120″ Optical Focus Drawings

120in. CASSEGRAIN.

11-25-'69
REV. 6-16-71

148.115
147.615

507.89 (+ 36" For second focus adjust't)
502.385

452.385 457.89

56

MIN. SETTING OR "IN" POSITION

(36) FOCAL PLANE TRAVEL

9" DIA. 7¾" ⌀

0

P.R.F.

X

SECONDARY TRAVEL   3

448.89
449.385

92
86

151.115
150.615

MAX. SETTING OR "OUT" POSITION

535.385 540.89
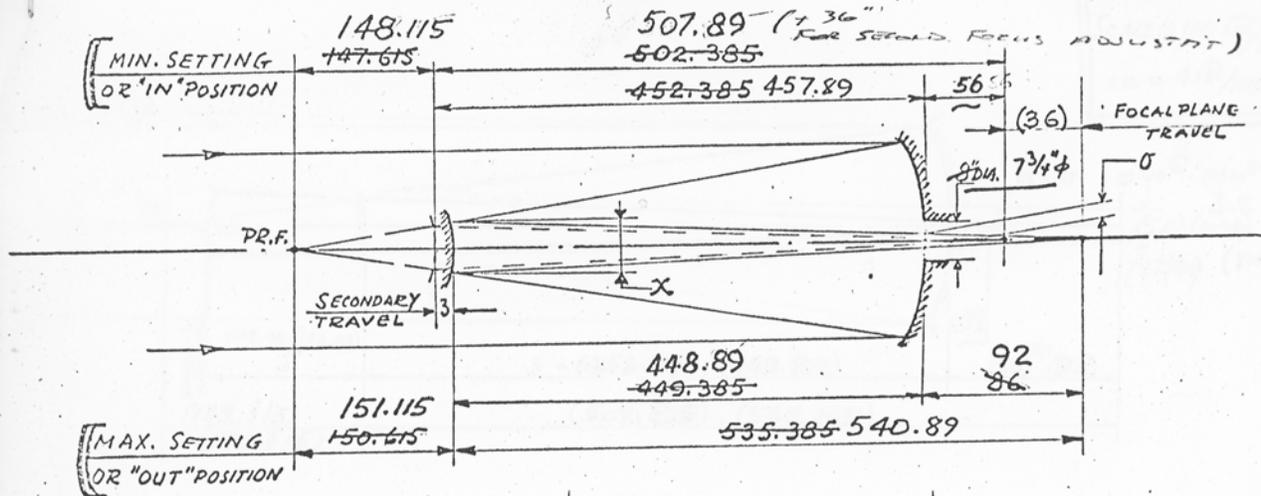
MINIMUM OR "IN":

$$X_{MIN} = \frac{148.115\ 147.615}{5} = \frac{29.62}{29.52}\ DIA$$

$$f_{MIN} = \frac{507.885\ 502.385}{29.62\ 29.62} = \frac{17.15}{17.0167}\ 17.9$$

MAXIMUM OR "OUT":

$$X_{MAX} = \frac{151.115\ 150.615}{5} = 30.22\ 30.12\ DIA$$

$$f_{MAX} = \frac{540.87\ 535.385}{30.22} = \frac{17.773}{17.773}\ 17.9$$

NOTES:

$f_{PRIM} = 5$

$$f_{MED.} = 17.4\ \boxed{17.524}$$

$$\Delta FL = 3\left(\frac{17.4}{5}\right)^2 = 3 \times 12.1 = 36.3"\quad O.K.$$

SCALE AT CASS. FOCUS

$$\frac{206.265}{17.0167 \times 120 \times 25.4} = \frac{3.975}{17.15} = 3.975/MM$$

$$\frac{206.265}{17.775 \times 120 \times 25.4} = \frac{3.807}{17.9}\ 3.78/MM = 3.78/MM$$

MEDIUM: 3".80/MM

TOTAL FIELD ≈ 13' arc

1.685' arc/inch   ~13.5' arc field

1.61' arc/inch   ~12.85' arc field

β'EAM AT OPENING: $\theta = \frac{56}{17.0167} = \frac{3.26}{2.94}$ in

$\frac{92\ 86}{17.9} = \frac{5.13}{4.84}$ in

APPROX UNVIGNETTED FIELD   8 − 2.94 = 5.06 IN

8 − 4.84 = 3.16 IN

MIRROR SIZE   29.523 + 5.06 = 34.583 IN. DIA

30.123 + 3.16 = 33.283 IN. DIA

BUT C.A. OF MIRROR HAS BEEN ESTABLISHED TO BE 33.25 IN. DIA

UNVIGNETTED FIELD OF 33.25 C.A. SECONDARY   33.25 − 29.523 = 3.73 DIA

33.25 − 30.123 = 3.13 DIA

RADIUS OF SECONDARY:
$$r_{MIN} = \frac{2 \times 147.615 \times 502.385}{147.615 - 502.385} = -418.0712$$

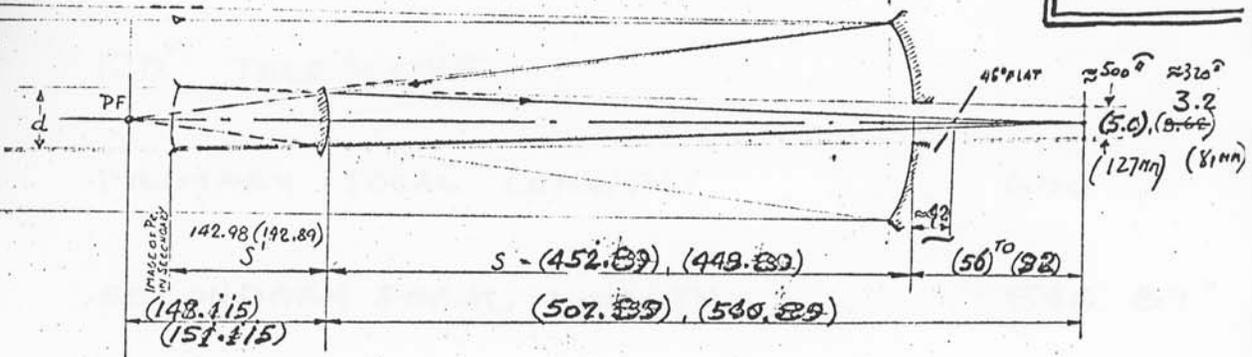$$r_{MAX} = \frac{2 \times 150.615 \times 535.385}{150.615 - 535.385} = -419.1439$$

$$r_{MED} = -418.536\ IN$$

MIRROR POLISHED TO THIS

120 CASSEGRAIN.
(CONT.)

Pg. #2 of

NOTE:
SCALE ≈ 100 sec/IN
OR ≈ 4 sec/MM.

45° FLAT ≈500″ ≈320″
3.2
(5.0),(3.6ᶜᶜ)
(127MM) (81MM)

142.98 (142.89)
S'
(148.115)
(151.115)

S - (452.89). (449.80)
(507.89). (560.89)

(56) TO (92)

MINIMUM OR "IN" POS.

nₓ = 418.07
nᵧ = 419.14

$$S' = \frac{451.89.418.07}{418.06 \times 451.89 \times 2} = 142.978''$$

SIZE OF IMAGE
OF PRIMARY AS SEEN IN SECONDARY
$$d = \frac{142.978}{452.4} \times 120 = 37.926''$$

$$\left(f = \frac{502.385 + 142.978}{37.92} = 17.016\right)$$

— SIZE OF UNVIGNETTED FIELD:

$$8 - \left(\frac{37.9 - 8}{142.98 + 452.4} \times 50\right) = 5.49'' \phi$$
OR ≈ 9¼' ARC

CORRESPONDING SIZE AT P.F. $\frac{147.6 \times 5.49}{502.4} = 1.61''$

BEAM AT 45° FLAT $\frac{56.49}{17.016} = .41$ ⟨.469⟩

DESIRED FIELD THRU 45° FLAT 2″ MAX.
OR.... $\frac{120}{3.98} = 30.7 MM = 1.19''$

APPROPRIATE HOLE 1.67″ W × 2.35″ H

(8″ × 1.41 = 11.3)

MAXIMUM OR "OUT" POS.

$$S = \frac{448.80. 419.14}{418.07 \times 449.4 \times 2} = 142.8886''$$
418.5

$$d = \frac{142.8886}{449.4} \times 120 = 38.153''$$

$$\left(f = \frac{535.385 + 142.8886}{38.153} = 17.778\right)$$
678.274

$$8 - \left(\frac{38.15 - 8}{142.89 + 449.4} \times 86\right) = 3.62'' \phi$$
3.2
OR ≈ 5¼' ARC

$\frac{150.6 \times 3.62}{535.4} = 1.02''$

$\frac{92 - 49}{17.778} = 2.405$
86 - 42
17.9

30″ MINIMUM
$\frac{30}{3.81} = 7.88 MM = .31''$

2.785 W × 3.49 H

2.405
.31
2.785

NOTES:

SIZE OF DIAG. MIRRORS ≈ 12 × 13½″
(ACCOMMODATING 8 IN. DIA FIELD)
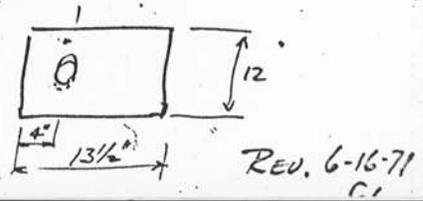
12
4″
13½″

REV. 6-16-71

120' TELESCOPE

+ 3" ADJUSTM'T

12½"

≈39" ⌀   LIGHT SHIELD SECONDARY

449.4"

-19.25 ⌀   CASSEGR. LIGHT SHIELD

223   114   TO BOTTOM OF SHIELD

13.0" ⌀ OD FLANGE
9" ⌀ HOLE

PERMANENT LIGHT SHIELD
CAS - 101

15

109

56"

6
14.89

7.5"

5" ⌀ HOLE IN MIRROR

2.73 ⌀ HOLE IN DIAGONAL

36" FOCUS TRAVEL

31.50 ⌀
19.25 ⌀

120″ Optical Focus Drawings

Prime Focus →

Optical Arrangement
Five Mirror
Coude System
ƒ 138.77

144.31979

No. 2

450.0

600.0

305.68021

150.0

199.7284

No. 4

199.7284

40°

No. 3

40°

No. 5

306.0

Coude Focus

720.0

Cassegrain
Focus

37° 21.71′

414.0

Horizontal
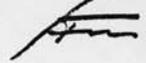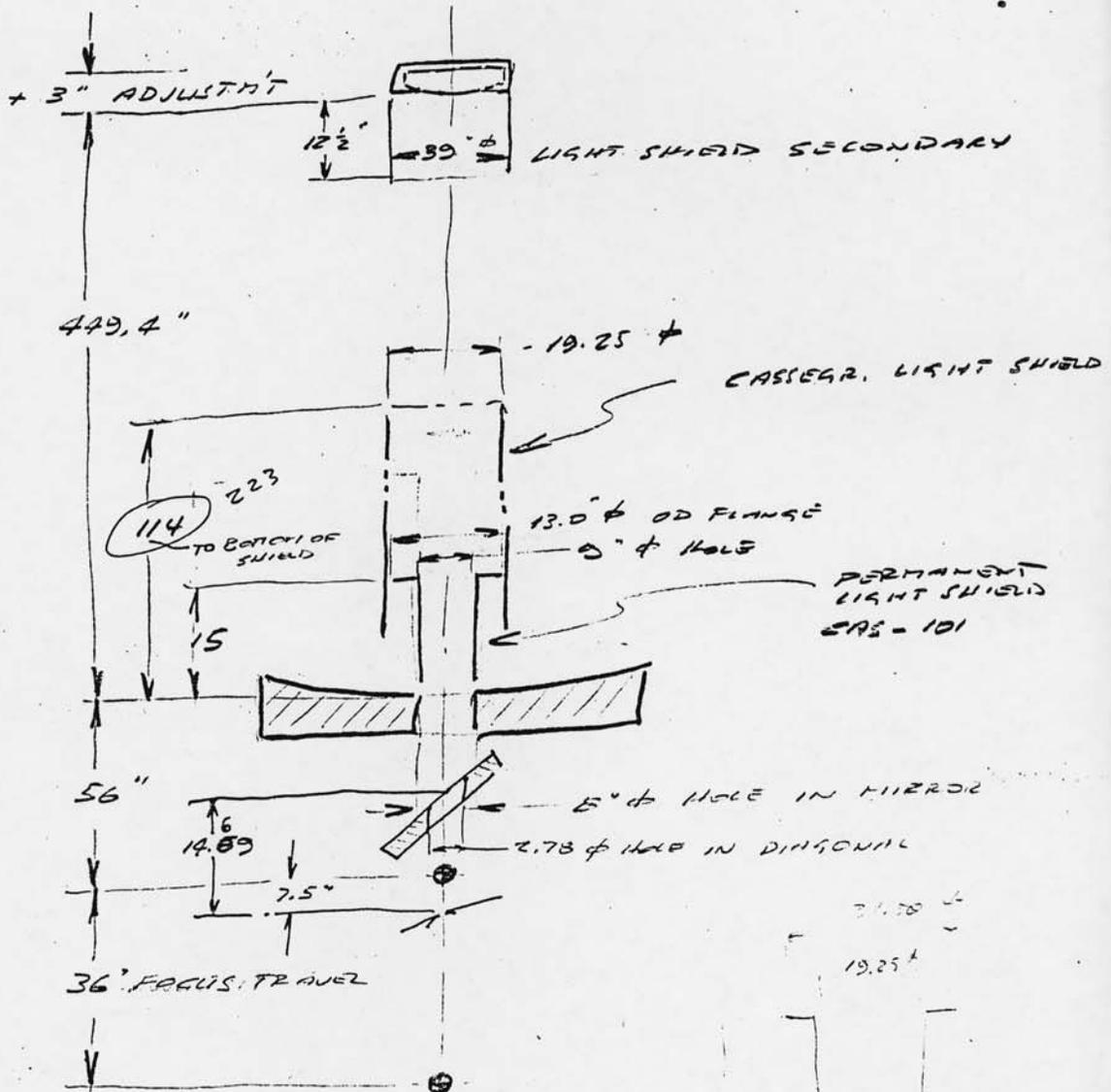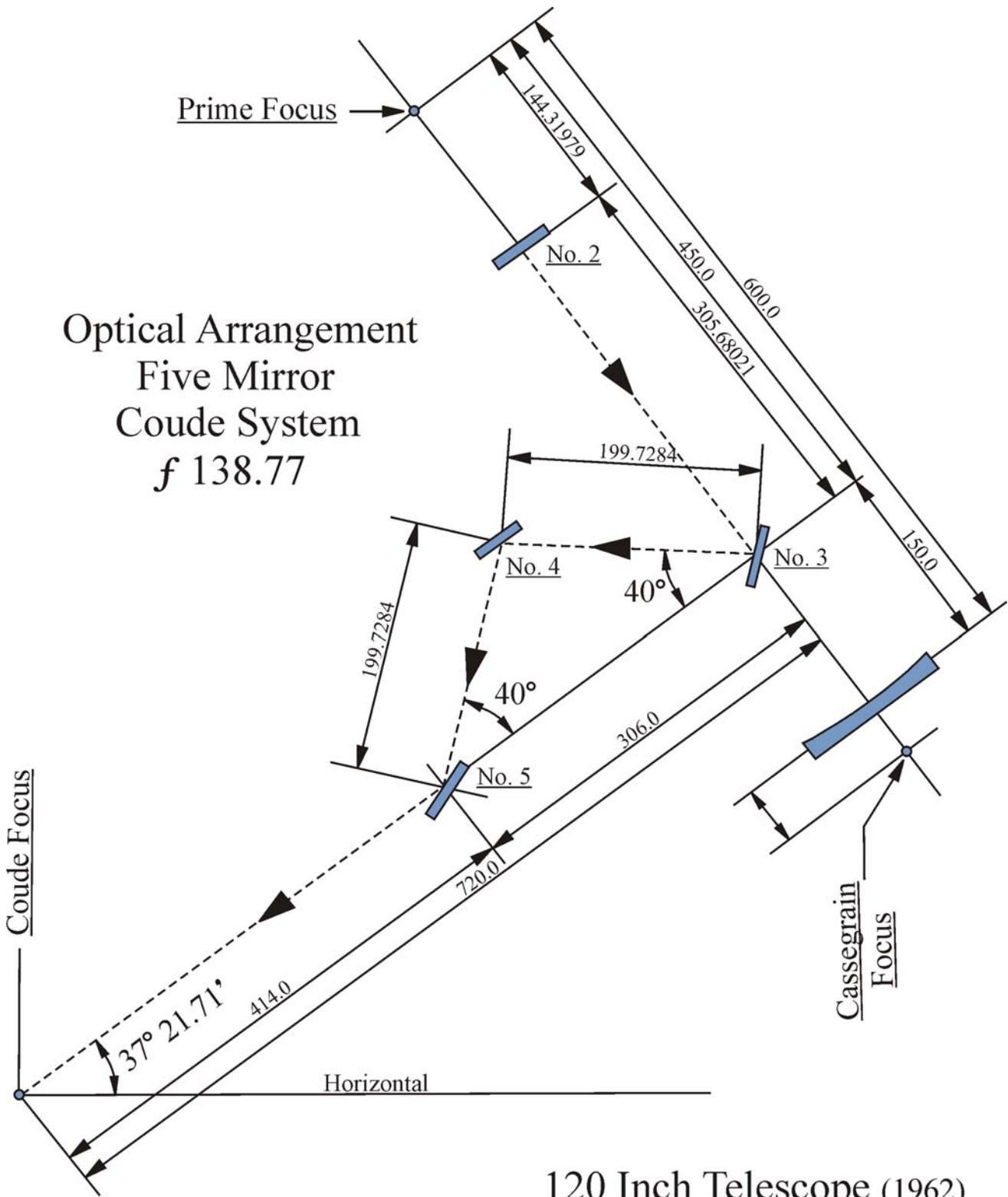
120 Inch Telescope (1962)
Redrawn - 16 March 2001   DRS