973 October 17d. 01h. 30m.  $\omega = 269^\circ$ . FIGURE 10 (right). 1973 November 19d. 22h. 00m.  $\omega = 274^\circ$ . Both by P. B. Doherty, 254 mm Spec., showing the effect of the extensive dust storm.

Sabaesus was of very low contrast. Rogers also noted that Mare Erythraeum on July 23–24 and Mare Serpentis and Yaonis Regio on July 24–27 were fainter than usual. By July 31 and August 1 the region Mare Tyrrhenum to Sinus Meridiani appeared to Rogers to be entirely normal.

It was in mid-October that the main dust storm developed. According to Capen, clouds first formed around Solis Lacus between October 14 and 16. Doherty reported the presence of an extensive bright yellow cloud near the preceding limb on October 16 which would be over Mare Sirenum (see figure 7). On October 17–18, the Cambridge observers reported that the region of Mare Sirenum and Mare Cimmerium appeared normal. On October 19–20, they recorded some slight obscuration, and by October 21–22 it was clear from reports of several observers that a major dust storm was in progress. Thus Rogers observing with the 300 mm refractor at Cambridge, found that Mare Sirenum was obscured by a cloud spreading over from Atlantis (see figure 8). During the following 10 days or so the whole planet appeared almost featureless except for faint shadings which to some observers could, however, still be identified. Some clearance of the cloud occurred during the first half of November. Thus on November 16, Heath recorded that Mare Cimmerium and Mare Tyrrhenum were well seen (estimated intensity 5), “almost comparable with the pre-storm period”. The clearance continued gradually during December, and Rogers reported in January that the planet’s features had returned to their normal appearance.

#### INTENSITY ESTIMATES

The presence of dust, cloud or haze in the martian atmosphere throughout the apparition made estimates of the true intensity of the surface features unreliable, and, therefore, it is not proposed to set out here in detail the numerous estimates that were made, as was done in previous reports. In general it appears that before the onset of the major dust cloud in October, the main features were of the same or slightly less intensity than in the apparition of 1971.

Intensity estimates of the principal dark areas made between September and December have been analyzed and plotted, from which it appears that the main dust storm was first apparent on October 21-22 (martian date January 26) when Mare Sirenum and Mare Cimmerium were seen to be heavily obscured, their respective intensities falling from 5 and 6 to 2.5 and 3.5 quite suddenly. Similarly Syrtis Major and Sinus Sabaeus, of average intensity 6 in early October, fell to 4 and 3 respectively in early November when that region was presented for observation.

As in previous Reports intensity estimates were made on the usual scale of 0 = the brightness of the South Polar Cap and 10 = background of the night sky in the vicinity of the planet in white light.