MEMOIRS

OF THE

BRITISH ASTRONOMICAL ASSOCIATION

TWENTY-FOURTH REPORT OF THE
SECTION FOR THE OBSERVATION
OF

MARS

DEALING WITH THE APPARITION OF 1941

Director—P. M. RYVES, F.R.A.S.

VOLUME 37
PART 1

1951
Price 7*s.* 6*d.*

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The British Astronomical Association was originally formed in 1890 and now numbers over 2000 Members. Its leading features are as follows:

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Papers offered for reading at the Meetings of the Association, should be addressed to the Secretary, M. W. OVENDEN, The Observatories, Madingley Road, Cambridge. Telephone: Cambridge 2413.

SECTION FOR THE OBSERVATION OF MARS

DIRECTOR.—P. M. RYVES, F.R.A.S.

TWENTY-FOURTH REPORT DEALING WITH THE APPARITION OF 1941

INTRODUCTION.

Conditions of the Apparition.

Opposition occurred on October 10 and was the most favourable for observers in this country since that of 1926. Although the planet's apparent diameter at the time of nearest approach was about one second of arc less than the maximum attained at the perihelic opposition of 1939, this small difference was more than offset by the greater meridian altitude, 42° as against 12° in 1939, for dwellers in southern England.

Autumnal Equinox of the N hemisphere ... Vernal Equinox of the S hemisphere ...	1941 April 17.
Mars in perihelion	1941 August 4.
Winter Solstice in N hemisphere ... ... Summer Solstice of S hemisphere	1941 September 10.
Mars in apparitional Perigee	1941 October 3.
Diameter in apparitional Perigee	22″·8.
Mars in Opposition to the Sun	1941 October 10.
Diameter at Opposition	22″·6.
Heliocentric longitude at Opposition ...	16°·6.
Position at Opposition	R.A. $1^h\ 06^m.6$. Dec. 3° 28′.
Position angle of N pole at Opposition ...	328°.
Latitude of centre of disk at Opposition ...	20·2°.

Throughout the apparition the S pole of Mars was always tilted towards the Earth to a considerable degree. On May 2 the latitude of the centre of the disk was −19°; rising to −22·5° on June 15 it again fell to −17°·9 on September 5, rose to −24° on December 2 and by the end of January had again declined to −19°·5.

Conditions were thus favourable for the study of the southern hemisphere

of Mars and particularly so for the "southern seas" which form a belt around the planet in low southern latitudes.

The Observers and their Instruments.

Observer		Locality	North Latitude	Instruments	Drawings
			° ′		
ACFIELD, F. J.	Ac	Forest Hill, Northumberland	55 01	10½-in Spec.	11
ALEXANDER, A. F. O'D.	Ax	Dorchester, Dorset	50 43	3-in, 6-in O.G.s 9-in Spec.	83
BAYLEY, D. P.	By	Warrington, Lancashire	53 23	5-in O.G.	6
BAZIN, J. R.	Bz	Dorchester, Dorset	50 43	6-in O.G.	38
BURRELL, B.	Bu	Doncaster, Yorkshire	53 32	3-in O.G., 8½-in. Spec	31
CAVE T. R.	Ca	Long Beach, California		10-in Spec.	6
CLARKSON, R. L. T.	Clk	Trimley, Suffolk	51 59	6½-in Spec.	19
COLLINSON, E. H.	Col	Playford, Suffolk	52 10	10-in. Spec.	7
COOPER, E. W.	Cp	Wandsworth, London	51 28	3½-in. O.G.	20
DU MARTHERAY, C. F.	DuM	Geneva, Switzerland	46 10	5½-in O.G.	6
ELLISON, M. A.	Ell	Sherborne, Dorset	50 57	6-in. O.G.	14
FOX, W. E.	Fx	Newark, Nottinghamshire	53 04	6½-in Spec.	21
HAAS, W. H.	Haa	Des Moines, Iowa, U.S.A.	41 36	6-in and 18-in Spec.	Map
HARGREAVES, F. J.	Hg	Kingswood, Surrey	51 17	14½-in. Spec.	10
HEATH, M. B. B.	He	Kingsteignton, Devonshire	50 33	10¼-in. Spec.	9*
HOUSMAN, W. B.	Hs	Seaton, Cumberland	54 38	5-in. O.G.	22
PAWSON, K.	Pa	Halifax, Yorkshire	53 43	4.2-in O.G.	5
PEEK, B. M.	Pk	Solihull, Warwickshire	52 25	12¼-in. Spec.	1
PHILLIPS, Rev. T. E. R.	Ph	Headley, Surrey	51 17	8-in O.G., 18-in. Spec.	20
RYVES, P. M.	Ry	Headley, Surrey	51 17	8-in. O.G.	1
WHITTOME, R. H.	Wt	Peterborough, Northants	52 36	8½-in. Spec.	13
WILDEY, H.	Wd	Hampstead, London,N.W.	51 31	12½-in Spec.	14
WILKINS, H. P.	Wk	Cardigan, Wales	52 05	6½-in Spec.	7

*[and notes of 48 other observations].

The Section has suffered a grievous loss since 1941 through the death of the Revd. T. E. R. Phillips, whose beautiful drawings published in this *Memoir* were the last he made. Artistic talent combined with exceptional skill and accuracy made his fine series of drawings of the planet, extending over nearly half a century, a contribution to the Section unequalled by that of any other member and as outstanding as his memorable work on Jupiter. With the exception of 1907, when conditions were so unfavourable that no observations were made in England, Phillips supplied the Section with valuable drawings and notes at every apparition of Mars from 1896 to 1941, inclusive. His energy and enthusiasm were unbounded and it was thanks to his instruction and example that several of our present day members became outstanding planetary observers.

CONCERNING THE OBSERVATIONS.

The period between the first and last observations (1941 May 4 to 1942 January 28) comprised almost nine months, corresponding to mid Spring and early Autumn in the Southern hemisphere of Mars, but the majority of members observed only from August to early December. Nearly all the earlier observations were made by Mr. Heath, and most of the very late ones by Mr. Burrell. Special thanks are due to these and a few other members who thus greatly extended the period during which the planet was under scrutiny.

Mars was well observed throughout this apparition in spite of war-time difficulties and although there was a good deal of discrepancy in matters of detail between the different observers, and between different observations of the same observer, the extent to which members confirmed one another in general and in some details, was very satisfactory, and a number of features peculiar to this apparition were thereby firmly established. The many variations and differences from previous maps recorded by our members is a healthy sign of a growing freedom from bias and a successful effort to see exactly what was there at the time and draw it correctly. The value to this *Memoir* of the detailed drawings and notes of the more experienced and well equipped observers is obvious; what is more surprising is the amount of confirmatory evidence which can be derived from drawings which show a few of the more prominent features only. Possessors of small telescopes can do useful service by careful and persistent observation, even though limited by aperture to the study of a few of the larger markings on the disk.

"Opposition of Mars, 1941", *J.B.A.A.* **52**, 265

The above is the title of a paper by Dr. Alexander, based on observations by himself and two other members of the Section. It gives a useful summary of the apparition and the majority of the conclusions contained therein are confirmed by the work of the Section as a whole.

This paper was opportune and served the purpose of an Interim Report on the apparition.

PLAN OF THE MEMOIR.

The division of the equatorial and temperate zones of the planet into six Sections, introduced by our first Director, Mr. E. W. Maunder, has been adhered to but in the general description of the observations adjacent *Sections* have been joined together in pairs to form three *Regions*, the object being to preserve continuity and avoid cutting up the larger formations. Region I, comprising the best known and most striking portion of the planet's surface, corresponds to Maunder's Sections (6) and (1), Martian longitudes 250° to 10° and covers the *Syrtis Major*, *Sabæus Sinus* and *Forked Bay*. Region II, old Sections (2) and (3), includes *Margaritifer Sinus*, *Auroræ Sinus*, *Solis Lacus* and *Mare Acidalium* (longitudes 10° to 130°). Region III, old Sections (4) and (5), contains *Mare Sirenum*, *Mare Cimmerium* and *Elysium* (longitudes 130° to 250°). These Regions are understood to extend to about latitude 60° North and South. The two remaining portions of the planet, around the poles to latitude 60, Maunder's Sections (7) an (8), are best designated simply "South Polar Region" and "North Polar Region" respectively.

In practice the frontiers of the several regions are somewhat flexible and a certain amount of overlapping is allowed, especially when referring to a feature which crosses a borderline. For example, Region III may sometimes be counted as beginning at longitude 120°, instead of 130°, so as to include the whole of *Mare Sirenum*.

In the general description of the planet's surface each of the main features is allotted a paragraph which starts with a brief note giving its appearance according to the observers in general, an average or majority finding, and this is followed by minority findings, exceptional observations, and interesting individual views, not necessarily in disagreement with the majority. Observers' notes are quoted between inverted commas; statements without inverted commas are interpretations of the compiler of the *Memoir*.

The terms: canal, bay, lake, etc., are, of course, used in the purely conventional sense and must not be taken literally. The usual letters are employed for the cardinal points, E and W being used in the areographical sense, that is E. = preceding, W = following. Other conventional signs: Ω = areographic longitude; Φ = areographic latitude; ω = areographic longitude of the central meridian at a given time; ϕ = latitude of centre of disk at a given time; η = heliocentric longitude of Mars; F = Fons; Fr = Fretum; L = Lacus; M = Mare; Pr = Promnotorium; R = Regio; S = Sinus.

In the past the preparation of Reports of the Section has been undertaken by the Director alone. This, in view of the large accumulation of arrears, has now become impossible and henceforth the work must be the result of collaboration among members of the Section. The Director holds himself responsible for the general plan of the Report, for the selection and arrangement of the drawings to be reproduced, the map of the planet's surface and some other items.

In the present case the whole of the laborious collation was performed, in the first instance, by Dr. A. F. O'D. Alexander and this, under the heading THE OBSERVATIONS forms a large proportion of the Report. Dr. Alexander also contributes a map of the South polar regions and a curve showing the shrinkage of the snow-cap, this section being entirely his personal effort. The Report is thus largely due to his work all of which has been carried out with great thoroughness and competence and our sincere thanks must be accorded to him.

The Director is much indebted to Mr. Arthur A. Wilkinson for re-drawing the general map of the planet's surface, also to Dr. Ellison and Mr. Wildey for making photographic copies of certain drawings and to Mr. Hatt for help in preparing drawings for the press.

THE DRAWINGS.

The Director decided, and his decision was upheld by the Council of the Association, that the most efficient way of putting on record the work of the Section would be to reproduce as many as possible of the drawings made by its members so that future investigators might draw their own conclusions from a study of them. The number of drawings here presented is thus greater than in most previous *Memoirs*.

The quality is very uneven; but it must be remembered that a rough sketch showing, perhaps, very little detail, may be valuable on account of the evidence

it affords on some particular point or because it confirms or contradicts something shown in a more detailed or more finished drawing. Skill in delineation does not always accompany a good eye for planetary detail; furthermore some drawings which appear satisfactory in the original lose much when reproduced by a photomechanical process. No excuse need, therefore, be offered for the inclusion in this collection of a few drawings which, at first sight, may appear scarcely worthy of a place therein.

A word must be said concerning the excellent drawings of the late Revd. T. E. R. Phillips, the last he ever made. On previous occasions Mr. Phillips made finished copies of his sketches on suitable paper, specially for reproduction in the *Memoirs*. In the present case this unfortunately had not been done at the time of his death and the reproductions had to be made direct from the sketches in his notebook. They consequently do not show up as well as in happier circumstances they would have done; nevertheless the high quality of these drawings is sufficiently evident and they do, in fact, form the backbone of this *Memoir*.

As stated above, in the verbal description and analysis of the observations the disivion of the equatorial and temperate zones into three large Regions is adhered to. When it comes to a comparison of the drawings the subdivision into six sections is followed, the 60° sections being each represented by 18 drawings, arranged in order of increasing longitude on plates placed facing each other to facilitate comparison. Capital letters, A to F are used to designate these several viewpoints. A and B falling in Region I and so on. Any drawing coming under a particular letter can thus be compared with any other under the same letter, the central meridian of which cannot differ by more than 60 degrees except in a few cases where some overlap occurs. In several instances it was difficult to decide what value to adopt for the longitude of central meridian because the longitude assigned by the observer, or deduced from the time attached to the sketch, was obviously inaccurate judging from the positions on the drawing of well known permanent features or comparison with the drawings of other observers at this apparition. Where the error was obvious and large the value for ω has been altered by the Director; small discrepancies may, however, be noticed on the plates where the drawings are arranged approximately in order of Martian longitude.

The time lag of nearly 10 years between the epoch of the observations and publication, due mainly to war conditions, is regrettable, but it has made it possible to include in this Report the work of some foreign members who for similar reasons had been unable to communicate their results earlier.

THE OBSERVATIONS.

REGION I.

Syrtis Major, Hellas, Sinus Sabaeus and Forked Bay.

Ω 250° to 10°.

MARE AUSTRALE (Eastern). (June—Nov.). Often dark, very often fairly dark; nearly always extending to S.P. Cap, and very often to S limb also.

Sometimes rather lightly shaded (He, Wt). Prominent, very dark above Hellas—(He, July 27).

"Whole S hemisphere grey with indefinite shadings"—(Co, Sept. 26).

Brown-grey with small dark knots—(Bu, Oct. 1).

"The dark area (*Hellesponticæ* and *M. Australe*) near the S.P. Cap appeared to have increased somewhat in size and depth of tone" since Oct. 1—(Ph, Oct. 31).

DEPRESSIONES HELLESPONTICÆ. Often wide, sometimes narrow. Dark (usually) or fairly dark; hardly ever faint. Patch or band of shading at or near edge of S Polar Cap, somewhat larger and more prominent in October and early December than before opposition.

Sometimes seen (Oct.) as very dark fork at S end of *Hellespontes* (Ph. Wd); "appeared to have increased somewhat in size and depth of tone since Oct. 1 (Ph—Oct. 31); large darkish area to S Polar Cap and limb (Bu—Dec. 1); dark grey round patch in shading under S.P. Cap (Ax—Dec. 3).

HELLESPONTUS. At times narrow, usually wide. Nearly always fairly dark or dark. Two distinct long, nearly parallel streaks (Ph). "Wide and curved" Haa.

Occasionally blue or green tinge (Bu, By); very dark (He—May 4); "strikingly conspicuous" (Wd—Oct. 28); darker at ends (Wt—Aug.); "very dark fork at S end (Ph—Oct. 1; Wd—end Oct.).

"Appeared as a double streak" (Ph—Sept. 24; also Oct. 1, 2)—W streak shown as a long southerly continuation of *Mare Serpentis*, E. streak as southerly extension of *Yaonis Fretum*. It appeared thus to Antoniadi in 1924.

HELLAS. Very bright and distinct to all observers. Late Sept. to early Nov. often a wide gap in the S border. White, cream, yellow or pink. Round, except that at times (especially Nov.) the S side seemed squarish or pointed. Dark border.

"Generally white or pale but twice (Oct. 1, Nov. 7) very red on C.M. (Hs); "fiery red" (Wd, Nov. 7); "a very beautiful pink hue over the N part of *Hellas* and also (though less strongly marked) over *Ausonia*" (Ph, Oct. 2).

Very occasionally dull or lightly shaded to Bz, Ell, Fx, He.

Divided by *Peneus* (Ell, twice; Ph, thrice).

"Bounded by diffuse dark line and completely separated from *M. Australe* and *M. Hadriacum* by orange desert"—possibly *Peræa* and *Chersonesus*—Bu (Nov. 8).

Extending on limb to S Polar Cap (Ax and Bz, Dec. 3).

Seemed brighter than S.P. Cap (Cp, Oct. 2; Ax, Dec. 3).

"Northern part of *Hellas* very bright" (Ph, Sept. 24, 30).

"N part of *Hellas* very light" Pk, Sept. 25. "*Hellas* brightish near centre of disk" Pk, Nov. 1.

"N part of *Hellas* decidedly light" Pk, Oct. 31, $\omega = 304$.

SURROUNDINGS OF *HELLAS.*

EURIPUS I. Fairly wide, darkness variable. Sometimes seen separated from *M. Amphitrites.* (Wide with dark knot at S end, but fainter than *M. Amphitrites*—Ph, Oct. 1).

CHERSONESUS. Seen by Bu, Clk, Ell, Ph, Oct. 1—3. Long and fairly light. (Joining *Ausonia*—Ell).

MARE AMPHITRITES. Narrow, rather dark, pointed, claw-shape. (Several observers). Dark, wide, diffuse, forked appearance (Ph).

YAONIS FRETUM. Seen a few times in October by Bu, Bz, Ph. Dark. (With extension towards S.P. cap doubling *Hellespontus*—Ph.)

YAONIS REGIO. Seen a few times in Sept., Oct. and Jan. by Bu, Bz, Ph. Slightly shaded.

MARE HADRIACUM. Wide and fairly (sometimes very) dark; narrower in the middle, so of hour-glass shape. (Confirmed by Ph).

Occasional green tinge (Bu, Cp).

Divided, giving a narrow rim to *Hellas* and a very wide edge to *Ausonia*—*?Borbyses*—(Bu, Nov. 8).

AUSONIA (Southern). Bright, distinct with dusky borders; yellow, cream, white or pink; round, oblong or triangular. From Opposition often drawn further N than *Eridania* and *Hellas*: dark shading probably spreading from South, and northern belt perhaps becoming lighter.

Bright as *Hellas* (Cp, Wd, late Sept.); "very bright" (Ph—Sept. 30); pink or orange (Bu, Hs, Ph, Wd); at times lightly shaded.

Light patch in *N. Ausonia* separated from rest by *Euripus* II (Ph—Oct. 1); narrow light elongation northward (Ph—Oct. 2, 5); bright area through *N. Ausonia* to *Libya* (Bu—Dec. 16). "Bright" (Haa).

BORDERS OF *AUSONIA*.

TIPHYS FRETUM. Often seen by Ph and several others. Dark.

PROMETHEI SINUS. Seen by most members on frequent occasions. Fairly dark, often wide and reaching to the S polar cap and limb.

HADRIA. Seen by several members as a fairly dark strait or gulf, but rather faint to Ph.

EURIPUS II. Seen a few times in October and November by Bu, Ell and Ph. Moderately dark, narrow, dividing *S.* from *N. Ausonia*.

PROCYONIS DEPRESSIO. Seen repeatedly by several observers as a dark bay N of *Xanthus*. Dark, wide and prominent (Ph).

MARE TYRRHENUM. Dark or very dark, long, fairly narrow; narrowing to S in Nov.—Dec.

At times dark but seldom faint or patchy. Darker than *M. Cimmerium* (Cl, Ell—late Sept.); "very dark" (Ph—Oct. 5); divided by light streak from *Syrtis Minor* (Ell—end Sept.); at times bluish or greenish tinge (Bu, Ell, He).

Apodis Depressio (SE corner of Mare) seen as dark bay in October (Ell, He, Wd, Wk).

SYRTIS MINOR. Dark. Very prominent May—August, when *Parnes* (or *Libycae Palus*) formed projecting dark area with *Syrtis Parva* northward towards *Nepenthes* (He); confirmed Oct.—Nov. (by Bu, Cl, Fx, Ph) when the dark marking was joined to *Nepenthes*.—A peculiarity of this Apparition.

Blue or green tinge in *Syrtis Parva*. (Bu, Cp).

LIBYA. Variable; bright to dusky.

Some disagreement; end Aug.—light (Fx); end Sept.—bright (Ax), faint shading (Cp), dusky (Ell); early Oct.—bright (Ax), light (El, Wd); "lightly shaded" (Ph); early Nov.—light (Ell, Fx); lightly shaded (He); "red" (Hs).

SYRTIS MAJOR. Fairly regular triangular shape: wide and stumpy at first, but from late Sept. pointed and tapering to most observers, though still blunt to one or two. Green or blue tinge often noted by several from mid-Sept. to mid-Jan.

Seems to have darkened appreciably from late Sept., being often very dark, comparable with *Sinus Sabæus*. Most observers at times saw it uniformly dark, but often darkest at the tip (North), and W edge, and sometimes E edge also, with lighter patches in South. N tip and W edge very dark too (Haa).

DELTATON SINUS appeared wide and rounded and a dark condensation in this region may have been *DEPRESSIO IONICA* somwehat displaced to the NW. This SW shoulder of the *Syrtis* was clearly bounded by the bright area *Srongyle Insula* and *Ana*. To some observers this appeared joined to *Deucalionis Regio*.

LIGHT PATCHES WITHIN *SYRTIS MAJOR*.

IAPYGIA VIRIDIS and *ŒNOTRIA* occasionally seen by several observers.

CROCIA seen as a bright promontory by several observers.

ARENA: "misty band" cutting off stub end from junction with *Nepenthes* (Wd, thrice, Oct.—Nov.; very slightly indicated by Ph, Oct. 2). Distinct (Haa).

NILI PONS: cutting off extreme tip (Fx, Nov. 8; Ph, Sept. 24, Oct. 1, 2).

Colour: "*Maria*, especially *Syrtis Major*, blue-green in 8-inch; more blue-grey and less green in 18-inch" (Ph, Oct. 1); "I though the *Syrtis Major* rather more greenish-blue than I did last night" (Ph—Oct. 2). Green and blue tinges also noted by Ax, Bu, Cp, He; and brown tinge several times late Oct.—early Nov. by Ax.

Note by Col (Sept. 26), "full of indefinite shadings too delicate to draw; f. side very clearly defined and is darkest part of planet".

DETAIL AROUND *SYRTIS MAJOR*.

HAMMONIS CORNU (Sept.—Dec.). Fairly long, distinct, bright cream promontory between *Syrtis Major* and *Sinus Sabæus*.

Divided from *Aeria* by thin dark line of *Poros* (Bu, Oct. 1); Wd, Nov. 5, 7).

NYMPHÆUM PROMONTORIUM and neighbouring portion of *Aeria*; bright, yellow, dream or white (Ax, Clk, Ell, Wt); ruddy (Hs, Wd).

(The small bay *Typhonii S.* was seen only by Fox.)

ASTUSAPIS SINUS. Seen by Ell and Wt.

MEROE INSULA. Observed by Bu on Oct. 1 as a roundish light area bounded by *Nilosyrtis* and *Astusapes*. Faintly indicated by Ph also.

MŒRIS LACUS. (Aug. 31—Nov. 8). Rather faint till late Sept.; dark and fairly large Oct.—Nov.; but not always seen. E part much darker than the part adjoining *Syrtis Major*, in which Ph shows a white patch (see Plate I, Fig. 5). Conspicuous to Ph on Sept. 30.

NEPENTHES-THOTH. Agreed (ten observers) as rather faint and narrow but fairly distinct, more so in Nov. than Sept.

Not seen before Nov. by Ax, Col, Fo, He, Wt; wide (Bu—twice); "*Lacus Moeris* conspicuous but most of *Nepenthes-Thoth* rather faint and narrow" (Ph—Sept. 30); Ph (Oct. 1, 2) shows *Nepenthes* forking into two distinct narrow dark branches between *L. Moeris* and *Syrtis Major*. Haa shows it narrow.

CASIUS. Seen occasionally (by Ax, Bu, Ell, Ph) in Oct. and Nov. Fairly wide, not very dark. Rather near limb.

UTOPIA. Seen as a faint triangular shading on a few occasions in Oct. and Nov. (Ax, Bu, Ph, Wd). A bright spot inside (Ph, Oct. 2).

NUBIS LACUS or *NODUS ALCYONIUS**. Occasionally seen fairly dark and roundish. (Ell, Fx, Wd, Wk).

* Marked *Nodus Alcyonius* on map.

This lake, which is often a prominent feature, has been observed at most apparitions and appears on the maps accompanying our Reports from 1900 to 1920 where it is designated *Nubis Lacus* by Director Antoniadi and his successor. In Antoniadi's book, published in 1930, it is, however, called *Nodus Alcyonius* and there is no mention of the name *Nublis Lacus* in the index or anywhere in the book. The mean position from our Reports is Long, 257°, Lat. 34° N. Antoniadi (1930) shows it 3° farther North but it is undoubtedly the same object.

ALCYONIUS. Appeared as a faint narrow streak to Pk (Oct. 1, 2) and to others as edge of *Utopia* shading.

NILOSYRTIS. Seen several times as a rather faint canal, on edge of *Neith Regio*.

SINUS SABÆUS. Nearly always appeared dark or very dark. Rather narrow in the middle, or rather to the W of the middle, widening considerably

at both ends. Sometimes drawn straight but more usually bent or curved (this partly due to perspective).

DARKNESS: In August occasionally fainter than M. Erythræum; "seemed obscured by yellowish haze" (He). Only moderately dark on several occasions in late Sept. Shown very dark by Ph in Sept.—Oct. "Almost black" (Ax, Sept. 21, Oct. 26). Paler than *Syrtis Major* and *Margaritifer S.* (Ax—Oct. 28). Shown very dark by Haa.

Occasionally *Furca, Sigeus, Scylla* or N Edge appeared darker than the rest (Bu, Col, Fx). Whitish gap through the middle (Ax—Sept. 22, 23). Small dark spot on N. side near p. end (Bu—Sept. 29).

COLOUR: Occasional blue or green tinge noted by Bu, By, He, Ph.

SINUS FURCOSUS. Divided by half the observers, revealing *Fastigium Aryn,* with difficulty, mainly after Opposition, very rarely before; prongs nearly always shown small and short. Dark or very dark. Rounded, pointed or triangular; south often rounded, with blunt or sharp single point to north.

Divided before Opposition by Ph. 4 times out of 6, others 4 out of 30; after Opposition, others 13 out of 30.

"Inky black" (Wd, late Oct.).

Prongs thrice seen long and sharp by Wd (Sept., Oct.); twice by Ph (Sept. 24, Oct. 1).

"*Furca* continually and widely double, *Fastigium* quite light". Pk, Sept. 25.

PORTUS SIGEUS. Recognised by most observers as a dark pointed bay. Double sharp point seen three times by Ell and Wd (Oct.—Nov.). Prominent, single to Haa.

SCYLLA AND CHARIBDIS. Very prominent, large and dark throughout the apparition.

MARE SERPENTIS. Prominent, large and dark, especially to Ph, who showed a long southward extension.

PANDORÆ FRETUM. Fairly prominent, but generally incomplete. there being a large gap in the middle or sometimes nearer the E or W end, Out of 66 observations by the Section it was missing in 11, incomplete (broken) in 34 and in 21 it was complete though in some cases hazy. Generally narrow except at extreme ends. It is shown broad by Wd on Sept. 29, narrow and straight by Ell and Bu on Nov. 4 and Dec. 1 respectively. Wt (Oct. 30) shows it narrow at the western end. *Pandoræ Fretum* just about bisects the angle between *S. Sabæus* and *Hellespontus* (Pk—Sept. 25). No progressive fading or darkening could be traced: intermittently visible from Aug. to Dec.

Earliest observations: lacking E end (Wt—June 16); dark, wide, complete (Fx—Aug. 17, 31); entirely missing (Wt—Aug. 26, 30).

When E. end only on disk, a few times fairly dark (Ac, Bu; Sept.—Nov.); W. missing (He—Sept. 18); "faint wisp" (He—Sept. 22); "faint, complete" (Ax—Sept. 22); middle and E missing (Bz—Sept. 22); "faint narrow streak" (He—Sept. 23); break in middle (Ax—Sept. 23); distinct, W end narrowest (Wd—Sept. 25); "middle third missing", "breaks off suddenly" (Fx—Sept. 23, 29); "W and middle missing" (Ax—Oct. 26); "extremely faint" (Ell, Oct. 26); "E wide, W. missing" (Ax—Oct. 28); "*Noachis* and *Deucalionis Regio* seem to merge into one large yellowish region" (He—Oct. 28); "*Deucalionis Regio* always seen as a channel winding round *Pandoræ Fretum* towards SW" (Hs).

Latest observations: missing (He, Hs—Nov. 7); E end darkish, middle missing (Wd—Nov. 7); "faint but unmistakable" (Ell, Nov. 4); faint, narrow, complete (Bu—Dec. 1).

Ph's observations: rather dark, narrow, complete with note: "*Pandoræ Fretum* easy this Apparition, contrast that of 1939" (Ph. Sept. 24). But the obscuration

of *Pandoræ Fretum* in 1939 is shown by Ph's drawings to be by widespread shading not by light patches, and his 1941 sketches do not disagree altogether with the other observations. Ph showed *Pandoræ Fretum* very hazy (Sept. 20—4-inch); very narrow and faint (Oct. 1—18-inch; Oct. 2); he noted a "small white spot or interruption in (middle of) *Pandoræ Fretum*" (Oct. 1); but wrote: "I thought *Pandoræ Fretum* to be rather more conspicuous" (Oct. 31).

"*Pandoræ Fretum* just about bisects the angle between *S. Sabæus* and *Hellespontus*" Ph, Sept. 25.

Pandorae Fretum is a peculiarly interesting feature on account of the way its visibility varies from apparition to apparition.

DEUCALIONIS REGIO. Bright and wide, but lightly shaded now and then to several observers.

Sometimes bright but rather narrow (Ax, Bz, Hs); orange or yellow occasionally (Bu, He, Wd). Now and then seen open at f. end joining *Thymiamata* (Ax. several times, Wt twice).

"A large area of *Deucalionis Regio* (E and mid) almost as bright as *Hellas*" (Ph—Sept. 24).

NOACHIS (Eastern). Very often lightly shaded, sometimes patchy, but quite often bright; and a few times yellow, orange or pink (from late Sept.).

June: rather bright (He, Wt); July: lightly shaded (He). Oct. 28: "very light grey, complex and patchy; several light gaps interspersed with faint shadings; rectangular, cut by light grey bands (? *Hyllus, Chalcoporos*, etc.)" (Ax).

Shading uniform to most observers but patchiness also seen by Ph (Sept.—Oct.), Fx, Hs (Oct. 24, 30).

NOACHIS (Western). Throughout Apparition to nearly all observers a wide bright region, frequently joined to *Deucalionis R.* and foten to *Argyre I* also. Very seldom shaded or patchy. A peculiarity of the Apparition, quite unlike 1939.

Observation figures; bright 67, lightly shaded 10, shaded 5, patchy 3; joining *Deucalionis R.* 41, joining *Argyre* 32.

June: "All markings fade out between *Sinus Sabæus* and *S.P. Cap*" (He). August "*Noachis* covered with yellowish haze" (He): "all bright from *Sinus Sabæus* to SW limb" (Wt).

Sept.: "*Noachis* and *Deucalionis* form a circular bright area in centre: *Pandoræ F.* entirely missing" (Ax); faintly shaded joining *Argyre* and *Deucalionis R.* (Ell); "*Pandoræ Fretum* breaks off suddenly and the surface here glistens as though covered by a highly reflective substance" (Fx). Several times shown faintly or very faintly shaded (Ph, Sept. 17—Oct. 1).

Oct.: "Bright area extending from *Deucalionis* towards *Argyre*" (Fx). Shown light by Ph (Oct. 2); "very bright" on E. limb (Ph—Oct. 23).

Nov.: Wide, bright (Ell, He, Hs); joining *Argyre* (Ell, Hs).

Dec.: Wide, bright (Ax); lightly shaded, orange (Bu); joining *Argyre* (Ax, Bu); "dull white" on limb (Bu—Dec. 18).

CONTINENTAL REGION TO THE N. OF *SINUS SABÆUS*

EDOM and *EDOM PROMONTORIUM* were described by Heath as "the reddest part of the planet, especially when about C.M." Also "very bright" to Ph (Sept. 24). *Edom Promontorium* was "ruddy" to Wd on Sept. 25 and orange and narrow to Bu, Dec. 1. Other observers have not made indications.

ARABIA. Ruddy (Fx, Wd in Sept.); shaded (Ph); rather bright, yellow (Bu—Dec. 1).

MOAB. Bright on the E limb to Ax (Oct. 25).

EDEN. Shaded (Ax, Bu, Ell, Fx, Ph); yellow on limb (Bu—Dec. 18).

CANALS IN THIS REGION.

PHISON. Seen occasionally by Bz, Col, Fx, Wd. Faint. The S part only seen by Wd.

EUPHRATES. Seen occasionally by Bu, Bz, Fx, Haa, Ph, Wd. Faint. The S. part only seen by Ph and Wd. Orange dividing two yellow areas (Bu—Dec. 1).

HIDDEKEL. Observed by several members, always faint and often seen only as edge of Eden shading.

GEHON. Seen frequently by several members. Faint and often appeared only as edge of *Eden* shading.

PROTONILUS. Seen by Ph on Oct. 2 as a rather faint diffuse streak.

DEUTERONILUS. Seen by Ax on Oct. 29 and 31 as N edge of *Eden*, darker than the rest.

(The two last Canals were too near the N limb to be well seen.)

LAKES OR OASES.

ISMENIUS LACUS. Seen occasionally in late Sept. Small, fairly dark (Ax, Fx, Haa, Wk).

COLOE PALUS. Does not appear to have been seen by any of the observers. Probably too near the limb.

REGION II.

Margaritifer Sinus, Auroræ Sinus, Solis Lacus.

Ω 10° TO 130°.

MARE AUSTRALE (Western). Rather faint (density variable and patchy to Ph) before Opposition, moderately dark thenceforward. Now and then striped and patchy, and at times in Oct., Nov., light.

Occasional colour: Oct.: "lightish brown" (Ac); "dusky orange" (Bu); Nov. "yellow" (Bu).

ARGYRE I. Often bright and distinct to most observers, especially when on a limb. Very rarely shaded. Yellow, cream or sometimes white. Very often joined to *Noachis*, sometimes to *Ogygis R.* and almost to *Thaumasia.* A few times by several observers seen joined to *Thaumasia* also.

Shape very variable; circular or rectangular as a rule, but at times long and rather narrow; now and then irregular or indefinite. May have increased in size after Opposition.

Shown by Ph rather long, narrow and vague, noted white on E limb (Oct. 21, 23). Very large, extending almost to S.P. cap, S.E. limb (Ell, Nov. 25; Bu, Dec. 1). "Yellowish patch in *Argyre* disappeared two hours later" (Bu—Dec. 1). "Long, narrow, dark lake inside W verge of *Argyre*" (Ax—Oct. 24).

SURROUNDINGS OF *ARGYRE I.*

ARGYROPORUS. This separation between *Noachis* and *Argyle I* was missing in 40 out of 62 observations. When seen it generally appeared wide and faint or of moderate density.

MARE OCEANIDUM. Seen by most observers in Sept. and Oct. Moderately dark, wide and long, forming S border of *Argyre I.*

Charitum Promontorium. Seen by Ax, Ell, Hs and Wd in Sept. and Oct. as pointed SW corner of *Argyre*; but occasionally appeared rounded.

Campi Phelgræi. Seen by several observers in Oct. as a moderately dark, fairly long bay.

Nereidum Fretum. Not very dark, fairly wide W boundary of *Argyre* (most observers).

Ogygis Regio and *Phrixi Regio.* (Sept.—Nov.). Notably wide, light and prominent in Sept. and Oct. (Ac, Ax, Ell, Fx, He, Ph, Wt). Often joined to *Argyre I* and sometimes to *Thaumasia* also, and several times almost joining *Thaumasia*. This little bridge between *Argyre* and *Thaumasia* is a peculiarity of the Apparition.

"*Phrixi R.* and *Ogygis R.* form two light areas between *Thaumasia* and *Argyre*" (Ell—Oct. 21)—generally shown by Ell and others, merged in one light area. Ph (Sept. 17) showed *Phrixi R.* and *Protei R.* forming one long narrow L-shaped light area.

Bosphorus Gemmatus (Aug.—Jan.). Darkish, often dark, but at times rather faint; rarely very dark or faint. Wide, but often either fairly wide, narrow or fairly narrow. Occasional bluish tinge Sept. Oct. (Ac, Ax).

Dusky brownish-grey (Cp—Sept. 15); "very conspicuous" (Wd—Sept. 16); "fairly dark, wide N to S, long E to W, prominent, quadrilateral or pentagon shape with several sharp bays, darker at *D. Pontica* and *Aonius S* ends, once seemed cut through by *Heræum Prom.*" (Ax—Oct. 21); dark but patchy, narrow in parts (Ell—late Oct.); darker N than SE (Bu—Dec. 30); shown by Ph dark and, except Sept. 17, fairly wide.

Mare Erytrhæum. Very patchy to most observers (including Ph) from mid-Sept. Duskiness moderate to slight, darkest (in parts) late October, afterwards fading a little. The darkest parts generally N. and W., but occasionally NE or E (exceptionally the South).

Twice in Aug., though rather faint, less so than *S. Sabæus* or *M. Australe* (He); "E end of *Mare* very square and sharply terminated" (Ell, Oct. 26). Faint (Haa).

DETAIL IN *MARE ERYTHRÆUM.*

Vulcani Pelagus. Large, round or squarish bay at SE corner of Mare. Variable intensity.

dark and large by Ph, Sept. 17).

Depressio Erythræa. Dark or fairly dark patch on N side of *Argye.* (Shown very dark and large by Ph, Sept. 17).

Pyrrhæ Regio. A lightish patch in the E of Mare, seen occasionally by Ax, He and Wt.

Arsinoes Depressio. A fairly dark, wide streak diagonally across Mare dividing *Eos* from *Protei Regio.* Seen only thrice (Sept., Oct.) by Ell and Ph.

Protei Regio. A rather small, lightish, triangular patch near centre of Mare. (Several observers, in Sept. and Oct.). Shown large by Ph, and on Oct. 23 joining *Eos.*

Capri Cornu. Another small lightish patch closer to *Auroræ Sinus* (Ax and Ell only).

Solis Lacus (Aug.—Nov.). Rather small and faint, though somewhat larger in several observations (Bz, Bu fairly often)—never very large; elliptical shape. Sometimes difficult to see even when central; patchy, sometimes darker nucleus and ends detected.

"Very dimly visible" (He—Sept. 11); dark ellipse with paler horn-shaped extension to W. (Ph—Sept. 17); fairly large, "pale, not easy" (Bu—Oct. 14); "difficult and outline quite uncertain" (Ell—Oct. 14); "fainter than *Aonius S*, elongated in a S.f.—N.p. direction" (He—Oct. 15); "better seen but elongated and patchy" (Ell—Oct. 16); oval, not very large or dark (Ph—Oct. 14, 16). Haa, very faint.

Observations of Oct. 21: "small, grey, elliptical, distinct, seemed darkest at centre and edge with lighter belt between" (Ax); fairly dark, medium size, distinct (Bz); fairly dark and large, elliptical, "very dark spot at each end, W and E" (Bu);

fairly large, elongated E—W, irregular outline, "difficult" (Ell); fairly dark and large, elliptical, "elongated in a p. slightly N direction" (He); fairly dark and large, elliptical, darker towards West (Wd); dark, small, elliptical (Wk); oval, slightly darker W and E ends (Ph).

Drawn as fairly large oval, dark spot at p. (E) end, wider and fainter towards middle and W, with two small faint projections to S (Ph—Oct. 28); rather dark, large, oblong (Bu—Nov. 19); fairly dark, small, elliptical, fainter than *Melasn* or *Phœnicis* L. but "darker nucleus in the best moments" (Bu—Nov. 25); pale, medium size, elliptical (Ell Nov. 25).

NECTAR (Sept.—Nov.; several observers). Distinct, often wide, density varying from faint to moderate.

"Easily seen, quite as dark as *Solis C.*" (Wd—Sept. 16); narrow but distinct (Ph—Sept. 17); "faint, rather wide, but only seen half-way to *Solis L.*" (Ax—Oct. 21) "Very faint, very narrow" (Ax—Oct. 23); drawn fairly wide and dark by Ph (Oct. 16, 21, 23).

THAUMASIA (Aug.—Dec.). In great majority of observations of all Members, including Ph, bright with S and E boundaries wider and darker than N and W; but the difference in width and darkness of boundaries not apparent in late Nov., Dec. (Ax, Bu, Ell). Fairly round in shape. Often yellow or golden (Ax many times, Ac, Cp), but to some red or pink (Ac, Hs, Wd) or orange (Ax).

Brightness. Observation figures; bright 74, faintly shaded 9, shaded 15, deeply shaded 1 (Fx—Sept. 13). Particularly bright on limb. Now and then patchy, part(s) shaded, rest bright (Cl, He—Sept; Ax, Bz—Oct.).

Special Notes: Sept. 15, "dusky yellow" (Cp); Oct. 18—20 "very red" (Hs); Oct. 21 "bright golden but strip along E. verge white—near W. limb" (Ax); "whitish spot in *Thaumasia* suspected" (Bu); "impression of complex fine detail within *Thaumasia*, which seemed to glitter with silvery-pearl sheen" (Ax); Oct. 30; "dull dirty red" on W limb (Wd), Nov. 25; "extreme pallor of the markings round and especially east of *Solis Lacus*—possibly large cloud extending (from SE limb) over the *Solis* region" (Ell).

Shape; rhombus (Fx—Aug., Sept.); square W corner (Fx—Oct. 14); polygon with up to seven sides (Bu—Nov., Dec.).

CANALS IN *THAUMASIA* RADIATING FROM *SOLIS LACUS*.

NECTAR. See above.

AMBROSIA. Seen occasionally by four observers. Narrow and faint to Ac and Ax; wide and curving to Ph.

BATHYS (OEROE). Seen by several observers in Sept. and Oct.; narrow and faint. "Not so easy as *Nectar*" (Wd, Sept. 16). Very narrow twisting streak (Bu, Oct. 20). Faint and narrow to Haa.

ACAMPSIS. Occasionally seen; rather narrow and faint—Ac, Bu, He, Wd.

EOSPHOROS. Rather faint, width variable—Bz, Bu, Ell, Haa, Ph, Wk.

TITHONIUS. Faint, not very wide. Wide and diffuse to Ph (Oct. 16); "Faint, narrow, long past middle of disk" (Ax, Oct. 11).

SURROUNDINGS OF *SOLIS LACUS* AND *THAUMASIA*

EAST AND SOUTH

NECTARIS SINUS. Fairly large and dark, rounded or squarish. Projection into *Thaumasia* (Hg and Ph).

FELIS PROMONTORIUM. Shown by Hg (Oct. 21).

Delphini Portus. Seen occasionally by Ax, Ell, Fx, Wt as a fairly dark rounded patch or bay (Oct.).

Coracis Portus
Pontica Depressio } Small roundish dark patch or patches on *Bosporus*; darkened perceptibly after opposition. Large, rather faint (Ph, Sept. 17).

Chrysokeras. Seen a few times as a light band (Fx) between *Hycseus* and *Bosporos*; Bu, joining *Thyle I, Ioniæ Depressiones.*

Aonius Sinus. Dark in October, before and after moderately dark; very seldom at all faint. In October, November often square with pointed bays, sometimes three. Wide as a rule.

Occasionally; rounded or triangular, projecting into *Thaumasia* (Ax, Bu, Ell). He; "rather faint but darker than *Sabæus, Margaritifer*" (Aug)., "moderately dark, darker than *Solis Lacus*, lighter than *M. Sirenum*" (Oct.). N. edge dark (Ac, Ell, Wd—Oct.); shown by Ph large, dark, rounded.

Oct. 21 (Ax); "pentagon shape with sharp bays, and narrow white strip along SW, W and N borders which disappeared in half an hour as the *Sinus* moved further from limb (? frost)"; (later) "*Phasis* wide, faint grey bordered *Aonius S* to north."

Bathys Portus. Fairly dark round or pointed bay. (Ax, Bu, Bz). "Slightly smaller than *Solis Lacus*", Bz.

Hyscus. Not shown by Ph and Ell on Oct. 16 or by Ac (Oct. 23). A definite band to Bu (Oct. 22, Nov. 11). Edge of dark shadings to Wd, Fx and to Ell on Oct. 21.

Phasis. Seen a few times in Sept. and Oct. by Ax, He, Wd. Rather faint, wide. ("Bordering *Aonius Sinus* to north—Ax, Oct. 21).

Araxes (Aug.—Dec.). Always faint before Opposition, but rather more often fairly dark afterwards. Width variable; narrow, fairly wide or wide.

Drawn faint and narrow by Ph (Oct. 14, 16) with *Nox* barely visible.

North and West.

Phœnicis Lacus (Oct.—Dec.; several observers). Not seen till after Opposition. Rather small, round or elliptical; density varying between dark and faint.

Occasionally large, diffuse. Particularly dark, more so than *Solis L.*, Nov. 25 (Bu). Seen only as decided angle between *Nox* and *Araxes*, Nov. 19 (Bu). Drawn faint, vague and diffuse by Ph (Oct. 14, 16, 21).

Tithonius Lacus (and nearby small lakes). (Sept.—Nov.).

Ph showed *Noctis L.* and *Echus L.* (Sept. 17) and perhaps also *Ius L.* (Oct. 23). *Tithonius L.* and *Ceti L.* merged with *Melas* (Wd—Sept. 16); *Ius L.* and *Noctis L.* fairly dark, roundish like *Melas L.* (Ell—Oct. 16).

Other observations of *Tithonius Lacus*: small, dark, roundish (Bu—Oct. 21, 22); fairly dark and wide, rectangular, "more conspicuous than *Solis L.*" (Ell—Oct. 21, 23); rather faint and large elliptical (He—Oct. 21); faint, wide, diffuse (Ell—Nov. 21) pale, rather small, elongated (Ell—Nov. 25).

Chrysorrhoas. Seen as a rather faint and narrow strip joining *Tithonius Lacus* to *Lunæ Lacus.* (Bu, Bz, Ell).

Melas Lacus (Sept.—Dec.). Small, round or elliptical. Darker than *Phœnicis Lacus*; rather faint before Opposition but afterwards much darker and usually very dark.

Slightly larger but not darker than *Phœnicis L.* (Ell, Oct. 16); "grey, small, elliptical, seemed darkest at centre and edge" (Ax—Oct. 21); "as dark as *Auroræ S*" (Ell, Oct. 21, 23); as dark as *Phœnicis L.*, darker than *Solis L.* (Bu—Nov. 25); small, oval, almost black (Bu—Dec. 30); shown by Ph (Sept.—Oct.) very dark, small, roundish, much darker than *Phœnicis L.* "Well seen" (Ph—Oct. 23).

Agathodæmon (Aug.—Dec.). Medium or faint, sometimes dark, seldom extremely faint or dark. Perhaps a little darker on average after Opposition. Fairly wide, but nearly as often narrowish.

Very dark, fairly wide, "as dark as *Aurora S.*" (Ell, Oct. 21, 23.). Shown fairly dark but narrow by Ph.

JUVENTÆ FONS. Seen as a small round black spot by Ph, Pk, Ry. "Unusually conspicuous", Ph (Sept. 17); Easy, Ry (Sept. 17). Seen quite near the limb, Pk (Sept. 25), longitude of central meridian about 13°.

BÆTIS. Seen by Ph and Ry on Sept. 17, narrow and dark ("a thin black line"—Ry), and on Oct. 21 by Pk (not so dark).

OPHIR and *CANDOR.* (Sept.—Nov.; several observers). Bright or lightly shaded; brightest Oct. 21—26 (Ax, Co, Ell, Wd).

"White" (Ax—Oct. 23); "as bright as *Thaumasia*" (Wd—Oct. 21); lightly shaded (Bz—Sept. 16, Oct. 21; Fx—Oct. 30; Ell—Nov. 25); shown light but with note "I cannot see any particular whiteness in the *Ophir-Candor* region (Ph—Oct. 23).

AURORÆ SINUS. Dark as a rule; often fairly dark; sometimes extremely dark, or medium or light grey. Very rarely at all faint. Now and then nearly all observers noted darkness of the N edge. Two distinct bays (*Iamunæ S.*, *Gangis S.*) often shown (by Ax, Bz, By, Ell, Fx, Pk) and a third (*Agathodæmonis S.*) drawn (once each by Ax, Bz).

Large, squarish, or triangular, blunt or rounded, but occasionally pointed.

Appeared much darker in mid-Sept. and late October, rather less so in Nov., but dark in Dec., Jan.

Colour. At times blue or green tinge noted by Ax, Ac, He and once brown by Cp. Sept. 15, 16; Oct. 21, 25, darkest marking on disk to He, Wd. "Darker than *Sirenum Sinus* (He—Sept. 11). "Very dark, and this darkness extended without detail to *Bosporos Gemmatus* and swept across to the east, gradually fading" (Wd—Sept. 16). N edge very dark, rest dark, "outline very sharp" (Ell—Oct. 23, 26). "Not so dark as in previous presentations" (Bu—Nov. 25). Double to Pk (Oct. 21), *Gangis S.* and *Iamunæ S.* showing as black round patches (Pl. VII, fig. 1). "Like an enlarged *Furca*" (Bu—Jan. 7).

EOS. Large and relatively bright to most observers.

AURORÆ FRETUM. Nearly always seen; moderately dark, or dark, usually unbroken from *Auroræ S.* to *Margaritifer S.*, but breached Sept. 18 (Ax, He), Oct. 22 (Bu), and Oct. 23 (Bu, Ph).

AROMATUM PROMONTORIUM. Light region, not usually distinguishable from *Chryse*, but white to Ax (Act. 23).

CHRYSE and *XANTHE* (Sept.—Jan.). *Chryse* often bright, yellowish. In October and January, *Xanthe* several times shaded, whereas *Chryse* bright. (Half the observers).

"A bright oval patch in *S Chryse*" (Ax—Sept. 18). "*Chryse* dusky brownish-red" (He—Sept. 15). *Xanthe* lightly shaded (Ph).

MARGARITIFER SINUS. Dark or fairly dark; at times rather faint. Very seldom faint or very dark. Large, triangular, tapering to a sharp point, but now and then small, stumpy or blunt.

Shown by Ph. large, fairly dark, distinct, tapering to sharp point (Sept., Oct.). Exceptional Views (late Oct.); larger than *Auroræ Sinus* (Ax); darker than *Auroræ Sinus* (Ax, Bz); more distinct than *Syrtis Major* or *Sinus Sabæus* (Ax).

IANI SINUS. This small bay is doubtfully indicated in drawings by Ax and Ell.

IANI FRETUM. Seen by most observers, rather faint, wide. "Very wide" (Ph—Sept. 24).

INDUS. Narrow and rather faint.

Seen by several; at times in Aug., Sept., none or only S part seen. Late in Oct. occasionally dark, more so than *Ganges* (Ax, Wd) and once or twice fairly wide (Ax, Fx). Very faintly indicated twice by Ph.

NILIACUS LACUS (Sept.—Oct.). Seen by most observers, faintish but at times darker, wide N to S, sometimes long E to W.

Fairly dark, long, narrow by N limb—Ph (Sept. 17).

IAMUNA. Seen by Bu and Ph as an eastern edge of *Xanthe* shading; but distinct (Ph, Sept. 17).

HYDRAOTES. Seen by Ph, Sept. 17, wide, distinct, running from *Lunæ Lacus* to N end of *Iamuna*.

NILOKERAS. Rather faint, sometimes wide N to S.

GANGES. Rather wide and diffuse, especially October onwards, but at times seemed narrow. Density varied from faint to dark. (Half the observers).

"Bell shape—S very narrow, N wide" (Ax—Oct. 24); sketched similarly by Ph (Oct. 21, 23) who showed it wide, diffuse, fairly dark.

LUNÆ LACUS. Wide and not very dark. Prominent but diffuse to Ph.

THARSIS. (Aug.—Oct.); several observers). Lightly shaded, but occasionally seen very dark or even bright. Roughly triangular with point to N; now and then joined to *Ceraunius* or even to *Ganges* (Ax).

"*Tharsis* and the regions near C.M. glowed with a bright reddish-ochre colour in good contrast with the whiteness around N and N.f. limb" (He—Sept. 9); very dark, point to N (Cl—Aug. 31); fairly dark, wide, large (Fx—Oct. 20); "as bright as *Thaumasia*" (Wd—Oct. 21). Drawn by Ph (Sept., Oct.) as large, lightish grey triangle, N apex rounded, interior shown light Sept. 17, Oct. 23.

MARE ACIDALIUM. Not definitely seen.

CERAUNIUS. Rather faint, wide, long or triangular (very dark and wide—Cl, Aug. 31). A light area to the W of *Ceraunius* seen by Ax, Ell, He and Ph; may have been a S extension of *Arcadia*.

LUNÆ LACUS—URANIUS—ASCRÆUS LACUS—IRIS (Oct., Dec.). Occasionally seen linked together as a band of faint shading parallel to and N of *Agathodæmon—Nox*. A peculiar feature of the Apparition.

Oct. 16; *Iris* separate, fairly dark and wide, short, by limb; just N of *Phœnicis L.* (Wd).

Oct. 21; 8h. faint shading from *Auroræ Sinus* to *M. Sirenum*, N. of *Agathodæmon* (Ell);

8h 45m, *Ganges-Lunæ L.—Uranius* drawn as faint connected shading (Ph);

8h 50m *Ascræus L.* faint grey, wide, separate (Ax);

9h. *Uranius* not seen, so *Lunæ L.* separated from *Ascræus L.—Iris*, which shown long, narrow by NW limb (Bz); faint shaded band, E wide, W narrow, from *Auroræ S.* to *Araxes* via *Lunæ L.*, etc. (Wd);

9h 15m, shaded band stretching from *Gangis S.* via *Lunæ L.* to *Araxes* (Ax);

9h 40m. This band continuous except for a gap at or near *Iris* (Ax).

Oct. 23; fairly dark and wide, *Ganges—Lunæ L.—Uranius* continuing via *Ascræus L.—Iris* along W limb (Ell); very faint indication of *Uranius—Iris* as a continuation westward of *Ganges—Lunæ L.* (Ph).

Dec. 30; *Uranius* faint, short, narrow, not joining *Ganges* but linked to *Ascræus L.—Iris—Araxes*; *Ascræus L.* small, faint, roundish; *Iris* narrow, rather faint (Bu).

REGION III.

Mare Sirenum—Mare Cimmerium, and Elysium.

Ω = 130° TO 250°.

THYLE I. (Sept.—Dec.; Bu, Ell, He, Ph, Wd). Sometimes light and distinct, but often shaded.

Large, light, distinct, oval (Ph—Sept. 4); long, narrow, (Bu—Oct. 12); yellow (He—Nov. 14); light (Bu—Dec. 27).

THYLE II. Often light, but more often shaded or faintly shaded.

Dark (Wd—Oct. 2); large, light oval (Ph—Oct. 1, 2, 12); rectangular (Ph—Oct. 7); "dull white" (Bu—Dec. 22).

PALINURI FRETUM (Aug.—Dec.). Moderately dark or dark, but much variation between faintness and darkness in October. Nearly always distinct, wide or very wide. Running E to W, or SE to NW, parallel to *Mare Sirenum.* Long, sometimes extending to S.P. Cap.

"*Palinuri Fr., Icaria* and *Aonius S* from a crooked band of shading up to S.P. Cap" (He—Sept. 9); drawn by Ph fairly dark, very wide, parallel to *M. Sirenum*; "rather darker than *M. Australe*" (He—Nov. 1); zigzag shape (Wd—Nov. 21).

MARE CHRONIUM. Shown by Ph and most others as moderately dark, and wide. Well seen throughout period. Often dark or very dark; seldom faint, especially after Opposition. Now and then narrow before Opposition. Darker depressions in the Mare, Oct.—Nov.

ULYXIS FRETUM. Frequently seen, wide, dark (faint to some), reaching to *S. Polar Cap.* (Curved to Ph, zigzag to Ax, Wd).

DANAIDUM DEPRESSIO (Oct.—Nov.; Ax, Bu, Wd). A very dark. large roundish area at E end of *Mare Chronium.* Prominent *after* Opposition.

MEROPES DEPRESSIO (Oct.—Nov.; Ax, Bu, Clk, Ph, Wt). Very dark, large, oval or rhombus-shaped bulge or knot in W. of *Mare Chronium* on S. edge of *Eridania.* These two depressions (*Danaidum, Meropes*) were striking features in Nov.

Duskier patch in Mare here shown by Ph—Oct. 5, 7, 12; also by Bu in mid-Oct.; the others observed it early in Nov.

PALINURI SINUS. Extensive faint or darkish shading reaching to S polar cap or S limb. (Western extension of *Mare Australe.*) Somewhat patchy (Ph—Sept., Oct.). With darker streaks (Wd—Oct. 16).

SIMOENTES SINUS. Darkish bay N of *Ulyxis Fretum.* Large, round dark bulge on *M. Chronium* (Wd). Seen three times (Ax, Ell, Wd).

ACHÆORUM PORTUS. Rather dark bay at S end of *Scandra,* occasionally seen. (Bu, Ell, Wd, Wt).

THERMODON. E edge of wide shading covering *W. Phæthontis.*

PHÆTHONTIS. Long E to W and narrow N to S Light, but at times faintly shaded, especially the W part. Now and then oval, quadrilateral or triangular (much wider at W end). Occasionally joined to *Electris,* but generally bounded on W. by *Simois,* especially after Opposition.

Shown by Ph light, long, narrow, widening to W; usually joining *Electris.*

SIMOIS. (Sept.—Dec.). Mainly seen after Opposition. Moderately dark, varying from narrow to very wide. Seems to have widened in Nov. and Dec.

Curved (Col, Ell, Ph); very wide, diffuse (Ph—Sept. 7, Oct. 2, 14); lacking (Ph—Oct. 7); narrower, curved, distinct (Ph—Oct. 12); very wide, distinct (Bu, Ell,—Nov.); wide, covering all *W Phæthontis* to *Thermodon* (Bu—Dec. 30).

ELECTRIS. Bright and distinct; seldom shaded even faintly. Shape mostly round, but now and then bent, irregular, triangular or rectangular. Often joined to *Eridania*, sometimes to *Phæthontis*.

Light, roundish, large (Ph—Oct. 7); smaller, distinct (Ph—Oct. 12); very bright on SW limb, "appears raised like a cloud or may be due to irradiation", oval, projecting over terminator (Ell—Nov. 21); but later on Nov. 21 appeared darkly shaded to Wd; fairly bright (Bu—thrice in late Dec.).

SCAMANDER. (Aug.—Dec.); half the observers, including Ph). Moderately dark, wide or very wide; width and density probably increased after Opposition. Occasionally curved.

Seen very wide by Fx (Oct. 11), Clk (Oct. 12), Ax (Nov. 8), Bu (Nov. 15, Dec. 22).

ERIDANIA. Bright, especially when by a limb, or at least light. Rarely shaded, even faintly, except in Dec. and Jan., when it was somewhat dusky. Usual colour yellow or whitish. Outline generally distinct. Shape most often circular, but many variations shown; long and narrow, square, rectangular, quadrilateral, oval, an irregular triangle, a curved parallelogram. Often joined to *Electris*, sometimes to *Hesperia* and/or *Ausonia*.

"Light triangle but not so light as *Ausonia*" (Clk—Oct. 12); "only thrown into prominence by darkness of *Scamander* and *Xanthus*" (Wd—Oct. 11); light, distinct, round or elongated (Ph—early Oct.); shaded (Bu, He, Wd—Dec. Jan.).

Xanthus. Fairly dark, wide, prominent (Ph and most others). Sometimes shown narrow.

MARE SIRENUM. Dark, sometimes only moderately; seldom at all faint. Very distinct and prominent; rarely hazy. Bird shape—shown by half the observers, but occasionally drawn oblong or triangular. Pk notes absence of beak. Patchy with darker spots according to some, e.g. Ph, and *Ios Insula* seen by several as a light patch or streak inside the Mare. A slight concavity in the middle of the S edge drawn several times (Sept.—Nov. by Ax, By, Ell, Fx, Ph). Blue or green tinge sometimes seen.

Darkness; in nearly 100 observations over 60% describe it as dark, 30% moderately dark and about 10% somewhat faint. Examples: "Dark" (He—June); still darkest on disk but had "faded a good deal since June" (He—Aug. 9); "very dark but faded away eastwards" (Wd—Oct. 14). Ph found it very distinct and characteristic in shape, decidedly dark though with lighter patches (Aug.—Oct.). Blue or green tinge noted by Ac, Ax, Bu, Co, He (Aug.—Oct., occasionally). "E. extremity apparently shrouded in cloud or mist" (By—Nov. 21). "Has no beak; it just stops rather indefinitely at its p. end" (Pk—Nov. 21). "Looks as if it had lost its beak" (Ph—Oct. 11).

DETAIL IN *MARE SIRENUM.*

IOS INSULA. A light area inside the middle of f. end of *M. Sirenum*, longer in the E—W direction (Sept.—Nov.; By, Bu, Co, Ell, Ph, Wt). "Very pronounced" (Co—Oct. 12). Large, round in the middle of the Mare (Ph—Sept. 7); inside f. end of Mare (Ph—Oct. 7—16);

CHIMÆRÆ DEPRESSIONES. A dark area round the f. edge of *M. Sirenum* near *Titanum Sinus*, always dark or very dark, when distinguishable from rest of Mare.

Whole f. end of Mare very dark (Ph—early Sept.); very dark round edges at f. end of Mare, light inside (Ph—Oct.); darkest part of Mare (By, Bu—Oct. 11—14); large dark area (Co—Oct. 12); very dark but not clearly distinguishable (Wd—Oct. 16).

CARALIS FONS. (First seen by Phillips at Headley, September 30, 1926. Discovered independently by Lyot at Meudon in November of the same year). Seen in Oct. by Ph as a "dark lake at S edge of *Mare Sirenum*" which he could not quite separate from the Mare on Oct. 14. Also doubtfully by Bu (Nov. 15) as a "dark spot in *Atlantis*", as he drew it near the middle of S. side of *Mare Sirenum.*

SIRENUM SINUS (Aug.—Dec.). Dark or very dark; rarely faintish. Beaked with point as often blunt as sharp; occasionally tapering. (Ax, By, Pg, Wd).

Darker than rest of Mare (Bz, Oct. 11; Co. Oct. 12; Bu, Nov. 19); also very dark Aug. 11 (Fx); Dec. 27 and 30 (Bu).

Hazy to Ph (Aug. 3) but distinct from Sept. 4. Rather faint to Bz, He (Sept.); hazy (Wt—Oct. 21, 23); "ill defined, perhaps veiled by mist or cloud" (By, Oct. 15); "Juts out prominently" (He—Oct. 15).

GORGONUM SINUS (Aug.—Dec.). Distinct to several in Aug., Oct., Dec., but not in Nov.; often indistinguishable or slight to some (Bu, Ell, Fx, Wd). Pointed or rounded.

Slight double bay not very distinct (Wd—Oct. 14, 16); very slight (Ell—Nov. 21); sharp, pointed, dark bay (Bu—Dec. 30; shown by Ph (Sept., Oct.), jutting out very prominently with light promontories on either side.

TITANUM SINUS (Aug.—Dec.). Dark or very dark, seldom moderately. Distinct in all observations (nearly 70). Equally often rounded and pointed; occasionally square.

Noted as prominent several times, by He. "Projects prominently dark and hard"; dark round lake at tip of *Titanum Sinus* separated from Mare by Ph (Oct. 7), but he could not separate it on Oct. 14.

ATLANTIDUM SINUS. Dark or fairly dark rounded or squared bay; thrice appeared pointed. Dark, squarish (Ph).

FUSCA DEPRESSIO. A darker part of Mare, just E. of *Gorgonum Sinus.* Not distinguishable in Ph's drawings.

GIGANTUM SINUS. Small blunt bay E. of *Titanum Sinus,* seen by Ph on Sept. 4.

SIRENUM DEPRESSIO. A dark concentration on SW edge of Mare. Seen by Bu—Oct. 14, and Ph—Oct. 16.

ATLANTIS I (Aug.—Dec.; half the observers). Distinct, but nearly as often shaded as light. Wide, but sometimes very narrow. Open usually at the N end, and often at the S end also.

"A very definite light area dividing *M. Cimmerium* from *M. Sirenum* near E limb and bounded on its N. side by a (narrow, dark) streak . . . very unusual" (Ell—Oct. 3, 5); "shaded, mottled" (Col—Oct. 11, 12); triangular, closed S, almost closed N, light (Ell—Oct. 11); very narrow, shaded (Wd—Oct. 11, 14, 16; Nov. 21).

A dark round spot on mid-*Atlantis* (Bu—Nov. 15).

Atlantis shown wide, light and distinct by Ph (Sept. 7); Oct. 7, 12).

ATLANTIS II and *SYMPLEGADES INSULÆ* (Oct.—Dec.). A peculiarity of this Apparition.

Oct. 5, 7; *Symplegades I* shown as light extension of *Atlantis* just S of *Læstrygonum S.* (Ph).

Oct. 11. A peculiar patchy appearance at p. end of *M. Cimmerium* with two lightish areas running N—S; on triangular (*Atlantis*); to W. of this a narrow oblong (? *Atlantis II*).—Ell.

Oct. 11, 12. *M. Cimmerium* area, and to E of *Læstrygonum S.*, "distinctly mottled with a lot of blurred detail"—Co.

Oct. 12. A light E—W area in p. end of *M. Cimmerium*—By.

Oct. 16. A second very narrow SE to NW lightly shaded streak parallel to *Atlantis* indicates *Atlantis II*—Wd.

Nov. 15. A light strip E of *Læstrygonum S.* (? *Symplegades I.*)—Bu.

Dec. 16. Suspected extra detail on N edge of *M. Cimmerium* (? *Symplegades I.*)—Bu.

UNNAMED DARK SHADING BETWEEN *TITANUM S.*, *LÆSTRYGONUM S.*

(Sept.—Nov.). A peculiarity of this Apparition.

Sept. 2, 4; smudge of shading between *Titanum Sinus*, *Læstrygonum Sinus* (Fx).

Sept. 9; narrow faint streak connecting *Titanum Sinus*, *Læstrygonum Sinus* (Ph).

Oct. 3, 5; dark narrow streak from *Titanum Sinus* almost to *Læstrygonum Sinus* (Ell).

Oct. 4, 7, 12; darkish streak E from *Læstrygonum Sinus* fading about midway to *Titanum Sinus* (Ph).

Oct. 11, 9h; dark narrow streak from bay E of *Læstrygonum Sinus* to *Atlantidum Sinus* (Ell).

9h 15m; rather dark and wide bay jutting E from *Læstrygonum Sinus*, which had a "detached appearance"; the rather narrow light area S of this projection would be *Symplegades Insulæ* (Co—similar view Oct. 12).

9h 50m; triangle of rather dark shading between *Titanum Sinus* and *Læstrygonum Sinus*, but not joining either (Bu).

11h 50m; large, fairly dark oval shading from *Læstrygonum Sinus* eastward, with narrower, fainter streak joining it to *Titanum Sinus* (Bu).

Oct. 12; wide, parallel branch of *M. Cimmerium* to *Titanum Sinus* (Bu).

Nov. 15; wide, rather faint belt of shading from *Titanum Sinus* to *Læstrygonum Sinus*, closing off *Atlantis I* and *Symplegades Insulæ* (Bu).

MARE CIMMERIUM. Before Opposition fairly dark or dark, but sometimes fairly or quite faint; after Opposition rather dark, dark or very dark—never less than medium density. Faintest July—August; darkest (very dark) Dec.—January. Green or blue tinge frequent before but not after Opposition. Several dark rather prominent bays on borders. Oblong shape, but occasionally others, e.g. rhomboid, triangular. Often patchy or streaky. Occasional indications that N edge or NW end was darkest, S edge next, interior less dense.

Mare drawn by Ph rectangular when near E limb, but when central forked at p end, concave to N; and with numerous small projections from edges.

Streaks and patches seen (apart from *Atlantis*, *Symplegades*, etc.).—Dark round patch inside (? *Atlantes Dep.*—Fx, Sept. 4); "darker condensations in Mare" (He—Sept. 7); light E—W streak through middle of p. end (Ph—Sept. 4, and Wt—Sept. 12); light streak inside NE edge (? *Cimmeria Insula*)—(Ell, Oct. 2); light streak inside (By—Oct. 12); light streak W from *Læstrygonum Sinus* through middle (Fx—Oct. 11); darkish patches round *Cyclopum S.* (Ax—Nov. 5); a little patchy at f. end (Ax—Nov. 7); very streaky at p. end (Wd—Nov. 21); light strip N to S just NW of *Scamander*, very patchy (Bu—Dec. 22); very dark, long, narrow, rather patchy with a faint projecting bay between *Læstrygonum Sinus* and *Cyclopum Sinus* (Ph—Oct. 7 and Wd—1942, Jan. 28).

LÆSTRYGONUM SINUS. Dark or moderately dark, rarely at all faint. Sharp pointed, but sometimes rounded, and occasionally squarish.

"Detached appearance" noted by Col on Oct 11, 12; shown by Ph (Sept. 7, Oct. 5, 7, 12) as large, dark, very prominent projection almost detached from Mare, giving p. end a forked appearance.

TRITONIS SINUS. Dark, at times very dark; rarely at all faint. Sharp pointed, occasionally blunt or rounded. Often square end but at times long and tapering.

Shown dark, and square or rounded by Ph.

HESPERIA. Always distinct around and after Opposition—not seen May—June, sometimes vague Aug.—Sept. Lightness variable; before Opposition as often light as shaded, but afterwards more often shaded; occasionally dark. Long and very often wide, but sometimes narrow. Before Op-

position open at N end, and at times at both ends or S only; after Opposition generally closed at the S end, and not often open at the N end either.

"Cut off from *Æthiopis* by a fairly wide dark channel" (Bu—Dec. 16); shown by Ph (Sept. 7—Oct. 12) long, wide, light, sometimes open at both ends, nearly always at N end.

HESPERUS. (Sept.—Jan.; half the observers). Just before Opposition, and in Nov., Jan., often seen closing *Hesperia* to the South. Wide and moderately dark, but variable in width and darkness.

Shown dark and wide by Ph. (Sept. 30—Oct. 5), lacking (Oct. 7), very faint (Oct. 12).

LESSER BAYS IN *MARE CIMMERIUM.*

ARIADNES DEPRESSIO. Usually appeared as dark sharp pointed bay at SE extremity of Mare. Double point (Ell, Oct. 5). Sharp, distinct (Ph—Oct. 7, 12).

SCAMANDRI SINUS. Dark, varying to faint; usually seen sharp but sometimes wide. Sharp, distinct, Ph—Oct. 7—12.

HESPERI SINUS. Intensity variable, sharp or rounded; shown by Ph, Oct. 12.

CERBERI SINUS. Seen three times by Ax, Ell; dark, sharp (Ell): fairly dark, square (Ax).

NE BAY. Dark or fairly dark, sharp point. Seen by several observers.

MEMNONIA. Bright or light, yellowish. Often divided into two bright oval or semicircular areas, *Sirenum Prom.* to the East, *Lumem* to the West.

"Whitish" (Ax—Oct. 14); "setting bright and of a creamy colour" (Wd—Oct. 11); "large, elliptical, bright without detail" (Wd—Oct. 14); slightly reddish (By—Nov. 21); bright yellow patch covering *N. Memnonia* on the limb (Bu—Dec. 22). Only very slightly indicated by Ph as small roundish light areas on either side of *Gorgonum S.*

ZEPHYRIA. Large, light, roundish. Bright red (He—Sept.). Yellow (Bu—Nov.). Varying, bright or faintly shaded (Ph).

LÆSTRYGON. (Aug.—Jan.).; several observers). Prominent most of the Apparition. Moderately faint, though at times darkish. Narrow, but quite often moderately wide, sometimes widening northward fanwise. At times long.

Unusual view; very wide, tapering to a point at the N, rather short (Wd—1942 Jan. 28). Not shown by Ph early Sept., but shown twice early Oct. as faint streak to *Trivium.*

ÆOLIS. Several times recorded as notably bright, especially by Fx. Red (He—Aug.) *N Æolis* faintly shaded (Ph).

ÆTHIOPES. Generally bright, but a few times slightly shaded; (e.g. Ph, Oct. 7).

NODUS GORDII. Seen as fairly dark knot at junction of *Eumenides* and *Sirenius* (Bu, Wd, Wk). Only a few times.

AMAZONIS. Seen by Ph and majority of observers as area of widespread faint shading; sometimes N part only shaded. Shading seen more often after Opposition (Oct.—Nov.), but seemed lighter in December, and patchy.

Shading dark, very wide in E and *N Amazonis*) Cl—Aug. 31); shading seen for first time by By on Nov. 21; shading only on *N Amazonis* and not so dark as *Mesogæa* (Wd—Nov. 21); *Amazonis* shading covered nearly one-third of disk (Ell—Nov. 21); bright yellow patch covering most of *Amazonis* on limb (Bu—Dec. 22); lightish (Bu—Dec. 27); lightish crossed by light grey streaks (Bu—Dec. 30).

MESOGÆA. Wide shaded area, faint to moderately dark; sometimes appeared triangular.

DETAIL IN *AMAZONIS—MESOGÆA* REGION.

SIRENIUS. Distinct, but not very dark—several observers. Dark streak inside (Ax—Oct. 11); W edge dark (Wd—Oct. 16).

GORGON. Seen by most observers. Faint, long and narrow, though it occasionally appeared short and woide.

GIGAS. Distinguished occasionally by several members, fairly dark, long and narrow, or as edge of shaded area.

TARTARUS. Medium width and darkness. Often near W border of *Mesogæa* shading. Long, narrow, distinct, not very dark (Ph).

TITAN. Distinct, though at times faint, narrow or fairly wide, sometimes border of *Mesogæa* shading.

PYRIPHLEGETHON. (Sept.—Dec.: Ax, Bz, Bu, Ell, Wd). Rather faint, long, varying from wide to narrow. Seen as NE edge of *Amazonis* shading, or as wide, fairly dark belt crossing fainter shading of *Amazonis* (Ell, Wd). Seen by Wd (Oct. 16) forming a triangle with *Lycus* and *Phlegethon*—rather faint and narrow, but distinct.

EUMENIDES. Not very dark; generally seen as S border of *Amazonis* shading. (Several observers).

ORCUS. With the preceding makes a long shading reaching from *Nodus Gordii* to *Trivium Charontis.* Seen a few times by several observers; probably S edge of *Amazonis* or N edge of *Mesogæa* shading. Diffuse streaks with condensation (Ph—Oct. 7 only).

PHRYGIUS LACUS. Moderately dark patch or knot on *Eumenides,* at or near junction with *Gorgon.*

AMMONII FONS. Not very dark condensation or knot on *Eumenides* near junction with *Titan* or *Gorgon.*

HIBES FONS. Faint condensation in *Orcus* between *Ammonii Fons* and *Trivium.* (Ph—Oct. 7).

ELYSIUM (Ax, Ell, He, Ph, Wd). Light and on the whole rounded, but sometimes seemed triangular. Not very conspicuous. N and NW borders rather harder to see than those on S and E sides.

Twice seen shaded (He—June); red (He—Sept. 7); rounded, lighter in E part (Ph—Oct.).

GALAXIAS. A faint streak of shading from *Pambotis Lacus,* crossing *Elysium* from S to N (Ph—Oct. 5 only).

TRIVIUM CHARONTIS. Small, round or oval, moderately dark, but occasionally faint.

"Prominent" (He—Sept. 7); "fanshaped shading at N end of *Læstrygon* (Ax—Aug. 31); "diffuse smudge inside N limb (Fx—Sept. 2); wide, dark, very prominent, diffuse by N limb (Fx—Sept. 4, 6); "rather faint but certainly seen" (Ph—Sept. 4); diffuse (Ph—Sept. 7, Oct. 5); small, rather dark (Ph—Oct. 2), "dark", small, round (Ph—Oct. 7, 12); "quite dark but rather small" (Pk—Oct. 6); dark, rather small, oval, green (Ell—Oct. 11); "occasionally glimpsed" (He—Dec. 18); "large, conspicuous grey oval" (Wd—1942 Jan. 28).

CERBERUS. Fairly prominent, but not as dark as usual and only moderately wide. Fairly dark to Ell on Oct. 3, not so dark and narrower on Oct. 5. "Rather faint but certainly seen" (Ph—Sept. 4). Perhaps fainter after Opposition.

CYCLOPS. Distinct, though rather faint, narrow, sometimes described as very narrow.

CYCLOPUM SINUS. Dark, rarely medium, hardly ever faint. Shape variable—often large with sharp or rounded, sometimes square, point.

Dark E—W wedge shown by Ph separated (Oct. 5, 7) by narrow lighter streak from Mare.

ADAMAS (or *TRITON*). (Aug.—Nov.; Ax, Bu, Ell, Pk, Wd). Moderately faint, at times darker; more often fairly wide than narrow. Sometimes long and tapering. Ax, Ell, Wd, Ph several times traced this marking to *Nubis Lacus*; hence more likely *Adamas*, as *Triton* should join *Nepenthes—Thoth* farther south. A prominent feature.

PAMBOTIS LACUS. (Seen a few times in Oct. by Ell, Ph.) A very small faint knot at junction of *Cyclops* with *Cerberus.*

Shown distinctly by Ph; by Ell (Oct. 11) as an irregular patch of shading near S end of *Cerberus.*

ÆTHIOPIS. Usually light, but a few times seen slightly shaded (e.g. Ph, Oct. 1, 2).

ÆTHIOPS. Seen by Ph; long, faintish canal running N from *Tritonis Sinus* between *Adamas* and *Hyblæus.*

ANTÆUS. Faint narrow canal seen by Ax, By, Ell, Ph on a few occasions. Extending from *Læstrygonum Sinus* to *Pambotis Lacus* (Ph—Oct. 7).

MARSAGUS. A short faint streak near N limb, joining N ends of *Æthiops* and *Hyblæus*—Ph.

EUNOSTOS. Rather faint and narrow.

HYBLÆUS. Rather faint and narrow (Ax, Ph); seen as border of *Æthiopis* shading (Ell—Oct. 5).

CHAOS. Seen by Ax, Ell in Oct.; moderately faint, wide and diffuse but rather dark to Ell, Oct. 3.

STYX. Wide, but not very dark. (Ell, Ph).

PHLEGRA. Faint wide shading, joining Propontis to Trivium.

PROPONTIS. (Aug.—Dec.; Ax, Bu, Fx, Wd, Wt). Faint on the whole, rather near N or NW limb; large or wide shading. Seen mainly after Opposition, only thrice before (early August).

Wide triangle of shading with dark small spot on SW edge (Wt—Aug. 7); small knot on NNW limb, fairly dark (Bu—Dec. 27).

AZANIA. Seen only by Col, Sept. 6, as large bright area on NNW limb.

EREBUS. Seen only by Ph, Oct. 7. Faint diffuse streak near N limb, parallel to *Orcus.*

EUXINUS LACUS. Seen only by Bu, Dec. 30, as small, round, fairly dark patch near N. limb.

LYCUS. Seen by Ph and Wd (three times in mid-Oct.). Wide streak running N—S to the E. of *Amazonis* (Wd), NE edge of *Amazonis* shading (Ph).

PHLEGETHON. Rather faint, long streak running E—W in *Amazonis.* Shown by Ph. as N edge of *Amazonis* shading. Seen three times.

SOUTH POLAR REGION.

The South Polar Cap and Surroundings.

1. THE *SOUTH POLAR BAND* AND *RIMA AUSTRALIS.*

SOUTH OF REGION I. The part of the Band below (just N of) the Cap in this Region would probably be *Depressio Magna* and Western *Rima Australis.* Band decidedly dark except in late June.

["decided, dark" (June 8—He); fainter (Jun. 16—24: He); dark (He, Aug. 26, 27); "a very dark grey patch close to E and N of Cap darker than anything else on Mars except possibly *Sinus Sabaeus*" (Ax, Sept. 21, 22, 23); dark rim (Sept. 18,

22, 27, 30; Oct. 3, 6; Wk, Fx); very dark rim (Fx, Oct. 30); dark rim (Hs, Bu—Nov. 2, 7). Dark and fairly wide, but very dark (Sept. 24), *Rima Australis* very narrow (Oct. 1)—Ph.]

SOUTH OF REGION II. The E. part of the Band below the Cap would correspond to *Rima Augusta*. Dark decided ring, at times side, seen early June, early July, mid August, mid Sept., mid and late Oct. (Ell, He, Fx, Wk). *Rima Angusta* part of Band dark, variable in width (Sept. 17, 20; Oct. 21), indenting Polar Cap (Sept. 17)—Ph.

SOUTH OF REGION III. (*a*) S. of *Thyle I* in the *Depressio Parva* area: Darkness of Band, and width intermittent—narrow at times in Aug., Sept., not always really dark in October (Cl, Ell, Fx, He, Wk). Dark band of shading with small dark knot (probably *Depressio Parva*) seen by Ell (Nov. 21). Dark, varying from narrow to wide, indenting Polar Cap Sept. 7—(Ph—Aug. 3, Sept. 7, Oct. 7, 16). (*b*) S. of *Thyle II*, corresponding to Eastern *Rima Australis*. Band dark, but rather slight in late June and only moderately dark Oct. 2, 3 (He, Ell; at times narrow or only fairly wide. Narrow dark streak some distance from Cap (may have been *Rima Australis*) seen by Wd (Oct. 11). Band wide and dark (Ph—Sept. 7).

2. BRIGHTNESS AND COLOUR OF THE CAP.

May 4, 12 dull; 16, 17 "glistening white" (He).

June 8, 13 "bright white"; 16, 20 "outer edges yellowish"; 22, 24, 28 "yellowish (He).

July 5, 20, 27 brighter but rather yellowish (He).

August 9—16 "bright yellowish"; 26-30 "yellowish, not very bright"; 31 rather bright, white (He). To Cp, Fx, Clk it was bright and white in mid August. Aug. 12 noted by He to be melting rapidly.

September. Throughout the month many observers, including He, saw the Cap "brilliant white and glistening".

October 1—11. Cap generally appeared to several observers dull, very small, faint and difficult to see.

14—28. (Just after Opposition) bright or brilliant to all, very small but distinct.

Of the three Regions, it was over Region II (10°—130°) that the Cap appeared most consistently bright, and this was during the periods Sept. 7—21, Oct. 14—26.

["Well defined in early September and greatly declined in October" (Wk)].

November. Difficult to see because of small size. Described as "very small whitish glow", "minute patch of whiteness" (He); some failed to detect it in several observations. Region I was in view in early November, and later Region III.

December 3 "extremely minute, less white than Hellas" (Ax). 16 "very dull, hardly seen" (Bu).

These were of Region I; the Cap was not definitely seen (in Regions II, III) by anyone after Dec. 16.

["Cap diminished gradually in size and between December 16 and 18 disappeared altogether, and was not seen again until 1942 Jan. 17, and this may have been only a transient patch of snow or frost" (Bu)].

3. SHRINKAGE OF THE CAP.

A series of estimates of size of the Cap by He gives 50° for May and early June; 45° early July; decline from 30° to about 10° during August; variation between 10° and 15° during September; only 5° to 7° throughout October; not more than 4° on November 3, and thence till November 14 exceedingly small or "a mere glow". The Cap is not mentioned by He on Nov. 21 or in December.

From the estimates of He and others, together with measures of the angle subtended by the Cap at the centre of the disk (allowing for cases where the Cap was drawn wholly inside the limb) made on the sketches of all observers, the regular shrinkage of the Cap has been confirmed, though the rate of shrinkage was found to be much greater in May to early August, in early to mid September, and in early to mid December than at other times. A regular curve was obtained by taking the means of all measures and estimates over 10-day periods.

Period	No. of Measures and Estimates	Highest	Lowest	Mean
		°	°	°
Aug. 1—10	9	30	15	22
11—20	6	23	13	19
21—31	11	29	13	18
Sept. 1—10	14	30	10	16
[Summer Solstice, Southern hemisphere, Sept. 10]				
11—20	35	30	7	13
21—30	46	19	6	11½
Oct. 1—10	27	16	5	11
11—20	55	20	3	9½
21—31	66	20	3	10
Nov. 1—10	29	15	2	8
11—20	5	10	2	8
21—30	8	12	2½	8+
Dec. 1—10	4	11	2	7

A more detailed examination of the figures reveals slight minima at the following periods:—

Sept. 18—20: 9½° followed by rise to 12°–
Oct. 15—16: 8° ,, ,, ,, 11°
Oct. 21: 7½° ,, ,, ,, 10°
Nov. 3—5: 5° ,, ,, ,, 8°

At all these four periods the same side of the globe was in view (*Margaritifer S., Solis L., Auroræ S., Syrtis Major* respectively), and the diminution of the angle subtended probably means that in these aspects the Cap appeared narrower from East to West, while on Oct. 21 two observers (Ax, Bz) noted an extension of the Cap northward, and on the same date Ph noted: "S.P. Cap does not appear to be diminishing. Is it slightly increasing again ?"

4. SHAPE OF THE CAP (see Plate I).

Owing to its shrinkage and to the pronounced tilt of the South Pole towards the Earth, the Cap was often seen entirely within the limb by many observers Sept. 16—Dec. 3. It usually appeared elliptical in shape but often circular when very small in October and November. The following irregularities were noted:—

Summer Solstice Presentation.

It often seemed to project over the limb in August, September (Ax, Cp, Fx, He).

ω 52°: indentation in mid front of Cap shown (Ph—Sept. 17).
ω 60°: "Cap rather elongated, perhaps a little irregular" (He—Sept. 15).
ω 154½°: "Cap eccentrically placed towards other side of globe" (Ph—Sept.4).
ω 178°: "There is a clearly marked indentation of the Polar Cap" (Ph—Sept.7)

Opposition Presentation.

ω 60°: "White patch adjoining NW portion of Cap", λ about 90° (Bz—Oct. 21).
ω 65°: "white patch adjoining NW of Cap", λ about 140° (Bz—Oct. 23).
ω 80°: "Cap like figure 8 with N extension", λ about 80° (Ax—Oct. 21).
ω 114°: "triangular extension to N from front of Cap" (Ax—Oct. 14).—
ω 136°:
ω 159½°: } "Cap long E—W, narrow" (Ax—Oct. 11).
ω 173°:
ω 281° "Cap very narrow, shape irregular with concavity to W of centre", λ about 290° (Ax—Sept. 29).
ω 285°: "Cap narrow" (Wt—Sept. 27).

By measuring the distance from S limb to mid front of Cap on all drawings, taking means for 20° sections of longitude (or 40° or 60° where observations were few), and deducting mean distance from S limb to S Pole (calculated from tilt of S Pole at the various dates), it has been possible to trace the approximate limit of the S Polar Cap for three epochs: Summer Solstice Presentation (mid August—late September), Opposition Presentation (late September —early November), Post-Opposition Presentation (early November—mid December). The resulting diagram, though perhaps somewhat exaggerating the irregularities in the contour of the Cap, clearly demonstrates three things:—

(1) The pronounced shrinkage of the Cap between August and November.

(2) The actuality of nearly all the irregularities noted by observers and listed above [e.g. those seen by Ph, Ax, Bz].

(3) The eccentricity of the Cap. Around Opposition the true centre of the Cap appears to have been situated about Lat. −86°, Long. 310°; in the next Presentation about Lat. −88°, Long. 300°.

SOME GENERAL CONCLUSIONS.

1. Brightness on the Northern Limb.

A brightness on the Northern, and sometimes on the N following limb was frequently observed during the apparition especially by Heath, but also by Messrs. Burrell, Ellison, Fox, Phillips and Wildey. It was least evident in Sept., Nov. Generally described a moderately bright or dull whiteness or slightly yellowish, misty, gradually diffusing away, with no clearly defined edge. May suggest heavy cloud rather than southward extension of N. Polar snows.

Owing to foreshortening and the tilt of the N Polar Cap away from the Earth it is hard to say whether the brightness was in the districts named below or in those just North of them.

It appears that throughout the Apparition the brightness was seen:—

1. Most regularly in *Tempe* (Jun.—Jan.), *Arcadia* (July—Dec.) [longitudes 40°—160°], [N limb whitish here to Ph (Oct. 14)].
2. Fairly regularly in *Diacria* (Jun.—Dec.) [longitudes 160—190°°].
3. Intermittently in *Cydonia* (June, July, Oct.) [longitudes 330°—20°]. [N. limb whitish in *Chdonia* area to Ph (Sept. 24)].
4. Only in the *early* part of the Apparition, (May—early Sept.) in *Umbra, Dioscuria, Ætheria, Cebrenia* [longitudes 190°—330°].

2. Occasional Pallor of the Maria.

During most of August and about Nov. 25, the darker markings seem to have been partially obscured by widespread thin cloud or mist on Mars. Most of the observations were by Heath.

> ["the markings seem to be breaking up into lighter areas between the Maria and the S Polar Cap" (He.—Aug 4;) "M. Sirenum darkest marking on disk but it has faded a good deal" (He—Aug. 9); S Polar Cap bright yellowish; "all markings very faint, even *M. Sirenum* fainter than on 9th. They appear dim as if overlaid with yellowish haze" (He—Aug. 12).
>
> Faintness of markings also noted by He on Aug. 16, 22 (*S. Sabæus, M. Erythræum* area); Aug. 26, 27, (*Syrtis Major* area); but by August 30, *M. Cimmerium, M. Tyrrhenium* fairly dark.
>
> "Extreme pallor of the markings round, and specially East of, *Solis Lacus* . . . possibly a large cloud extending (from SE limb) over the *Solis* region" (Ell, Nov. 25.)]

3. Determinations of Longitude by Rev. T. E. R. Phillips.

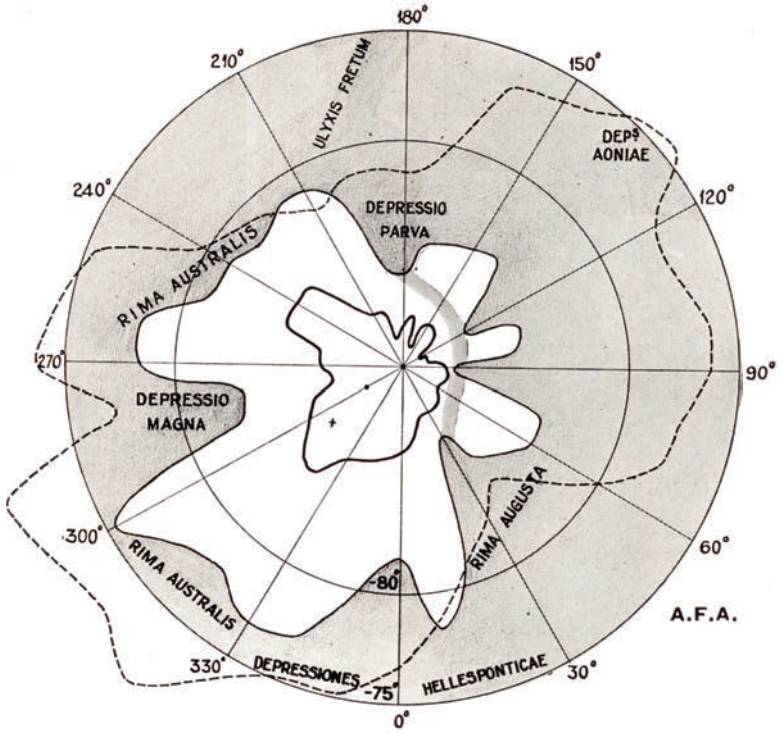
Longitudes of points on the disk determined by estimates of the time of transit over the central meridian.

Feature	Date (1941)	λ
Melas Lacus	Oct. 21	71°
Solis Lacus	,, 21	87°
Lake at S. edge of *M. Sirenum* (*Caralis Fons*)	,, 12	160°
Laestrygonum Sinus	,, 12	196°

4. Characteristics of the Apparition.

1. Dark depressions in the S Polar and S Temperate zones.
2. Darkness and prominence of the Maria of the S Temperate zone, e.g. *M. Oceanidum, Bosporus Gemmatus, Aonius S., Palinuri Fr., M. Chronium, Tiphys Fr.*
3. Brightness and distinctness of the large Southern islands:—*Phaethontis, Electris, Eridania, Ausonia, Hellas.*
4. Darkness and prominence of the straits dividing these islands, especially *Scamander, Xanthus, M. Hadriacum.*
5. Northward shift of the lighter part of *Ausonia.*
6. Prominence of *Hesperia.*
7. Unusual appearance of *Syrtis Minor.*
8. Continuing faintness and narrowness of *Nepenthes-Thoth.*
9. Darkening and lengthening of *Syrtis Major.*
10. Unusual extent of light areas in *Hammonis Cornu* neighbourhood.
11. Shortness of prongs of *Furca.*
12. Extreme indistinctness and incompleteness of *Pandoræ Fretum.*
13. Unusual bright area stretching from *Argyre* through *W Noachis* to *Deucalionis R.*
14. Unusual lightness of *Ogygis R.* and *Phrixi R.*
15. Prominence of *Melas L.*
16. Comparative smallness and faintness of *Solis L.*
17. Band of shading connecting *Lunæ L.* through *Uranius, Ascræus L., Iris* to *Araxes.*
18. Dark bays, streaks and patches in *M. Sirenum.*
19. Brightness of *Memnonia.*
20. Widespread shading and dark streaks and knots in *Amazonis* and *Mesogæa.*
21. Very unusual configuration of *Atlantis* area with band of shading from *Titanum S.* to *Læstrygonum S.*
22. Prominences of *Atlantis.*
23. Prominent dark bays, streaks and patches in *M. Cimmerium.*
24. Prominence of *Læstrygon* and *Adamas.*
25. Pallor of the Maria in August and about November 25.
26. Frequent misty brightness on the North limb.
27. Shrinkage and disappearance of South Polar Cap, darkness and prominence of band and "depressions" at the edge, irregularity of shape of Cap and eccentricity of its position.

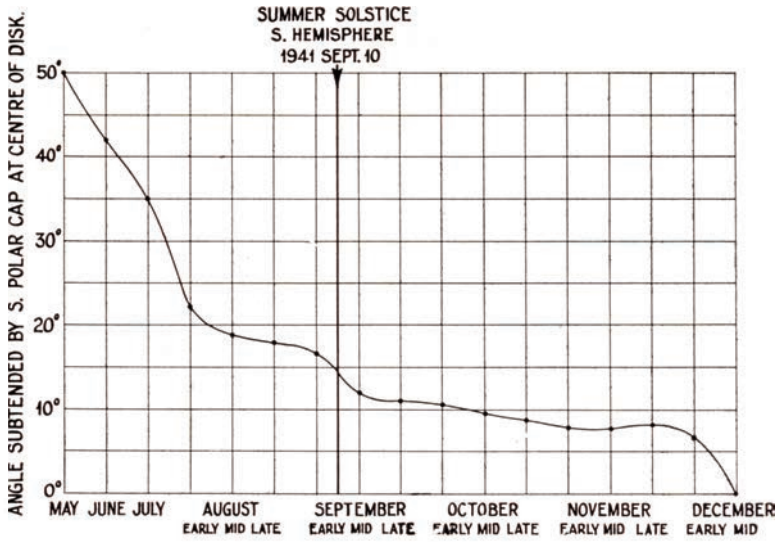
Plate I



SOUTH POLAR CAP OF MARS (AFTER OBSERVATIONS OF MEMBERS OF THE SECTION)

Approximate limit of Cap { Summer Solstice (mid-August to late September) - - - - -
Opposition presentation (late September to early November) ————
Post-Opposition presentation (early November to mid-December) ▬▬

Approximate centre of Cap { Opposition presentation × (Lat.,–86°; Long. 310°).
Post-Opposition presentation • (Lat.,–88°; Long. 300°).



PROGRESSIVE SHRINKING OF S. POLAR CAP DURING MARTIAN SPRING AND SUMMER (SOUTHERN HEMISPERE), as observed at 1941 apparition. (*Note*: Curve before August is based on fewer observations also slope of curve is exaggerated by shorter time scale.)

Plate II

A

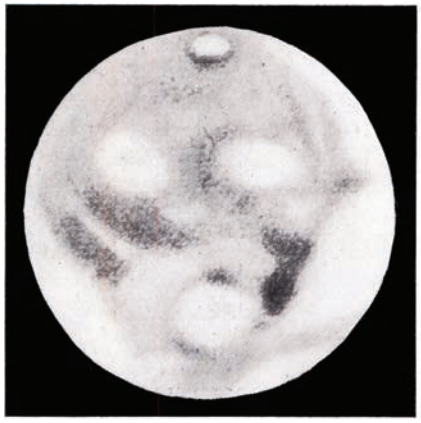
♌ 250°—310°

Nov. 8 $\omega = 260°$ $\phi = -23°{\cdot}1$
B. BURRELL $8\frac{1}{2}$-in. Spec.

Oct. 1 ω $\phi = 266° = -19°{\cdot}3$
T. E. R. PHILLIPS 8-in. O.G.

Oct. 2 $\omega = 271°$ $\phi = -19°{\cdot}4$
H. WILDEY $12\frac{1}{2}$-in. Spec.

Sept. 30 $\omega = 274°$ $\phi = -19°{\cdot}2$
M. A. ELLISON 6-in. O.G.



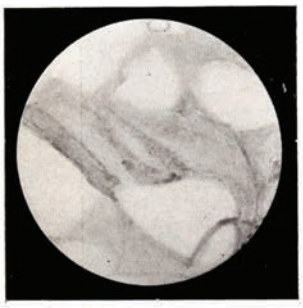
Oct 1. $\omega = 280°$ $\phi = -19°{\cdot}3$
T. E. R. PHILLIPS 8-in. O G.

Oct. 6 $\omega = 280°$ $\phi = -19°{\cdot}9$
F. J. HARGREAVES $14\frac{1}{4}$-in. Spec.

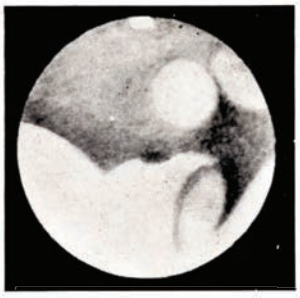
Plate III

A

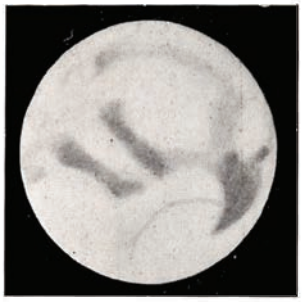
♌ 250°—310°



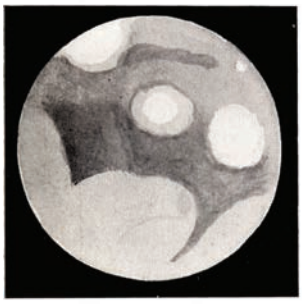
Oct. 16 $\omega = 252°$ $\phi = -20°{\cdot}9$
T. R. CAVE 10-in. Spec.



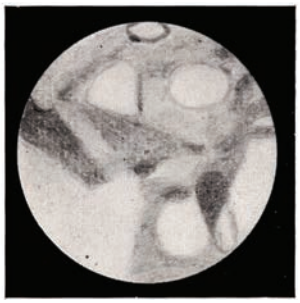
Sept. 30 ω 260° $\phi = -19°{\cdot}2$
W. B. HOUSMAN 5-in. O.G.



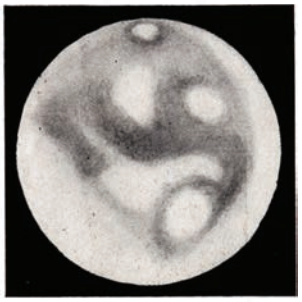
Nov. 8 $\omega = 260°$ $\phi = -23°{\cdot}1$
W. H. WHITTOME 8½-in. Spec.



Nov. 7 $\omega = 260°$ $\phi = -23°{\cdot}1$
J. R. BAZIN 6-in. O.G.

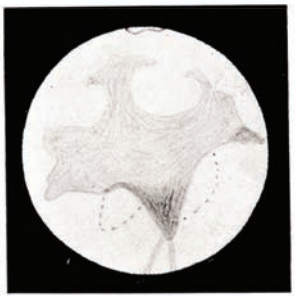


Oct. 1 $\omega = 264°$ $\phi = -19°{\cdot}3$
B. BURRELL 8½-in. Spec.



Spet 30 $\omega = 267°$ $\phi = -19°{\cdot}1$
T. E. R. PHILLIPS 8-in. O.G.

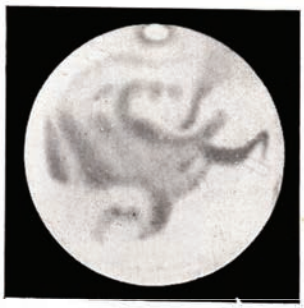
Oct. 3 $\omega = 270°$ $\phi = -19°{\cdot}5$
H. P. WILKINS 6½-in. Spec.



Sept. 29 $\omega = 281°$ $\phi = -19°{\cdot}1$
A. F. ALEXANDER 3-in. O.G.

Nov. 7 $\omega = 289°$ $\phi = -23°{\cdot}0$
H. WILDEY 12½-in. Spec.

Oct. 1 $\omega = 291°$ $\phi = -19°{\cdot}3$
B. BURRELL 8½-in. Spec.



Oct. 2 $\omega = 294°$ $\phi = -19°{\cdot}4$
F. J. HARGREAVES 14¼-in. Spec.

Sept. 26 $\omega = 295°$ $\phi = -18°{\cdot}9$
E. H. COLLINSON 10-in. Spec.

Plate IV

B

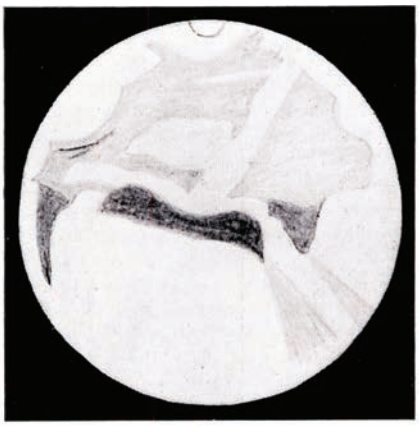
♌ 310°—10°

Nov. 4 $\omega = 313°$ $\phi = -22°{\cdot}8$
M. A. ELLISON 6-in. O.G.

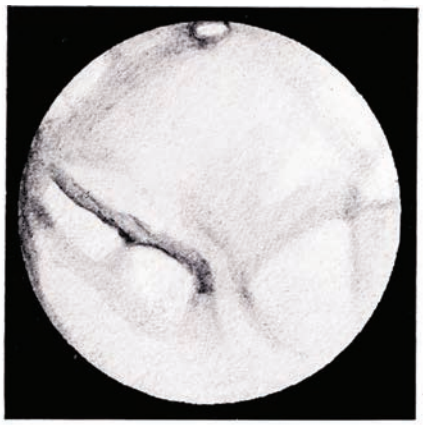
Oct. 3 $\omega = 324°$ $\phi = -19°{\cdot}3$
T. E. R. PHILLIPS 8-in. O.G.

Sept. 29 $\omega = 333°$ $\phi = 19°{\cdot}2$
F. J. HARGREAVES $14\frac{1}{2}$-in. Spec.

Sept. 24 $\omega = 335°$ $\phi = -18°{\cdot}7$
T. E. R. PHILLIPS 8-in. O.G.



Oct. 28 $\omega = 348°$ $\phi = -22°{\cdot}2$
A. F. ALEXANDER 6-in. O.G.

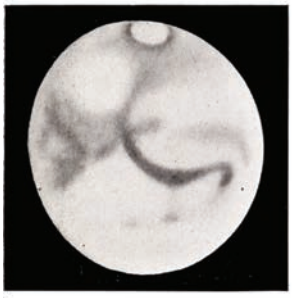


Oct. 30 $\omega = 2°$ $\phi = -19°{\cdot}2$
W. E. FOX $6\frac{1}{2}$-in. Spec.

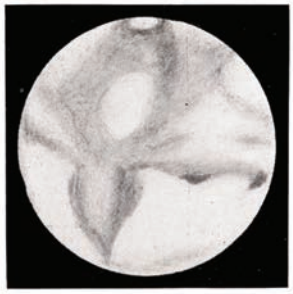
Plate V

B

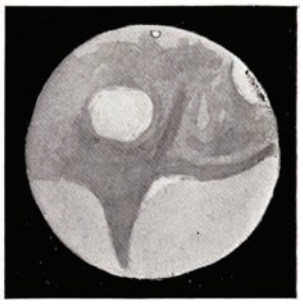
♌ 310°—10°



Aug. 25 $\omega = 301°$ $\phi = -18°{\cdot}0$
F. J. Hargreaves $14\frac{1}{2}$-in. Spec.

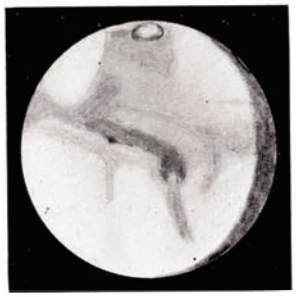


Sept. 27 $\omega = 315°$ $\phi = -19°{\cdot}0$
W. E. Fox $6\frac{1}{2}$-in. Spec.



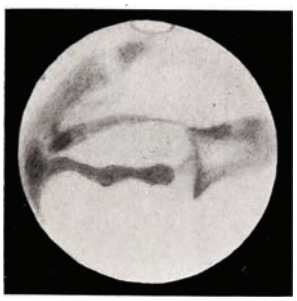
Oct. 2 $\omega = 319°$ $\phi = -23°{\cdot}4$
J. R. Bazin 6-in. O.G.

Oct. 6 $\omega = 330°$ $\phi = -20°{\cdot}0$
R. T. Cave 10-in. Spec.

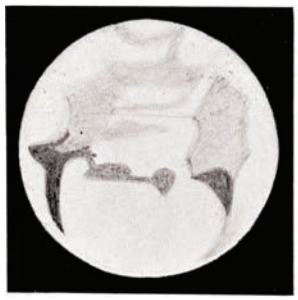


Dec. 1 $\omega = 350°$ $\phi = -24°{\cdot}5$
B. Burrell $8\frac{1}{2}$-in. Spec.

Sept. 26 $\omega = 354$ $\phi = -18°{\cdot}8$
R. L. T. Clarkson $6\frac{1}{2}$-in. Spec.

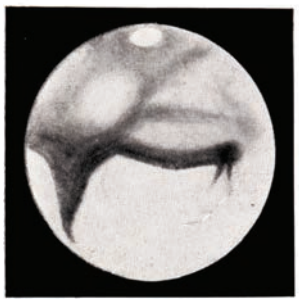


Oct. 30 $\omega = 2°$ $\phi = -22°{\cdot}5$
R. H. Whittome $8\frac{1}{2}$-in. Spec.



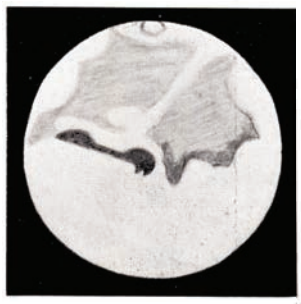
Oct. 28 $\omega = 340°$ $\phi = -22°{\cdot}8$
A. F. Alexander 6-in. O.G.

Nov. 8 $\omega = 0°$ $\phi = -23°{\cdot}2$
R. T. Cave 10-in. Spec.



Oct. 30 $\omega = 2°$ $\phi = -22°{\cdot}5$
H. Wildey $12\frac{1}{2}$-in. Spec.

Sept. 23 $\omega = 331°$ $\phi = -18°{\cdot}5$
J. R. Bazin 6-in. O.G.

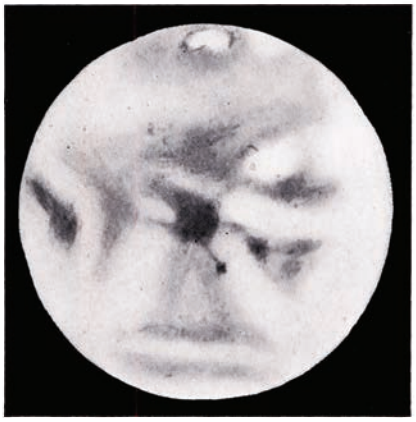


Oct. 28 $\omega = 4°$ $\phi = -22°{\cdot}3$
A. F. Alexander 6-in. O.G.

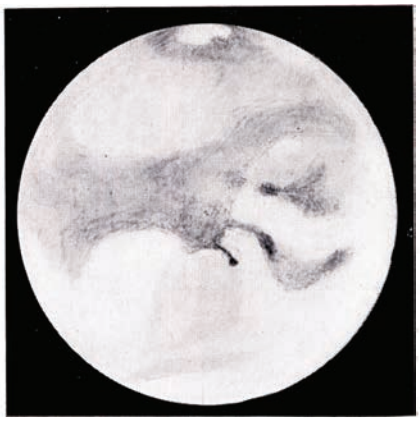
Plate VI

C

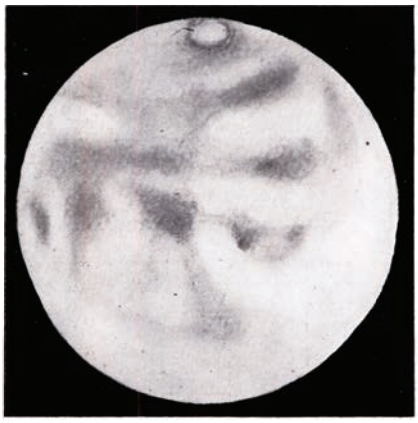
♌ 10°—70°



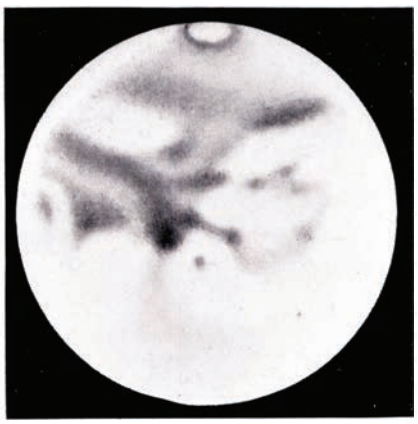
Sept. 17 $\omega = 52°$ $\phi = -18°{\cdot}2$
T. E. R. Phillips 18-in. Spec.



Sept. 16 $\omega = 55°$ $\phi = -18°{\cdot}1$
P. M. Ryves 8-in. O.G.

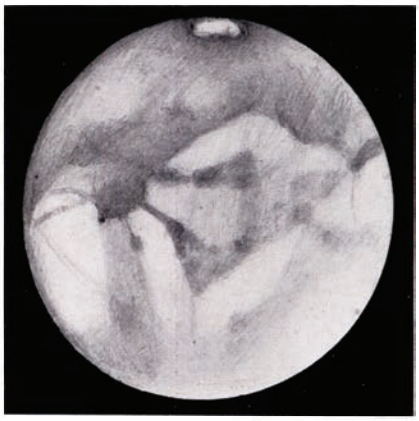


Oct. 23 $\omega = 57°$ $\phi = -21°{\cdot}8$
T. E. R. Phillips 8-in. O.G.



Oct. 21 $\omega = 58°$ $\phi = -22°{\cdot}6$
F. J. Hargreaves $14\frac{1}{2}$-in. Spec.

Oct. 21 $\omega = 70°$ $\phi = -21°{\cdot}6$
B. Burrell $8\frac{1}{2}$-in. Spec.



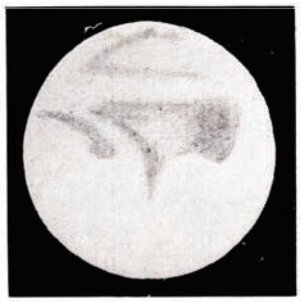
Sept. 18 $\omega = 80°$ $\phi = -18°{\cdot}2$
C. F. M. Du Martheray $5\frac{1}{2}$-in. O.G.

Plate VII

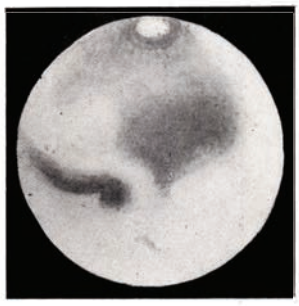
C

♌ 10°—70°

Oct. 28 $\omega = 16°$ $\phi = -22°{\cdot}2$
H. WILDEY $12\frac{1}{2}$-in. Spec.



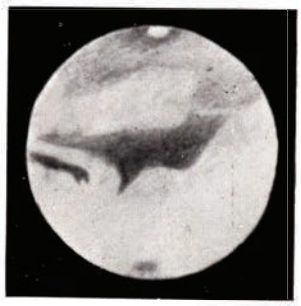
Sept. 18 $\omega = 16°$ $\phi = -18°{\cdot}2$
M. B. B. HEATH $10\frac{1}{4}$-in. Spec.



Sept. 20 $\omega = 18°$ $\phi = -18°{\cdot}4$
T. E. R. PHILLIPS 4-in. O.G.

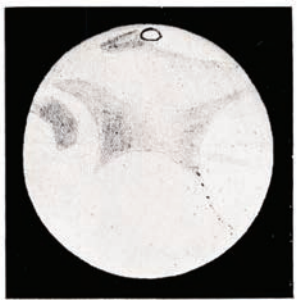
Aug. 16 $\omega = 20°$ $\phi = -18°{\cdot}6$
W. E. FOX 6-in. Spec.

Dec. 1 $\omega = 25°$ $\phi = -24°{\cdot}0$
B. BURRELL $8\frac{1}{2}$-in. Spec.



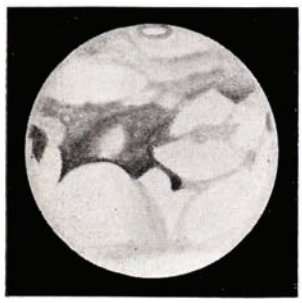
Oct. 29 $\omega = 32°$ $\phi = -22°{\cdot}3$
W. B. HOUSMAN 5-in. O.G.

Oct. 26 $\omega = 34°$ $\phi = -22°{\cdot}1$
D. P. BAYLEY 5-in. O.G.

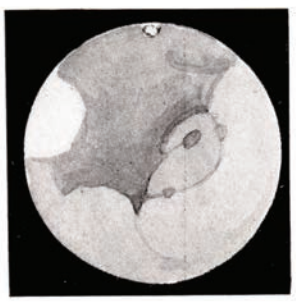


Oct. 26 $\omega = 37°$ $\phi = -22°{\cdot}1$
E. H. COLLINSON 10-in. Spec.

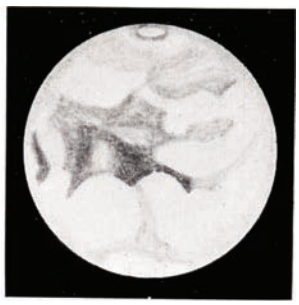
Sept. 18 $\omega = 50°$ $\phi = -18°{\cdot}2$
A. F. ALEXANDER 6-in. O.G.



Oct. 23 $\omega = 57°$ $\phi = -21°{\cdot}8$
M. A. ELLISON 6-in. O.G.



Oct. 21 $\omega = 65°$ $\phi = -21°{\cdot}4$
J. R. BAZIN 6-in. O.G.



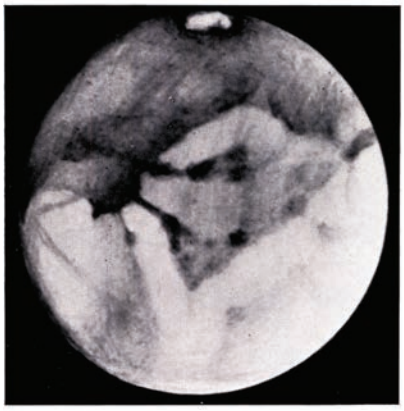
Oct. 21 $\omega = 69°$ $\phi = 21°{\cdot}6$
M. A. ELLISON 6-in. O.G.

Plate VIII

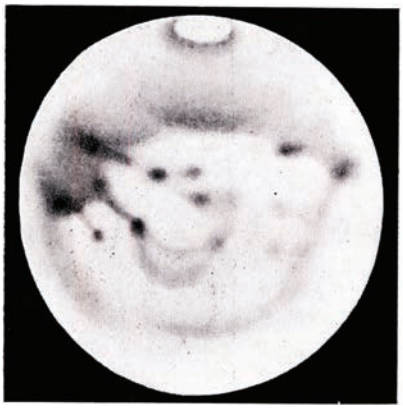
D

♌ 70°—130°

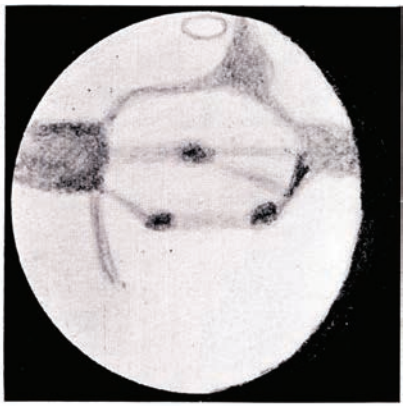
Oct. 21 $\omega = 82°$ $\phi = -21°{\cdot}6$
B. M. PEEK $12\frac{1}{2}$-in. Spec.



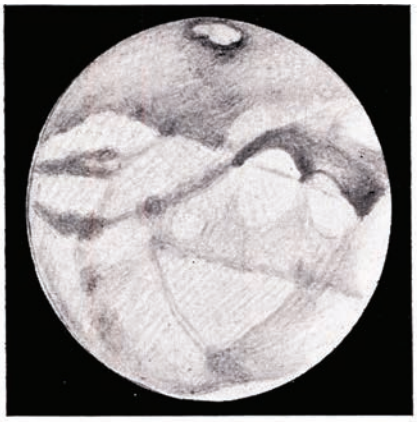
Sept. 17 $\omega = 87°$ $\phi = -18°{\cdot}2$
M. DU MARTHERAY $5\frac{1}{2}$-in. O.G.



Sept. 17 $\omega = 77°$ $\phi = -18°{\cdot}2$
F. J. HARGREAVES $14\frac{1}{2}$-in. Spec.



Nov. 25 $\omega = 90°$ $\phi = -23°{\cdot}9$
B. BURRELL $8\frac{1}{2}$-in. Spec.



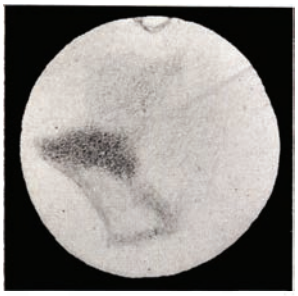
Sept. 13 $\omega = 113°$ $\phi = -18°{\cdot}1$
C. F. M. DUMARTHERAY $5\frac{1}{2}$-in. O.G.

Oct. 16 $\omega = 119°$ $\phi = -21°{\cdot}0$
M. A. ELLISON 6-in. O.G.

Plate IX

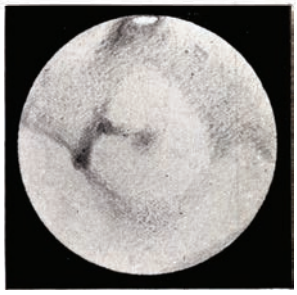
D

Ω 70°—130°



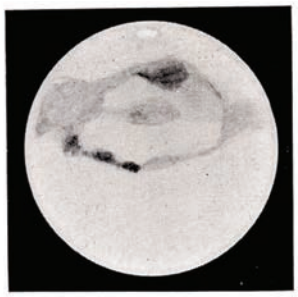
Oct. 20 $\omega = 73°$ $\phi = -21°.5$
R. L. J. CLARKSON $6\frac{1}{2}$-in. Spec.

Oct. 21 $\omega = 75°$ $\phi = -21°.5$
H. WILDEY $12\frac{1}{2}$-in. Spec.

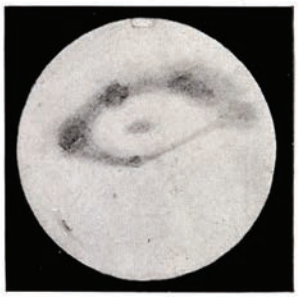


Oct. 20 $\omega = 87°$ $\phi = -21°.5$
W. E. FOX $6\frac{1}{2}$-in. Spec.

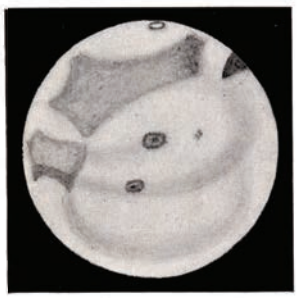
Oct. 21 $\omega = 83°$ $\phi = -21°.5$
M. B. B. HEATH $10\frac{1}{4}$-in. Spec.



Oct. 22 $\omega = 85°$ $\phi = -21°.7$
B. BURRELL $8\frac{1}{2}$-in. Spec.

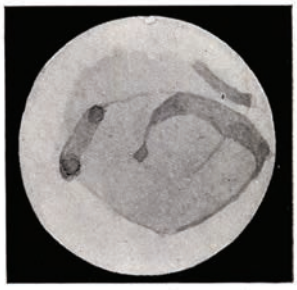


Oct. 23 $\omega = 86°$ $\phi = -21°.8$
R. H. WHITTOME $8\frac{1}{2}$-in. Spec.

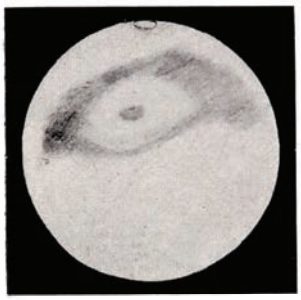


Oct. 21 $\omega = 86°$ $\phi = -21°.5$
A. F. ALEXANDER 6-in. O.G.

Oct. 23 $\omega = 90°$ $\phi = -21°.8$
F. J. ACFIELD $10\frac{1}{2}$-in. Spec.



Oct. 16 $\omega = 98°$ $\phi = -21°.0$
J. R. BAZIN 6-in. O.G.



Oct. 21 $\omega = 100°$ $\phi = -21°.6$
R. H. WHITTOME $8\frac{1}{2}$-in. Spec.

Oct. 28 $\omega = 115°$ $\phi = -22°.2$
R. T. CAVE 10-in. Spec.

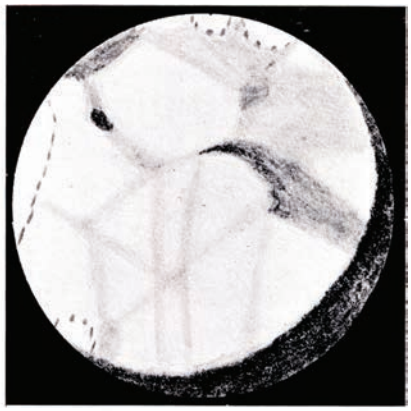
Oct. 16 $\omega = 118°$ $\phi = -21°.0$
T. E. R. PHILLIPS 8-in. O.G.

Plate X

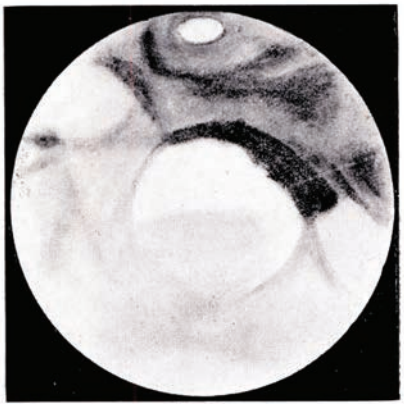
E

♌ 130°—190°

Oct. 18 $\omega = 133°$ $\phi = -20°{\cdot}8$
M. A. Ellison 6-in. O.G.

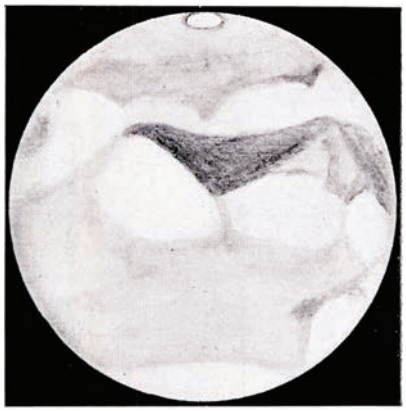


Dec. 30 $\omega = 135°$ $\phi = -22°{\cdot}9$
B. Burrell 8½-in. Spec.



Oct. 16 $\omega = 140°$ $\phi = -21°{\cdot}1$
H. Wildey 12½-in. Spec.

Nov. 21 $\omega = 153°$ $\phi = -23°{\cdot}8$
H. Wildey 12½-in. Spec.



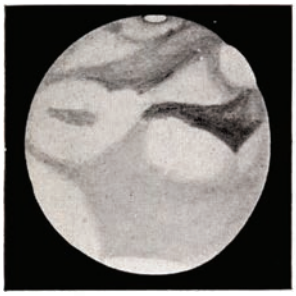
Oct. 11 $\omega = 163°$ $\phi = -20°{\cdot}4$
M. A. Ellison 6-in. O.G.

Oct. 7 $\omega = 187°$ $\phi = -20°{\cdot}0$
T. E. R. Phillips 8-in. O.G.

Plate XI

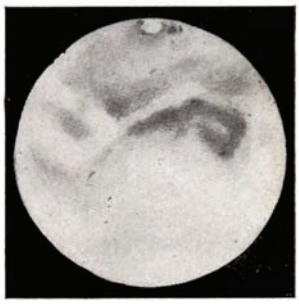
E

♌ 130°—190°

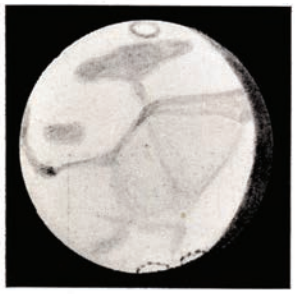


Nov. 21 $\omega = 131°$ $\phi = -23°{\cdot}8$
M. A. Ellison 6-in. O.G.

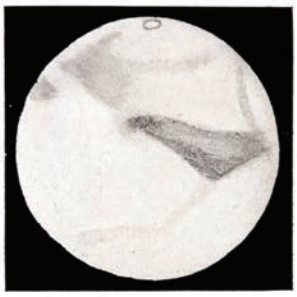
Oct. 16 $\omega = 134°$ $\phi = -21°{\cdot}0$
J. R. Bazin 6-in. O.G.



Oct. 14 $\omega = 137°$ $\phi = -20°{\cdot}8$
T. E. R. Phillips 8-in. O.G.



Nov. 19 $\omega = 140°$ $\phi = -23°{\cdot}7$
B. Burrell 8½-in. Spec.



Oct. 12 $\omega = 140°$ $\phi = -20°{\cdot}5$
E. H. Collinson 10-in. Spec.

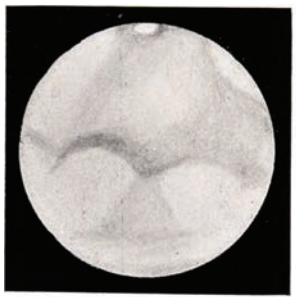
Oct. 14 $\omega = 148°$ $\phi = -20°{\cdot}7$
W. E. Fox 6½-in. Spec.

Oct. 11 $\omega = 150°$ $\phi = -20°{\cdot}4$
P. H. Wilkins 6½-in. Spec.

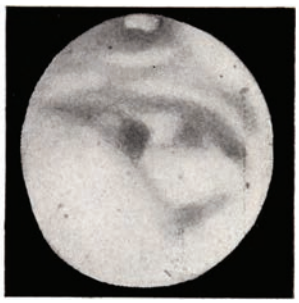
Sept. 4 $\omega = 155°$ $\phi = -17°{\cdot}9$
T. E. R. Phillips 8-in. O.G.

Oct. 14 $\omega = 155°$ $\phi = -20°{\cdot}7$
A. F. Alexander 6-in. O.G.

Nov. 21 $\omega = 160°$ $\phi = -23°{\cdot}8$
H. Wildey 12½-in. Spec.



Sept. 12 $\omega = 170°$ $\phi = -18°{\cdot}0$
W. E. Fox 6½-in. Spec.



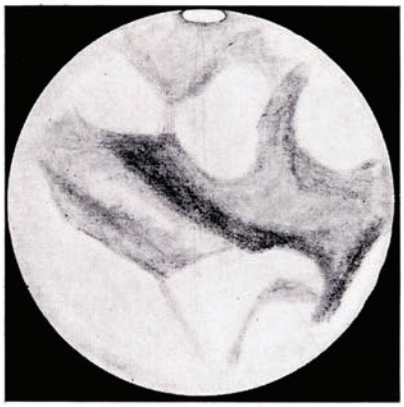
Sept. 7 $\omega = 178°$ $\phi = -17°{\cdot}9$
T. E. R. Phillips 8-in. O.G.

Plate XII

F

♌ 190°—250°

Oct. 12 $\omega = 196°$ $\phi = -20°{\cdot}5$
T. E. R. PHILLIPS 8-in. O.G.

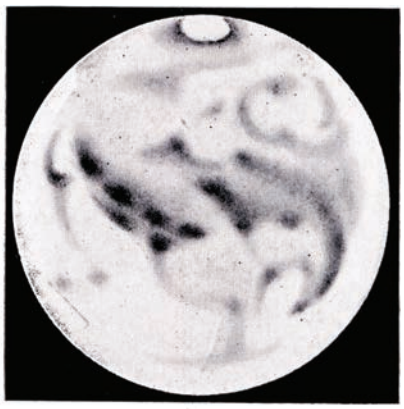


Oct. 5 $\omega = 227°$ $\phi = -19°{\cdot}8$
M. A. ELLISON 6-in. O.G.

Oct. 5 $\omega = 230°$ $\phi = -19°{\cdot}8$
T. E. R. PHILLIPS 8-in. O.G.

Sept. 1 $\omega = 237°$ $\phi = -17°{\cdot}9$
F. J. HARGREAVES $14\frac{1}{2}$-in. Spec.

Oct. 2 $\omega = 230°$ $\phi = -19°{\cdot}4$
M. A. ELLISON 6-in. O.G.



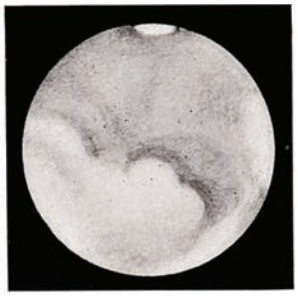
Oct. 6 $\omega = 248°$ $\phi = -19°{\cdot}9$
F. J. HARGREAVES $14\frac{1}{4}$-in. Spec.

Plate XIII

F

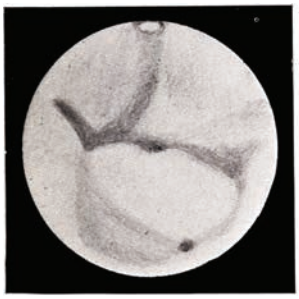
♌ 190°—250°

Sept. 7 $\omega = 190°$ $\phi = -19°{\cdot}9$
M. B. B. Heath $10\frac{1}{4}$-in. Spec.

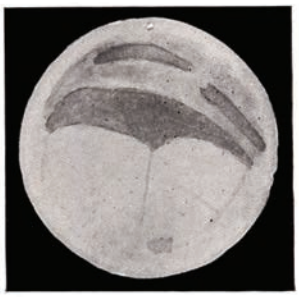


Oct. 11 $\omega = 197°$ $\phi = -20°{\cdot}4$
W. E. Fox $6\frac{1}{2}$-in. Spec.

Oct. 11 $\omega = 200°$ $\phi = -20°{\cdot}4$
B. Burrell $8\frac{1}{2}$-in. Spec.

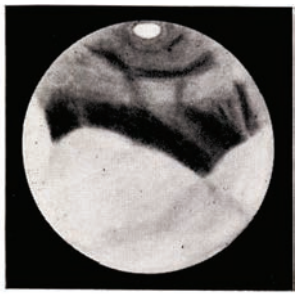


Oct. 11 $\omega = 202°$ $\phi = -20°{\cdot}3$
W. E. Fox $6\frac{1}{2}$-in. Spec.

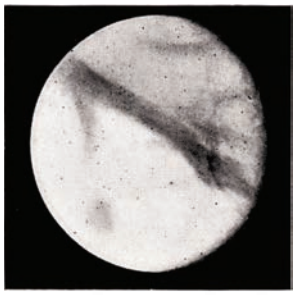


Nov. 14 $\omega = 204°$ $\phi = -23°{\cdot}5$
J. R. Bazin 6-in. O.G.

Aug. 31 $\omega = 209°$ $\phi = -17°{\cdot}9$
A. F. Alexander 6-in. O.G.



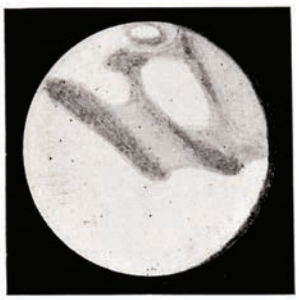
Oct. 11 $\omega = 210°$ $\phi = -20°{\cdot}4$
H. Wildey $12\frac{1}{2}$-in. Spec.



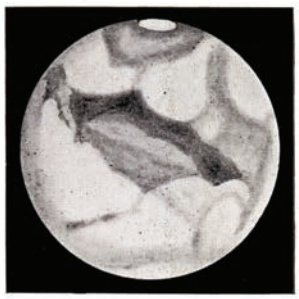
Jan. 28 $\omega = 213°$ $\phi = -19°{\cdot}5$
H. Wildey $12\frac{1}{2}$-in. Spec.

Nov. 8 $\omega = 236°$ $\phi = -23°{\cdot}1$
A. F. Alexander 9-in. O.G.

Oct. 2 $\omega = 241°$ $\phi = -19°{\cdot}4$
R. L. T. Clarkson $6\frac{1}{2}$-in. Spec.



Nov. 7 $\omega = 241°$ $\phi = -23°{\cdot}0$
B. Burrell $8\frac{1}{2}$-in. Spec.



Oct. 3 $\omega = 241°$ $\phi = -19°{\cdot}5$
M. A. Ellison 6-in. O.G.

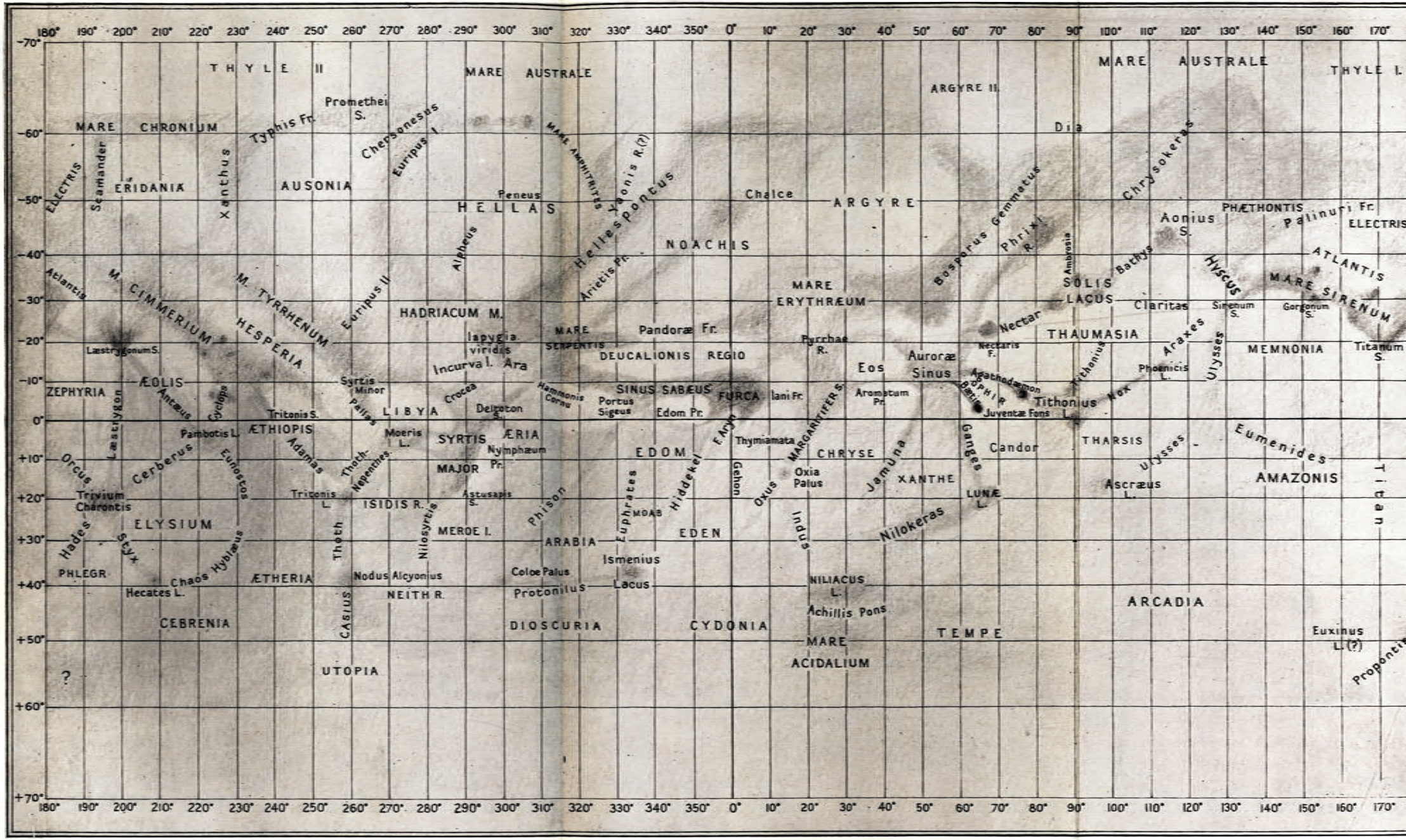


CHART OF MARS ON MERCATOR'S PROJECTION

PREPARED FROM OBSERVATIONS MADE BY MEMBERS OF THE SECTION IN 1941

[Abbreviations: *M.* = *Mare*; *S.* = *Sinus*; *Fr.* = *Fretum*; *L.* = *Lacus*; *P.* = *Palus*; *F.* = *Fons*; *R.* = *Regio*; *Pr.* = *Promontorium*.]