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R. L. Waterfield.
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Record Book of
Photographic Observations made
at Mr. Phillips' Observatory
Headley
Epsom.

with 6" F/4.5 27" focus Astro Photographic
lens by Cooke, Troughton and Simms No
ordered February 1932, first delivery delivered September
1932, returned to York and redelivered with
new front component Jan 1933.

Mounted on Cooke equatorial with 6" Cooke visual[⊕]
as guide (built for J. Poyser, Uxbridge 1914)

and with F/3 Aldis 8" focus on same mounting.

and with various other instruments used for special purposes.

⊕ Focal length of 6" Guiding Telescope = 80.375

* Plate No 0.

7888 Micrometers 25.76

N.B. $\pm 15\frac{1}{4}$ turn of Aldis

1932 Sept 14. Partial Eclipse of Moon. Photographed with Double 4" Gray Camera of 60" \pm focus using a large 10" x 4" plate to include both images.

Mira 1 and infra Red Filter used respectively over the two halves of the plate. N.B. only eclipsed portion photographed - uneclipsed part cut off with shield. During $\frac{1}{2}$ hour up to max phase Eastman Mesocyanine

infra Red Plate (hypersensitized \bar{c} ammonia) 30 min exp. During $\frac{1}{2}$ hr. following max phase Kodak infra Red Plate (unsensitized) used 30 min exp. The double camera was mounted on 8" Cooke mount - driving \bar{c} 8" Cooke.

Following eclipse the two plates were reexposed on full moon giving exposures (each 1 minute) using full apertures, $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$ & $\frac{1}{16}$ on both, violet image much the brighter for full moon. On Kodak IR image slightly brighter, on Eastman IR image much brighter than violet image

W. Grewer measured \bar{c} photometer the plates 1 Red eclipse - IR eclipsed = maps
Owing to violet transmitting IR (a check plate shows violet transmits $\frac{1}{3}$ rd of IR) no accurate figure for violet is set. But since the combined V + IR image gave uneclipsed - Eclipsed = maps, the same for the pure violet image must be much more. Next time use two plates in holder one IR, one Blue sensitive!

1932 Sept 16 on 6" F4.5 lens arrived from Cooke; mounted; focus plate & plate on Andromeda* nebula all show but come to near centre of field. Lens returned to Cooke - & part component broken in journey. New component figured and adjusted.

No O. 1933 Jan 23 6" Return from Cooke, remounted with 6" Cooke visual as guide and F/3 Aldis of 8" focus. The 6" astrophotographic is ready for adjustment & testing. The Aldis F3 has still some alterations to be made to the squaring on fittings of lens and of plate holder.

Instrumental data cont:-

2 1/4" Finder = 57.0 mm aperture

Magnification = X 12.4

Field = 2° 32.5'

Plate No I

	R.D. 1.2 ^m	0.7 ^m	0.42 ^m	
Micrometric Eyepieces (1) T.E.R.P.	X 125	X 210	X 350	Dull Eyepiece X 130
(2) W.H.S.	X 150	X 240	X 305	X 390 X 610
FL.	.54	.32	.26	.20 .13
R.D.	1.0 ^m	0.65	0.50	0.40 0.25 ^m
(3) W.M.L.	X 101	X 210	X 387	X 490
R.D.	1.45 ^m	0.70 ^m	0.48 ^m	0.30 ^m
Coole Eyepieces No: #1	.65	R.D. 3.0	X 50	
	1.33	2.45	X 60	
	0.65	1.25	X 123	
	0.37	0.73	X 216	(X 206)
	0.26	0.58	X 308	(X 259)
	0.165	0.38	X 485	(X 395)
No <u>312</u>		0.55	X 273	
No <u>120</u>		0.97	X 155	

T.E.R.P. Micrometric

Value of Screws

Direct = 25.75

With Barlow = 13.264

Plate No 2.

1933.

Jan. 25. about midday Focus Plate on 6" F4.5 Cooke Helix Cam.

11/2 Ford Monarch (from Batch 3 months old).

Exposure on center near center of Plate

7 exposures each 2 minutes

Focus Reading	2.5	Scale	0	Mill head	1
			8		2
			16		3
* Best focus.			* 24		4
	3.0		7		5
			15		6
			23		7



Best focus appears to be 2.5 - 24"

Squaring on of lens found approx. correct only.

N.B. The latter photos of series are surrounded by haze - clouds?

Development Agd 1 in 15 parts water

T = 55° F. Time 12 minutes.

Examination of plate shows definite lack of squaring on.

Jan 26. Moderately transparent.

40 minutes exposure on Orion Nebula at 25" - 12" 5".

(Old) Monarch 11/2 Ford Plate Focus at 3.0 - 0.

Plate again shows previous lack of squaring on.

176

Jan 28 afternoon and evening (sky overcast). 6" F/4.5
 a cross was placed at center of plate holder end
 and the lens was carefully squared on to this point
 by drawing reflections from lenses of a bright light
 Before this was done the squared on point fell about
 $\frac{3}{8}$ " above and $\frac{1}{8}$ " to right of central point.

after this was done, a reversed plate was put
 in plate holder - the cross still remaining immediately
 in front of it - and a light was held in front of
 the lens and it^x together with the cross and its^x
 reflection from the glass plate was drawn. They all
 fell on a straight line confirming the maker's squaring on
 of the plate on the camera axis.

Therefore within the errors of these two tests the
 plate is found squared on to the camera and
 the optic axis squared on to the center of the plate.

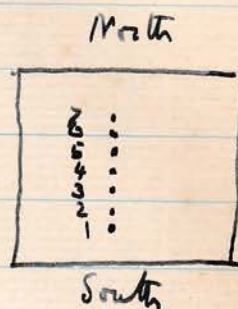
Plate No. 3

c. Jan 29. Clear early in evening. Four Plate 6" F/4.5
 (624) Alfred Monarch seven exposures 2 minutes each About 10° 20' - 10° 40'
 The exposures were made by moving in declination
 and giving four steps of 4 divisions of milled-head
 (i.e. half the size of previous steps)

No 3 cont).

Jan 30 (continued) The exposure was γ Devision center of plate.

No. 1.	2.5	-----	13
2	2.5	.....	17
3	2.5	-----	21
4	3.0	-----	0
5	3.0	-----	4
6	3.0	-----	8
7	3.0	-----	12



The plate shows that No 7 is the best - unfortunately we have not got both sides of focus. The focus as determined on Jan 25 was that of No 4 "3.0 ... 0". But this has been appreciably changed by the movement of lens during squaring on adjustments of Jan 28.

So far as one can judge the squaring on is much better. all over the plate No 7 is the best image. At least the plate is very much more symmetrical than on Jan 25 & 26. This point will require further checking by going both sides of focus.

Another matter shown by this plate is that No 6 image is definitely inferior to No 7. perhaps, therefore, the focus is not reached in it - anyhow one should go further & take finer steps: 2 divisions of head instead of 4.

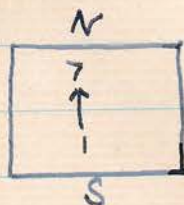
After developing plate the sky became overcast & no more could be done.

Feb. 2 6" Focus plate

Plate No 4.
taken.

about 10^h 30^m. Seven exposures made Capella at center 2 minutes

each	1	3.0	....	8
	2		....	12
	3		....	16
	4		....	20
	5		....	24
	6	3.5	....	3
	7		....	7



There seemed little doubt that No 6 was out through
No 7 was almost as good.

about 11^h 30^m another focus plate 6"

No 5.

Seven exposures made Castor at center 2 minutes

each.	1	3.0	....	20
	2		....	24
	3	3.5	....	3
	4		....	7
	5		....	11
	6		....	15
	7		....	19

Here 3.0.... 20 No 2 seems definitely out.

This is inconsistent with the previous plate.
and apparently there has been some error in
rewinding the machine - or possibly in taking up
the back-lash of the focussing screw.

The plate seems cloudy though not quite so much
as. The images are pretty good.

Feb. 5. a slight alteration was made in squaring on lens moving the axis about $\frac{1}{20}$ " inch to the left of plate i.e. moving out very slightly the left side of lens [d. being when camera is E. of pier pointing S] Sky too cloudy to expose a plate.

Plate No 6.
(Broken)

Feb. 13. Focus Plate Monach (old batch) exposed on Cebille centre
 > 2 minute exposures

N 7
↑
S 1

Readings were	1	3.0	.....	8
	2	-	.....	12
	3	-	.....	16
	4	-	.....	20
	5	-	.....	24
	6	3.5	.....	3
	7	-	.....	7

The best focus was suspected to be No 2. i.e. "3.0.....12"

Plate No 7.

Second focus plate Monach old batch exposed on α Tauri
 8 exposures 2 min. each

N 8
↑
S 1

Readings were	1	2.5	.....	17
	2	-	.....	21
	3	3.0	.....	0
	4	-	.....	4
	5	-	.....	8
	6	-	.....	12
	7	-	.....	16
	8	-	.....	20

The best focus was No 6 "3.0.....12"
 which checks up on the last one. Squaring on is close.

Plate No 8.

Feb. 15. Sky not v. transparent. Drifting fine cloud.
6" F4.5 Exposure 40 minutes - Monach (old batch) - ϵ Orionis centre.
Focus reading "3.0 ... 12".

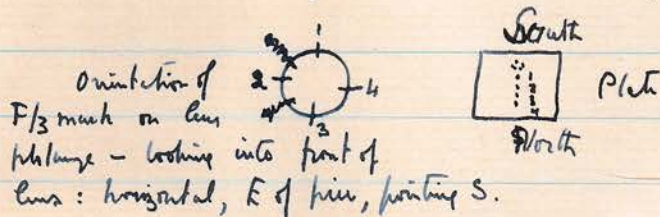
Feb 17. Sky fairly transparent - but only small gaps in heavy cloudy periods.

Two focus plates were obtained with F/2 Aldis.

Plate No 1.

1. ϵ Orionis at centre. 4 exposures 1 minute each.

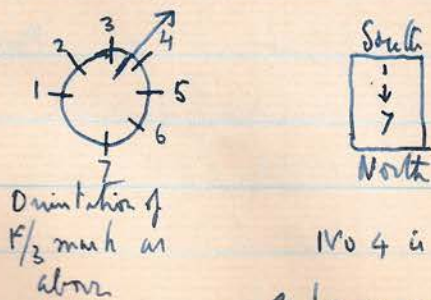
The declination slow motion stuck and a group of superposed exposures were first made. Following them the exposures were



No 1 was clearly the best.

Plate No 2^a

2 Seven exposures 1 min. each (diaphragm cooled down).



No 4 is best: and No 3 is better than No 5.

As far as one can see from this plate squaring-on is fine. Lens was afterwards set just to the S side of 4. ↗

Feb. 17. a rough visual comparison on 6" F4.5 focusing screen was made of the two 6"x6" "selected plate glass" flats supplied by Gowlands & Ross (Huseltius). The Ross plates were far superior. They only produce a small elongation of image. The single 6" Zeiss flat produced no visible distortion. The Ross plates are to be tested further.

Feb. 21 After 3 days of cross storm there were some short clear gaps to night. In one such (about 11 hrs?) two exposures were made - one each with the 2.8 & 6"0 to try to get 1933a Comet Peltier. The position was not known correctly so we drove on γ Casopis. Five minutes after exposure started thin cloud came up & for two more minutes the guide star was only just visible.

Next day Stearnson identified a v. faint trail on both plates as the comet. 6"0 11prod XPress 2.8 Barnet Press.

Feb. 23. 6"0 11prod & 2.8" Barnet

Sky fairly clear. Exposures 9.14 - 10.54 = 40 mins

Dir. Centre = \pm 2 hrs on. + 57° Peltier 1933a Comet.

Comet too faint to dir on: allowed to trail.

The comet on 6" plate v. bright trail with large v. faint elliptical fuzz round it. It is much less obvious on 2.8 plate.

This 2.8 plate shows that the lens is definitely out of square.

Plate No 9.

Plate No 3^a

3

Plate 10.

Plate 4^a

Feb. 26. Clouds snow & rain since 23rd. The F/3 plate was examined for squaring on. It is clear that the part of the plate nearest the 6" guiding telescope is too close to the lens by about $\frac{3}{8}$ turn of a rotation of the lens.

Plate 5^a

Feb 27. Screw A was given $\frac{1}{4}$ turn out from lens. F/3 Forme plate (after accidental trials) taken at positions 4, 5, 6, 7. Max "5" is best

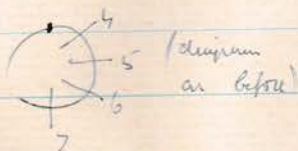


Plate 6^a

F/3, a check plate taken at Position of lens "5" was given 20 minute exposure $\pm 13:30-13:50$ on γ Cassiopeiae. Fairly transparent sky. Not developed.

Plate 11.

Feb. 28 F/4.5 and F/3 exposed Lepid Peun & Baurat Peun (unpict.)

center ϵ Orion $7^{\text{h}} 58^{\text{m}} - 10^{\text{h}} 3^{\text{m}}$ Exp. $2^{\text{h}} 5^{\text{m}}$.

Faint moonlight (Moon Age =) Sky very transparent at first

But Orion getting low & slight haze last $\frac{3}{4}$ hr. After exposure

some dew found on F/3 lens & considerable dew on F/4.5.

This despite mugs wrapped round both lenses. [N.B. 6" OB also dewed as well as T.E.R.P.'s 8"]

Developed both plates & check plate of last night.

French Developer started 70° Agol ~~2~~ 1:20. 14 minutes.

Plate 8 a.

Plate 9 a.

Plate 10 a.

Marq. min sun temp = 37°

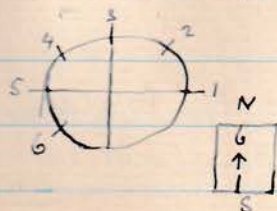
Plate 11 a.

* This result is surprisingly good: distortion is v. slight & would not affect
grating spectrum at this F-length. N.B. a faint subsidiary image was Plate 12.
due to a piece of lens remaining uncovered by flats. Next day I was offered a $5\frac{7}{8}$
Zeiss flat for 10/- — the same as one I already have. So I think I shall use this
instead for grating!

March 4. Plate 5a and 6a examined & squaring on errors estimated. It was decided to give all four screws $\frac{1}{2}$ turn inwards and then to make an entirely fresh adjustment by squaring on optically. It was found that the necessary changes were what was expected from the plates 5a and 6a.

Four exposure started - but stopped by cloud

March 5 Focus exposure resumed and completed - 6, 2 mins each.



at centre No 2 is best

at edge No 3 or 4 best.

? Still not quite square.

March 7. Focus exposure at 4, $3\frac{1}{2}$ and 3 (3 doubled in R.A.)

Here 3 is best at centre 4 at edge & ? 3a is

without compromise

March 9. Four exposures $1\frac{1}{2}$ minutes each - eight in all taken at

2, $2\frac{1}{3}$, $2\frac{2}{3}$, 3, $3\frac{1}{3}$, $3\frac{2}{3}$, 4, 5 (5 was doubled in R.A.). For squaring on.

Test Infra Red Plate taken at Focus 3 - 30 minutes exposure in full moon & less - near horizon. This plate is definitely out of focus - hence it will be necessary to refocus for IR.

Test plate for the selected plate glass (grating mount.) Focus expts.

1 min each taken with two plates in front of O.G. Focus 3.0, 3.5, 3.10, 3.15

Centre x. less.



Exp. (1) F = 3.0 is best - ? better further in. *

F/3 Plate ~~was~~ was
damaged & not kept.

infra Red Focus of Aldis. →
(Plate not kept.)

Mar 22 Sun min temp 37°

Mar 23 Sun min 32°

* Plate 13
* Plate 14

* Swellhead 10 mins $\pm 70^\circ$ (cooling part) Agd 1 in 10.

Mar 10 - Mar 20. The squaring on of the plate of the Aldis was extremely sensitive and quite a number of further plates had to be exposed before a satisfactorily symmetrical field was obtained. Although optically the reflected image from back lined up on the center point of plate, the symmetry of the images indicated a definite lack of center - the axis being displaced about $\frac{1}{8}$ inch \pm in each direction (E of pin). Therefore the lens was tilted about $\frac{1}{4}$ turn of one screw to correct for this & result was definite improvement of the axis was being appreciably at center. After this squaring on of plate was continued and finally plate No 12a was obtained showing a good enough result. [Several plates here - intermediate for squaring on between 11a & 12a have been destroyed - with this note - as being of no interest.] In addition he packed focus for 1st of Plate was found. This is half turn of lens out from Blue focus. Both points are marked.

Mar 22. Started double exposure Aldis Infra Red & 6" no filter.

Exp on ϵ Orionis 6" 8.40 - 9.25 = 35 min.

Aldis 8.40 - 9.25 = 45 min.

he packed 1st of
1st of Press

Orion setting fairly clear sky.

Mar 23 continued double exposure 6" 7.50 - 9.30 stopped.

Infra Red. Aldis 7.50 - 9.40 = 1 hr 50 min.

Sky very transparent.

Plate 13 6" lens therefore had an intermittent exp. of 2 hrs 15 min
Plate 14 6" Exposed on ϵ Geminae for Nova 11.0 mag discovered Mar 20 Exp. 10.20 - 12.5
Mar 24 continued I.R. Aldis exposure 8 hrs - 9 hrs 30 min.

Fairly transparent

Mar 24 Screen Mintemp. = 36° Plate 15

F/2 Plate ~~15~~ image
extremely faint - unfortunately
lost.

Mar 24 continued

Exposed 6" for Pons Winnecke Comet (search plate)

Center of plate R.A. Dec Exposure $14^{\text{h}} 28^{\text{m}} \rightarrow 15^{\text{h}} 58^{\text{m}}$.

Barnet Super Pass Plate. Developed 17 minutes $\pm 70^\circ$ Agd 1 in 10.

Sky remarkably transparent.

Mar 25 Continued alibi exposure on Orion $8^{\text{h}} 55 - 9^{\text{h}} 30$. Sky v. transparent.

Mar 26 Continued alibi exposure on Orion $8:55 - 9:5$ Sky fairly transparent.
Exposure finished. Total = $6^{\text{h}} 40^{\text{m}}$.

March 30. Tot exposure on Earth lit moon 6" visual 11ford IR plate red filter -
exp. $8^{\text{h}} 53^{\text{m}} - 9^{\text{h}} 13^{\text{m}}$ - for development. Earth lit moon very faint.

Exposure on earth lit moon 6" visual 11ford red filter $9^{\text{h}} 16.5 - 9^{\text{h}} 36.5$
- not to be developed.

$6^{\text{h}} 54.5$ Exposure on Pole Star $9^{\text{h}} 50^{\text{m}} - 52^{\text{m}}$ for 2 minutes. Pole star in
finder \square (left top corner of square). Plate Barnet Super Pass.
Plate not developed.

Plate 16. →

Min Screen Temp = 50°

[fog so bad F/3 plate not kept.]

Min Screen Temp = 44°

Plate 17.

Plate 12 a.

April Bad weather, hard work and then illness prevented any definite work photographically till middle of May - some Ipan-Red plates were exposed in $F/3$ camera after various degrees of fogging to try to find the optimum degree of fogging for overcoming the弊端 of incandescence.

to 16. →
] May 19 Double exposure on North America Nebula started 11^{hr} 35 stopped 13^{hr} 45^{min} very transparent then continued May 21 11^{hr} 5^{min} - 11^{hr} 35^{min}. thin clouds passing. $F/4.5$ & $F/3$ camera 11^{hr} 45^{min} X pan plates. Developed May 21; 20 minutes, 70° ; Agol 1 in 10. Unfortunately $F/4.5$ plate has slight fogging on one side - ? leak in holder? gap behind lens? development - while the $F/3$ plate is very badly fogged over one half undoubtedly due to leak round camera back. No dew on lens. (Extraordinary amount of rain & scudding cloud for moonless part of interval).

Plate 17.
late 12 a. June 21 Remarkably transparent night with good seeing, but some dew. Double exposure $F/4.5$ & $F/3$ - both Barnet Plates - on ξ Cygni (center) for region of America Nebula. Started exposure 11^{hr}; finished 13 hours. Despite heavy flannel coverings over both lenses they were both dewed: 6" moderate layer not extending to edge; 2" thick layer all over. Developed 14 mins 70° Agol 1 in 10. Excellent pictures despite dew.

Min Sam Temp = 59°

Plate 18.

" 13a

Plate 19.

Provisional Four Seals	30°	3	12
	40°	3	9
	50°	3	6
	60°	3	3

Time of Exp. Sam Temp = 58° Observatory Temp 60°

Plate 18.
13a

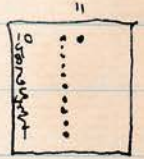
July 17. 11^h 20^m - 12^h 20^m (1 hr. Exposure.) with 6" & Aldis
center 29 Cygni. Very transparent, very swar dew. Expt. to
try new 6" Dew Cap packed with rug. Photo almost in
zeith 6" absolutely clear at end of Exhume - Aldis densely
dewed. Plate (Barnet Press) shows very poor trace -
presumably temperature effect. Aldis shows very few stars because
of dew.

19

July 17. In order to investigate the temperature effect on the focus - suspected as
a result of the plate exposed July 17, ten exposures were made of 1 1/2 mins
each centering on *Susae Majoris* 11^h - 11:20. The images were moved
in declination, the last one being identified by being repeated by an
eleventh exposure in the same dec. but different R.A.

The focus readings are

1	2.5	.....	17
2	"	.....	21
3	3.0	.....	0
* 4	"	.....	4 *
5	"	.....	8
6	3.0	.....	16
7	"	.....	20
8	"	.....	24
9	3.5	.....	3
10	"	.....	7



The previous focus "3.0 12" was left out.

Examination of plate shows that No 4 is best, and No 3 is better
than No 5. Hence the focus adopted was between 4 & 3 & nearer 4
to wit "3.0 3". The temperature in Observatory & in Camera was 60° F.

Plate 20.

" 14a

20 continued

*Plate 21.

*Oriented Galactic Plane

Plate 15a

*Plate 22

*O.G.P.

*Plate 16a.

F/3 lens also oriented in Galactic Plane

20.
42
July 19 continued. Double exposure with Cooke at its new focus $3.0 \dots 3$
(both Barnet Press) centring on 29γ \pm started at $12.25 \pm$ and
continued through passing cloud till $12.45 \pm$ (probably only 10 minutes fairly
clear). New wooden dew cap on aldin

July 20 Double exposure started on July 19 continued from $11.40 \pm \rightarrow 13.30 \pm$
a great deal of the exposure being obscured by cloud. shutter kept open.
at end of exposure there was no dew on either lens. but there was
not a critical test as the dew on grass & windows was only slight.
Temperature 60° . Hazy sky & lot of passing cloud.

July 23 Double exposure (both Barnet Press) centring on γ from
 $10^{h} 35^m$ to $13^{h} 40^m$ starting temperature in obs. 65° , finishing temp. = 60°
 45^m aldin
No cloud but sky only moderately transparent say $\frac{7}{10}$ (or 10). No dew
on either lens - slight dew only on grass. Exp: Cooke = $3^{h} 5^m$; aldin $3^{h} 10^m$.

22
July 24 } $11^{h} - 0^m - 13^{h} 10^m = 2^{h} 10^m$ Centred on \pm R Aquilae [XVIII^h 40^m , -6°]
25 } $12^{h} 35^m - 13^{h} 30^m = 55^m$ Total exposure = $4^{h} 30^m$.
26 } $11^{h} 25^m - 12^{h} 50^m = 1^{h} 25^m$
Double Exposure Barnet Press No dew on either lens.

32
The Plane
July 24 Transpant $\pm 8-7$: July 25 v. Transp ± 9 : July 26 Transp $7-8$.
Unfortunately guiding was interrupted & was very bad so that 6"
plate shows marked elongation. Somehow or other 2.8 plate got
shifted so that all images are doubled. The 2.8 plate shows extraordinary

July 24, 5, 6. ^{cont.} contrast between sky & Milky Way & is not overexposed! The 6" lens
is in comparison much less nearly fully exposed. Does this mean
that more than $4\frac{1}{2}$ hrs can be given with advantage on 2.8 &
perhaps more than twice that (or 9 hrs) can be given with 6"
or is it (as Hauptmann suggests) that a broken exposure - due
? to damp on plate - is less effective than a continuous one?

Aug. 1. 11^h 50^m - 14^h 15^m Veg. Transp. 10.

23
17a
Double exposure continuing on 52 Cygni. Exposure left over
till following night - but owing to cloud on Aug 2 & oncoming
moon the further exposure was not made.

6" plate very excellent showing both "lace" nebulae & intermediate
nebulosity? more with longer exposure.

Oddly enough the 2.8 does not show the two nebulae so
dense as the 6" - why?

24
18a
25
Aug 8? Both cameras were trailed for precisely 30 sidereal minutes
(error ± 2 secs) on α Cygni - near meridian passage, for determination
of scale.

Following this 6" was exposed for 30 ^{seconds} ~~minutes~~ on a star
field. The plate ^{holder} was closed & removed for camera, replaced
& opened & exposed 30 secs. Then cloud removed replaced opened
& exposed for a 3rd 30 secs. Thus 3 superimposed exposures were

made in all 120 sec.

Then camera was moved in Declination and 120 sec exposure made. Finally it was moved a ~~second~~ time in R.A. & another 120 sec exposure made.

Examination of the three sets of images show them equally good. Therefore it is safe to move plate-holder from camera during exposure.

Scale of Camera: -

6" lens

Measurement of trail of α Lyri gave scale near center of plate

$$1^\circ = 1.18 \text{ cms}$$

This gives Focal length of 26.6"

$$1 \text{ mm on plate} = 7.508$$

$$= 5' 4''.8$$

August 16. Double exposure started on southern most
milky way. Centering star due to M17.

9 hr 40 m to 11 hr 10 mins. Very transparent, say 8-9.

Exposure stopped as field was approaching the trees. $T = 55^\circ$.
Exp. To be continued -
August 17 cloudy.

August 18 Exposure continued from 9 hr 30 m - 11 hr 0 m - when
clouds suddenly stopped them. Very transparent say 8-9. $T = 56^\circ$
Total exposure both cameras = 3 hr 0 m.

Fach α of 1 in 10 65° 25 min.

August 18 continued Double exposure 6" = 150 Zenith 2.8" = Superium Prism
exposed for ophidius Nova III which was yesterday reported risen
from 4.8 m \rightarrow 6.0 m. In the 18" the nova was a
most brilliant purple-cerise colour. Spectrum showed H_α
and a bright blue (H_β ?) together with many other bright
emission lines. There was definite continuous spectrum in Red
& to the long side of ? H_β .

The exposure given with both cameras was 30 m
- 11 hr 40 to 12 hr 10 Clouds prevented starting earlier, after
previous exposure - & setting behind trees stopped it. Frequent
flicking clouds during exposure cutting it down v. considerably.
 α of 1 in 10, 65° , 25 m:

August 18 continued. Removed 2.8" dew cap & mounted P.L.R.P.'s 35°

Aug 18 cont)

Prism objectives. Exposed Half hour (Barnet Super Perm) 2.8
(not Panchromatic!)
on Vega - much passing cloud. Adjusted clock drive 1 revolution
fast for lengthening spectra. Exposure 13 hr 5 m - 13 hr 35 m.
Telescope aimed $22\frac{1}{2}$ N of Vega for guiding.

Aug 20 Very transparent after rain. Considerable delay as clock cable broke.
10^h 10^m - 40^m Exposed F/3 with Objective prism & Panchromatic (Iford S.G.) on Nova III
Ex = 30^m. Ophiuchi; 30 mins. Star? about 7-8 mag. Spectra cover out H₂, β , γ , δ
and faint lines between H₂ & β & between H β & γ . Practically no continuous
spectrum seen.

11 hr 10 m - 40 m Double Exp. 6" (Barnet Super Perm) ; 2.8 Panchromatic I.S.G.
on Nova III Ophiuchi.

Aug 23. Very transparent g.t. Double Exposure 6" & 2.8 (Super Perm Barnet)
on R. Hydrus 9 hr 15 m - 12 hr 5 m to be continued? T = 49° at end

Aug 24 continued from Aug 23 Double Exposure Pretty good Transparency 8.
9 hr 30 m - 11 hr 30 m. Total Exposure 4 hr 50 m. T = 52°
Frost developed each 23 m. 65° ±

Aug 24. Double Exposure Barnet Super Perm 6" & 2.8 on ω Geminae
in search for Faintly's comet. Exp 12 hr 10 m - 15 hr 10 m (1 hour exposure).
altitude at first very low but sky was remarkably transparent & even the
early part of exposure we saw faint stars in finder. Dawn stopped exposure.

Aug 25. Not very transparent. ± 6

Take Exposure 6" x 2"8 (B.S.P.) on Andromeda Nebula.

Exposure 12^h 20 - 13^h 40^m = 1^h 20^m. Clouds stopped exposure

shortened photographing for Finlay's Comet.

Aug. 26. Moderate sky 4-5 (hazy low down).

Double Exposure 6" x 2"8 (B.S.P.) on 21 Aquilae

Exposure 9^h 27^m - 12^h 46^m = 3^h 19^m.

Aug. 27. (1) Poor sky Transp. 4 getting less and some slowly passing cloud.

Double Exposure 6" x 2"8 (B.S.P.) on star in Aquilae 19^h 35^m \pm 11^o.

Exposure 10^h 23^m - 12^h 35^m = 2^h 12^m - stopped by cloud.

(Star image show great enlargement due to haze & cloud)

(2) Poor sky Transp. 4-5 but much drifting cloud.

Double exp. 6" x 2"8 (B.S.P.) for Finlay Comet search. Center star (5^m)

N + perseus Started 14^h 17^m Stopped by cloud 15^h 7^m.

Aug 28. Very Transp. 7-8.

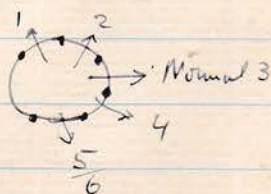
Double exposure 6" x 2"8 (B.S.P.) on ~~perseus~~ ^{68 Ophiuchi (Kappa)} Started 9^h 45^m.

Stopped owing to break down in driving 11^h 20^m. Plate probably no good,

owing to drive. Ex = 1^h 35^m.

1a
Sept. 14. Squaring on Exposures on F/3 Aldein. (Barrett before Pans)

Each 3 min. exposure Five exposures: 1-5 screwing the lens homewards each moved in Dec. No 6 same focus as 5 but slight mist in R.A. not in Dec.



35*
32a.
Sept. 15. Very transparent.

Drable Exp. Barrett before Pans Tooke 6" & Aldein 2"8. Continuing on ξ Cygni
Started 9^h 48^m: Finished 13^h 48^m - Total Exp. 4 hr. Slight
dewing of 6" lens - none in Aldein. T = 45° at Start - 55 focus
was changed to "3".... 6 "

Sept. 14. Fairly transparent - but lots of drifting cloud &
transparency falling off. Started about 7 finished about 4-5.
Extreme 19^h 35 + 11° (+) Started 9^h 20^m Finished 11^h 40^m.
Aldein lens badly dewed, 6" moderately dewed. Very severe
dew outside.

Absent in America end of September October & first part of November.
R. W. Wood ruled a copper disc 5000-7000 lines diamond on
slant at various angles, replicas were made & that selected
that was brightest in red of one 1st order. This one, in original
disc, gave maximum light in one 3rd order. The replica is
 $4\frac{1}{2}'' \times 3\frac{1}{2}''$ & was mounted between the two $5\frac{7}{8}''$ Zeiss flats.
R. W. Wood estimated that about 90% of the red was in one
1st order.

November 8 landed from U.S.A. Found that the counterpoises
sent for extra weighting had not been returned. Nothing could be
done therefore

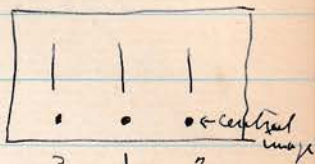
November 9. with some difficulty (owing to stiff oil) counterpoises
were refilled on declination axis.

November 13 through cloud and with a trial exposure was made
on Asphella. with gratings. Exp. 10 minutes, drive $\frac{1}{2}$ turn of regulator
too slow, Burnet Super Press Plate. Spectrum over exposed &
very narrow. a few lines are visible.

November 15. Objective Gratings. Wonderful def. & transparency 8-9.

Tribe exp. on a Bausch & Lomb plate for focus on Betelgeuse.

- not kept.
1. 12^h 40 - 13^h 00 Focus = 3" ... 5 center
 2. 13 0 - 13 20 Focus 3" ... 10 right.
 3. 13 20 ---- cloud 13:35 Focus 3" ... 15 left



Drive was 1 which turn too slow except for 1/2 of the first exposure which was 3/4 of a turn too slow.

not kept.

Dec. 9. Focus Grating Plate 6^h Cepella

1	3 ... 10	
2	3 1/2 5	•••••
3	3 1/2 15	1 2 3 4
4	(3 1/2 25) (4.0)	

Focus Grating Plate 10^h Betelgeuse

1	3 ... 15	
2	... 20	
3	3 1/2 0	•••••
4	3 1/2 5	6 5 4 3 2 1
5	3 1/2 10	
6	3 1/2 15	1 in width.

These plates passed pretty definitely through the prism & it was really good definition was obtained. That the Grating was badly at fault was shown subsequently by examining a Mercury arc with it & finding numerous ghosts associated with each line.

1933 - 4.

Dec. 15. Exh. F3 & Cook F4.5 on Pleiades. Burnett super Press

Started 11^h 40 - 12.5 - stopped for cloud. Continued 12^m 40 - 12^h 10^m

Started again for cloud. At first lots of haze then passing cloud

Last 1 1/2 h Transparency about 6-7. Total Exh. = 1^h 55^m.

Temp $\pm 28^\circ$. Focus 3"12. No dew on lenses. I watched "Johnson

Contract", $\pm 65^\circ$, 7 mins.

Jan 5. Focus and Squaring on plate for Alder with new clack slide.

A. Seven exp., each moved in 1/12th rotation of lens, last exp. trailed in RA.

But at center between 3 & 4. Single saw side of plate holder too near lens.

(Orion)

B. Single saw side of plate holder moved out 1/4 turn. No change

Then exp. 3.5.7. of above

(Orion)

C. Moved single saw 1 1/2 turns out from Plate A. Three exp.:

now both sides seem equivalent & Top & bottom pretty good.

Exp. 3.5.7 of above

(Orion)

D. Four plate with the new Squaring on. Five exp. 5.6.7 of

above and 8.9 again 1/12 rotation in of lens — on Procyon etc

But in between 6 & 7 (lens set here).

Jan 8. amazingly transparent say 10 $T = 33^\circ$

Double exposure Aldein and Coke (3"-12) Barbet Super Perm.
Center ϵ Orion Started 8^h 20^m Finished 12^h 0^m.

Total exp. 3 hrs 40 mins. Drive good. Both lenses completely
cleared over at end! Developed Johnson Contrast. 65° 7 mins.

Jan. 12. Got back after P.A.S. meeting about 9:30 Amazingly Transp say 10

Wind - very dry air. Exposed 6" only on Orion (center ϵ Orion)
Started exposure 10^h 10^m (approx) Stopped for cloud after about
1 hour (?). Exp. ?? about 1 hour.

Plate Not developed till Feb. 1. (? with which!) $6\frac{1}{2}$ min Johnson 65° .

Feb. 7. Poor Transparency 6-7. Double Exp. Barbet Super Perm 6" \times Aldein

Exp 7^h 5^m - 9^h 5^m. Stopped by cloud. Second hour Transp = 7-8?

Dev. $65^\circ F$ 7 min. Johnson Contrast. Temp = 38° (3"-12 F) Center ϵ Orion

Feb. 8 Very Transp. say 8-9. Double Exp. Barbet Super Perm 6" \times Aldein.
Center ϵ Orion Exp. 7^h 20^m - 11^h 40^m. to be cont. Temp 38° , falling to 33° (3".....9.5 F)

Feb. 9 Extremely Transp. say 9-10 Double Exp. cont. from Feb. 8. (ϵ Orion)
restarted 8^h 0^m stopped 10^h 40^m. Temp = $37^\circ - 35^\circ$ same focus.

Total Exp. = 7^h 0^m. Developed $\pm 70^\circ$ Johnson Contrast $7\frac{1}{2}$ min.

Feb. 11. Double Exp 6" x Albin Bussat Super Perm Very Transp 8-9.
Started Exp 9^h 15^m - 11^h 45^m. - to be continued T = 37°-35° (3"-10")
Plate Center (with p. Sirius)

Feb. 12 Cont. Double Exp. Perfect Transparency say 9-10.
Exp. 8^h 5^m to 11^h 15^m. Total Exposure 5 hours 40 mins.
Developed: 65°-70° Johnson contrast 6½ mins. (T = 39°-37)

Feb. ? date Four Panoramic Plate F/3. M. filii.

Mar. 16. Single Exp. 13^h 22^m - 14^h 26^m Very Transp (8-9)
Exposure = 64 mins. For 'Object' discovered by Boyer (alga) on Mar 7.
Center Plate Approx R.A. 11^h 28^m Dec. + 15°. Focus (3...10) T = 38°.
Johnson contrast 7 mins. 68°. Bussat Super Perm.
Object appears as short trail (which is stellar) 11^h 27^m 34^s + 15° 23'.

Mar 17. Double Exp. 13^h 14^m - 13^h 50^m. T = 36°. Very Transp (8) but
fading cloud which prematurely stopped exp. For Boyer object.
Center Plate Approx 11^h 28^m + 15° Focus 3...10 T = 39°.
Johnson contrast 6½ mins 68°. Bussat Super Perm.
Object appears as before on F/4.5. R.A. 11^h 26^m 38^s + 15° 44'

Mar 18. Polar Sequence Double Exp. Barret Super Press. V. Tramp (say 10).

11^h 5^m → 13^h 5^m Total = 2 hours. Center Plate near to Pole. F=3.10; T35°

Johnson Contact. 68° 7 mins.

6" Plate shows marked witness of rotation due to error in orientation of axis.
But stars in sequence of mag 17.0 are visible & 17.5 doubtful.

F/3 Plate scale is smaller & trailing is practically negligible.

Stars 14.6, 15.0, 15.3 mag can be distinguished definitely.

Mar 19. Polar Sequence 6" Exp. Barret Super Press V. Tramp but occ

drifting cloud (say 8) Exposure 1 hour Center Plate = Polaris, telescope

actually aimed on Polaris. The result is a little better as far as the
trailing of the sequence is concerned - but not markedly so.

April 12-15 Attempts were made to improve orientation of axis by
visual method on Polaris North & South culmination and W.
clouds prevented completion of adjustment so far.

April 15 Double exposure 6" Wellington Plate H.D 850. F/3 Barret Super Press
on star near M 52. Exposure 6" 10.40-11.00 and 12.00-12.40 = 1 hr.

Exposure F/3 10.40-12.40 (half an hour or more sky overcast) = 2 hrs.

Wellington Plate bad (too old?) very few stars - nebula just visible.

F/3 Plate good - nebula intense - but grain too coarse for detail.

April 18. Further adjustment of polar axis.

Gimbal adj. by following meridian star. Run on Dubhe finally resulted in a change in declination of $(\pm) 1''$ in 15 minutes. Clouds stopped further work.

April 19. Adjustment polar axis.

altitude adjusted by following δ hese minor 6 hours east of meridian. Finally a run of 15 minutes showed no shift in α h. Dec.

The tube was then driven on Polaris (3 hrs west of meridian) for $\frac{1}{2}$ hour and no shift could be observed.

high Exposure 6" lens Bessel tube Pass on Star was M 52. Can Ven.

Started 12^{hr} 15^{min} ended 13^{hr} 15^{min} Total Exp. 1 hr. ± 4 day moon just setting; sky v. transp, say 7-8; trace of dew on lens at end of exposure.

single Exposure 6" lens Bessel tube Pass on Polaris center for Polar sequence.

Started 13^{hr} 45^{min} Ended ?? : Exposure about 20 min. Shows v. great improvement in orientation.

11/11/19 - June 9. Two plates taken of which water unfortunately
mislaid.

48 is fairly long exposure about 2 hours of Polaris Sequence

49 fairly long exposure about 1 1/2 hours of Coma Berenices.

50

June 9. 11^h 30^m - 13^h 30^m. Double Exposure between α & γ Cygni $\times \times$ 30^m + 45°.

6" Newlford X Press Film Equin Plate & F/3 Bannet X Press Plate.

Transp about 5 only shy light at end. Devel. 3 1/2 min + Mees Developer.

T = 55° F = 3...5

June 11. 11^h 5^m - 12^h 20^m Double Exp. between γ & η Cygni - center 28 Cygni

6" Newlford Film Equin X Press F/3 Bannet X Press.

Transp about 7 falling to 5 and but greater hour about 3-1-0. Stopped by high cloud. To be cont. if poss.

T = 50° F 3...6

June 13 Double Exposure 28 Cygni Continued. Transp 8 From 11^h 40^m - 12^h 55^m

T = 55° Total Exposure therefore 2^h 30^m or 150 mins - but 20 min very thick haze.

Transp not altered from previous night. Developed Mees Contrast Developer 72° For 3.5^{mins}.

June 16. Double Exposure between η & β Cygni

6" Newlford Film Equin X Press F/3 Bannet X Press. Exposure 11^h 20^m - 12^h 50^m.

Total Exp = 90 mins. Very Transp^{Says 8} - few fluting clouds. T = 58° F = 3...4

Developed Mees 3 1/2 min 65°.

June 16 continued. Exposure for Encke's comet +25° II 40^m. Time 13^h 35 - 48^m

Exposed only 6" - behind wall for F/3. Exposure 13 mins. Very transparent but bright shy. No star visible 6" or fainter near enough for guiding even with lowest power - camera allowed for run.

Developed Mees 75° 2 min.

2, 3.

June 17. Double Exp. between β Cygni & $XIV^h + 20^\circ$. Center about $14^h 10^m + 25^m$.

Sketched 11^h 50^m - 13^h 0^m. ~~to be continued~~. 6" Newell's Fin Grain X Per, F/3 Barnt & Bay

Fairly Transp - say 6-7. Temp = 6.24° F = "3... 2"

2, 4.

β was pretty away & pretty very busy during remainder of year
only one plate was taken July of nebulae around δ 2 Cygni.
Exposure continued over two nights - but badly fogged - Feb 4 hours or
more.

1935 Jan 2 Exposure on Birtchouse for checking focus.

Jan 4. Exposure of 40 mins with 6" grating on 6" & ordinary
7^h 40^m } Ilford Double Exposure plate on Nova Hercules -
Focus "3-5"

Feb. 2. Mounted on 6" new spectrograph made by Broadhurst Camera.
The wood grating mounted directly in front of the 3", $F=24$ " Reflex
Rectilinear by Beck (purchased in 1927 for the Geigler with collim). The lens
& grating focus by rackwork the plate ($\frac{1}{4}$ plate size "No 1") is held
in holder which is fixed by 3 screws to the camera body. It can
be tilted to the required angle by one of these screws.

Four plates taken on Orion. Cloud prevented photo of Nova.

Feb. 8 (19^h ±) Ilford Hypersensitized Panchrom exposed on Nova Hercules (Spectra).

1. Single exposure (at Mark $4\frac{1}{2}$ from front) 20 mins.

2. Two exposures (at Marks $5\frac{1}{2}$ & $6\frac{1}{2}$ from front) 20 mins

$4\frac{1}{2}$ mark was cut: till not far out.

Clouds prevented further improvement.

Feb-26. 6" $F4.5$ Exposed with Ilford Double Exposure on Comet Johnson
Exposure from 7^h 53^m to 8^h 24^m.

~~Ultraviolet~~

2, 8
March 4. 6" F4.5 Exposure 50 min 140d Double Exposure.

Comet Johnson From 8^h 1 min to 8^h 52 mins.

Very transparent - but low altitude - almost in trees at end.

Drove with moving micrometer wire on star: wires 3/4" apart changing every 10 minutes. Drive v. good Comet round no tail but few rays at right angles? halation effect.

3" Spectrograph. 3 exposures on Nova Herulis 40 min each.

(1) 13^h 12 - 13^h 52 mag 4.0

(2) 13^h 53^m - 14^h 38 mag 3.5 + some less good than

(3) 14^h 44 - 15^h 21 mag 3.0 at 4.5 mag -

Trail 3' ± in 40 minutes. Hyperion. Panchrom. 140d

March 8. 3" Spectrograph gap in clouds Exposure 15 min Nova Herulis.

Time 13^h 0 - 13^h 15^m. ±

March 9. 3" Spectrograph Nova Herulis. Exposure 45 min +

clouds came gradually over at 45^m but exposure continued to 60^m.

Time 13^h 15 - 14^h 0^x - 14^h 15^x x mainly cloudy.

2, 9
March 25 Object dense reported "between Antares Quinorum & I Quinorum"

Exposure 1^h 7^h 45 - 8^h 45^m. No sign of any "object" - ? little

cluster near to the main M35 core mistaken for comet by lens.

1435-

June 6. 12^h 15^m - 13^h 15^m Very transparent 7028 (in 10).

2, 10. Exposure (1 hour) on Nova Herculis with 6" Cooke only.

11/2" Double Exposure fine grain: Developed Agol 1 in 12, 65°, 25^{min}.

Temp Photograph = 55°: Focus 3... 3.

2, 11. June 7. 11^h 20^m - 13^h 15^m. Very transparent 7028 (in 10).

Exposure 1 hr 55^m. Nova Herculis 6" Cooke only.

Temp Photo. = 54°: F 3... 5. 11/2" Double Exposure, fine grain.

1936

July 24. Comet Kaho.

2, 12

The comet was found early close to the N.E. horizon in strong twilight by setting 6" circle to $9^h 50^m + 37^\circ$ being in the field of the Cooke Comet eyepiece. It looked like a slightly fuzzy star - but no sign of tail. An exposure of 5 minutes was given with the 6" Triplet: Ilford Double Xpress plate: Developed Agol 1 in 20 @ 60° 10 minutes. Temp of Photograph was 55° Fahr. Focus 3.....5.

Time of Exposure Local Sidereal Time $18^h 12^m 50 \rightarrow 18^h 17^m 50^s$. Plate shows comet with Tail $\frac{1}{4}^\circ$ & several stars: but draw was poor as the instrument is still out of balance (in this position) owing to Dew Cap & Aldin F/3 not having been remounted since Christ Expedition.

2, 13

July 24 Comet Peltier.

Exposure $12^h 15^m \rightarrow 13^h 20^m$. Continuous drifting cloud with very Transp (9) intervals. Probably on 15 minutes total exposure. Afterward lens was very thickly dewed: exposure probably still less. Temp = 55° F Focus = 3.....5. Plate Ilford Double X Press. Developed Agol 1 in 20 @ 60° 10 minutes.

July 29. Count Peltus.

2, 14

Exposure 11^{hr} 25^m - 12^{hr} 25^{min} on Imperial Fine Grain Ordinary.
Temp. Exp. = 50° F. felling; Focus 3.....7. Dev. Agf 1 in 24 60° 5 mins.
Guiding '26" Eyepiece dark & illuminated wire.

Count Peltus

2, 15

July 29 cont. Exposure 13^{hr} 5^m - 13^{hr} 30^m. on double X film 114rd.
Temp. Exp. 48° F; Focus 3.....7. Dev. Agf 1 in 24 63° 10 mins.
Guiding '37" Eyepiece dark paper wedge (v. difficult).

* 12ford Inpa Red Hypersensitized by 14 days with Triethanolamine

* Kautman I.P. Inpa Red Hypersensitized night before with ammonia
4 lbs .880 Ammonia in 100 lbs water
held at 10° C. for 50 sec
rinsed rapidly with Jan.

1938.

November 7. Total Lunar Eclipse.

The programme was to have photographed totality thus:-
30 minutes exposure on 12" Kodak Double X Pan with 6" F/4.5
30 minutes " " 12" Kodak Infa-Red Plate (Hypersensitized) 4"
30 minutes " " Eastmann ^{I.P.} 1" Red Plate (Hypersensitized Ammonia) * 4"

The last two with my Wray 4" & Min. Church's 4" Wray
mounted in the double camera used for same purpose in 1932.

On each of these three plates exposures were taken to
be made on Full Moon varying apertures & also varying exposures
on 6" Full Moon 5 secs exposure with apertures ranging from
 $\frac{1}{32}$ " to $\frac{3}{8}$ ".

and with $\frac{1}{32}$ " aperture exposures of (5), 20, 80, 320^{secs}.

On both 4" cameras Full Moon each 15 secs with aperture
ranging from $\frac{1}{4}$ " to 2".

and with 1" aperture exposures of 7.5^{secs} (15),
 $\frac{1}{h}$ 30, 60^{secs}

Unfortunately night was partially cloudy. The 4" cameras
were only able to be exposed for 3.5 min 10^h.15 - 10.18.5
and the 6" camera approx 1 min at 10.10 - 10.11
and 3.5 min 10.15 - 10.18.5 = 4.5 min altogether.

P.T.O.

lunar eclipse continued)

after totality clouds prevented any exposures on full moon.

It was not until a month later Dec. 8 that exposures could be made — 1.5 days past full moon. It was then useless to expose the plates taken with 4" lenses, as the hypersensitization had worn off. Thus only the 6" plate was exposed.

The exposures given were

Dec 8 12^{hr} (midnight). Exposures 5 secs $\frac{1}{32}$ " $\frac{2}{32}$ " $\frac{3}{32}$ " $\frac{4}{32}$ "
[and with $\frac{1}{32}$ " exposures (5), 20, 80, 320^{sec}.]

This plate was developed Agol $1\frac{1}{2}$ in 20 pts water @ 70° (starting) for 13 minutes.

The results are good — except that there must have been some mistake in the exposures of varying time with constant aperture — instead of $\frac{1}{32}$ " the exposures of 5, 20, 80, 320 ~~must~~ must have been made by mistake with a larger aperture & as there too much exposed.

The two IR plates with 4" lens were developed Agol $1\frac{1}{2}$ in 20 water @ 70° for 9 minutes. They cannot be used for

2,16 Plate taken some days before eclipse with varying apertures as test for necessary exposure times - apertures unfortunately have been mislaid. Exposures all 10 sec.

2,17 Plate. Total eclipse at center with varying $\frac{4}{h}$ apertures (\times varying $\frac{4}{h}$ exposures, over exposed) of full moon round margin.

Plate Total eclipse Hartman ^{I.P.} / I-R. hypersensitized ammonia
Plate Total eclipse Ilford IR hypersensitized with
Triethanolamine.

measurement. But they show a much milder
gradient over the eclipsed lunar surface than
the Blue Double X-Ray plate; and this in spite
of their intensity curve being probably much steeper
than that of the blue plate.

Plates show:-

1939.

Jan 12. Exposure 6" F/4.5 Ilford Double X-Pan
Pleiades. 6 hr 55 min to 7 hr 55 min = 1 hour.

$T = 32^{\circ}$ $F = 3-12$. Using heating element - no
dew at end of exposure. Transparency good ± 8 .

Developed Agel $1\frac{1}{2}$ in 20 water. $T = 65^{\circ}$ for 15 minutes.

Jan 24. Exposure 6" F/4.5 Ilford Double X-Pan
Comet Peltier approx time 6 hr 35 min - 6 hr 45 min. (10 min).

The intention was to give longer exposure, guiding on comet,
to get detail of tail etc. Hence the times were only approx
noted. Clouds however stopped exposure after 10 minutes &
guiding was only rather poor. Later it was found that
very few positions of this comet were to hand - so the plate
was measured (Merton 2 star method) for position.

Comparison stars used were BD 25° 4635 & BD 26° 4323.

Comet position $E = 1939.0$ was 1939 Jan 24 18^h 40^m 1

$a = 21^{\text{h}} 53^{\text{m}} 18^{\text{s}}.66$ $\delta + 26^{\circ} 0' 40".3$

The scale of plate came out at $1^{\text{mm}} = 5'.0833$
 $= 5' 5".6$

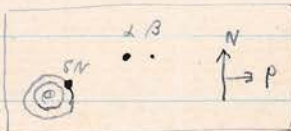
\therefore Focus 26^{!!}.6

Comet Peltier.

20. Feb. 1. $6^{\text{h}} 26^{\text{m}} 5. (\mu)$ 2 minute exposure 6" F/4.5 Wood Double X Pan
 $6^{\text{h}} 26^{\text{m}}$ center of exposure \pm . Plate shows comet with short tail. Drove
 on stars.

221 Feb. 12 Super Nova in N.G.C. 4636 ($\alpha 12^{\text{h}} 35^{\text{m}} 41^{\text{s}}$, $\text{NPD } 86^{\circ} 32'$, 1860)

Exposure from $13^{\text{h}} 55^{\text{m}}$ to $15^{\text{h}} 25^{\text{m}}$ = 90 minutes. Drove on
 5^{th} mag star just over 1° S/N nebula. Plate shows nebula with tiny
 star involved about $\frac{1}{2}^{\circ}$ N/P center of nucleus. Photographic mag
 roughly estimated at 14^{mag} . The same was just after exposure picked
 up in 18" reflector visually; α estimated as
 approx equal to star α , say $13.5-14.0$ mag.



The blank also suggests $\text{SN} = \alpha$, though owing to involvement in nebula
 comp. is v. difficult. Obviously S.N. has faded since Zurich's 2nd
 observation 12.5 mag Jan 20

Feb. 15 $12^{\text{h}} 0^{\text{m}}$ 18" reflector

Super nova estimated half way between α & γ (faint star + nebula)

Feb. 19 $11^{\text{h}} 30^{\text{m}}$ 18" reflector S.N. est. $\frac{3}{4} \alpha$ to γ about $1.2 \text{ mag} > \gamma$.

Feb 20. Super Nova 18" reflector. Same as Feb. 19
i.e. $\frac{3}{4}$ way from α to γ .

Mar 17. Super nova 18" reflector (after a long cloudy spell).

Observed only for a very brief interval in a gap in the clouds
all three companions ^{L.B.Y.} ~~stars~~ were easily visible - but though I suspected
very doubtfully the S.N. it was not definitely seen. \therefore it has faded
considerably since Feb. 20.

Mar 22. Super nova 18" reflector. Very transparent. all three
companions were very easily seen - but despite careful
examination with unaided vision no indication of S.N. could be detected.

April 19. Comet Hassel low down in N.W. Transp 3. hazy horizon. $T = 45^\circ$

1. Short Exposure for position $8^h 38^m 51^s$ - $8^h 40^m 51^s$. (2 minutes).

2. Long Exposure $9^h 8^m 30^s$ - $9^h 53^m 30^s$ (45 minutes).

but comet getting lower towards trees.

Both plates 1/2 pad Double X-Pen Bached. Developed Agst 1:15. $10^{\text{min}} @ 65^\circ$.

Long exposure shows 6° of tail, numerous subsidiary streamers from head,
a dislocation with two extra streamers about 1° from head, & to end of
tail the structure consists of fine feathery slightly diverging streamers.

1939.

223

April 20 Count Hassel. Transparency 4. owing to being so low down.

9^h 34^m 0^s - 10^h 14^m 0^m (40 minutes).

1st order Double X-Ray Backed. $T = 45^\circ$. $A_{3\lambda} 1:15 @ 65^\circ 10$ min.

224

April 21. Count Hassel. Transparency 2 with much passing cloud.

10^h 1^m - 10^h 36^m (35 minutes)

1st order Double X-Ray Backed. $T = 50^\circ$. $A_{3\lambda} 1:15 @ 65^\circ 10$ min.

225

April 22. Count Hassel. Transparency 5 on the low down.

10^h 38^m - 11^h 8^m. (30 minutes).

1st order Double X-Ray Backed $T = 45^\circ$. $A_{3\lambda} 1:15 @ 70^\circ 9$ min.

(Showing practical disappearance of tail!)

226

April 25 Count Hassel Transparency 4 but moonlight.

approx times 11^h - 11^h 20^m (20 minutes)

1st order Double X-Ray Backed $T = 40^\circ$. $A_{3\lambda} 1:20 @ 70^\circ 8$ min.

227

May 6. Grating returned from R.W. Wood with a new replica placed in between the two 6" plates. 1st order 6° .

≈ 6 " Coche 12^h 40^m to 13^h 0^m. Test plate on Actinium. 1st order X-Ray

Transparency ± 5 , but some passing cloud. Clock drive slow = 14.

$A_{3\lambda} 1$ in 20, 70° , 7 minutes. Both 1st & 2nd order rather ~~than~~ can exposed in bright part.

228
May 13 6" Replica Grating & 6" Coche.

Two exposures on a single Plate (1) α Cygni $10^h 30 - 11^h 0^m$ (30 minutes)
clock slow @ Mark 10 and (2) γ Cassiopeiae $11^h 40 - 12^h 20$ (40 minutes)
clock slow @ Mark 6. Very transparent ± 7 . Focus = $T =$
Ilford Double X-Pens. Developed Agf 1 in 12 @ 70° . 10 minutes.

June 6. F/4.5 Coche. Poor Transparency ± 3 $T = 60^\circ$ $F = 3 \dots 3$
Polar Winiweci's Comet $\pm 10^m 55^s - 11^m 40^s$ Exp = 45 minutes

Ilford D-X Pen Barched [$\frac{1}{2}$ Plate] Developed Agf 1 in 10. 70° . 7 mins.
Guided on stars

June 8. F/4.5 Coche Transparency ± 6 $T = 50^\circ$ $F = 3 \dots 7$

Polar Winiweci's Comet $11^m 39 - 12^m 29^m$ Exp = 50 min

Ilford D-X Pen Barched [$\frac{1}{2}$ Plate] Developed Agf 1 in 10, 67° , $9\frac{1}{2}$ m.

Guided on comet low power eyepiece & two square ended bars (~~square~~) comet ± 10.0 mag.

with sharply stellar nucleus - visually.

June 16. (1) F/4.5 Coche & Wood Replica Grating. Four exposures.

Arcturus: \pm each 10 minutes, driving 18 slow.

Focus $3^1 \cdot 0$, $3^2 \cdot 3$, $3^3 \cdot 6$, $3^4 \cdot 9$, $3^5 \cdot 12$, $T = 50$ Ordinary focus = $3 \cdot 6$

..... 5
| | | | | 1
| | | | | 2
←—————
5 4 3 2 1

(2) F/4.5 Ordinary exp Polar Winiweci comet $T_2 = \pm 6$ $T = 50^\circ$ $F = 3 \cdot 7$

P.T.O.

June 16 cont. 16ford D X-Press Backed $\frac{1}{2}$ Plate Exp. 12^{hr} 15 - 13^{hr} 0^{hr} = 45^m. Guided on wrist as before. Dev. H₂O 1 in 15 T = 70° 7^{min}.
 Comet now fairly easy in 2" Finder - not fainter than mag 9.0. Stellar nucleus.

June 17. Cooke F/4.5 + Grating. 16ford Double X-Press. whole plate
 Hartmann Test. Exposures made between 11^{hr} and 12^{hr}. Vega.

Grating half covered; Clock driving slow: just under 1 turn, mark 20.

- | | |
|--|-------------------------------|
| 1. N half grating exposed, Exposure ± 10 minutes | } F = <u>3...0</u> T = 50° |
| 2. S half " " " Exposure ± 20 minutes | |
| 3. N half grating exposed, Exposure ± 10 minutes | |
| 4. Half minute gap clock stopped | |
| 5. N half grating exposed Exp. ± 15 minutes | } F = <u>3...6</u>
T = 50° |
| 6. S half grating exposed Exp. clouds ?? (v. little) | |

Here F = 3...6 is the normal lens focus.

N.B. Primary image fell on S end of plate, 1st order lying just S of center, & 2nd order just N of center of plate.

July 12. Cooke F/4.5 + Grating

Mod. Hartmann Test Exposures made between 10^{hr} 30^m & 12^{hr} 30^m. Altair

Grating half covered. Clock driving slow, mark 17: under 1 turn. T = 50°

16ford Double X-Press whole plate. Very transparent ± 7. P.T.O.

? Plate 232

Record lost This is probably report of 231

1
2
3
4
5

July 12 continued (see over): Hartmann Test.

Exposures:	1	N half quartz window	Exposure	15 min	} F = 3...6 (T = 50°)
	2.	S " " "	" "	" "	
	3	N " " "	" "	" "	
	4	N " " "	" "	" "	} F = 3...12 (T = 50°)
	5	S " " "	" "	" "	
	6	N " " "	" "	" "	

N.B. Primary image S end of plate (i.e. its lower edge in camera), 1st order just S of middle of plate; 2nd order just N of middle of plate.

1939-1948.

Due to outbreak of war & my virtual absence from Healdy, no further systematic observations were made at Healdy after July 12. I occasionally visited Healdy for the odd night during 1939 & 1940 & on such occasions used to see Phillips in the observatory. But about this time Phillips retired & went to live at Tedworth; & owing to his failing health his own journeys to the observatory became infrequent. In 1940 I joined the army & shortly after lost Phillips - one of the greatest visual observers - died. By going "absent without leave" I managed to attend his funeral - & really got shot. It was on a lovely afternoon in Healdy churchyard - and all the cricket team attended in their white flannels - for T.R.P. was a most enthusiastic supporter of that game. After that I did not visit the observatory again until about 1944 - when, a day or so after my return from Italy, a "doodle-bug" fell very close to the factory, heading it completely down, & doing a certain amount of structural damage to the three observatory buildings (some smashed quite away), without fortunately damaging the instruments. With the aid of Musell, the gardener, I made the damaged buildings waterproof - until 1948 when the Royal Observatory finally took down the instruments & buildings: some were erected in 1850, the 8" heliometer was sold to the S. African Govt., & the 18" & 12 1/2" reflectors were sold privately.

1948

Asst. Suringhill. Sidwood Park.

August 29. During afternoon a piece of white continuous thread was stretched diagonally across from all four corners of plate holder and of camera (F4.5 Cooke), their intersection giving the center of the plate. With an optical microscope the reflections ^{from lens} were observed & found to be very slightly (about $\frac{1}{10}$ ") above the intersection (when camera was E of pier & pointing S.) This was corrected by push & pull screws of lens — the upper part of the lens being brought nearer to the plate.

An exactly similar (photomicroscopic) method was then used to check centering of visual 6" Obj. & a very slight correction made to the lens bringing the reflections exactly to center of the eyepiece tube. This was checked the same evening on a star image & found to be very satisfactory.

Evening A series of exposures were made on a star field (Altair at center) 2 minutes each at different fuses.

3.0 ⁽³⁾ ₍₄₎	3.0 ⁽²⁾ ₍₀₎	2.5 ⁽¹⁾ ₍₂₁₎
3.0 ⁽⁴⁾ ₍₈₎	3.0 ⁽⁵⁾ ₍₁₂₎	
3.0 ⁽⁷⁾ ₍₂₀₎	3.0 ⁽⁶⁾ ₍₁₆₎	
3.0 ⁽⁸⁾ ₍₂₄₎	3.5 ⁽⁹⁾ ₍₃₎	
	3.5 ⁽¹⁰⁾ ₍₇₎	

On development I think there is no doubt that the best images were those of Exposure (5) "3.0 12" Exposure (6) I think superior to Exposure (4)

During this exposure Temp in Observatory fell from 57°-52°. Plate used was Ipford Express Ortho.

Provisional Value of Revolution of Micrometer = $25.9''$ Probably ± 25.86

Micrometer Eyepiece X125 X210 X350

448.

August 30. Driving on star East of meridian near pole - when movement in RD was clearly in altitude only - no appreciable drift was detected in Dec with 15 minute run.

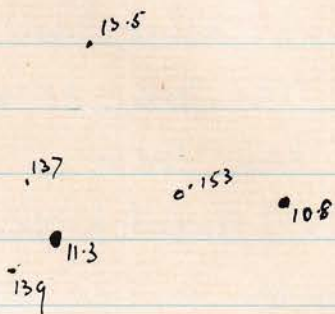
Driving on a star on meridian (N. Dec $17^{\circ} 10'$) starting 18 minutes E of meridian there was only 2073 sec drop in field by time meridian was reached. During the next 29 minutes there was a large drop (due to refraction now working in same direction) amounting to about $\frac{1}{2}$ the distance between the two fixed micrometer wires. This indicates that south end of polar axis points slightly E of South.

October 21-22-23. Several determinations were made of the Micrometer Screw revolution value on Transit of Polaris using the lowest medium & highest lower cyclopes. Each time the readings were taken over 10 consecutive revolutions. The results ranged from 101.0 to 101.5 seconds of time per rev. The provisional value adopted worked out to $25.9''$. There seemed to be no variation in the different revolutions.

October 29. Rough measures of Magnification of Micrometer by prism gave for discs 1.2 mm 0.7 mm 0.42 mm : $\times 126$; $\times 210$; $\times 350$

234.

U.V. Persei :



0 = U.V. Persei

235

Plate shows above stars except 0 & 153 - near the point
on v. faint object seen ? 0 ? 153. I feel it would be worth
trying for U.V. again after correcting lens & giving say 2 hr. +
exposure. This plate was taken in v. transparent sky &
near zenith.

Oct. 30. Two focus plates were made. One on whole Plate & one on $\frac{1}{2}$ Plate with adaptor.

Whole Plate $T = 40^\circ$ all 1 minute exposures.

$\frac{1}{2}$ Plate $T = 35^\circ$

Pattern same for both plates 3-6

3-9

3-12

3-18 3-15 3-21 3-24

In both cases results were same showing no difference in focus for Plate Holder & $\frac{1}{2}$ Plate Adaptor.

There appears to be a faint outer halo round images.

Fainter images where outer halo is not visible give 3-15 but focus. But darker images where halo fills up but images would be 3-21 & 3-24 were! On reexamining Plate of Day 29 same effect is seen but it is not apparent in previous focus plates at steadily!
? some change in position of components

Nov. 6. Exposure 60 min $2^h 44$ to $3^h 44$ sid time. ^{*} (11:45-12:45 AM)

$T = 43^\circ - 38^\circ$ F 3-12 Star very near U. V. Persei & close

to Double Cluster. This plate shows same image defect as focus plate, & also more rapid increase of coma etc. from center than in original steadily Plate. Inspection showed that front component of lens was not secured quite home - $\frac{1}{8}$ - $\frac{1}{4}$ Rev. Put up! ? Cause.

Hyd 1 in 20 70° 12 min.

To Test next fine up!

1448

Nov. 14. Focus Plate 6 hrs 30^m - 45^m G.M.A.T. Vega center. 1 fford Pan Octav S2
6 Exposures after seeing home part lens of triplet.

The halo effect showed in all plates taken at Aesd is unchanged.
Is it possible that effect is due to green sensitivity of the plate?
I phoned Deason of Icford who tells me that the Octav series 2
- the improvement on Icford Double X Press - has been greatly boosted
in green. He tells me Zenith 700 is an ordinary blue plate & that the
Prinial Zenith Astro Plate has only a slight sensitivity in red.

Nov. 20. Focus Plate 1/2 Plate Zenith 700 6 hrs G.M.A.T.

6 Exposures. Further broke in untable Exposure 2 minutes.
of intended first exposure.

The halo effect has gone!

3/6	
⋮	
3/9	
3/12	3/21
3/15	
3/18	

Nov. 20 10 hrs - 11^h 30 G.M.A.T. 2 Focus Plates on 2 Arctis

Exposures 1 minute each	3/6	
	3/9	
First Plate Zenith 700 1/2 Plate	3/12	3/21
	3/15	
second Plate Astro Zenith White Plate.	3/18	(3/21)

No halo effect on either plate. But? a little more
large round large images on the Astro Zenith.

Both plates developed together same time: I think Zenith 700
gives slightly fainter?

Rough determination of amplitude of periodic error in worm
drive = ± 0.19 Rev or Total 0.38 Revolution
i.e. $\pm 5''$ or Total ± 10 Sec of arc.

Nov. 21. Intended to give 2 $\frac{1}{2}$ hr exposures on same field with zenith 700 & Astro Zenith. But cloud stopped before first exposure completed.

Plate Zenith 700 $\frac{1}{2}$ Plate. 6^h 5^m - 6^h 28^m G.M.A.T. Centre $\left\{ \begin{array}{l} \text{Cygne} \\ \text{Cygnus} \end{array} \right.$
Exp = 23 minutes. Focus 3/12 T = 45° Temp. rising. But increasing
passing cloud. Dwellled Δ 1 in 20 65° 15 minutes.

Dec. 4. About 6^h 30^m G.M.A.T. Focus Plate Zenith 700 ($\frac{1}{2}$)
Centre on γ U. Min 7 1 minute exposures (exactly 1 min) &
driven critically

Temp = 40°.

3/6

3/8

3/10

3/12

3/14

3/16

3/18

3/18 (not driven critically).

There is no doubt that 3/12 & 3/14 are the best images & probably
3/14 better than 3/12. Suggest correct setting is about 3/13.

Dec. 12. During short period of clear sky an attempt was made
to determine the maximum oscillation of a star in the field
due to periodic error in the worm. Seeing moderately
good. There appeared to be a double oscillation one considerably
larger than the other. The magnitude of the larger one
was found to be full amplitude 0.38 Revolutions of
Munich saw which is about $9\frac{1}{8}$ - say 10 seconds.

Polmer Sequence comparison of Zimith 700 & Zimith 400.
Plates equal but Zimith 700 at slight disadvantage
in development & transparency

∴ Zimith 700 probably slightly faster
Exposure 40 minutes Temp. 3-4 (V 1000)
Landing May 14.5.

1948. Dec 24. Comparison of Zenith 700 & Zenith Astrom.
1 Exposed Plates.

One exposure each plate of 40 minutes on Polar
Sequence (Expos on Polaris)

Zenith Astrom Whole Plate 6 hr 15^m to 6.55
(Exp. Start Time = 24^h 30^m to 1^h 10^m) Temp \pm 3-4 (v. poor)

Zenith 700 Half Plate 7 hr 20^m to 8 hr 0^m.
(Exp. Start Time 1^h 33^m - 2^h 13^m) Temp \pm 3 ? slightly worse

Both plates developed in alternately in same Agot
sol (1 1/2 hrs in 20) at starting T = 70°. But temp
fell v. quickly & more quickly in the Zenith 700 dev
& Zenith 700 was probably less developed than Zenith Astrom.

On examining plates 14.5 mag was seen on both
equally well - this was limit of definite images.
Since both plates reach same limit & since if
anything Zenith 700 had disadvantages in both transcribing
& development the test is slightly in favour of Z 700.

During exposure the driver appeared good - there was
practically no correction in declination. But on plate
elongation is already apparent in the sequence stars.

Focus of camera was 3/13 T 37°-35°

The warming element was used & lens was perfectly
clear, while the unwarmed Visual Obj was heavily covered

~~May~~ Jan. 1st.

(1) Minor Planet Nausica ($4^{\text{h}} 5^{\text{m}} 3 + 32^{\circ} 56'$)

Exposure $9^{\text{h}} 55^{\text{m}} - 10^{\text{h}} 10^{\text{m}}$ approx Total 15 minutes. Transp. 7
Heating element used - no drawing. [* train time did clock (G.S.T.)
from $4^{\text{h}} 0^{\text{m}}$ over - $4^{\text{h}} 55^{\text{m}}$ over.] Dec. set on star $33^{\circ} 15' N$ for
guiding. $T = 40^{\circ}$ approx. Half Plate Zenith 700.

Tropic gale blowing - very narrow about w/f, but all was well.
Above was intended to be followed by second plate 3 hrs later but
they clouded over - to be used in Blunk Comparator for identifying planet.
Agst 1 in 15 $T = 70^{\circ}$ - 20 min.

(2) Polar Sequence $T = 40^{\circ}$ Exposure 15 minutes Zenith 700 $\frac{1}{2}$ Plate Transp. 7

G.S.T. $5^{\text{h}} 47^{\text{m}} 0 - 6^{\text{h}} 2^{\text{m}} 0$ (approx 11^h to 11^h 15). ? Some
fading cloud - but very slight. Agst 1 in 15 $T = 70^{\circ}$ 20 min.
Plate centered on approx true W - no guiding done.

Images are good far better than before. Star seen down 14.9
mag definitely. Below 15.0 some suspected stars not seen.

It appears that 15 min in good sky reaches 15 mag.

Clouds prevented a companion exposure with Zenith astro plate.

(3) Ecliptic Comet 1948 L. Easily visible in Ron Brinson's

8.2" finder. In Comet highest on C⁴ very large & diffuse no
nucleus. Round - possibly 20'-30' diameter May 6-7.

But little time to observe as I wanted to get a plate.
Too low to guide on comet - could just reach a

N.B. The minor planet Marsica was quickly picked up in the
Mink Computation using this plate Jan 3 start of Jan. 1.

quite clear over well with 6" sq. - but Camera lens
was fully clear of obstruction. Transparency about 7
but very low down & some passing cloud. Alt = 13°
Exposure 11.54 to 12.15 approx 9 MAT - but at
least 5 minutes were obscured by cloud [21 min ? 15 min]
Zenith direction White Plate $T = 40^\circ$ Focus 3/13.
Height 1 in 15 $T = 70^\circ$ 20 mm.

Count appears about 6-7 mag. No tail. Only
more central parts appear though faint surrounding
webs can be traced with diameter of 10'. There are
questionably 2 or 3 condensation in outer part of this
webs - but ? faults in plate. Count in exposure traced
Hourly motion was 145" N p.

Jan 3. Being very clear I came down from London to Photowall
Comet. Unfortunately sky clouded over about 9 hr 30
9 MAT & nothing could be done. However a plate was
exposed on minor Planet Naosica - for comparison
in Blink comparator with plate exposed two nights ago.
Set in Dec $33^\circ 20'$ on what I think was the same
quadrant star. Exposure 8.55-9.10 9 MAT ±
[G.S.T. exact 3 hr 48^m to 4 hr 3^m]. Very Transp 8
Exp. 15 minutes. $T = 33^\circ$, $F = 3/13$ Zenith 700. $\frac{1}{2}$ PL.

On Jan 16 obtained Position of Observatory from Ordnance
Survey Map and changed clock from G.S.T. to
Local Sid. Time

Position is $0^{\circ} 38' 18''.87$ West.

$51^{\circ} 24' 37''.77$ North.

Correct Sid Time = $2^m 33^{\text{Sec}}.26$ late of Greenwich.

1944. Jan 8. Moon fairly quiet but sky transparent.

1. Exposure on Polar Sequence Series of graduated exposures
7 sec 20 sec 1 min 3 min 9 min 27 min. owing to
moon too high were hopelessly fogged. The picture shows that
this field will probably give a satisfactory series of images
for magnitude scales.

2. Exposure on Comet 1948 L 12^h 7^m G. M. A.T. - 12.37
Very transparent, but plate hopelessly fogged by moon. Comet
too low so that no guiding could be done - the clock was
left on its own & thus in bad trailing. Comet was just
visible after the exposure when moon was getting low.

1944. Jan 21 Intended to photograph Comet Neowise I
as suggested by Herton; but as soon as it was dark enough
comet was too low for more than v. short exposure &
exposed map is about 14!

Exposed on Comet 1948 m Bertin $\frac{1}{2}$ Plate 2 with 700
Faintly transparent but checked over towards end of exposure.
Local Sid Time 3^h 14^m to 3^h 44^m (30 min Exh.)
Guided on comet with micrometer wire moving at 5 minute
intervals 0.37 Revolution. Dwell had 20 min 65°. 1 in 20.
Object almost entirely comet - faint fuzz. : 2^h 30^m - 8^h 54^m
approx.

1949. Jan 23. Exposure made on Beta Grant at G.M.A.T. 6.15 but within 5 minutes it clouded completely & remained thin for $\frac{3}{4}$ hrs. as I had started microscope driving on count the exposure could not be continued satisfactorily after so long an interval.

about 7.30 G.M.A.T. it cleared again & a second plate was exposed. from approx 8.0-8.30. Run time was L.S.T. $4^h 1^m$ to $4^h 33^m$. Exp = 32 min. Very poor transparency - microscope guiding on count. Swel Hgt 1 in 20 $25^m 65^{\circ}$. On this plate, tho' same exposure, images considerably less dense than on plate of Jan 21. However object inspected on Jan 21 plate was not traceable in a corresponding position on tonight's plate. ? fault in plate Jan 21. Beta plate $\frac{1}{2}$ Plate Zenith 700.

1949. Jan 28. Count Beta 1 hr. Exp. Zenith 700 $\frac{1}{2}$ Plate L.S.T. $3^h 7^m 54^s$ approx 6.30-7.30. V. transp. Unfortunately, forgot to fix clips in plate holder & plate was loose. Result hazy - but perhaps of interest as example of out-of-focus image. Too late to get a second plate.

Eclipse Grant 1948 L. 40 min Exp. Zenith 700 $\frac{1}{2}$ Plate L.S.T. $6^h 33^m - 7^h 13^m$ from 5 minutes on count. Only used. Transp. $T = 30^{\circ} \pm$ Swel Hgt $1/24 70^{\circ} 25$ min. Count is well seen on plate as small circular fogs with much central condensation - no lack of circularity & homogeneity. after exposure count was a faint tho' very distinct in 6" count eyepiece - very large & diffuse may be read roughly 8-9.

(3) Emulsion case of →
plate destroyed

1949. Jun 29. Mercurially transparent but thick haze low on ground & obscuring
slightly towards horizon.

1. Exposure Berta comet 1448 m L.S.T. 2^h 54 to 3^h 54 (One Hour)
approx GMAT = 6.20-7.20. Mercurially clear on comet RA. 2^h 25^m Dec 0°
T = 39° F 3/13.

2. Exposure Berta comet 1448 m L.S.T. 5^h 49^m - 6^h 31^m (42 min.).
Owing to lower alt. & increasing haze transparency considerably less than
first exposure. In fact I stopped it as I felt it was pointless going on.
Plate required as check on the earlier plate. Again Mercurially clear on comet.
Same position. T = 35° F 3/13.

3. Exposure series on comet 1448 L (celipus C.)

(1) 15 mins (2) 5 mins (3) 100 sec. First two minutes
clear on comet L.S.T. 7^h 5^m - 7^h 20^m; 7^h 22^m - 7^h 27^m;
7^h 29^m for 100 sec.*

Intended to make a series of exposures in & out of focus
on Psh - but increasing & variable haze made this useless to attempt.

* The last exposure of this series of 3 did not come out - presumably the shutter
did not open. The comet appears in the 15^m & faintly in the 5^m exposure.

The plates of Berta's comet show a small diffuse object which
has moved the correct amount between the two exposures. The positions
on the two plates are approx 2° North of the position of Berta. In the
true position of Berta a fairly definite, but v. faint, object was found only
on the 1st & longer exposure. This is probably the comet.

* Plate Broken. not kept after
a few weeks.

1949. Jan 20. High haze - late morning overcast.

auster exposure was made on Comet Beata to check up on the two plates of last night. L.S.T. 3^h 0^m to 3^h 50^m.

(approx G.M.A.T. = 6.24 - 7.14) but clouds hazing most of the time & the finding than often invisible. Exposure stopped when it completely clouded over. Zenith 700 1/2 Plate. Neither of the two objects was shown.

1949. Feb. 19. (1) Exposure* Comet Beata RA 2^h 41 Dec. +8° 30' approx.

Exposure 1 1/2 hours L.S.T. 5^h 5^m 12^s to 6^h 35^m 12^s (G.M.A.T. approx 7.10-8.40)

Transparency about 6. Zenith 700 [Dwed. Agd 1 in 12 65° 20 min] T about 45°. A very faint (? doubtful object) in Mercator's position as on the first & larger exposure of Jan 29. No trace of the other suspected object 2° north. If the suspected image in Beata I would put it 3 mag ± fainter than that of Eclipse Comet photographed shortly after ward (see next plate). As eclipse comet is said to be (or appears to be) magnitude 11, this makes Beata mag 14. Numerous stars on comet

Feb 19 (2) Exposure Eclipse Comet RA 5^h 49^m - 6° 30' approx.

Exposure 40 minutes L.S.T. 7^h 9^m 12^s to 7^h 49^m 12^s. (G.M.A.T. approx 9.10-9.50)

Transparency about 6. Zenith 700 (Dwed. Agd 1 in 12, 65°, 20 min) T. about 40°.

Numerous stars on comet. Object is very easy. Comet with plates on Jan 28 & 29 suggest that it has faded 1 mag. Said to be & looks about 11.0. It is enormously easier than Beata (?) with 90 min exp. - probably 3 mag brighter.

None came up after this & nothing more done.

left of the
star.

Feb. 26. Intermittent clouds. Tried to take a graduated series of exposures on Ecliptic Comet - but the 3rd & 4th of the series were interrupted by cloud & finally the sky clouded completely.

Zenith 700 $\frac{1}{2}$ Plate (1) 1m 27 sec. The focus timer was not noticed
 (2) 4m 20 sec. as it was realized the plate
 (3)[±] 2 min. would be of no use. The exposure
 4 \pm \pm 15 min. was roughly between 11:00 & 11:30 A.M.

No image of the comet could be detected on this plate. $T = 47^\circ$
 Devol. Agst 1 in 20 70° 20 min.

Feb. 27. (1) Exposure on Ecliptic Comet: series of 3 graduated exposures. Sky very transparent ± 8 . No cloud. Zenith 700 $\frac{1}{2}$ Plate. $T = 41^\circ$

(a) Exp. of 39 min. L.S.T. $6^h 4^m 10^s - 6^h 43^m 10^s$.

(b) " " 13 min. L.S.T. $6^h 46^m 10^s - 6^h 59^m 10^s$

(c) " " 4^m 20^{sec} L.S.T. $7^h 1^m 50^s - 7^h 6^m 10^s$.

Devol. Agst 1 in 20 70° 20 min.

Examination of plate showed no trace of comet was in the longest of the exposures. Just the next day that Comet had presumably faded unexpectedly & he wrote back to say at the same time as my exposure he had searched visually at Oxford (12"?) and found a faint nebula emerging on the North side of a 9th mag star. B.D. = $4^\circ 1268$ later this was confirmed by the nebula moving clear of the star. A re-examination of the plate showed a perfectly definite small nebula protruding on the North side of this star's image.

Feb. 27 cont.) (2) Exposure on Schwarzschild Wachmann (1) —
suggested by G. Merton in case this work may have made use of
its periodic flare-ups following the recent great solar activity;

Exposure centered R.A. $8^h 56^m \pm$ Dec $+18^\circ 40' \pm$

Transmittance ± 8 — very good. No clouds. $T = 37^\circ$.

Exposure 60 minutes. d.S.T. $7^h 55^m 40^s - 8^h 55^m 40^s$

(Approx. G.M.A.T. 9.25-10.25). Two stars on stars. $M_{\text{total}} = 20$ $T = 70^\circ 20''$.

On examination there was no trace of any cometary object within
several minutes of arc of S-W predicted position. Certainly < 12.0 mag.

probably < 13.5 mag. But in R.A. $9^h 0^m 5^s + 18^\circ 42'$ (1920)

a fuzzy object \pm mag 11.0 was seen. This was not found till plates
were examined on Feb. 29 — on this day I phoned V.A.S. & asked him to
search with 30" telescope at Cambridge. He reported next day —
no comet near place given; but in this place a small cluster of
12-13 mag stars. This is probably my object.

Mar 13 Took ill — infantile keratitis — was
unable to do any observing — but began
in a vague sort of way a year later
by trying to photograph total lunar eclipse —
which I im-
- in 1950 April 2.
Unfortunately clouds prevented any observations.

1950 April 2. Preparation made for photopublishing
Total lunar eclipse - ordinary & I-R plates with
variable apertures & fine exposures. There was
some light cloud - except for a few minutes when
mid W. light when moon was faintly visible.
Very beautiful to N-E - but no good for
programme. However both plates were exposed
- about 3 min - ord. Plate 6" 4.5 f. &
I.R. Kodak plate 6" f 11.0. I.R. plate no
mark; but quite dark image on ord. plate
- this' cloud was poor as moon was largely
invisible in preceding telescopes.

was helped by Lt. Edgar Thompson
& my chauffeur Ken. Smith.

1951.

Jan 31. Attempted to photograph *Trichia conch.*

But as exposure was started clouds came up & the resulting plate (40 min. exposure) showed very few stars & no comets.

Feb. 6. Attempted to photograph *Trichia conch.*
1951a. Perfectly clear before dawn; but as comet rose above trees (E. horizon) clouds covered it. At 6 hr 10 min the guide star became visible, but his light was getting brighter. Increasing his light & passing clouds resulted in a fogged plate (Exp = 15 min) & stars only to mag 6 & no comets.

*
Feb. 12. Exposure on Comet 1951b (Arend & Rigaux) d.S.T. 6 hr 1m - 6 hr 41m.
Hours time by MAT. 8:30 - 9:10. Exp. = 40 min.
RD. 7 hr 30 + 27° - guide star \checkmark green. (v)
Very clear but moon 6 days old.
No heating system - no dew. Plate helped Zeiss Photo.
T: 40° - 35°. F = 3/13. No sign of comet on plate

1951. Mar 3. Exposure 20 mins 1951 a, Zenth Astronomical Plate
 $\frac{1}{2}$ Plate. Drove on moving wire, but made a slip &
only drove about $\frac{1}{2}$ the proper rate. Comet shows as bright
linear nucleus with short & widened tail.

1951. Mar 4. Exposure 40 mins 1951 a Z. Ast Plate $\frac{1}{2}$ Plate
Local Sidereal Time 5^h 59^m to 6^h 40^m.

Position of Plate \pm 23^h 15^m +53° Moved micrometer
wire 1.0 revolution per 5 minutes (δ $36^{\circ}.5$)

Comet appears as bright nucleus with broad fan-shaped tail
Star trails are good. Tail 10' long.

Rough position of comet 1950 23^h 19^m 3 53° 10'

1951. April 25 Comet 1951 Kresak. Exposure 45 minutes ZA Plate

Drove on 46 Cancer (stationary wire) d.S.T. 11^h 18^m to 12^h 3^m.
[U.T. = 21^h 28^m $\frac{1}{\lambda}$] T = 55° Focus = 3.7. No heating of lens -
no dew. Comet appears $\frac{1}{2}$ degree following 46 Cancer. Rough

position - measured from 46 C. with 8" Wey microscope - is
(1951) 8^h 44^m 1 +30° 50' (using 46 Cancer position H.A. 50)

N.B. Comet discovered previous evening in Russia RA 8^h 40 +30° 30'

- no daily motion given. My plate shows very diffuse patch of
light about 7' x 5' with eye, & 3' x 2' with lens & hardly any
central condensation. Very low luminosity - but I had integrated
brightness 9.0 or brighter. No time to look carefully for comet
with 6" - but not seen in a rough examination.

Count 1951 f (Keresak)

1951. April 27. (Left Asut 26⁰⁰ for Conwell & reached W.M. Lindley on 27 & showed count visually with him in 5 1/2" scope)

W.M.L. found count quite easily. I thought it mag 9.0 or brighter - he put it at 10.0. Position 22^h 55^m V.T. RA 8^h 52^m 35^s + 31° 28' (1951)

April 28. W.M.L. Conwell. We again got count - same as previous night. Large & diffuse - no condensation 21^h 42^m V.T. RA 8^h 56^m 22^s + 31° 41' (1951)

Apr. 29. W.M.L. Conwell. Count as before fairly easy & large in 5 1/2" M=9.0 Position 22^h 25^m RA ~~8^h 56^m 22^s~~ + 32° 23' 9^m 00^s - 36 + 32° 1' (1951)

May 2 W.M.L. Conwell. Count as before
V.T. 21^h 55^m & 9^m 13^s 43 + 32° 46' (1951)

May 3 W.M.L. Conwell. Count as before 1951 f (Keresak)
V.T. 21^h 40^m & 9^m 18^s 4 + 33° 1' (1951)

May 10. Returned to Asut 35 mins Exp. on 1951 f (Keresak)
L.S.T 13^h 8^m to 13^h 43^m. T=45° F 3/10. (Moon near.)
at 9^h 48 S + 34° 0' Drive on star. Count fairly easily sea afterwards & count eyepiece. Plate shows count much the same as on Apr. 25.

May 11. Moon too near to photograph count - would see it fairly easily however with 4" Wray & count eyepiece.

1951 Dec. 26. Exposure for Comet Harrington 1951 K. Bad clouds
intermittent & nothing of comet is seen on plate. Plate ^{was} at height.

Dec. 30. Exposure (about 40 mins.?) on Harrington 1951 K.
approx position $1^h 16^m.5 + 16^{\circ} 25'$. Guided on star -
comet appears as faint trail. About May. 11.

1952 Jan 18. Comet Schumasse 1951 L
 $\alpha 7^h 35^m.7 + 49^{\circ} 39'$. Exposure 34 min L.S.T $5^h 1^m - 5^h 35^m$.
Focus 3-13 $T=35^{\circ}$ Swirl. Azim 1 in 12, 12 min, 70° .
Exposure intended to be longer but cut short by cloud.
Comet int. about mag 8.0 - easy in 2" field glasses - very
long & diffuse. On plate appears perfectly round coma - no tail,
bright nucleus.

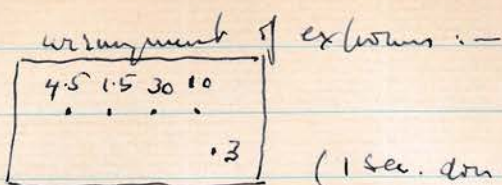
1952 Jan 26 Schumasse 1951 L
Plate centered $\alpha 8^h 9^m + 55^{\circ} 40'$ Exposure 66 min. LST $6^h 1^m - 7^h 7^m$
(L.T approx $22^h 15^m$). Focus 3-18 $T=25^{\circ}$. Plate Zenther 700.
Swirl. Azim 1 in 12, 14 min, 70° . Transparency fair - some
faintly cloud. Comet shows no sign of tail.

1952 Jan 27. Schumasse 1951 L
Graduated Exposures 1 sec. 3^s . 9^s . 30^s . $1\frac{1}{2}^m$. 4^m -

Cf. Photo 1952 Feb 23 with 24"-36" Antis Schmidt, Michigan reported in
La Physique des Comètes p 35 - practically identical with my photo Jan 28
- 27 days earlier. On my photo east Red Vector = PA 17° , hence
angle of divergence is 15° . Diagram in above article shows (p. 37)
angle of divergence on Feb 23 was but 10° in same direction.

1952

Jan 27. cont)



(1 sec. don't get exposure)

Comet appears 4.5^m & 1.5^m & ? 30^{sec}.

Time of Photograph approx 19^h U.T.

Jan 27 cont. Schumasse 1951 E

Plate centered 8^h 13^m + 56° 26' Exp 66m. LST 5^h 45^m - 6^h 51^m.

Form 3-18 - T = 27°. Plate Zenith Aster Dec. Argol in 12,

14 min., 70°. Transparency fair to good (much as previous night)

[On this & previous night used small st. c. prism on
meridian eyepiece for guiding, as it was almost in zenith).

Comet much as before but was suggestion of tail
pointing due South. N.B. This plate is less good form
than 2700 & shows not such faint stars. Magn 6.5-7.0

Very easy in field glasses & v.?? with naked eye.

Jan. 28. Schumasse 1951 E. Plate centered 8^h 15^m + 57° 12'.

Exposure 66 min. L.S.T. 6^h 7^m - 7^h 13^m. Very transparent &
comet very close to zenith - hence guiding with st. c. prism on moving web.

Web moved 18" east 8 min.: hence star trails = 2' 26". PA = 224° 45'

F = 3-18 (T = 35°) (should have been 3-14, but forgot to change it from last night.)

This plate shows a very definite, but extremely thin filamentous
tail about 20' long in P.A. 185°. Tail appears better on

paper prints & Lumina slide (later enlarged). Apped 2.700

Magn 6.5-7.0

Argol in 12, 70°, 12 min.

Feb. 12-23. Unfortunately got a cold & couldn't observe, so missed the greater part of the next moonless period & several clear nights.

Feb. 23. It was hoped to photograph C. Schumannrose 1951 β & C. Wilson-Harrington 1951 ϵ - but the whole week - and the sky was very hazy & mostly overcast. However one exposure was got on C. Wilson-Harrington, which is now up from S. hemisphere but fading.

Feb. 23. Wilson-Harrington 1951 ϵ . Exposure 42 min \angle ST. $5^h 30^m = 6^h 12^m$.
Owing to bad haze & passing cloud had to use a bright star \vee β for guiding $\pm 2^h 30^m + 5^{\circ} 10'$ which had the moon $2^h 39^m + 4^{\circ} 42'$ considerably off center. Despite the bright star it was often blotted out by cloud - hence the guiding is poor. Moon was in 8 min $17''$. Hence star trails = $1'30''$ PA = $199^{\circ} 15'$. With haze & cloud I doubt whether the 42 min. exp. was worth more than 10 min.!

($F = 3.13$ $T = 40^{\circ}$). Swed. Hyd. i in 12, 70° , 12 min. 1 f. focal Zeiss 700. Plate shows small comet \pm mag 10 but with v. definite robust tail about PA 80° and about 2' long. The exposure was ended by incoming cloud - & clouds prevented any attempt on P. Schumannrose.

1952.

Mar 23. Schummers comet.

44 mins exposure on this comet in very transparent sky.
L.S.T. = $12^h 59^m - 13^h 42^m$ approx V.T. 1^m to $1^m 44^m$.
 $T = 40^\circ - 35^\circ$ $F = 3.13$ Draw with micrometer $13''$ (0.51R)
per 8 minutes. approx RA $11^h 58^m$ Dec $+46^\circ$.

The comet has faded a bit. No longer any sign of
the tail - just round object.

~~May 17~~ New Comet Markos discovered May 14. Message
from Markos asking for confirmation.

Exposure double 40 mins & 13 mins
L.S.T. $16^h 29^m$ to $17^h 9^m$ & $17^h 10^m - 17^h 23^m$.
 $T = 55^\circ$ $F = 3.8$. Fairly transparent but v. low altitude
& last quarter moon rising towards end - hence fogging
of plate RA. $23^h 58^m + 40^\circ 20'$.

Comet about mag 11 diam = $3'$. Two images with
Both show oval PA $60^\circ - 240^\circ$ N+ - S+ . Layer
image shows a duckhead arc in one S of central
condensation. ?? defect. The secondary condensation
is $30'' - 40''$ distant from primary in P.A. 160° .

May 26. Comet Markos.

Exposure 45 min L.S.T. $17^h 1^m - 17^h 46^m$.

Central Exp approx V.T. $1^h 12^m$. Fairly transparent
but down coming at end of exposure. Plate central
 $\Delta 23 57 \delta + 38^\circ 49'$. $T = 53^\circ$ F 3-9. Down on Comet.

Dwell Hyd 1 in 12. $T = 70^\circ$. 10 min. 1/2 pd Zenith 70° .

Comet as before May 11-0. Total diam $2' - 3'$.

Double nucleus: Primary $20''$ diam. Secondary $10''$ diameter
separation $40''$ PA 110° (secondary of primary.)

? Is this the same double nucleus as found on
May 17 with the PA changed. On this plate both
nuclei are perfectly round - not elongated as on May 17.
Secondary nucleus is not a star etc, as it is not
present on plate of May 17 - it does not look like a star.

June 23-24 Comet Peltier Exposure 30 min

approx V.T. = $23^h 45^m$ June 23 (mid exposure).

L.S.T. = $17^h 32^m - 18^h 2^m$. Transp 6.

$\Delta = 14^h 40^m + 68^\circ$. Down on star. $T = 55^\circ$ F = 3-9

Dwell. Hyd 1 in 12 10 min 70° . 1/2 pd Astro Zenith

- old plate. White Plate. Comet round May 9

No motion Position from BD = $14 42 20 + 68^\circ 22'$

V.B. Comet very in $6''$ & glimbed in $2''$ finder.

1952.

June 27-28 Count Peltier.

Looked for comet, but could not see it - so waited no time & gave 30 min Exp.
Exp. 30 min. L.S.T. 18^h 0^m - 18^h 30^m approx V.T. 0^h 0^m mid exposure.
Setting $\alpha = 14^{\text{h}} 53^{\text{m}} 30^{\text{s}} + 69^{\circ} 58'$ (nearest high star). Drove on star.
Zenith 700 (Betel 1951 Feb.). Transp. 4. T 65° F 3-6. Very hot day
So opened up roof 2 hrs before. Excellent flat. - no fog - & very
good star images ? due to allowing time for cooling. at first
no sign of comet - but then found ^{it} as faint nebulae surrounding
8.5 mag star BD 69° 773 - ? signs of extension towards fr.
Position (50k from star) 1952: $14^{\text{h}} 50^{\text{m}} 47^{\text{s}} + 69^{\circ} 25'$
Decl. April 1 in 12 $75^{\circ} 10$ mins.

June 28-29. Count Peltier

Exp. 40 mins. L.S.T. 18-23-19.3 mid exp about 0^h 30^m V.T.
Setting about $14^{\text{h}} 53 + 69^{\circ} 41'$ Drove on star. Transp. 5.
T=65° F 3-6 Opened roof 2 hrs before. Refed Zenith 700 $\frac{1}{2}$ plate.
Very good images no fog. Comet now clear of stars. ? slightly
fainter than with eye Position from BD = $\alpha 14^{\text{h}} 52^{\text{m}} 47^{\text{s}} + 69^{\circ} 40.2'$
Decl April 1 in 12 $73^{\circ} 10$ mins.

1952. Nov. 8.

Exposure 90 min on D. F. Cygni. Miss Harwood
skipping work and took this plate. Transit about 4.
(U.T. approx $21^h 32.5 - 21^h 52.5$) L.S.T. $0^h 42 - 1^h 2^m$.
Zenith $700. \frac{1}{2}$ plate. $F = 37^\circ$ $F = 3.14$ $\Delta \rho 1 \text{ in } 12 \text{ 10}^m$
Miss H kept the plate. 75° .

Dec. 9. Made a number of runs on Polaris with
TERP micrometer & new Barlow for value of screw
while doing Mercury. I fell over & broke my leg
No other observations were made until Jan 29
lunar eclipse, but it was not until mid March that
I could make more than an occasional visit to
Mercury.

1953.

Jan 29. Total Eclipse of Moon.

Final plates were obtained from Mr. Walker of IAPD -
Zenith 700 $\frac{1}{2}$ Plate Bachel & I.R. plates (Ektar Wvl. 8000) which
he kindly prepared for me.

Jan 25. Test exposures were made with Zenith 700 on ^{6"} Triplet for
Exposure times. Fixed aperture 2^{mm}. Exposure 3^{mm}. 9^s. 27^s. 81^s.

Test exposure on 6" Cooke Visual I.R. plate for exposure
& focus. Fixed aperture (full) 6". Exp. 1^{sec}. 3^{sec}. 9^s. 27^s. 81^s.
N.B. moon 4 days before full: probably $\frac{1}{2}$ full moon surface
brightness. On these I.R. photos the focus was altered outwards,
but the two longest exposures had the same focus. In this
I was helped by Tim McCoy.

Jan 29. Helped by Edger Thompson, Sidome & Royce
Familoe. Completely cloudy before eclipse & again before
its end - so comparison exposures were not possible.
During Totality perfectly cloudless & very transparent.

I.R. camera Full 6" aperture Exposure 30 minutes
(15 min before to 15 min after mid eclipse) L.S.T 8^h 8^m -
8^h 38^m. V.T. approx 23^h 32^m - 0.2.

Blue Camera (Triplet) Full 6" aperture Exposure 6 min
(3 min before to 3 min after mid Totality) L.S.T. 8^h 20^m - 8^h 26^m
V.T. approx 23^h 44^m - 23^h 50^m.

P.T.O.

* Mounted as at center by Edgar Thompson, Sidome & Lopez-Farinos.



B

S
↑
↓
N

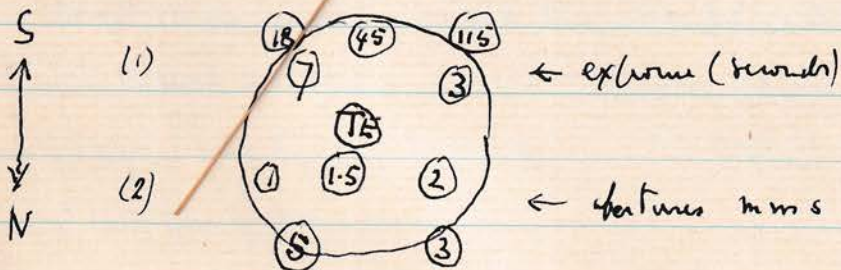
Eclipse moon cont. 1453 Jan 29.

Companion images in brackets because of cloud on 7m 30 & 31

But on Feb. 1 - 3 days after full moon - sky perfectly clear & extremely transparent (I am an eclipse night)*

A. CoRoT Triplet (1) Fixed Aperture $1\frac{1}{2}$ mm Exposure UT 23^h0 - 23^h15^m
 Blue plate. Varying Exposure 3. 7. 18. 45. 115 sec.

(2) Fixed Exposure 7 sec.
 Varying aperture 1^{mm}. 1 $\frac{1}{2}$ ^{mm}. 2^{mm}. 3^{mm}. 5^{mm}



B. CoRoT Vis Obj. (1) Fixed aperture 3". Exposure 23^h15 - 23^h30 UT.
 Varying exposure 3. 7. 18. 45. 115 sec.

(2) Fixed Exposure 18 sec.
 Varying aperture 1.5". 2". 3". 4". 6" (full)

(1)	3 ^s	7 ^s	18 ^s	45 ^s	← exposure
	1.5	—	T.	115 ^s	
(2)	2"	3"	4"	6"	← aperture

N.B. Blue images all same way up
 in I-R images the TMA2 Eclipse image is inverted relative to
 companion images.

483.

April 19 W.H.S. staying

Measured star pairs for value of Merz's saw (TERP no Barlow)

BD +27° 2019 Greenwich 1910 Cat. 5424

BD +27 2020 " " " 5425

almost the same RA.

Diff in Sec cor for PM & Refraction (alt. 66°) or minimum = $311.54''$

Five settings made: 12.030 12.116 12.060 12.080 12.091

Mean = 12.075 \therefore 1 Rev = $25.80''$

Apr. 20 W.H.S. measured same pair again

12.101

12.037

11.997

12.089

11.935

12.120

12.067

12.003

12.011

12.005

Two settings

Mean = 12.037

\therefore 1 Rev = $25.882''$

W.H.S. behind Fisher's characteristics 2"

Aperture = 57.0 mm. = $2\frac{1}{4}''$ Power = 12.4

Field = $2^\circ 32.5'$

453. March 15. Exposure on Albert Wilson Object - probably just moving
minor planet - discovered Palomar Marq with D.M. of
nearly 5° daily = $\alpha + 17^h 12^m$ $\delta = +3^\circ 16'$. Predicted position
for the high transition was for Mar 15.9 $\alpha = 13^h 0^m$ $\delta = +47^\circ 40'$
Guided on mount bright enough star $\alpha = 13^h 3^m$ $+48^\circ$ (center of field)
Exposure was divided so that trail could be identified by size of gaps:
 17^{min} gaps of 9^{min} 17^{min} : total period = 43^{min} actual exp = 34^{min}
L.S.T. of Exposure $10^h 37^m$ to $10^h 54^m$ and $11^h 3^m$ to $11^h 20^m$.

Mid Exp = LST $10^h 58.5$ U.T. approx $23^h 25^m$

The region was high in sky Transparency about 5, Guiding rather
poor. Focus = 3.14 $T = 34^\circ$. Plate shows MS1 near one edge
No sign of any trail

May 17-18. Exposure on Comet Mako 453a. Mod Transp 2?
Exp. 30 min L.S.T. $15^h 0^m$ - $15^h 30^m$. Center of plate $\pm 0^h 52^m$ $+65^\circ$
Drawn on comet. $T = 55^\circ$ F 3-9. $\frac{1}{2}$ Plate Zenith 700 Agl 70° in 12
10 min. Comet perfectly round - no trail - marked central nucleus.

June 6-7 Exp. on Comet Mako. Very shy & hazy
cloud. Exposure 20 min - but mostly cloudy during last
10 min. L.S.T. = $16^h 25^m$ - $16^h 40^m$ Center of plate
 $5^h 6^m$ $+64^\circ$. Drawn on comet $T = 53^\circ$ F 3-9; $\frac{1}{2}$ Plate Zen 700
Agl 70° , in 12, 10 min. Comet shows excellent internal nucleus.

1953.

June 8 Measured pair of stars for value of stars of TERP Merid 5 Barlow.

Yale Cat. $-1^{\circ} 32' 30''$ α 16 39^{h} $11^{\text{m}} 83^{\text{s}}$ δ $-2^{\circ} 3' 0.25''$ May 8.4

$-1^{\circ} 32' 31''$ 16 39 12.23 $-2^{\circ} 4' 51.67''$ May 9.1

Epoch 1934.0

Annual PM increases δ separation $0.02''$ annually

\therefore Separation in P 1953 = $111.76''$

Corrected for refraction = $111.665''$

Four settings (crossed years) Mean = $8.687'' = (\frac{1}{2}) 4.344''$

V. Pos seeing. \therefore 1 Rev. = $25.71''$

\times 8.664
8.692
8.721
8.672

June 22 Same star pair re-measured (TERP's Barlow) Seeing v. poor.

8.732 7.742 7.751 6.625 6.683 7.712 6.680 Mean = $8.70357''$

Separation $111.665''$ \therefore 1 Rev. = $25.66''$

These two figures of mean $25.71''$ & $25.66''$ & WALS's $25.80''$ & $25.88''$
are disappointingly discordant. ? became star an too faint.

June 22 Occultation NZC 2058 May 6.9 in dark time Phase 11.3 deg
PA 148° Cloud 5.2 sec just

Obs. first time d.S.T. = $15^{\text{h}} 47^{\text{m}} 40.1^{\text{s}}$ (cor. for clock error)

" " v.T. = $21^{\text{h}} 47^{\text{m}} 7.6^{\text{s}}$ (4.4 sec early).

Good quality.

June 26 Det value of saw TERP B. minutes.

L.S.T. 16^h 26^m Pile Star 12 Revolutions Left saw. 1 Rev = 25["]74
(Seamy fair)

L.S.T. 16^h 26^m Pile Star 12 Revs. Right saw 1 Rev = 25["]80
(Seamy fair)

L.S.T. 17^h 5^m Pile Star 12 Revs. Right saw 1 Rev = 25["]71
(Seamy fair)

Mean for 2 readings Right saw = 25["]76

June 29 Det. value of saw TERP B minutes.

L.S.T. 15^h 50^m Pile Star. Seamy fair. 23 Revs. Right saw 1 Rev = 13["]265

July 4. Det. value of saw TERP + B minutes

L.S.T. 16^h 29^m Seamy good. Pile Star 36 Revs Right saw 1 Rev = 13["]253

L.S.T. 17^h 8^m Seamy good Pile Star 33 Revs. Left saw 1 Rev = 13["]237

July 5 Det. value of saw TERP + B minutes.

L.S.T. 16^h 12^m Seamy good Pile Star. 40 Revs. Right saw 1 Rev = 13["]263

Measured B. by in PA 54.6 A = 34.1

July 17 } Booths v. bad seamy 1["]16 PA 310.5

July 18 } Booths v. poor seamy 6["]42 PA 354.3

July 26 } Booths v. poor seamy 6["]32 PA 355.3

July 31 } Booths fairly seamy 6["]23 PA 355.8

Aug 2 } Booths fairly good seamy 6["]33 PA 355.5

Aug 3. 44 Booths Elog very poor seamy 1["]30 PA 255.3

Aug 30 Occult. NZC 587. Mag 6.4 Right D. limb Ph = 21.3 days
PH 286°

Clock error 1.1^s slow.

Observed L.S.T = 22^h 9^m 48.6 (cor. for clock error)

Observed U.T. = 23^h 36^m 55.6 (cor. for clock error)

(good quality obs.)

(4.4 hrs early)

21.3 days

Aug 3 (cont)	70 Aphidid	$\Sigma 2272$	Seing v. poor	5.66	PA 102.4
Aug 8.	44 Borin	$\Sigma 1909$	Seing Moderate	1.40	256.2
	5 Cr. Borin		" "	6.15	227.8
Aug 10.	5 Borin	$\Sigma 1865$	Seing Mod. good.	1.08	311.2
	70 Aphidid	$\Sigma 2272$	Seing poor.	5.46	101.9
Aug 24.	5 Cr Borin		Seing fair - clouds stopped.	—	226.5
Aug 30	5 Cr Bor		v. poor seing - stopped obs	—	228.0
Aug 31	5 Cr Bor		Seing good	6.14	227.4
"	70 Aph		Seing bad - stopped obs.	—	102.4
Sept. 6.	70 Aph. $\Sigma 2272$		Seing Mod.	5.52	102.8

Sept. 4 Photo. C/Prom Borin. W.H.S. shape.
 Search plate. Exp. 4 min, Transp. poor 3-4
 LST 14^h 58 - 20^h 38^m. $\Delta = 17^{\circ} 24' + 47^{\circ} 42'$
 Drove with fixed web on C. Mercurii. No sign of Comet on plate.

Sept 5. Test plate for h - out of focus images.

Each was a 2 min. exposure (all fair at center)

(1) F = 15.7 inside focus

(2) F = 30.7 Focus

(3) F = 45.7 outside focus.

and Trail of 1 minute.

Images 1 & 3 are similar. Diameter 0.85 mas. A ring with central spot

Sept 6 (cont) Set. of Value of Micro screw TERP + Barlow

Made by single runs of ϵ brass microns between webs widely spaced - so that the wire was not touched between the turns. The webs were placed apart 26.031 Revs. apart & four runs were shown - one by W.H.S., three by R.H.W.

2^m 48.5 W.H.S.

2 48.5 R.H.W.

Mean = 2^m 48.1

2 46.0 R.H.W.

2 47.5 R.H.W.

Observation 20^h 40^m - 20^h 58^m L.S.T.

Corrected for differential refraction

Right screw \rightarrow 1 Rev. = 13".274 (TERP micro)

Set. of value of Micro screw W.H.S. + Barlow.

As above runs on ϵ brass microns

The three runs were on 22.276 Revs =

L.S.T 21^h 19^m - 21^h 29^m.

2 21.0 R.H.W.
2 22.0 R.H.W.
2 21.5 W.H.S.

Corrected for diff. refraction

(Ratchet screw) \rightarrow 1 Rev = 13".058 (W.H.S. Micro)

Sept 7.	44 Bortis ^{$\Sigma 1904$} (ring 4-8)	1.49	257.4	R.H.W.
"	" "	—	257.4	W.H.S.
"	77 Apidae $\Sigma 2583$ (ring 4-8)	1.40	112.6	R.H.W.

Further occultation observed with 4" at Timore simultaneously
with W.M.L. — Sept 28 + Oct 2.

Sept 28 occult M2C 852 125 Tauri Mag 5. Prof. dual
Observed corrected U.T. = $23^h 46^m 37.5^s$ v. good
(passing cloud - but star definitely seen to pop out into light.)
within $\frac{1}{2}$ sec. of W.M.L.

Oct. 2 occult M2C 1275 θ Cancri Mag 5.6 Prof. dual.
Observed corrected U.T. = $4^h 7^m 14.0^s$ v. good.

Sept. 12. Σ 2909 Sing. v. post Obs. stopped

— PH 274.7

Sept 13. ♂ Cor. Bor Sing. v. post

6:47 228.7

Sept. 27 Staying with UM directly Tupper Cornell

Oculat. time observed by WML with 5 1/2" Cooke & simultaneously by myself with my 4" Gray on alt. Tripod — on lawn outside the observatory using a microphone for clock ticks.

Coordinate + 0^h 19^m 54.86 Lat + 50° 32' 40".8 alt 15 meters

17	Tauri D	dark	Obs. UT	2 ^h	25 ^m	22.5 ^s	v. good
23	Tauri D	"	" "	2 ^h	58 ^m	14.0 ^s	prob. early
17	Tauri R	light	" "	3	26	47.0	v. good
27	Tauri D	dark	" "	3	36	24.0	prob. early
27	Tauri D	dark	" "	4	32	8.5	prob. early
27	Tauri R	light	" "	4	51	57.2	very good.

Clock error -67.3^{Sec.}

17	T D	2	24	15.2
23	T. D	2	57	6.7
17	T R	3	25	39.7
27	T D.	3	35	16.7
27	DD	4	31	1.2
27	T R	4	50	49.9

Times
Corrected
3 Sec before WML
Clock error 10 sec before WML
1 sec before WML
The other 3 obs. were
within 1/2 second of WML.

1953 Oct. 11 Exp. Comet Pons Brothers Transp Mod. 4. Zenith astro
 Exp. 39 min. LST $20^h 27^m - 21^h 6^m$ (approx. L.T. $19^h - 19^h 46^m$)
 Centre of plate $\angle 17^h 31^m 40^s + 41^{\circ} 18'$
 Micro PA $59^{\circ} 40'$ \nearrow HM 27" Driver in 3 steps of 6", 13 minute intervals.
 used Barlow.

Comet easy on plate. Est Mag = 12.6 Coma v. diffuse 3' diameter
 Central condensation may be double - but v. faint, & probably effect
 of overlapping faint star images.

Oct. 23. Determination of value of Micro screws (Non-ratchet screw)
W.H.S. + Barlow. L
 Plate Star Observed 27 Revolutions (worked out by Full Campbell method)
 Seeing good LST $12^h 1^m 35 - 12^h 58^m 05$
 1 Revolution = $13''.020$ (cor for curvature & slope etc.)

1953 Nov 1. Comet Pons Brothers - first available chance since Oct 11!
 Transp 3-4 - but much passing cloud \bar{c} interruptions
 LST $21^h 47^m - 22^h 39^m$ - but shutter only opened for 35 mins exposures
 Cent $\angle 17^h 46^m + 38^{\circ} 42'$. Driver on fixed web on star at
 $\angle 17^h 45^m + 38^{\circ} 56'$ 1/2 Plate Zenith 700
 No definite comet but ? hazy object in right position requires
 confirmation in better sky.

later This? hazy object is definitely comet as shown by cf
 plate next night Nov. 2. Its position many stars is identical with
 that by visual observation of W.H.S. 30" reflector.

Nov. 2. C/Pom Brooks Exposure 40 min. Transp 5-6.

L.S.T. $21^h 19^m - 21^h 59^m$. Done on fixed web

Center of plate $17^h 44^m 40^s$ $\pm 38^s 56'$.

Plate shows comet in correct position & confirms hazy ring of last night. Diam coma 1". Mag Est 13.0. Central condensation has diameter of $10''$ & mag. 14.5. It is definitely fainter smaller & more condensed than on Oct. 11.

Nov. 16. Occult of δ Piscis May 4.6 Dis. dark limb $P 88^\circ$. Plus 10 days

Observed L.S.T. $21^h 3^m 59^s.8$ (corrected for dark cover 2.0^s faint)

Observed V.T. $17^h 24^m 36^s.7$ (about 6.8^s less late of prediction)

This film of cloud over moon but strong observation v. satisfactory.

Dec. 14. Occultation of NZC 51 May 7.2. Dis. dark limb $P 71^\circ$, $P 8.4$ days

Observed L.S.T. $3^h 16^m 58^s.9$ (corrected for dark cover 5.1^s faint).

Observed V.T. $22^h 46^m 29^s.2$ *

Due to faintness of star I used W&S micrometer setting to true worst PA & putting distance webs to equal distance from luminator to dark limb. Due to darkness the star did not appear till 1 minute before time, & if it had not been for micrometer I doubt if I should have picked up the star in time - as it was it was exactly on the cross wire!

Observation only moderate quality ± 0.2 seconds.

* (got the Dec. 25 night & couldn't show it middle of Feb.)

December 25. C/Padijurohova (1953L) Pom Transit 2-3 & v. low alt.
Exposure 30 min LST $24^h 22^m - 24^h 52^m$ (Approx UT $18^h 15 - 18.35$)
 $d = 23^h 41.0$ $\delta = 22^\circ 49'$ (const) Centre of plate several
degrees north for the guiding tube spec to be clear of
observatory wall. Comet then unknown in lower part of plate.
Comet easy on plate Est mag 10.5. Coma v. diffuse 3' diameter.
Central condensation 20" diameter, ? Radiating spikes from nucleus
radially through coma in PAs 0° 60° 140° 250° & 320° —
the three brightest are underlined.

Dec. 25 cont) Comet Pom Brothers Transparency Institute 3-4 —
but exposure stopped by cloud. Exp 20 min LST $1^h 22^m - 1^h 42^m$
(Approx UT $19^h 5^m - 19^h 25^m$) Est mag 13.0. Very diffuse coma 3' diam.
with definite central condensation. There is a ? second condensation
near outer part of coma 1.5" (PA 270°) — but this may be a flaw.
No brighter, but larger, than on Nov. 2. Certainly fainter than on Oct. 11.

1954.

Feb. 27. Comet Pom Brothers. Transp. v. poor 2. Much passing cloud
blocking out middle of exposure. v. low altitude. Exp 20 min
LST $5^h 35^m - 5^h 55^m$ (Approx UT $19^h 5^m - 19^h 25^m$) Exposure equivalent
to about 5-10 min. Done on comet — cometary $22^h 18.4 + 40^\circ 39.9$
Comet easy, but very few stars Est mag 9.0 (Very roughly)
Coma 1' Central condensation 15" Definite fuzzy tail
2' in length in PA 330° — (Real Vert should be about 360°)

1959

March 5. C Pons Bwbs Fairly good Transp. 4. - but v. low altitude
Exposure 32 min. LST $6^h 15^m - 6^h 47^m$. (approx U.T. $19^h 25 - 19^h 57^m$)
Count at $22^h 44^m 30^s + 41^\circ 4.5$ just below center of plate.

Mag est. 8.5. Much brighter than before & probably brighter than Feb. 27.
Central nucleus $40''$ diam about mag 10.0 - with extremely diffuse
coma $3.5'$ diameter. The bright nucleus is markedly eccentric being
well S of center of coma about PA 135° . Stretching from nucleus
through coma is a very faint but def. tail $2'$ long again in PA 330°
- tail is fainter & thinner than on Feb 27, but in same PA &
opposite to the displaced nucleus.

March 5. cont. C/ Abell 1953 g. Fairly good Transparency 4.
Exp = 35 mins. (stopped by sudden cloud). LST $9^h 10^m - 9^h 45^m$
(approx UT $22^h 30 - 23^h 5^m$). Count at $\alpha = 1^h 29^m 40^s \delta + 72^\circ 7'$
- very nice ephemera ($1^h 29^m 3 + 72^\circ 19'$). Count easy on plate

Est. Mag 9.5 Fairly diffuse coma $2'$ diam Central nucleus $30''$ estimated
about mag 10.5 Definite broadish tail, diffuse, in PA 60° and $6'$ long.

March 26.9 Count abell Exposure $42\frac{1}{2}$ min. LST $10^h 15^m - 10^h 57^m$ (A.P. U.T. 21:30)
Moderate transparency 4. Counted $3^h 11^m 8 + 70^\circ 14'$ (approx). Drove on count.
Count v. easy on plate. about a mag. brighter than Mar 5. But tail less
definite - only an elongation of coma. Est. in mag. mag = 8.5; Coma $2.5'$
diameter & elongated towards PA 45° . Central condensation $20''$ - mag. ± 11.0

1954-

March 28.8 C. Pons Brooks. L.S.T. $8^h 41^m - 9^h 11^m$ Exposure = 30 min. [A.U.T. $20^h 35^m$]

Good Transparency 6: but very low altitude ($< 10^\circ$?). Grove on Comet.

Comet $\alpha = 0^h 36^m$ $\delta + 40^\circ 3'$ - very close to M31. The comet was fairly easy object in 2" finder; & large bright object in low power micrometer eyepiece of 6". The comet just preceded bright star mag 6.5 (BD 39-138).

Rough Visual est of int. Mag = 7.5. [Rebored on plate, see below]

March 28.9 C. Abell L.S.T. $10^h 51^m - 11^h 43.5$. Exp = 52.5 min

Good transparency 6. Grove on comet. Comet $\alpha 3^h 24^m 7$ $\delta + 69^\circ 38'$

On very brief search not seen in finder or comet eyepiece of 6".

The above two plates were the first of a new batch of Astro Zentars. They were developed together & in same way as the plate from the previous box was developed 2 nights before. Both plates are grossly underexposed showing very few stars. The plate of C Abell on the two plates shows that the limiting mag of the second one is at least 1 or 2 mags less than that of the first. Almost certainly the emulsion is different.


On above two plates both C Brooks & C Abell appear - but only their central condensations - no conclusion can be drawn, except: (1) C Pons Brooks Central Condensation = Mag 8.5, which is about 1.5 mags brighter than on Mar 5 & fits in with comet's integrated mag of 7.5 (vis.)
(2) Central condensation of C Abell same as on Mar 26.

Apr 4.9 cont C. Abell. Comet was quite easy in 2" finder
& diffuse object in 6" x 130 (micrometer). On plate the comet is
very clear object. Diam coma about 3' with central condensation about
30" diameter. There is a very faint & diffuse tail extending towards
PA 45° about 3' long - the coma seems pulled out slightly in this
same direction. The integrated mag of comet I had at about 7.5
I had it essentially equal to BD $67^\circ 310$ mag from EBSL 7.7 photo.

& BD $69^\circ 222$ mag from H.P. 7.1 photo.

The second mag is less reliable - I take the first one.

Comet is certainly much fainter than BD $68^\circ 286 = 6.3$ photo (H.P.)

April 4.8 C/Pons Brooks. Exposure 35 min. Transp. 6. Altitude very
 low about 12° & camera aperture beginning to cut off by wall of observatory.
 L.S.T. $9^h 3^m - 9^h 38^m$ (approx U.T. 20.15 - 20.50). Very easy
 in 2" finder. Large diffuse object in $6" \times 130$ (micrometer eyepiece).
 $\alpha = 1^h 9^m 3^s + 38^\circ 58'$ (count). Draw on star, moving web - in
 steps of about $6"$ every $2\frac{1}{2}$ minutes in PA 104° \rightarrow . Comet v. easy on
 plate. Coma diam $5'$ with central condensation eccentric towards SE
 condensation towards PA 150° Coma elongated towards PA 330° - coma reaching
 $2'$ from central condensation in 150° & $3'$ in 330°  \uparrow
 a definite thin tail extending nearly due N PA 5° & reaching to
 about $15'$ definitely, possibly $20'$. I suspected a second fainter
 tail in PA 330° - the two forming the borders of a fan \downarrow
 Central condensation diameter $60"$. I estimate from plate integrated
mag. about 5.0. Comet is definitely much brighter than γ Andromedae
 BD $36^\circ 201$ - photo mag = 5.9 & also brighter than β Andromedae BD $40^\circ 209$
 - photo mag = 6.1 . I think it definitely brighter than δ Andromedae BD $43^\circ 234$
 photo mag = 5.3 & definitely fainter than ν Andromedae BD $40^\circ 171$ photo mag = 4.5
 - Comet is definitely nearer δ than ν . [Mags & C/Is obtained from
 F.B.L. & allowance made as far as possible for diff. atmospheric
 extinction. Plot = Zenith 70° .

April 4.9 C/Abell Exposure 52.5 min Transp. 6. LST $11^h 30^m - 12^h 25^m$
 (approx U.T. mid exposure $23^h 15^m$) $\alpha = 4^h 0^m 5^s + 68^\circ 22'$ Draw on comet
 in steps of about $3"$ every $2\frac{1}{2}$ minutes in PA 113° \rightarrow See opp. page

1954.

April 24 to May 12 at W.M. Kirdip Dr. Trezona Council.

Observation made of Comet aberr with my 2" Ross Binosculars x7 - 7° field.

April 25.9 Mag est. between BD 61° 831 & 832 (mag 8.0 & 8.4) Mag = 8.2.

April 26.9 Mag ab. about equal to 61° 831 (mag 8.0). More transparent than previous night (7/10) Short tail subtended vertical = PA 50' Mag = 8.0

April 27.9 Mag ab. equal to BD 60° 921 (mag 8.0)

Very transparent 7/10 Tail as before PA 50' Mag = 8.0.

April 28.9 Mag est equal to 60° 921 (8.0). Less transparent 4/10 -

no tail seen Mag = 8.0

April 29.9 Mag est. between BD 59° 949 & 59° 950 (8.1 & 8.8)

Poor transparency 3/10 - no tail Mag = 8.4

May 4.9 Mag est between BD 58° 941 & 57° 982 (7.9 & 9.1)

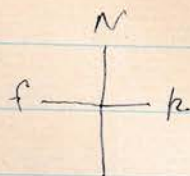
Moonlight - no tail v. transp. Mag = 8.5

May 6.9 Mag est. ^{between} 57° 999 & 1000 combined = 8.0 & BD 56° 1149 = 8.3

Moonlight - no tail v. transp. Mag = 8.2.

In all above observations comet in binoculars was almost stellar - only just distinguishable as comet - & very near limit of visibility.

May 21-24 week W.H.S. staying. Not a single fine night. Removed 6" Obj. & changed out & back in focus with Tefel - also front surfaces of 6" Tripht & 4" Obj.



Hell's Comet Core, central condensation Tail & faint extension May 30.0.

Cf. Zuber Observation (Observing June 1954, p. 139)
 on May 2 (cont. Rad. Vect. = 68°). Main narrow tail $12'$ long PA 64° , & shorter &
 broader streamer PA 34° (approx 90° from main tail) "which quadrants between the
 two tails contains material streaming from nucleus".

This description agrees with my drawing & angles - the 20° difference coinciding
 with the 20° change in Rad. Vector.

* $\alpha = 8^h 24^m + 36^\circ 16'$. Drove on Comet which was
 moving about $25''$ per 10 minutes towards PA 145°



1554.

May 29. First clear night since return from Cornwall.

Photographed C/Ahll May 30.0 Above V.T. May 29 23^h0 - 23^h32

L.S.T. 15^h32.5 - 16^h5^m Exp. = 32.5 min. Plate Astro Zenite $\frac{1}{2}$.

Temp fair, but mist near grass rising level with Obj. during exposure - probably 4/10. Sky light. Dewpoint QM 8 min 66°.

Good eye in finder. Trace to mist was not visible in 2" binoculars.

2" Fader Impression: not much brighter than when last seen in Cornwall \pm 7.5 mag.

Very weak estimate from plate: fainter than BD 43° 1770 (mag 6.3, A₀) and

about equal to BD 43° 1783 (mag 7.2 A₀) Final Est = 7.0 - 7.5 mag.

On plate one sees clearly a fairly narrow tail about 30' long in PA 85° (Red. Vel. 95°). The coma is about 5' in diameter & there is a

central condensation eccentrically placed S of center of coma (P.A. = 225°)

The central condensation has a semicircular outline, the flat side

facing PA 85°, it is about 1/2' in diameter. The coma shows elongated

branches PA 45° (away from central condensation & there is a suggestion of

short faint extensions (tail-like) in PA 0° & 45° [Cot. Red. Vel. = 85°]

June 4. *Explosion on C/Ahll (June 5.0) from June 4 23^h0 - 23^h28^m above V.T.

L.S.T. 15^h50 - 16^h18^m = 28 mins. Temp 3/10 & alt. v. low with high

twilight. Plate somewhat fogged & shows much less than previous one, May 30.0.

One can just trace short tail PA 85° & see central condensation flattened

on f side. Easy in finder. In 4" scope with comat appiece mag estimated

extra-faintly between BD 36° 1826 (6.9 K) & 1825 (7.5 A₀) = May 7.2.

1954.

June 30 Total Solar Eclipse viewed from aeroplane about 130 miles East of Shetlands and about 25 miles south of central line of shadow. Timing with stop-watch showed that our watch lost $2^m 31^s = 151$ sec. as we were flying exactly parallel to the shadow at about 200 m.p.h. This means that for a stationary observer watch would have lost about 132 seconds & taking 154 seconds as stationary stability on central line this means we were about 25 ^{miles} distant from it. We actually were flying at an altitude of about 12,000 feet.

July 12, 1954. ξ Bootis TERP Micrometers + Barlow
Veg poor seeing 2 but fairly steady 3 PA = 356.0 Δ = 6.40 5.5.5.

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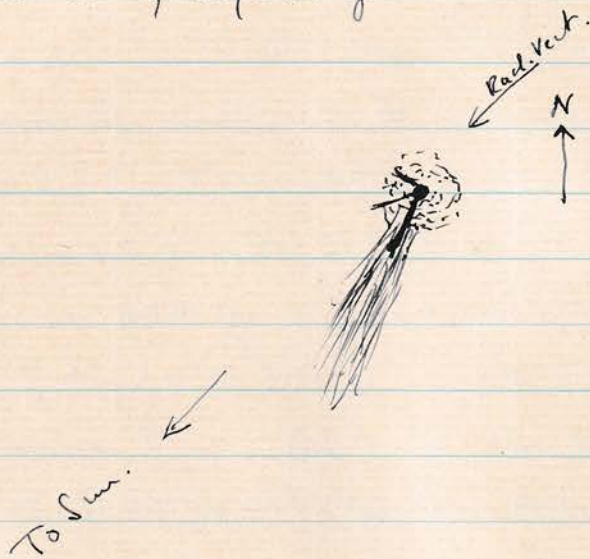
1954

July 3.9 Comet 1954 D Kresak - discovered on June 26. Telegram given position on 3 nights June 26.9, 28.9 & June 30.9. Being in a hurry I worked out position for July 4.9 instead of July 3.9 & made my exposure centered on $\alpha 13^h 42.3$ $\delta + 2^{\circ} 34'$ instead of proper position. Hence comet is near edge of plate. It is a round fuzzy object - no tail - about mag. 9-10 & its rough position obtained from B.D. gives $\alpha = 13^h 51.3$ $\delta + 3^{\circ} 33.5$ (1954). This gives a daily motion since last observation on June 30.9 of $\alpha - 7.33$ min, $\delta - 76.4$. I drove on comet (moving web) on the assumption of $\Delta \alpha = -7.75$ min, $\delta - 72.0$ & made a further mistake of calculating a 5 minute motion & moving web every 4 minutes! As a result I drove at a differential speed of 28.4 hr 4 minutes in PA 32° instead of the correct differential speed of 22.3 hr 4 minutes in PA 35° . The image is therefore markedly elongated & diffuse. The exposure given was 30 minutes LST $17^h 57^m - 18^h 27^m$ (Approx U.T. = $23^h 10^m - 23^h 40^m$) on Astro Zenith half plate in a very transparent sky 6/10; but there was moderate twilight & altitude was low ($10^{\circ} - 15^{\circ}$) so there is some fogging of plate. The star trails are pretty good. No time to observe visually.

5.5.5.

July 4.9 Comet Kresak Exposure 30 min LST $17^h 42^m - 18^h 12^m$ (Approx U.T. $22^h 52^m - 23^h 22^m$) - mid exposure $23^h 12^m$. Astro Zenith half plate. Good transparency 7/10 low altitude & slight twilight. $\alpha 13^h 44^m$ $\delta + 2^{\circ} 17'$. The comet was very easy in 2" finder and appeared very large, but extremely diffuse, with 6" - about $10^1 - 16^1$ or more in diameter - & v. little central condensation. On plate it $(10^1 - 15^1)$

thing^{is} that the main tail, which is unmistakable, is pointing almost directly towards the Sun. The continuation of the radius vector I make to be in PA 330° which should be the direction of the tail — instead it is 163° out!! Nothing of the tail could be seen visually tho' I did expect an elongation of some towards PA 330° — I do not think there is any elongation of some on the plate.



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- 2 do

July 4 cont) Comet Kresch 1954 d.

appeared much smaller about 3' in diameter & rather faint. I estimate
visual integrated mag 9.0 - but photographically I would put it a bit
fainter. Coma is quite round on plate & there is no tail.

[N.B. Comet moving wholly south was not observed again]

Aug 6.9 New Comet Vozarova 1954 f. Was missed 7 days ago - but
helpless weather prevented search till tonight. Set telescope on plane extrapolated
from 2 positions & drove on the derived daily motion approx setting
 $d = 7^{\text{h}} 14.5$ $\delta + 72^{\circ} 47'$ & drove on marked star which was a wide-
double Δ about 30". I drove in PA $77^{\circ} 15'$ at rate of about 19" per 10 mins.
moving every 2.5 mins using Barlow lens. Transit generally good $6/10$
- but comet was a bit low - beneath wire - with slight haze there
& horizon light. Exposure 40 mins d.s.t. $18^{\text{h}} 50^{\text{m}} - 19^{\text{h}} 30^{\text{m}}$
(approx a.t. = $9^{\text{h}} 50 - 10.30$). $\frac{1}{2}$ arc to Zenith & M. decl. etc. after exposure
found comet quickly in 6" (comet eye piece) less than 1° from exposure point.
Comet was quite small & visually about 2'-3' diameter, but fairly bright
surface brightness, with only slight condensation. No nucleus seen. It was
just visible in 2" finder integrated mag estimated 9.5 - fainter than
Kresch, but much smaller & brighter surface. Plate shows comet
well with tail. Coma diam = 3'. Tail in PA 167° is thin & faint
& 10 minutes long - in its first 3' it is a linear spine. Two
shorter spines are marked about PA 75° & 130° . The odd

1957

Aug. 7.9 Exposure Vozarova Comet 1954 f.

Exposure 60 minutes L.S.T. $19^h 52.5 - 20^h 52.5$

[approx LT $10^h 50 - 11^h 50$] Very transparent 7/10 - better than last night. also slightly higher altitude (later L.S.T. & higher declination). Plate centered same as last night & drawn on same star: comet very close of center about $1/2''$ North. Comet's $\lambda = 7^h 22.45$ $73^\circ 40'$ (circles) above on moving web $\rightarrow 71^\circ$ at rate of $20''/10$ mins in stars of 2.5 minutes - using Barlow. The plate is very good - a few smudges in emulsion but none near comet. Comet is similar to last night, but tail is much stronger & extends fully $15'$ & possibly $20'$. It is in at least approximately the same PA (about 165°) almost towards the Sun. The two spikes are not seen - but in the same PAs about 75° & 135° (i.e. 90° & 30° from direction of tail) I think one definitely sees diffuse extensions - as if the narrow spikes had grown longer & much more diffuse in the interval. In the direction away from Rad. Vector (330° approx) one just fancies the ghost of a tail - but very doubtful. I have never seen or heard of before a comet with a solitary robust tail towards Sun. Sent cable to the Donald Observatory? spectroscopic study. Comet otherwise same as last night. The longer more robust tail may be largely due to longer exposure & better transparency - but the change is probably partly real. $1/2$ Plate Zeiss Astro 8M double.



Photographic image of rock Aug 26.9.

NB⁺ The measurements were made of both ends of the trail
from optically & mean taken for both coordinates.

1954.

August 26.9 C Vozarova 1954f. Following the dawn of Aug 7.9 there were cloudy skies & then more & I was away on holiday from Aug 13-24. Aug 26.9 was the first opportunity to take another plate. Exposure given 90 minutes LST $19^h 10^m$ to $20^h 40^m$. approx U.T. = 20.50 - 22.20. Sky v. transparent $7/10$ - or perhaps a little better. The local transp. was certainly better than on Aug 7.9 because of greater altitude - over 12° higher. Plate centered roughly $13^h 4^m + 85^\circ 36'$ Error on moving with "PA" $8^\circ 40'$ \longleftrightarrow [i.e. incl PA of motion of comet $98^\circ 40'$] 10 minute motion = $23.3 = 1.76$ sec with Barlow - using $2\frac{1}{2}$ inch steps, just under $6''$. [Owing to the proximity to pole I calculated Motion & PA from given α & δ using spherical triangle & 6-figure tables.] after exposure I made a very brief search for comet with $6''$ & coned eyepiece, but saw nothing. $\frac{1}{2}$ Plate Zeiss Astro ~~developed~~ Azol developer. The plate is excellent. Comet appears near center close to star BD $86^\circ 190$ (mag 9.0) $13^h 21^m 11$ $86^\circ 10.1$ (1855). I made rough position of comet $13^h 21^m 2$ $86^\circ 11'$ (1855). It is a clear image but very much fainter. I estimate mag roughly between 11 & 12: sky 11.7. There is no sign of any tail. The image consists of an extremely faint circular coma $2''$ in diameter. A central brightening is placed within exactly S of center. But this central brightening has a curious shape like a ^{comma} ~~comma~~ with the tail of ^{comma} ~~comma~~ pointing to PA about 50° - the coma is $1''$ long.

The position of comet relative to BD $86^\circ 190$ was measured on my machine Comet $6.7''$ north of star & 7.0 sec to star. $\text{Par} = 13^h 15^m 52.8 + 85^\circ 38' 55.2$ (1954) \therefore Comet = α $13^h 15^m 43.8 + 85^\circ 40' 1.9$ (1954) at time Aug 26 $9^h 36^m 40^s$ - center of exposure U.T. See over \star

Sept. 11 TERP Main + Barlow

♂ Coronae Bor.	Seeing best 2-1.	PA 226° 8	Δ = 6" 28	5.5.5
♂ Herulis	" " 2-1	108° 3	4" 80	5.5.5

Sept. 12 TERP + Barlow

70 Ophiurida	Seeing 3-3	PA 100° 3	Δ = 5" 57	5.5.5
♂ Aquila	Seeing 2-2	109° 5	1" 5	5.5.5

Δ of ♂ Aquila measured with star quality spread between the belts
limited "Δ 3eq." gave Δ = 1" 47 (3.3 readings)

Sept. 17. TERP S Barlow Seeing fairly good

♂ Coronae Bor.	Seeing 6-5	PA = 227° 0	Δ = 6" 11	5.5.5
(Δ on assumption 1 Rev = 25" 77)				

Oct. 6. Occult. NZC 2959. Mag 7.2 J. Dis. PA 24° age 9.8 days. Transp good

But seeing. No passing cloud. Good quality obs. Obs. L.S.T. 21^h 5^m 26.9

Clock ^{correction} ~~error~~ = -1.4^s (total) Final obs. corrected Times: 21 5 25.5 L.S.T.

$$U.T. = \underline{\underline{20^h 8^m 11.5^s}}$$

Oct 9. Occult. NZC 3870 Mag 6.2 J. Dis. PA 62° age 12.9 days. V. Good seeing. Thin

cloud - but not interfering. V. Good quality observation Obs. L.S.T. 23 39 13.0 Clock ^{correction} ~~error~~ -1.4^s

Cor. L.S.T. 23 39 11.6. Corrected U.T. = 22^h 29^m 44.6^s

Sekt 4.9 C/Vozarova (957) F - first good night since Aug 26.9.

W.H.S. in observatory. Exposure 90 min. L.S.T. 20^h 10^m - 21^h 40^m

5.5.5 approx UT. 21^h 15 - 22^h 45^m. Transp. moderately good 5/10.

5.5.5 T = 55° - 60° F 3...8. Circle setting near 1^h 6^m + 79° 55' (position count)

1/2 plate Asta Zenith. Swoldred 5M 7 minutes.

5.5.5 W.H.S. found comet in 4' Wray with Rauden Count eyepiece & found it extremely difficult - he estimated 11-12 mag. after exposure

5.5.5 he found it in 6" & showed it to me - still v. difficult.

the web Plate shows small round coma about 1' diameter with central condensation which is just round now. It is therefore considerably smaller than on Aug 26.9 - about half the diameter

Direct comparison of the 2 plates show comet definitely $\frac{1}{4}$ to $\frac{1}{2}$ mag on later plate. Mag. est about 12.0

5.5.5 No sign of tail or eccentricity etc.

ok good

9

Key. Thin

condition
Chd water - 1.4

Oct. 10. 70 Oblique measured TERP minute + Barlow Seeing poor 3-2 (standard)

$$PA = 101.1 \quad \Delta = 5.36 \quad (5.5.5)$$

π aquilae TERP + Barlow Seeing 2-2 v. poor.

$$PA = 112.8 \quad \Delta = 1.55 \quad (5.5.5)$$

π aquilae measured TERP + Barlow using method for PA of estimating perpendicularity & for Δ placing hair equidistant between 2 webs (384)

$$PA = 113.3 \quad \Delta = 1.35$$

Oct. 11 γ Arietis TERP + Barlow Seeing poor 3-2 standard.

$$PA = 359.4 \pm 0.2 \quad \Delta = 8.01 \pm 0.04$$

Oct. 15. Occultation NZC 742 (99 Tauri) Mag 6.0 Ref. Dark Mt.

Age of moon 19.0 days P.A. = 230° (Predicted V.T. $23^h 35^m 18^s$)

Measurements were at correct distance & D.A. from terminator

so that unambiguous position was known. Thin cloud but did not interfere. Observed L.S.T. = $1^h 8^m 40.5^s$ Clock correction - 3.7^s

corrected L.S.T. = $1^h 8^m 36.8^s$

\therefore Observed U.T. = $23^h 35^m 19.8^s$ fairly good quality.

Oct. 25. Comet Baade 1954h.

Exp. 120 minutes by Fair Tranch 5/10. Approx VT mid Exp. = $19^h.30^m$.
d.S.T. = $20^h 43.5$ to $22^h 45.0$. Drive on comet $18''$ per hour

in PA $8^{\circ} 12'$ \swarrow in 15 minute steps. Plate centered (inches) =
 $15^h 2^m 55^s + 60^{\circ} 25'$. Ephemeris position of comet $15^h 3^m 2 + 61^{\circ} 4'$

Plate shows star probably to at least 16.5 mag. (1-2 mag fainter than Franklin Adams print - so no use for comparison). There is

a small round, almost stellar, but slightly hazy object close to predicted position. Estimated mag = 15.0 - 15.5. A rough

determination of position from BD given 1855 $15^h 1^m 12^s + 61^{\circ} 27'$
or correcting for precession 1954 $15^h 3^m 24^s + 61^{\circ} 3'$ -

which is close to predicted position. Must try again as soon as moon goes (no clear night available in present dark period).

Nov. 15 Comet Baade. This was first moonless night since Oct 25.

Intended to give 90-120 minute exposure - but exposure was stopped by sky
hazing over. Tranch started fair 4/10 becoming 2/10 in $1/2$ hr & 0/10 in 40 min.

Exposure equivalent to 30 min. d.S.T. $21^h 53^m - 22^h 33^m$. U.T. approx $18^h 20 - 19^h 0$

Now batch of plates 2 inch. Hurdly water developing - but did so. Plate goes
much fainter than expected, and confirms that object of Oct 25 has moved away
another object - not trailed & slightly fuzzy & of right brightness - was

found in web on Oct 25 plate. 1855 Position $2 = 15^h 24^m 7^s + 62^{\circ} 33' 4''$
Drive with web moving $13''$ every half hour in 15 min. Steps. $\text{U.T. mid Exposure} = 18^h 35.5$

Occultation Dec. 4th NZC 3524 (BD +3° 4909) May 6.9 Dū Dūh limb
Age of moon 9.3 days. PA = 75°. Observed 6" Cooke J.R.P. ~~S. Baker~~

Clear Sky. No clouds near. Star easily visible.

Dist. eye & ear estimated half way between clock ticks.

Clock error showed 3 hours before at 18 U.T. & checked the previous afternoon
noon - rate regular. Clock correction - 21.7 sec.

Obs. L.S.T. corrected = $1^h 48^m 29.7$ = U.T. $20^h 58^m 29.6$

(Diffraction occurred about 0.1 ^{minute} after predicted time)

Nov. 28.75 C/Baade. 1954h

Appalling weather - bit of cloud at sunset & JCR just over 1/2 hour exposure between twilight & its clouding over again. Temp fair 4/10 for 30 min then cloud coming up & the remaining 5 minutes of exposure fell off rapidly. Plate centered (inches) $15^{\text{h}} 46^{\text{m}}.3 + 62^{\circ} 46'$. Exposure 35 minutes L.S.T. ~~22^h 14^m~~ $22^{\text{h}} 49^{\text{m}}$.

Approx U.T. $17^{\text{h}} 50 - 18^{\text{h}} 25^{\text{m}}$. Astro Zent Plate - fogging on one edge as in previous plate (due to maker's fault). Comet shows up very nicely; small round image & pretty hazy - quite unlike short star trails. Spore on comet in PA 41° \nearrow 30.9 hrs hours in 10 minute steps. ~~rough measure (with mistake) from image of 1925 Oct.~~

(1954) ~~$15^{\text{h}} 42^{\text{m}} + 63^{\circ} 42'$ for ~~22^h 14^m~~ 28.75~~ Estimation of position from BD & correcting for precession given Nov. 28.75 (1954) $15^{\text{h}} 43^{\text{m}}.5 + 63^{\circ} 42'.9$. The image is quite sharp in 30 minutes & must be about 14.0 mag. Position of Nov 15 is also on this plate & the image seen on that date has disappeared. The position occupied on the negative plate is empty on Nov. 15. [Exh = $22^{\text{h}} 31^{\text{m}} 30^{\text{s}}$

* Taking effective exposure as 35 min. (& correcting for clock error in this case zero) LST mid Exh ~~$22^{\text{h}} 17^{\text{m}} 20^{\text{s}}$~~
- which is U.T. Nov. 28 $18^{\text{h}} 5.7^{\text{m}}$.

1954.

Dec. 17.9 Cf Kresch-Peltier. This comet has been followed (since) showed it early in July in S hemisphere - & has only recently become visible again in N. hemisphere. But apart from S hemisphere - felt 25 made it slightly brighter than otherwise. But photos at Greenwich in NW failed to show it & Van Biesbroek failed with a short exposure & put it therefore below mag 13 - although it should have been about mag 11.0 according to otherwise. Since I noted it as being unusually diffuse in July I thought the recent failures might be due to too large a scale. So I gave an exposure of 60 minutes. Transp. good 6/10. Crossing meridian (alt $\pm 60^\circ$). Exposure dLT 4^h 27.5 - 5^h 27.5. Approx UT. 22^h 30^m - 23^h 30^m. Plate center 4^h 13.7 + 21' 48" S. on line PA 26° 30' \leftarrow 1.795 Nov/10 minutes. Plate in very good. No sign of comet in Eph position. Must be below mag 15.0.

December. About Dec. 25 now was revised of comet discovered by Haro-Chavez 1954k ? mag 15 on Dec. 18 which was close to edge of my plate for Kresch Peltier on Dec. 17.9 But images near edge are much distorted & exam. of my plate showed no sign of comet. Weather was bad but I made an exposure about Dec. 26-30 which was spoiled by thin high cloud coming up. Plate not kept - no sign of comet - but plate would not have gone much beyond mag. 11.0!

1956 Feb. 27 Ocult NZC 411 Mag 7.3 SD . Age 5.1 days P.A. 143° .

This is a Σ three double ($\Sigma 305$). Occultation was due (en train 30 min. after transit) & sky was a bit hazy. I was v. pleased (surprised) to find the star up several minutes beforehand & also to be able to see easily the 82 comae.

Obs. L.S.T. $4^h 25^m 1.0$ Clock cor $-3^s.5$ \therefore Cor Obs. L.S.T. = $4^h 24^m 57.5$ \therefore Cor. Obs. U.T. = $18^h 0^m 20.3$

Good quality. No correction had. (G.M.T at $\gamma = 18^h 0^m 48.5$) Did not accurately time comae - but it was seen to disappear 41-42 seconds before the primary.

Feb. 28. Ocult. NZC 563 mag. 6.9. SD . age 6.1 days P.A. 71° [Pred. U.T. = $18^h 39^m 6$]

Obs. L.S.T. $5^h 7^m 48.0$. Clock cor $-3^s.5$ Cor Obs. L.S.T. $5^h 7^m 44.5$ \therefore Obs. cor U.T. = $18^h 39^m 4.5$

Good quality. (P.E. ± 0.25) Observation $1\frac{1}{2}$ secs early.

Feb. 28 Ocult. NZC 566 mag. 5.9. SD . Age 6.1 days P.A. 145° (No correction $\gamma = 19^h 2^m 56.5$)

Obs. L.S.T. $5^h 30^m 48.5$. Clock cor $-3^s.5$ \therefore Obs. cor L.S.T. = $5^h 30^m 45.0$ \therefore Obs. cor U.T. = $19^h 2^m 1.2$

Very good quality (P.E. ± 0.1)

Feb. 28 Ocult. NZC 582 mag. 5.8 SD . age 6.1 days P.A. 112° (Pred. U.T. = $22^h 8^m 18.5$)

Obs. L.S.T. = $8^h 37^m 38.0$ clock cor $-3^s.5$ \therefore Cor Obs. L.S.T. = $8^h 37^m 34.5$ \therefore Obs. cor U.T. = $22^h 8^m 20.1$

fair quality passing cloud (P.E. ± 0.5) (Obs. 2 secs late.)

1955.

March 13:85 Baade's Comet. Transp 4/10 - but clouds came up.
Exposure d.S.T. $7^h 17^m 15^s - 7^h 52^m 15^s - 35$ minutes, but after
10 minutes clouds over & most of the remaining 25 minutes was
cloudy. Estimated to be equivalent to 15 mins. Plate centered
fairly close to comet which was at $1^h 48^m 5^s + 81^{\circ} 49'$. Before
& after main exposure, which was driven on comet, short exposures
of 1 minute were given 6 hrs before & after the center of main
exposure. Unfortunately I mistakenly put the first of these 2 exposures
on the wrong position with - so that the three images are
not in line & thus no good for measurement on plate
Diameter of coma = 30". Short tail 1' long in PA 330° (?).
Interpolated mag estimated 12.0 or a little brighter - not as bright
as 11.5. Estimated from comparison with the 1 min. exposure -
taken as $2\frac{1}{2}$ mag fainter than main exposure - on the same
BD $81^{\circ} 57'$ & BD $81^{\circ} 59'$ Green Asteroid Cat $Ph mag = 8.8$ & 10.4 .
A rough position with ~~other~~ minor error from ~~the~~ ^{BD 59} ~~position~~ as well as
BD $81^{\circ} 60'$ and $81^{\circ} 61'$ gives position at $1^h 48^m 5^s + 81^{\circ} 49'$ (1955):
- Position taken for Gr. Aster. Cat.. This is v. close to ephemeris of Mer for.

Mar 28 Ocult N2C 693. mag 6.0 DD. age 4.6 days PA. 73° (Pred UT $19^h 8^m 54^s$)

Obs. LST. $7^h 28^m 19.4$ clock cor -11.8 \therefore Cor Obs LST $7^h 28^m 7.6$ M. G. U.T. = $19^h 8^m 59.2$

quality v. good (PE ± 0.1) (Observation 5 sec late)

Some difficulty in finding star in twilight so far from terminator -
but once found was very easy to see.

Mar 28 Ocult. N2C. 709 T Tauri. mag 4.3 DD. age 4.7 days. PA 152° .

Obs. LST. $10^h 13^m 53.2$ clock error -12.0 (Pred UT = $21^h 54^m 0^s$)

\therefore Obs. cor. LST. = $10^h 13^m 40.2$

\therefore Obs. cor U.T. = $21^h 54^m 4.7$ very good quality (Observation nearly 5 sec late)

Ocult of companion of T Tauri (about $1'$ S of primary)

M. LST. $10^h 16^m 8^s$ \therefore cor Obs LST = $10^h 15^m 56^s$

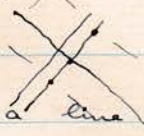

\therefore Comes Obs. cor U.T. = $21^h 56^m 20^s$ fair (± 0.5 sec)

N. B. Heard that many years ago BM Park had suspected step-like
disappearance at occultation of T Tauri - so paid particular
attention - but disappearance was normal. But seeing was rather
poor (low altitude) & a small step might easily have
been obscured by fluctuations due to seeing.

However when watching disappearance of comes I noticed
a very definite fade-out occupying about 0.3 seconds. I was
quite certain of this and was most interested to find
W. H. Stevenson at Cambridge noticed exactly the same
thing this same night: the very considerable paradox as it
to Cambridge makes a suitably inclined lunar cliff unlikely!

1958

Mar 19. Beade's Comet. Exposure 45 minutes. Transf from 4/10.

d.S.T. $7^h 31^m 15^s - 8^h 16^m 55^s$ (Approx U.T. mid-exh $20^h 12^m$). Guided on comet - 9.4 hr 10 minutes - moving in 5 mins steps - in PA 43° also gave 2 secondary exposures, approx 30 seconds each, with guiding star exactly 5 micrometer revolutions (5×25.75) on either side of central exposure & placed on the position web . Thus the central image & the two secondary images are exactly in a line with one another, this line being exactly in the direction of comet's motion (43°). The shutter was opened & shut with great care for these two short exposures so as to produce minimal motion of image off the cross-wools. Astro Zmit's $\frac{1}{2}$ Plate was used. The image of comet, though much stronger than on Mar 13 owing to longer exposure, is hardly any larger & is approx $30''$ diameter. The coma however is drawn out in PA 30° into a short pointed spike  about 60° angle with the tail in P 330° . This 330° tail is now quite definite & is approximately $2\frac{1}{2}$ long - wide & straight. Taking photo map from Gen. Astrophys. Cat. & using 30 sec exp of comparison star - assumed 4 mag fainter than primary exposure - indicated Mag of comet estimated 12.0. Orientation of Red. Vector is in PA $39^\circ - 70^\circ$ from main tail 10° from coma-spike.

Mar 16. W.H.S. here. 3 Exposures on Euterpe to illustrate method of "dotting the stars"

Exp. 1. mid H. $11^h 45^m$ S.T. Exp. (2) Shifted 50" in Dec. immediately after Exp. 1.

Exp. 3 1 hour after Exp. 1 & same PA & Dec as Exp. 1. all exposures 5 mins. each. But transparency bad for 1 & improving for 2 & still more for 3. Unfortunately Exp. 1 on Euterpe is only just visible - so not much good for demonstration. W.H.S. used plate to get a rough position.

April 15. (WHS here). W.H.S. obtained the R.A. of Kaitake apparently from a nearby star by transiting them across the micrometer web of 6" after that I gave a 60 minute exposure on comet Abell 1955b discovered at Palomar April 13 & reported May 15.

Abell's Comet 1955b Exp. 60 min L.S.T. $10^{\text{h}}46^{\text{m}} - 11^{\text{h}}46^{\text{m}}$
+ Approx UT $22^{\text{h}}9^{\text{m}} - 22^{\text{h}}9^{\text{m}}$. Transparency 5/10 fair. Comet very near zenith. Plate Astro Zenith $\frac{1}{2}$ Plate. Drove on fixed star using diagonal $\times 320 \pm$ (6" 26 fow). On development found serious flaws over emulsion - but fortunately missing region of comet & of M51 nearby. M51 appears very beautifully defined. Next day W.H.S. & I found a very suspicious object which rough measures from BD gave RA comet but Dec about 3-4' north of Alhena. This object is highly elongated (tailed) about 30" long in PA $10^\circ \rightarrow$ which varies with daily motion roughly. It is almost certainly real & well above limit of plate - but might be a small edge-on spiral - however it is not given in N.G.S.. I hope to confirm to night - or if cloudy, by comparison with FA charts at RAS tomorrow. Est mag ± 14

Apr. 16. (WHS here) Abell's Comet. Exposure of 40 minutes Approx U.T. 22^{h} . Drove on same star as last night. Plate shows suspected object in same position as last night - an extra galactic nebula. Definitely not the comet. Images are poor compared with last night's plate - ? due to change in focus owing to roof being fixed only immediately before exposure after last January day.

Occultation.

Apr. 24 NZC 630 Mag 7.5 Dab limb δ Capricorn. Moon's age 2.3 days
P.A. 26°. Observed L.S.T. 11^h 6^m 56.7 Clock 7.6 s. stat.

Obs corrected L.S.T. 11^h 7^m 4.3^s. \therefore Obs Cor. U.T. = 21^h 1^m 10.5

Pred U.T. 21^h 1^m 0 (duration $\pm 10^s$ late).

I strongly suspected in this case that disappearance was not quite instantaneous but faded over a space of about 2 secs. NB yet calculation given angle of incidence on

NB. This is double star (see NA).

lunar surface 31° i.e. $\sin^{-1} 0.5$.

April 24. Observed Eutake in Perseus. It was v. close to the lines predicted by W.A.S. & was quickly identified. Its movement was very aberrant in 6" after 20 minutes. It was obviously not going to pass near a star during the evening.

April 25. Eutake seen again & was more not passing close to any star

May 10. At Truro with G.M.L. Observed with 5 1/2" refractor v. good seeing

Conjunction of Uranus & Jupiter Observed from 20^h to 22^h U.T. Closest

approach about 21^h. \ddagger approx diameter of ϵ due north of Jupiter

\ddagger $\frac{0.1}{1.4}$ $\frac{2.3}{3}$ \ddagger I estimated = 2; & midway between 4 & 3.

\ddagger had a very faint greenish blue tinge Cf with 12 & 3.

No occulting bars available

1955 Apr 22.9 Baada's Comet. Exposure 45 mins. Mod. tank 4/10.

Approx UT 22^h 30 - 23^h 15^m d.S.T.: 13^h 19^m - 13^h 4^m. 1/2 Plate Astro Zent.

Only got to observatory late & started exposing, directly after springing roof following hot day: once again images are poorly focussed, but not sufficiently bad to affect cometary image - only v. critical star images. The exposure is identical with that of Mar 19. Comet is clearly fainter than on 19th by about 0.5 mag. or more. I now estimate integrated mag 12.5-13.0. There is now definitely no tail that of last 2 plates has definitely gone. Coma is also quite round - no spike as on 19th - σ is slightly smaller just under 30" diameter. On 19th it was a fraction over 30", not including spike.

May 22.9 Baada's Comet. Exposure 45 min. Fairly good tank 5/10 -

but considerable twig light at beginning of exposure Approx UT 22:35 - 23:20

d.S.T. = 14^h 30^m - 15^h 15^m. Comet (from center of plate) = δ 5^h 39 σ 64° 11'

Circ. making about: δ 5^h 32^m + 64° 15'. Over on comet with moving web

PA 49° 25' γ moving in 5 minute steps (3.4), with wire 4 steps apart -

13.64 = 0.530 μ ers. a fairly cool day. Photo started 1/2 hr after springing roof T = 50°.

Plate is in quite good focus. Comet appears exactly same density as on

identical exposure of a month ago (Apr 22.9): Est int. mag 12.5-13.0.

Diameter of coma as before - a fraction under 30". There is now once again a definite short tail - in PA 345° & about 45" long. Though focus is poor on previous Apr 22.9 plate I feel pretty certain that there was no equivalent tail on that date which time is, definitely one now - it has returned after dis appearance!

Trail of B01166 →



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1955

June 17-18 Comet Markov 1955c - discovered June 12. G. Markov saw it June 16 so I had rough D.M.s. Unfortunately comet was v. low (due north horizon at midnight) & neither E. or W. of pier was it possible to get with telescope & camera centered on comet. If not head would be in 6" - very easy in finder with short tail - also in 4". Tail about $\frac{1}{2}^\circ$. Rough mag est 4.5-5.0 - just around midnight. I was able to reach a star bright enough to guide on with v. restricted aperture ($2'' \pm$) 5° north of comet. I drove on this star with moving web PA 48° Δ 1.59 Revs/10 min in 75 second steps. Exp = 14 min. L.S.T. $17^h 42^m - 17^h 56^m$. (U.T. central exp $\pm 0^h 6^m$ June 18:00). Even so considerably twilight & poor transp. 3/10. Comet in three near bottom of plate. Coma 3.5 diam with strong central $2'$. Tail naked eye to $1^\circ 15'$ definite & expected to 2° . Fanned out between PA 0° & PA 310° - main axis in PA 340° along this axis is a linear spine definite for $18'$ length. A short strong spike is in PA 310° . Rough position central exp. from BD is $5^h 13^m 37 + 50^\circ 48' 5$. BD. $50^\circ 1166$ mag 8.3 trailed across tail 1.9 width of centre of head during exposure. The linear spine ^{is first 3" or 4' from coma.} otherwise straight has a sigmoidal distortion.

Second plate diving directly on comet (no star available for guiding) to get comet near centre of plate was got from LST $18^h 30 - 18^h 35^m$ (U.T. June 18 $0^h 49^m$). Very difficult to see comet & only Δ or rather poor. Plate shows much less than the other.

June 18-19. Comet Markov Exposure 21 min ($17^h 40 - 18^h 1$ in L.S.T.) ^{abstr.} UT June 19. $0^h 3^m$. With much restricted aperture used guide star 2° north of comet. But transp. v. poor 2/10. Moving web PA 47° Δ 1.66 Revs/10 min - 75 second steps. Comet $2.5^h 29^m$ $\delta + 52^\circ 11'$. Clouded over as exposure ended - comet not showed visually. But image much the same as last with - longer exposure is fed off by poorer transparency. Only significant difference is that the linear spine seems to have disappeared.



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June 26.0 C/Mohr. LSP of passing cloud; but below clouds Transob
was visible about 4/10 Exposure given 30 min L.S.T. $18^h 8^m - 18^h 38^m$.
(but owing to clouds probably equivalent to about 20 min) but Exp. just after midday.
Telstar E. of line; Camera well clear of wall & most of Obj. also clear. Guided
on star about 1° rate of travel. Const $\alpha = 6^h 50^m, + 58^\circ 55'$.

Moving with PA 20° \rightarrow $48''$ per 10 mins in $1\frac{1}{4}$ mins. Const seen in
2" Ross Bin. (before exposure) bright sky & high cirrus: about $\frac{1}{2}$ mag. fainter than
14 days. H.P. mag = 5.4 - in absence of haze the two might have been about
equal. Real Mag probably round 5.9. In 6" Const negative appearance & tail
much as on June 18.0. Plate shows straight part of tail (if side) $1\frac{1}{4}''$ long
in PA $5^\circ - 10^\circ$. On the succeeding side there are indications of shorter & increasingly
curved plumes as far round as about PA 33° . Coma diam $4'$ heavily
condensed centrally - dark part $2'$ diameter.

July 3.4 C/Mohr Full moon - no good for photography. Const just visible
in bright sky with 2" binoculars & estimated with night 6-6.5 mag.

July 10.0 C/Mohr. Bright moonlight - but quiet, but low cloud & white comet in sky.
also two Obj. Exposure 10 min LSP $18^h 53^m - 19^h 3^m$ (near midnight). Astro Zenith.
 $\alpha = 10^h 12^m.6 + 57^\circ 11'$. Slow PA $25^\circ 30'$ \rightarrow $45''$ / 10 minutes in $1\frac{1}{4}''$ steps.
Fairly heavily fogged plate. Straight tail $3\frac{1}{4}''$ in PA 65° . Coma shows a
spike in PA 40° & a less definite one in PA 90° . Coma $\pm 3'$ diameter heavily
condensed towards center - dark region $1'$ diameter. Perhaps owing to
short exposure & fogging the tail is straight & no layers fanned
out.

↑
N



July 23. 0 Markon

The fan is now straight - all curved as originally
The straight line may now have a slight curvature in opposite direction.

No time to photograph other corner backhouse.

Count $\alpha = 12^h 1.4$ $\delta = 44^{\circ} 35'$

July 17.0. Munk showed to my mind a new comet 1955 f discovered July 13 19 km.
in Russia: mag 8.0 and daily return period. W.H.S. was skyping & the sky
cleared but sky was poorly transparent. W.H.S. looked at comet with 4".

Comet Baharav 1955 f. Exposure 30 mins. Transit 3/10.
Drove with moving car 42.4/10 mins towards PA 70° 30' Δ
in 1 1/4 minute steps. (Focus was kept then and was at .11 instead of .07.)
Temp 67°! Photo shows round coma about 4' diameter only
moderately condensed - with short rather than tail about 6' long in PA
225°. Coma surrounded with low fingers in 4" x 6". Very large diffuse
object: diameter about 5' & very little central condensation. Easy
in 2" finder & later from the quadra eye in 2" binoculars &
2" predictor. W.H.S. from 4" observation & B.D. got a rough
position .. 22^h 45^m.8 + 25° 11' (my circles gave 22^h 45^m.5 + 25° 13'
This with original position of July 13 gave D.M. = -1.53, + 89'.6
& leads to 38.3/10m in PA 76° 17' - but the right error in drive
is barely significant

July 23.0 C.M.H.S. But sky too muggy! Transit 5.6 - but not so good in north -
probably 4/10. No twilight. Exposure 60 min LST 18^h 35 - 19^h 35. At UT June 22, 23^h 15^m
Drove on road with car 35.5/10 mins PA 46° 10' ∇ in 1 1/4 minute steps. mid 4th.
Coma 5' diam. Bright center 1' diam. Tail fan-shaped PA 20°-75°. 75° border
is brightest & longest 1° long - a separate tail straight or? slightly curved.
Fainter spine & diffuses about 3/4° long in PA 60° - This fades into the rest
of the fan which becomes shorter & shorter towards PA 20°.

Occultation July 27 N2C 2134 43 B Lib (f)* May 6.1 S. Dublin Age 8.4

P.A. 170° (no a b correction). Predicted U.T. = $21^h 4.0^m$ (Greenwich)

Presumably a double star* - did not notice a companion - but sky was pretty bright (twilight)

Observed L.S.T. $17^h 19^m 29.5$ Clock wr + 3.9 (slow) Signals obtained at 21^h

(4 minute before duration) $\pm 22^{\text{hrs}}$ - no change in error. \therefore Obs Cor. L.S.T. = $17^h 19^m 33.4$

\therefore Obs. Cor. U.T. = $21^h 3^m 30.0^s$ very good quality.

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July 24.0 C Bahharav. 453f. Transit only here 3/10.

Exposure 60 min L.S.T. $19^h 5^m - 20^h 6^m$ UT mid Exp. about July 23 $23^h 45^m$
and Plate Zenith 700 Count d $22^h 32.1$ $D = 35' 2''$ stars with
moving web $35.2/10$ min in $1\frac{1}{4}$ m. scale in PA $71^{\circ} 5'$ \uparrow

Plowed count visually 2" finder & binoculars. Overall visual diameter 12'

Extrapolated est. of mag. Count about equal to BD $34^{\circ} 47' 14''$ mag = 7.5

Mag estimated 7.5 visually. Plate shows strong coma with broad &

very faint & diffuse tail about PA 215° and about 15' long. at
the root of this tail within the coma is a short thin spike 2' long in

same PA. Coma overall diam is $2\frac{1}{2}$ (fit 12' visual diameter!) &

there is a bright central part $\frac{1}{2}$ diameter. This part is exactly placed
in coma towards PA 35° , while from it in PA 215° the short spike emerges.

July 26.0 C Bahharav 453f. Transit v. good 6.7/10 - but for weather

Exposure 60 min Zenith 700 L.S.T. $18^h 35^m - 19^h 36^m$.

moving web. $33.9/10$ min PA $69^{\circ} 10'$ \uparrow $1\frac{1}{4}$ min scale.

Very good plate Tail 30' long PA 210° , broad diffuse & straight.

Bright straight streak in axis extending to 5' & $1\frac{1}{2}$ broad

not linear. Coma overall 7'-8' diameter round
with central condensation $1\frac{1}{2}$ diam.

Visual estimate mag = 8.0 - extrapolated 2" finder - would
between BD $36^{\circ} 48' 42''$ (8.1) & BD. $37^{\circ} 45' 85''$ (7.8)

July 28.0 Bahharav Count Visual extrapolated est mag with
2" finder for Count = BD $39^{\circ} 48' 56''$ (8.0) Est. mag = 8.0

age 8.4

right (twilight)

at 21^h

19 33.4

Occlusions.

Aug 6 NZC 3320 K Agr. Mag 5.3 Reaf. Dark limb. age 17.6 days PA 232°

Predicted V.T. as at 1^h 17^m 36^s

Obs. L.S.T. = 22^h 10^m 4^s.5 Clock correction + 9^s.4 (slow. Slight before 22^h & after 12^h U.T.)

∴ Observed corrected L.S.T. = 22^h 10^m 13^s.9 ∴ Obs. corrected V.T. = 1^h 17^m 32^s.6

Very good quality obs. (minutes web set in position of star within say 10")

Occlusions. assisted by Christopher Warner

1. Aug 7 NZC 3455. q Psc Mag 6.4 Reaf. Dark limb age 18.6 days PA 215°

Predicted V.T. (as at) = 1^h 53^m 24^s.

Obs. L.S.T. 22^h 50^m 0^s.5 Clock correction + 10^s.2 ∴ Obs. Cor LST = 22^h 50^m 10^s.7

∴ Observed corrected UT Reaf. = 1^h 53^m 27^s.0 very good quality (star position pin pointed with web)

2 Aug 7. NZC 3453 K Psc. Mag 4.9 Reaf. Dark limb age 18.6 P.A. 250°

Predicted V.T. (as at) = 1^h 55^m 48^s

Obs. L.S.T. = 22^h 52^m 26^s.5 Clock correction + 10^s.2 ∴ Obs. Cor LST = 22^h 52^m 36^s.7

∴ Observed corrected V.T. Reaf. = 1^h 55^m 52^s.6 very good quality (star position pin pointed with web)

(Reaf. of this second star was observed simultaneously by Christopher Warner in 2nd finder — I found star v. difficult in finder!)

Aug. 12.0 Photo Count Bahamas 1955 f

PA 232°

Exposure 30 min LST 21^h 5^m - 21^h 35^m. Approx V.T. = 0^h 20^m.

Trump fair 4/10 - but wind exactly in Zenith. (used R.Led prism).

Count = 21^h 30.8 P + 54' 41'. Drove with moving web 20.1/10 min in 2 1/2 minute steps. Zenith 700 plate.

Some passing cloud. Count on plate appears quite round with no size of tail. Overall coma diam 5'. Burst at central condensation 30" diam.

PA within = 48° 36' ↗

Intention was intended to photograph new comet Honda - but just before it cleared the trees in N.E. sky clouded over - about 24:45 hr V.T. So did not see it.

Aug 15.0 First chance to observe C Honda 1955 h. after my failure on Aug 13.0, I waited up all next night - but no clearing. To night started cloudy but cleared about 22^{hr} V.T. & by 24^{hr} V.T. was quite transparent in East. I found comet in field directly it rose above trees

PA 250°

started exposure soon after. Waning moon fairly near so only gave limited exposure. Exposure 24.5 LST 21^h 40.0 - 22^h 4.5

Approx V.T. mid exp about 0^h 20^m. Trump fairly good 5/10. Zenith 700

Count = 21^h 20.3 + 41' 45' PA 77° 4'

Count x = 5^h 20.3 + 41' 45' PA 77° 4'

Plate destroyed by hot water in covered desk-room.

Count = 5^h 20.3 + 41' 45' PA 77° 4'

Plate destroyed by hot water in covered desk-room.

Count = BD 40° 1268 (S. 6 H.P.)
BD 41° 1162 (S. 1 H.P.)

22^{hr} after 12^{hr} V.T.)
32.6
10")

PA 215°
50 10.7

was broken
into with web)


52 36.7

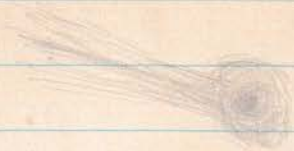
quality
broken into with web)

Plate work.
Aug 16.0 C/Honda Exposure 40.5 min in unimpacted sky 6-7/10 Tr.
Done with moving web in 1/2 minute steps PA 75° 13' Δ
4 minute motion = 66.4" = 2.573R. Δ of time of plate in light showed
a dense comet image. But plate (with previous one) was
destroyed by technician trying to hot water in washing process -
a mistake to borrow someone else's dark-room!

Visual mag 2" Binocular extra focal C slightly fainter than T/Anigwa (BD 4.8)
C very slightly brighter than BD 4.7 3178 (BD = 6.0) Est mag 5.5 - 6.0.
Smaller in 2" finder = 10' approx. Count in 6" in very diffuse
Considerable central condensation - but no definite nucleus. Appears
to have a short & wide fan shaped tail.

Aug. 24-25 ? Comet Remer (message from Howard received to-day: reported discovery
of comet: 10th mag August 16.2 α 19^h 12.5 δ +67° 33' DM 5.6 "S.S.W.")
message obtained properly; but I exposed a plate instead α 19^h 12 δ +66° 50'
- I was doubtful whether W meant f or f. Done on fixed web for 30 min.
Transp poor 3/10. Zenith 700. Δ ST 19^h 35^m - 20^h 5^m. T=70° F=3-4.
Plate excellent star images going fainter than I expected - but no sign
of comet. Certainly no comet brighter than mag 4.0 within 5° of diurnal position.

Aug 25.0 C/Honda. Sky had deteriorated to very poor Transp 2/10.
Exposure 40.5 min 21^h 47^m - 22^h 27.5. T=65° F=3-7. Done moving
web 4 min Motion = 42.68" = 1.66 Rws. in 1/2 minute steps in PA 58° 20' Δ
Zenith 700. Plate central about α 14^h 40.3 + 71° 12'. Short tail few minutes
long PA +75°. Comet appears definitely fan-shaped about PA 20° - 200° 



Aug 26.0



Sept 10.0

larger scale - comets smaller (6' diam)
as opposed to $7\frac{1}{2}$ on Aug 26.0.

Sept 10 cont.

more condensed. Coma is now markedly elliptical (the point
of the "pear" having gone. Ratio of two axes 7-8/10. The major
axis is PA. 10° - 190° . There is suggestion of subsidiary
tail branch PA 45° .

d.s.T. of exposure $21^h 3^m - 21^h 57.5$.

Exp = 54.5 m.

avg wgh estimate in 2" strips of vial integrated mag - without
comparison stars but it about 6.5 - much higher than previous figure of 8.5!

August 26.0 C/Honda Very good sky Trunk 5-7/10. Exposure 60.5 min.
 Lat $19^{\circ} 55.0 - 20^{\circ} 55.5$. T = $65^{\circ} - 63^{\circ}$ F = 3...7. Snow moving well
 4 min. Motion = $38.4 = 1.491$ Pws. in $\frac{1}{2}$ minute steps. PA $62^{\circ} 45'$ \searrow Zenith 700
 Plate centered approx $15^{\circ} 2.7 + 67^{\circ} 40'$. Plate shows very strong image of
 comet. Core overall diameter = 7.5 Central fully exposed part 2' diameter
 The coma is remarkably "pear-shaped" PA $20^{\circ} - 200^{\circ}$ - point towards 200°
 - probably "egg-shaped" is better. The outer diameter is $7-8/10$ of larger
 diameter. Tail is short but strong definitely traced 25' in PA 75°
 - it is rather narrow when it emerges from the coma

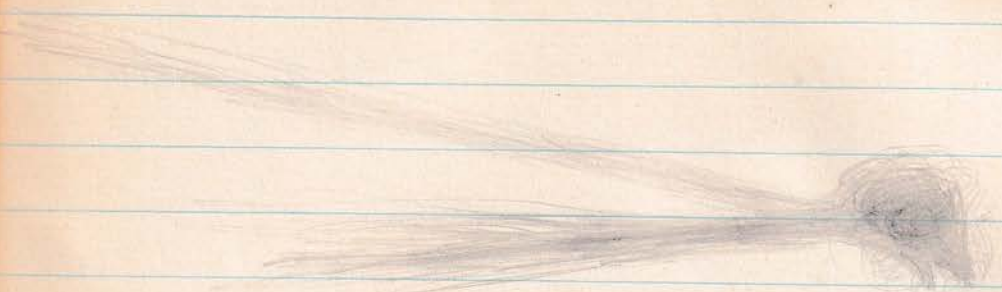
(6' diam)
 Aug 26.0.

[left for I.A.V. in Delhi Aug 27 0 did not return till
 Sept. 7, which was hazy night. First opportunity was on night
 of Sept 9-10, which was beautifully transparent.]

the front
 the major
 structure

Sept 10.0. C/Honda Very good sky. Trunk 7/10. Exposure 54.5
 but some passing cloud - probably equivalent to about 40 min.
 Count 2 = $16^{\circ} 6.4 + 41^{\circ} 30'$ near white center. Snow with
 moving well P.A. $75^{\circ} 34'$ \searrow ($165^{\circ} 34'$) $20.1/10$ minutes, in
 $2\frac{1}{2}$ minute steps. Visibly $6'' + 2''$ fainter comet appeared much
 smaller than before but more condensed + brighter in surface brightness.
 Plate shows v. strong image. Tail 25' long in PA 87° - but
 suspected as a wavy structure for 75'. Core overall diam = 6'
 Central fully exposed part 3' diameter. Coma is definitely smaller

without
 flying 8.5!



C. Honda Sept 12-9.

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Sept 12-13 C Honda Very Thick Sky 7/10. Exposure ~~to~~ 123 min. Zenther 700.
 Exposure L.S.T. 19^h 57^m - 21^h 57^m. - U.T. Sept 12.9 on S12 21° 35' ±
 mid exposure. Comet distance: $d = 16'' 9.3 + 39^{\circ} 26'$ near center of Plate
 Drive with moving web in 2½ minute steps of 4'' .32 each in PA
 74° 40' (7) i.e. PA 344° .7°. Comet image v. strong. Sublimation
 exposure being doubled the comet is definitely much smaller than on Sept
 10.0. Coma overall diameter is now 5' & bright central part 2½'
 The perfect oval shape of 3 nights ago is replaced by a more irregular
 outline: more or less triangular - one angle at root of tail PA 95°;
 one angle about PA 350°; and the third & most marked angle
 about P.A. 210°. This last is the point of the previous hour shaped
 figure - but the point seems definitely split into two prongs.
 The tail is narrow where it leaves the head and as it fans out
 it divides into two parts. The stronger part is in PA 95° & extends
 to 25', the fainter part is about PA 80° & extends further - to
 50'.

On first seeing comet in 2" finder & 6" I was struck by how much
 fainter it was than 3 nights ago. I afterwards estimated it visually
 extraocularly in 2" binoculars Sept 12 23^{hr}. : —

Comet fainter than BD_s 39° 2961 (6.0) & 40° 2987 (6.8)

Comet about equal to BD_s 40° 2971 (7.6) & 40° 2972 (8.0)

Comet brighter than BD 40° 2983 (8.5)

Est. integrated mag ± 7.8 over 1 mag fainter than
 on Sept 10.0

1955.

C/Honda

Sept 16-17. Cloudy night - but there was a brief, very transparent clearing. No time to go to observatory; so I tried to observe C/Honda from garden with 2" binoculars. I thought I would see comet near correct position - but only just above the limit. But before I had time to check more definitely on whether or not it was the comet the sky clouded up. Either this was the comet, or if not then the comet is beyond range of the binoculars. The limiting mag. which I have found previously for comets is about 8.5. Therefore the comet was around 8.5 or fainter - meaning that it has dimmed another 0.7 mags at least in last 3 days.

[N.B. 23 years ago to-night I took the first photo plate with the 6" Cooke Triplet at Healdly, which arrived that day.]