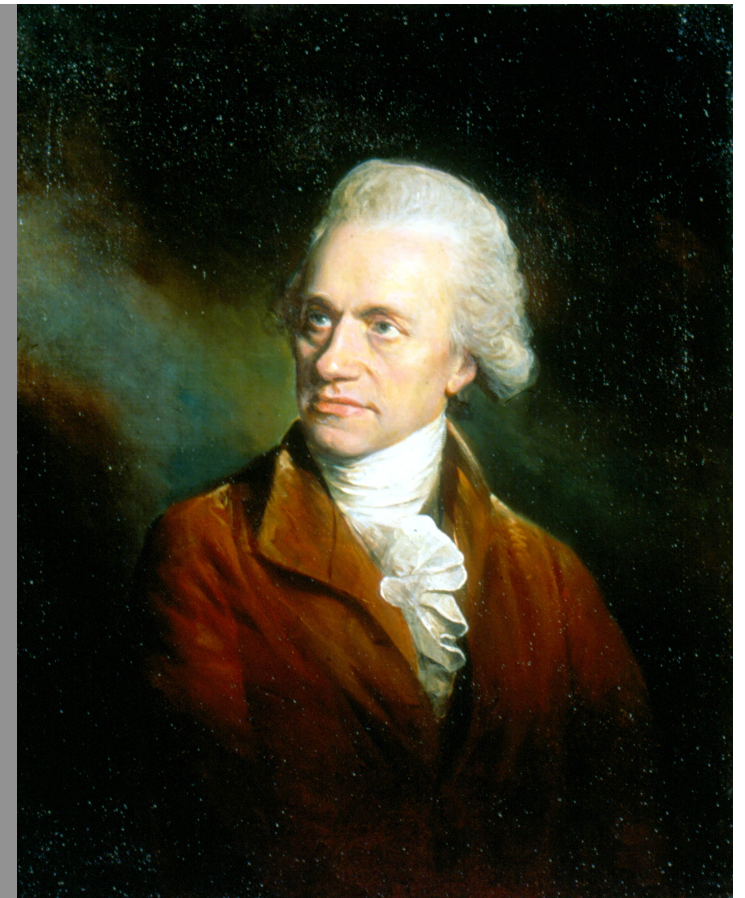
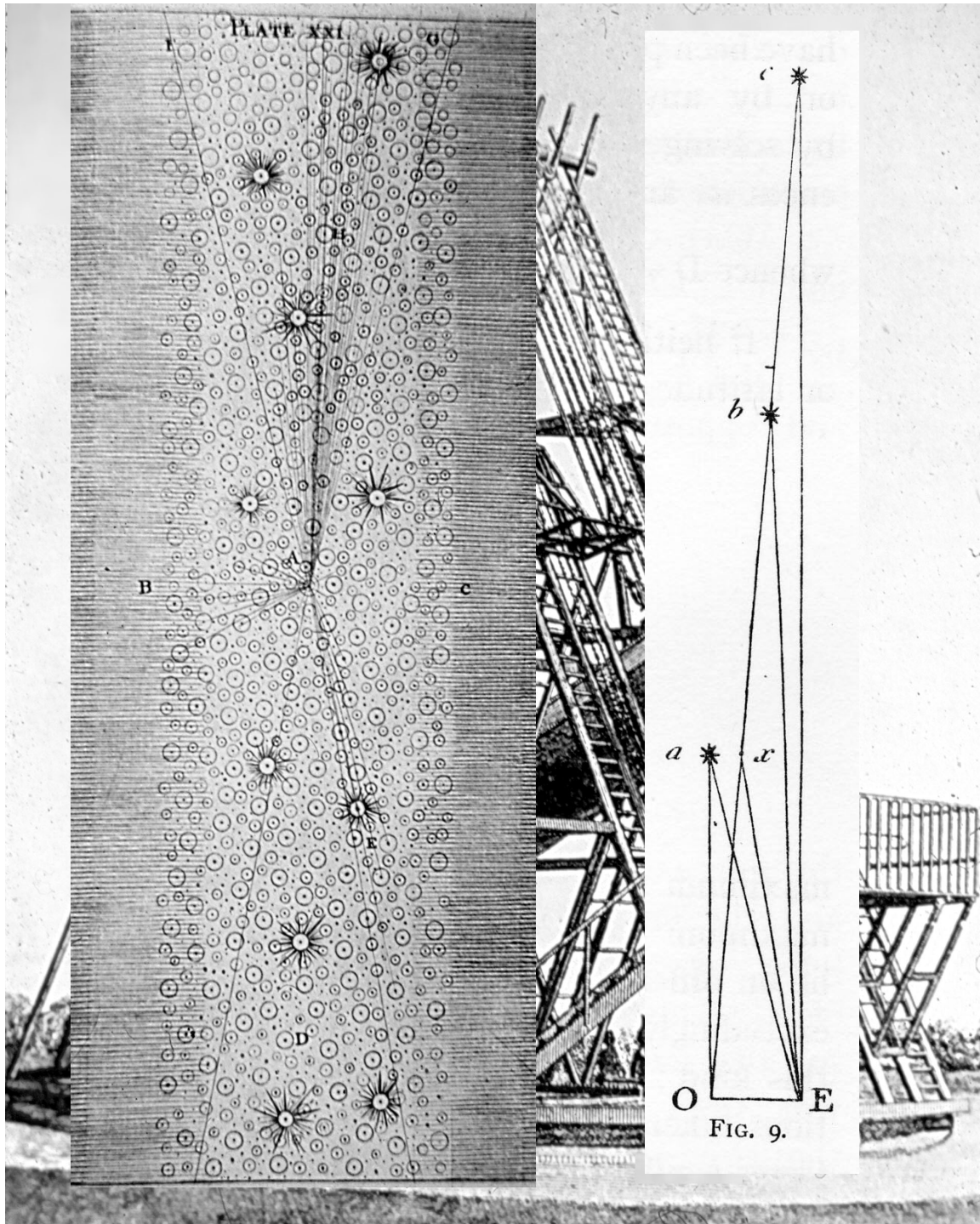


# Early History of the Infra-red

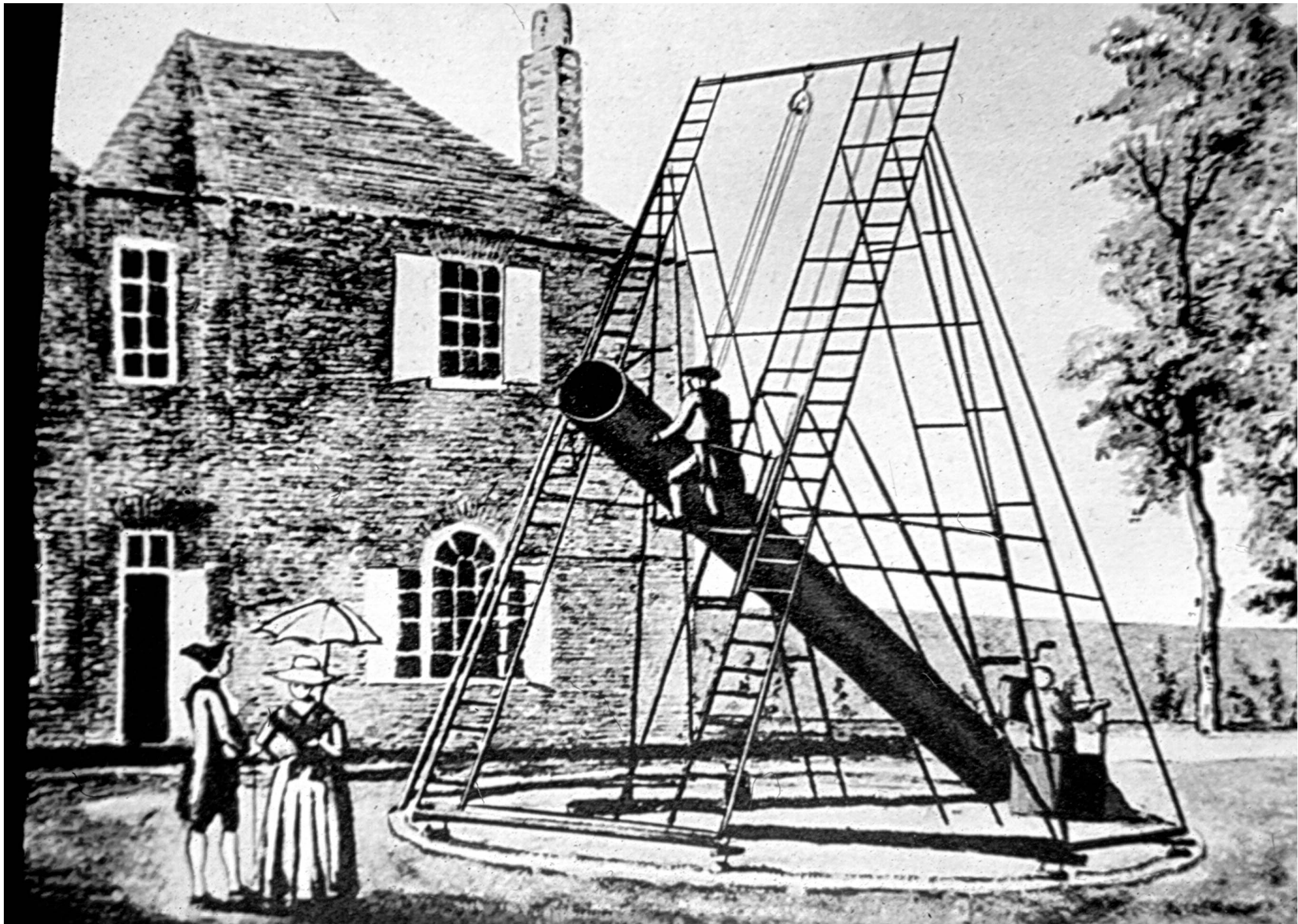
Owen Gingerich

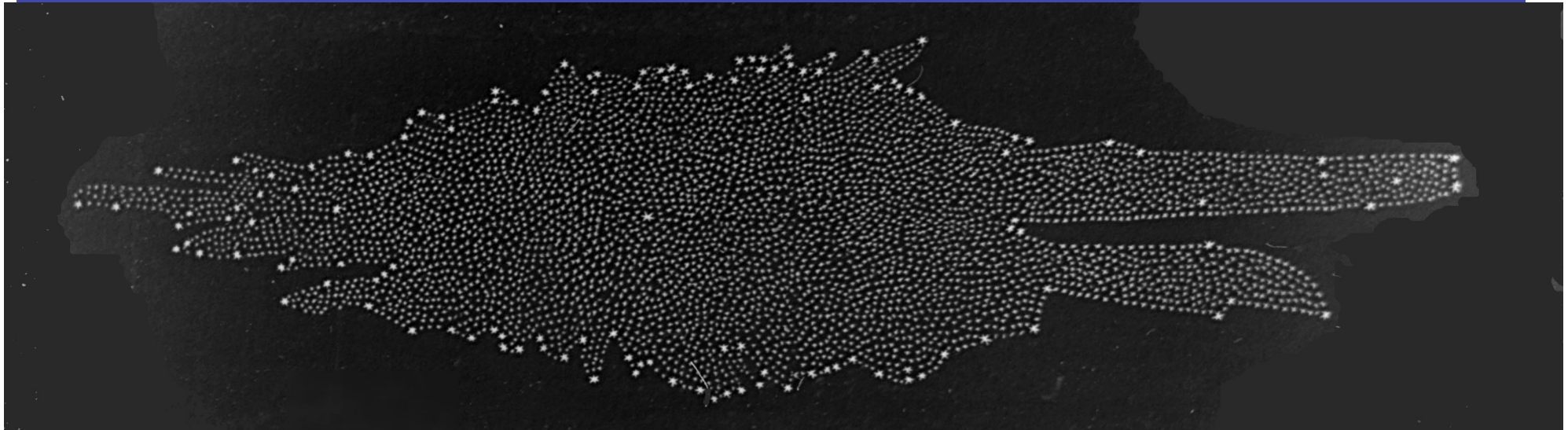
for the

Fazio Festival



William Herschel:  
Probing the  
depths of space





Herschel's Milky Way  
Cross section perpendicular to the plane



1786, 1789, 1802  
Herschel catalogued 2500  
nebulae & clusters.

With his large telescopes,  
the closed universe  
of the fifteenth century  
had truly given way  
to the vast structures  
of outer space.

# Wm Herschel Phil Trans 1800

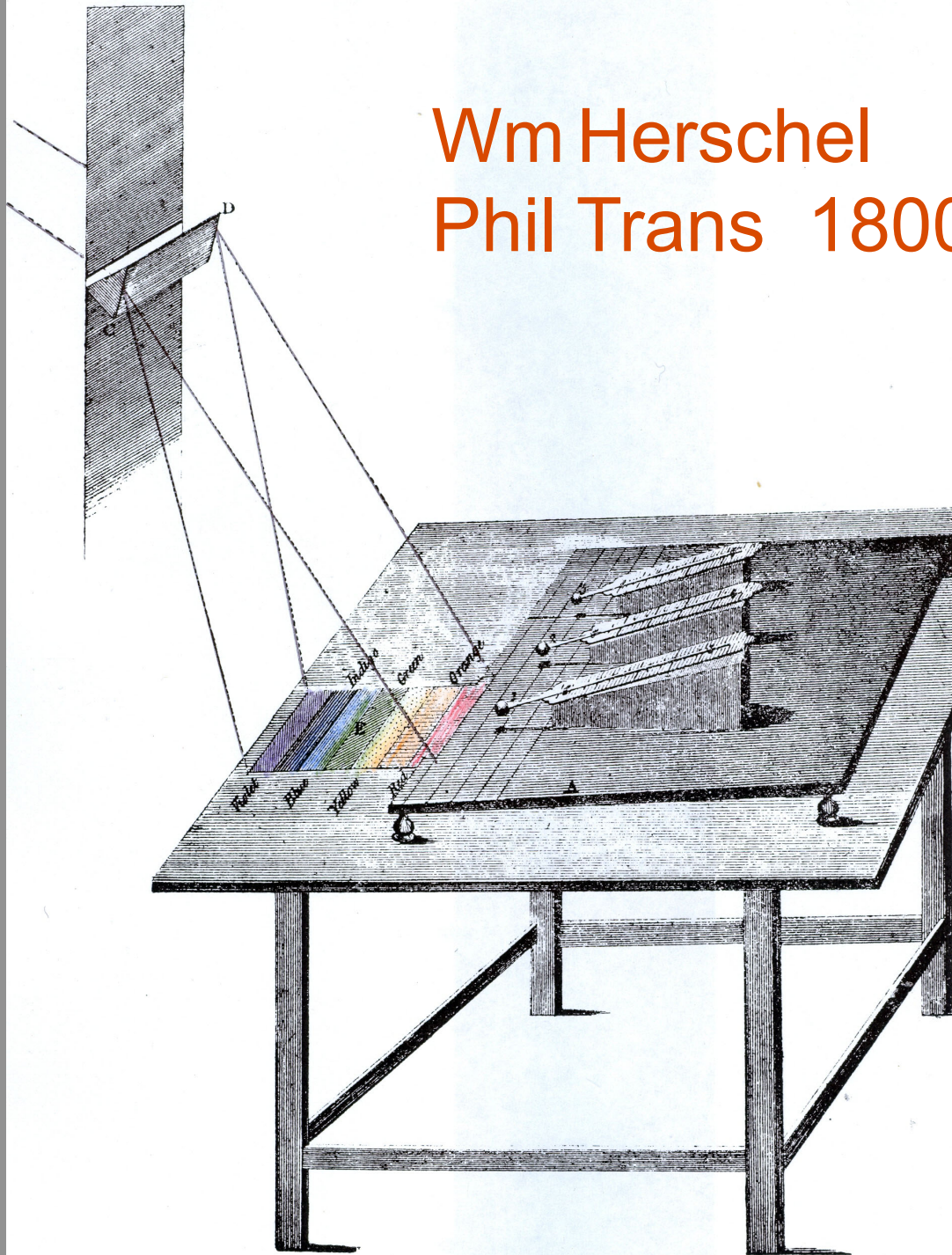
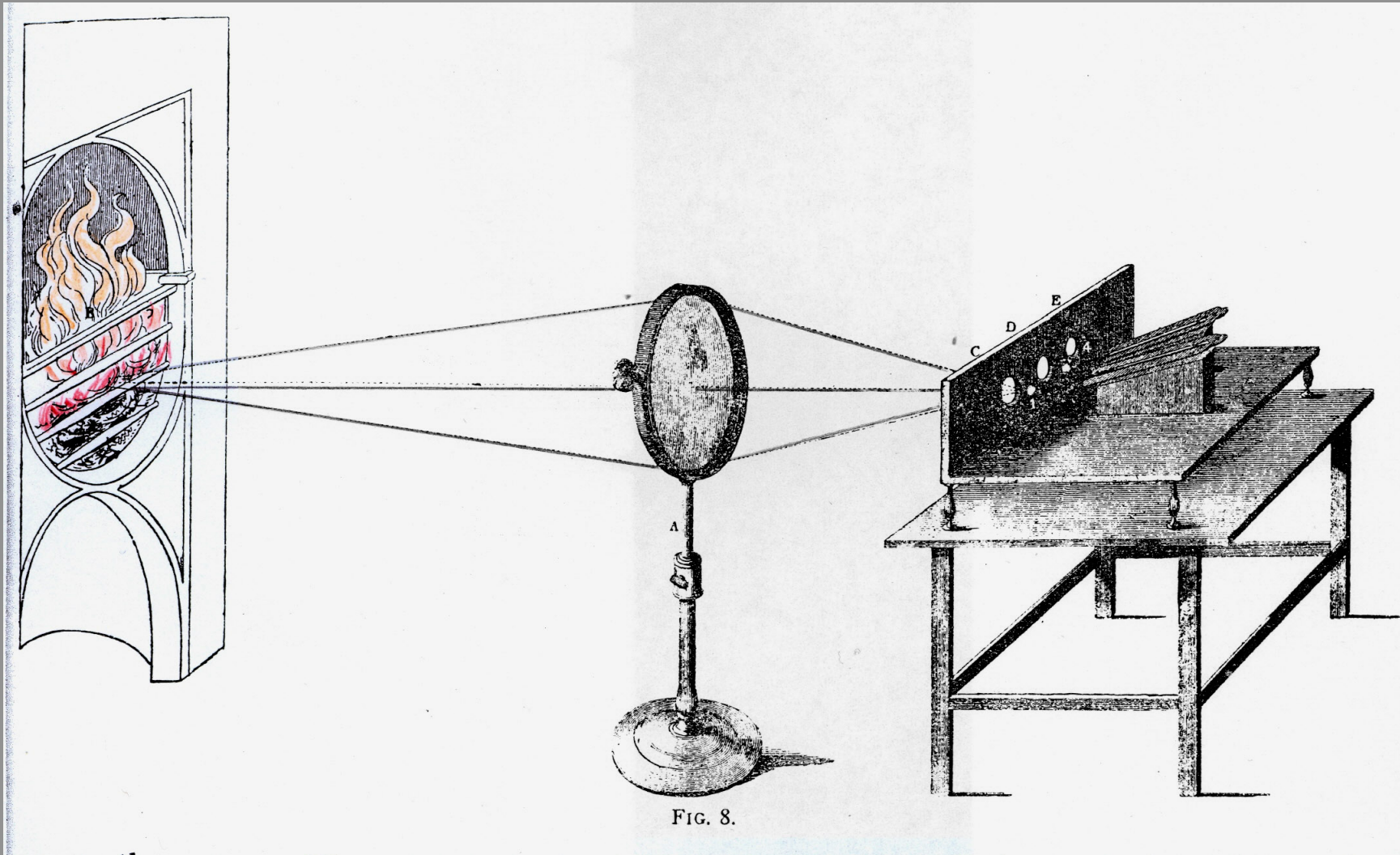


FIG. 1.

# Wm Herschel Experiment 14



# Wm Herschel Experiment 16

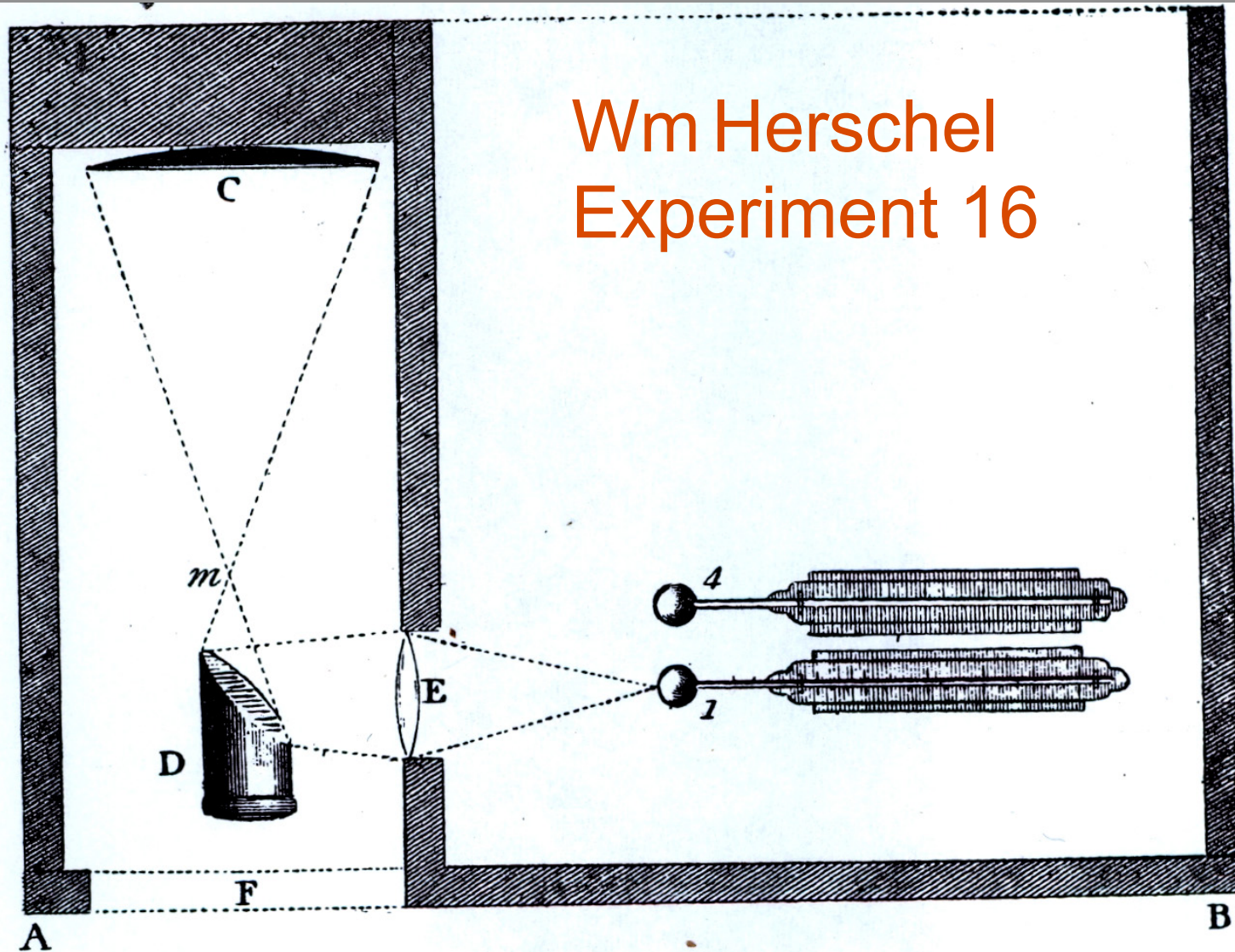


FIG. 10.



# Wm Herschel 1800

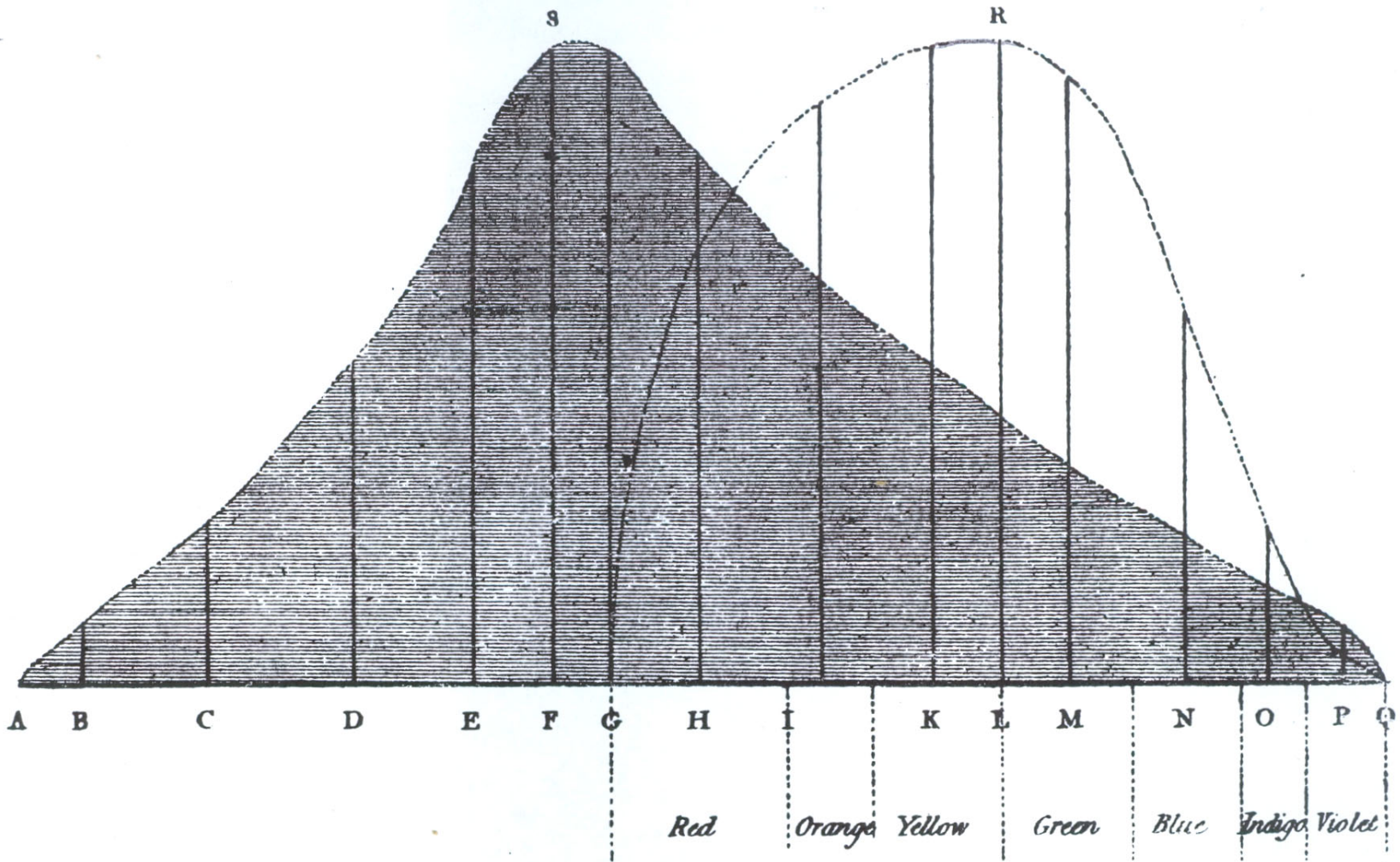


FIG. II.

# Early History of the Infra-red

Herschel did not use the word “infra-red”  
--- it was first used in *Nature* in 1881.



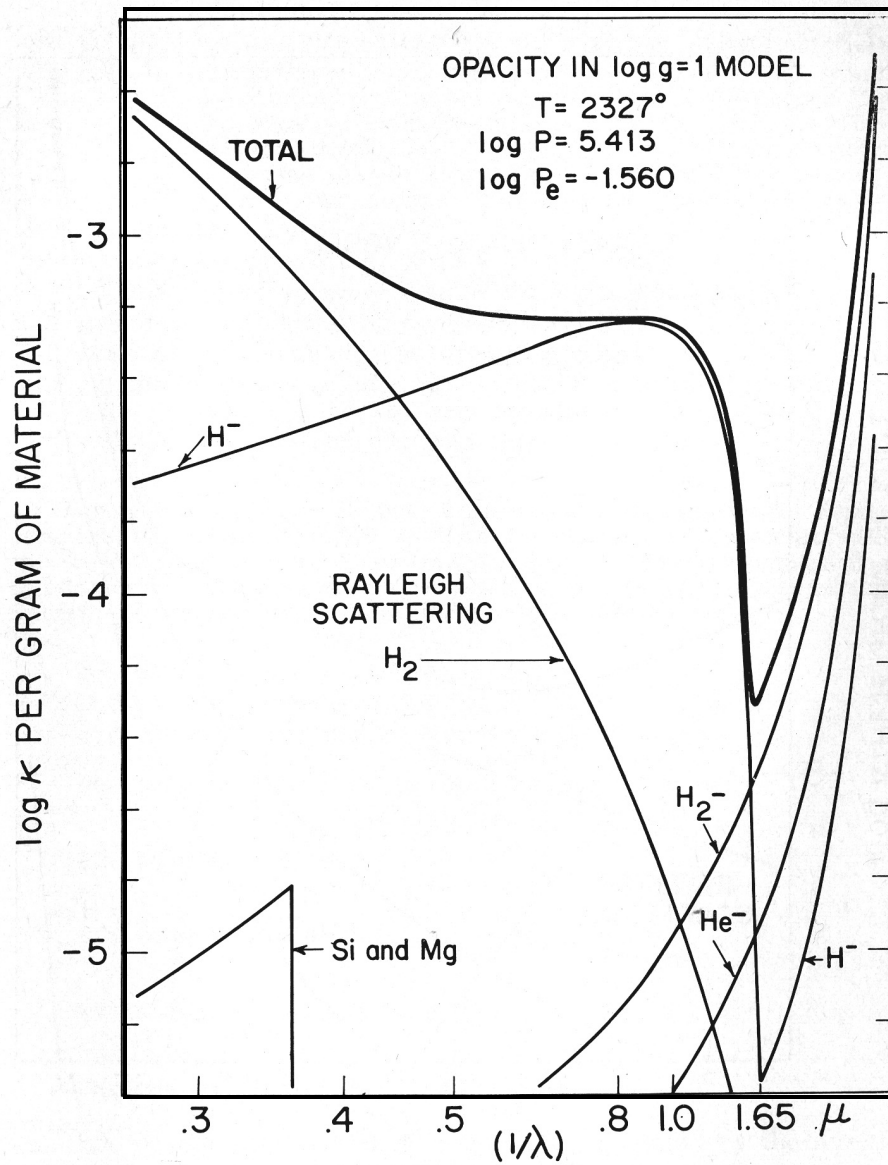


Fig. 2 — The opacity window at  $1.65 \mu$  is clearly marked for the low-gravity star.

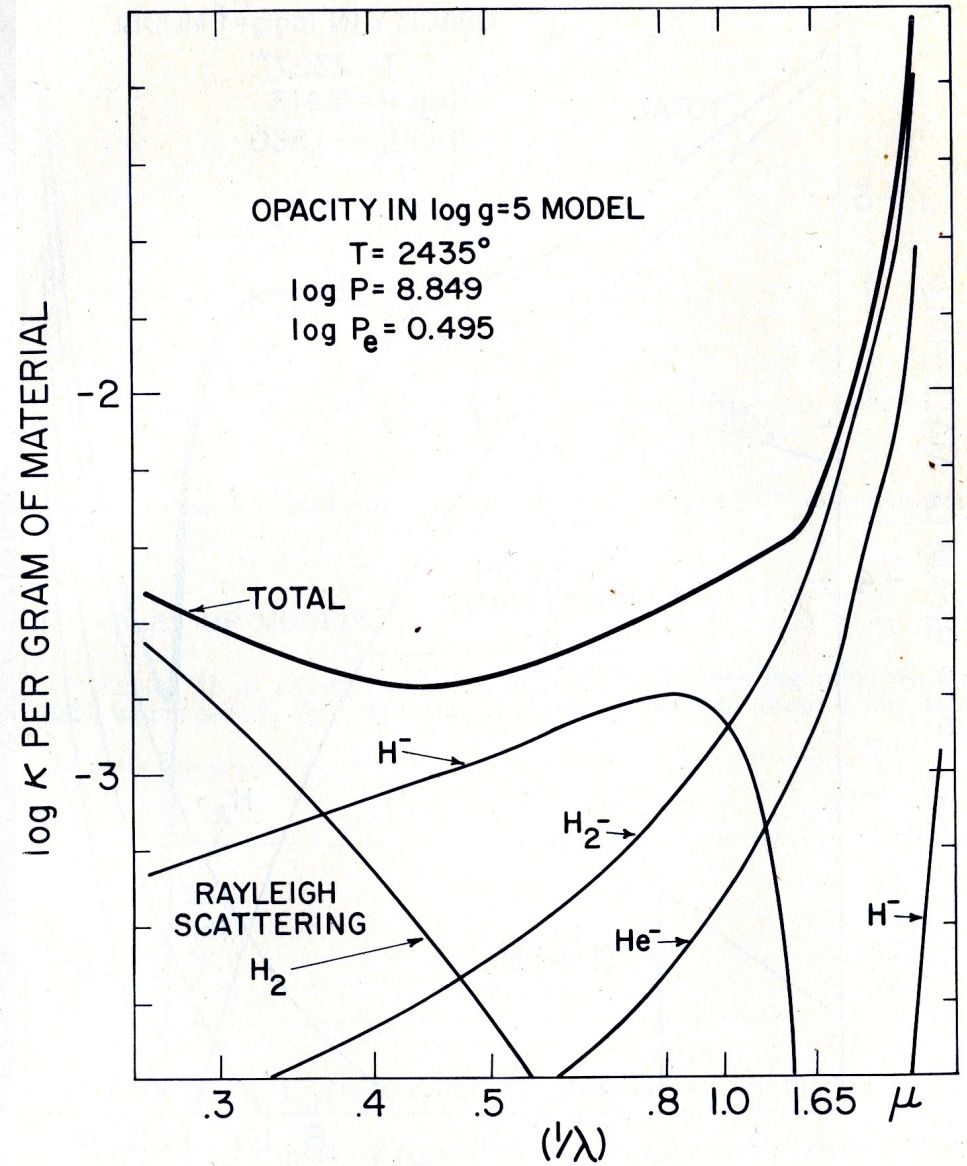


Fig. 3. — The monochromatic opacity for a dwarf star.

Gingerich, Latham, Linsky & Kumar 1967

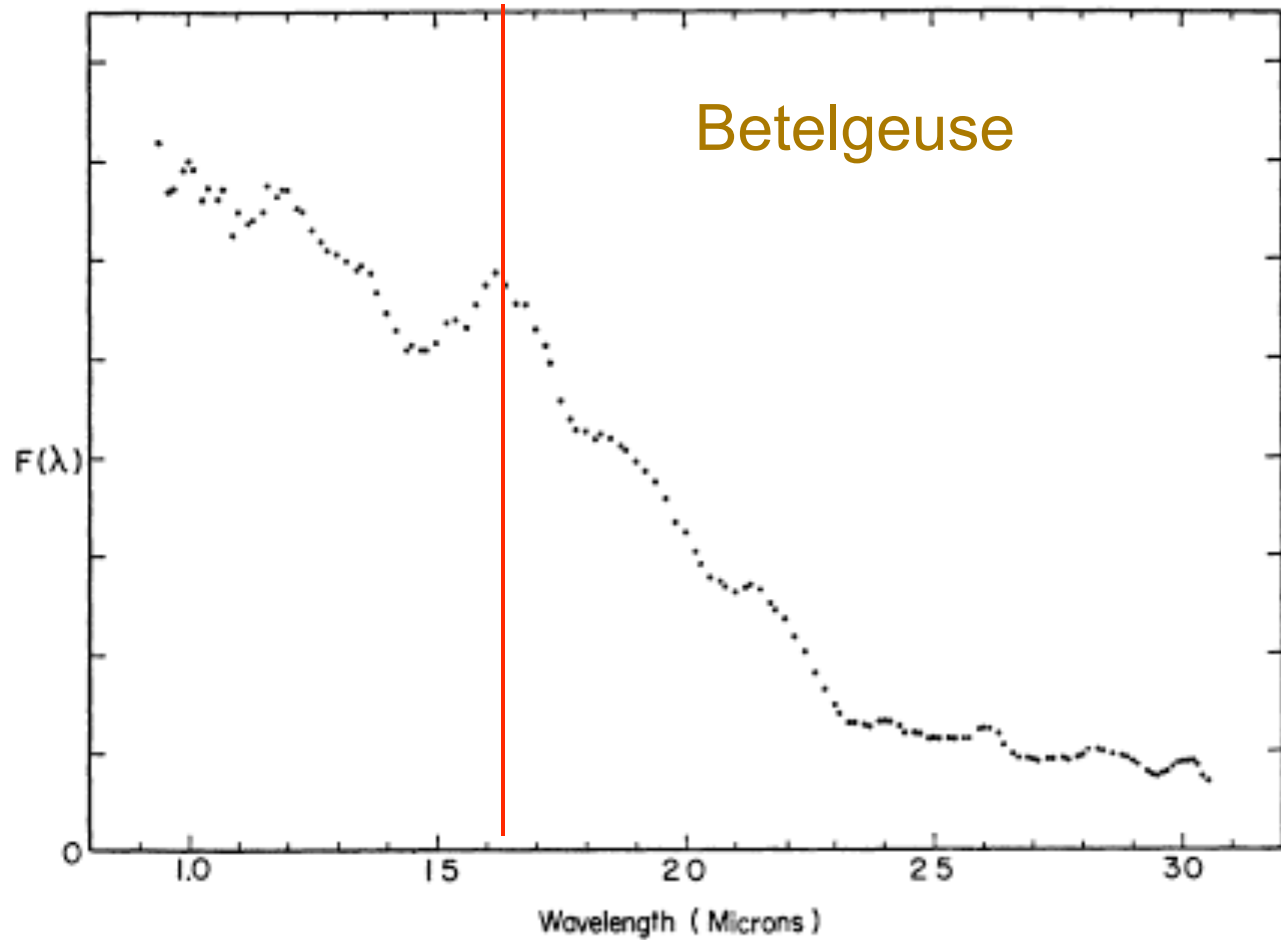
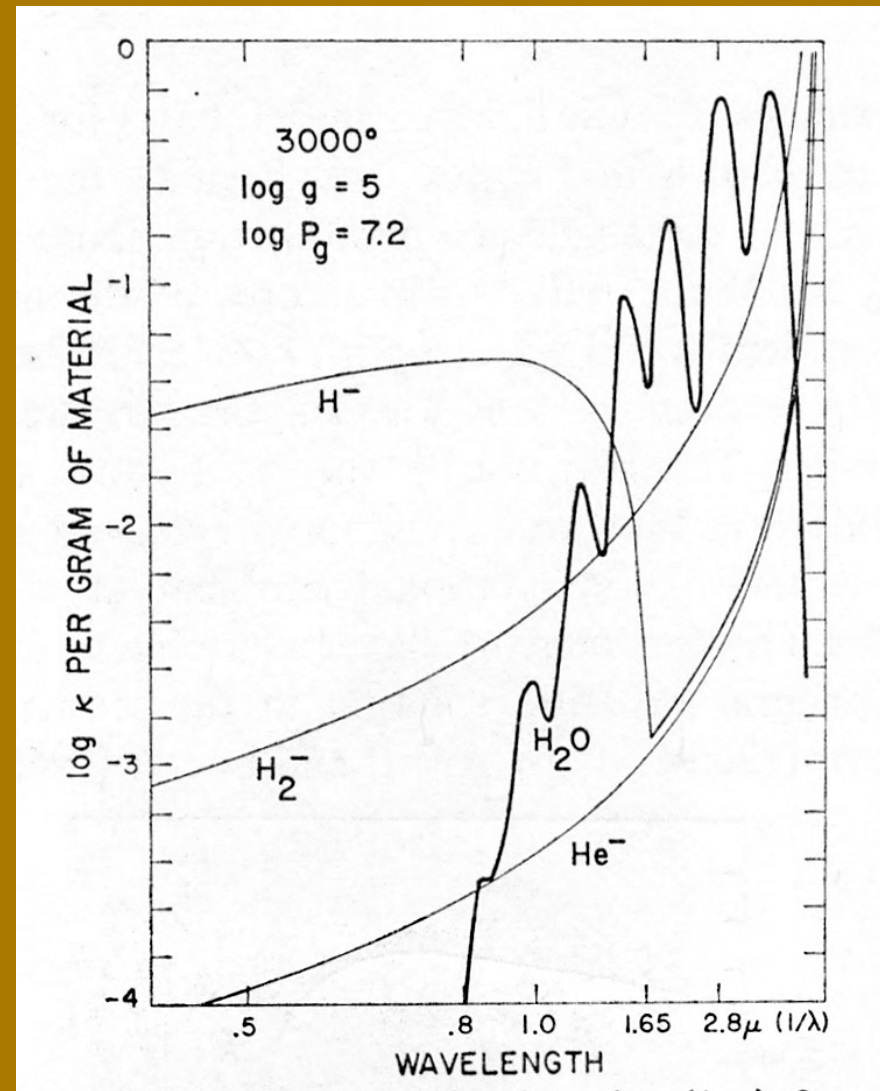
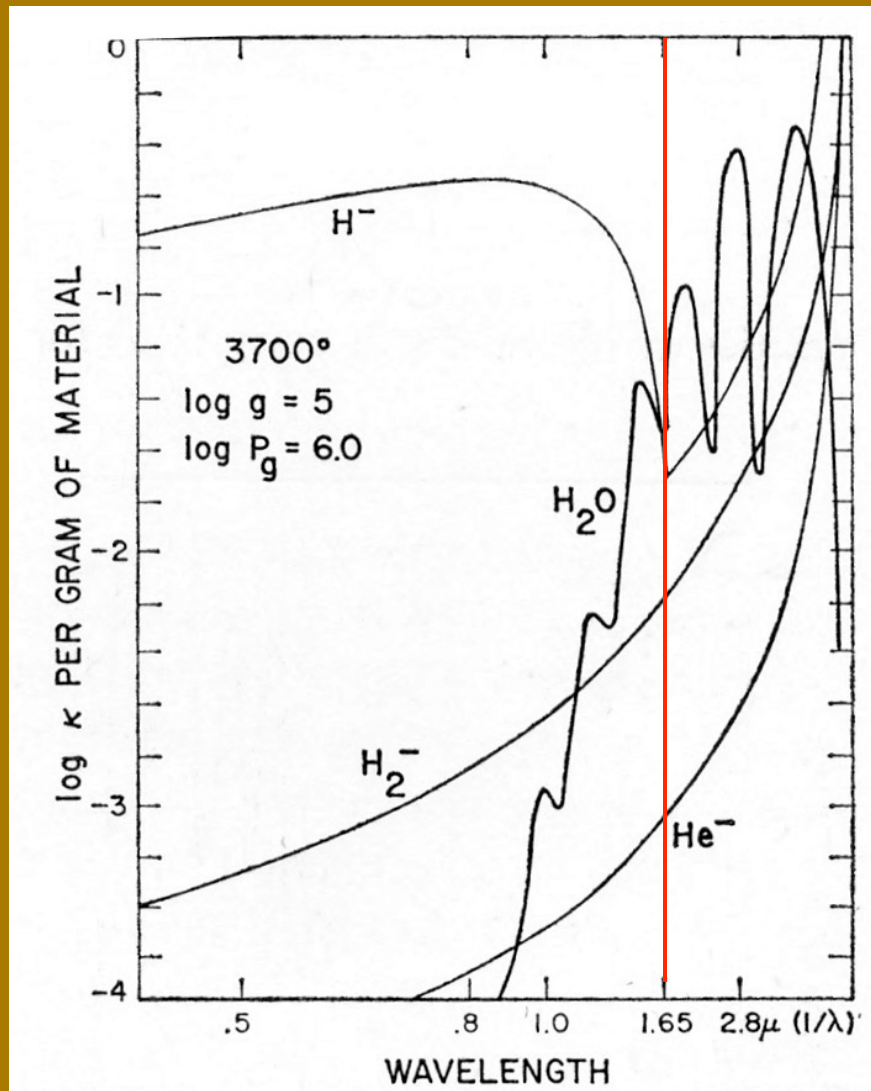
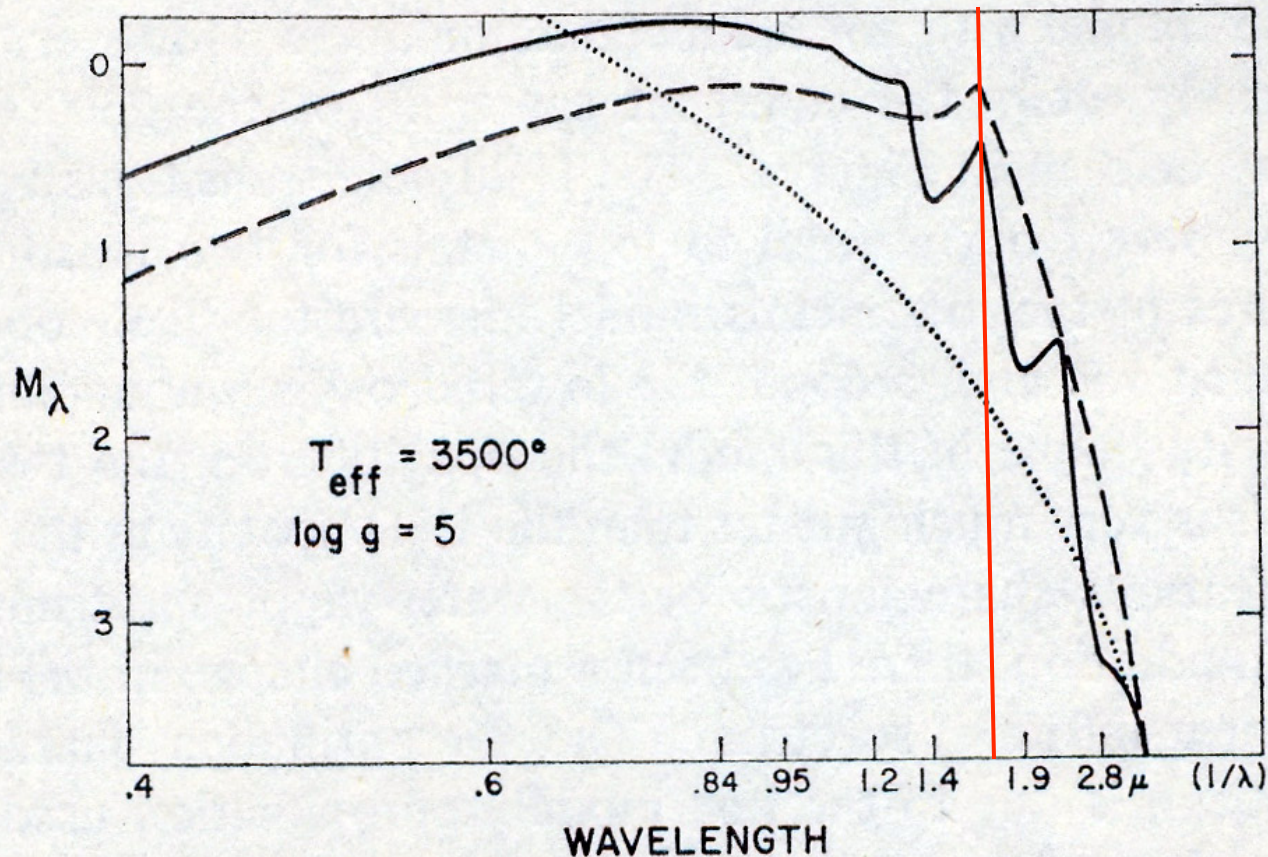


FIG. 5.—Infrared spectrum of  $\alpha$  Orionis (Detector B)

Princeton Stratoscope 1964



Carbon, Gingerich, & Latham, 1969



**FIGURE 5** Emergent fluxes (ergs/cm<sup>2</sup> sec sr) in magnitudes for  $T_{\text{eff}} = 3500^\circ$ ,  $\log g = 5$ : dashed line—model without H<sub>2</sub>O; solid line—model with H<sub>2</sub>O; dotted line—constant energy curve proportional to  $2.5 \log \lambda^2$ .

Carbon, Gingerich, & Latham, 1969

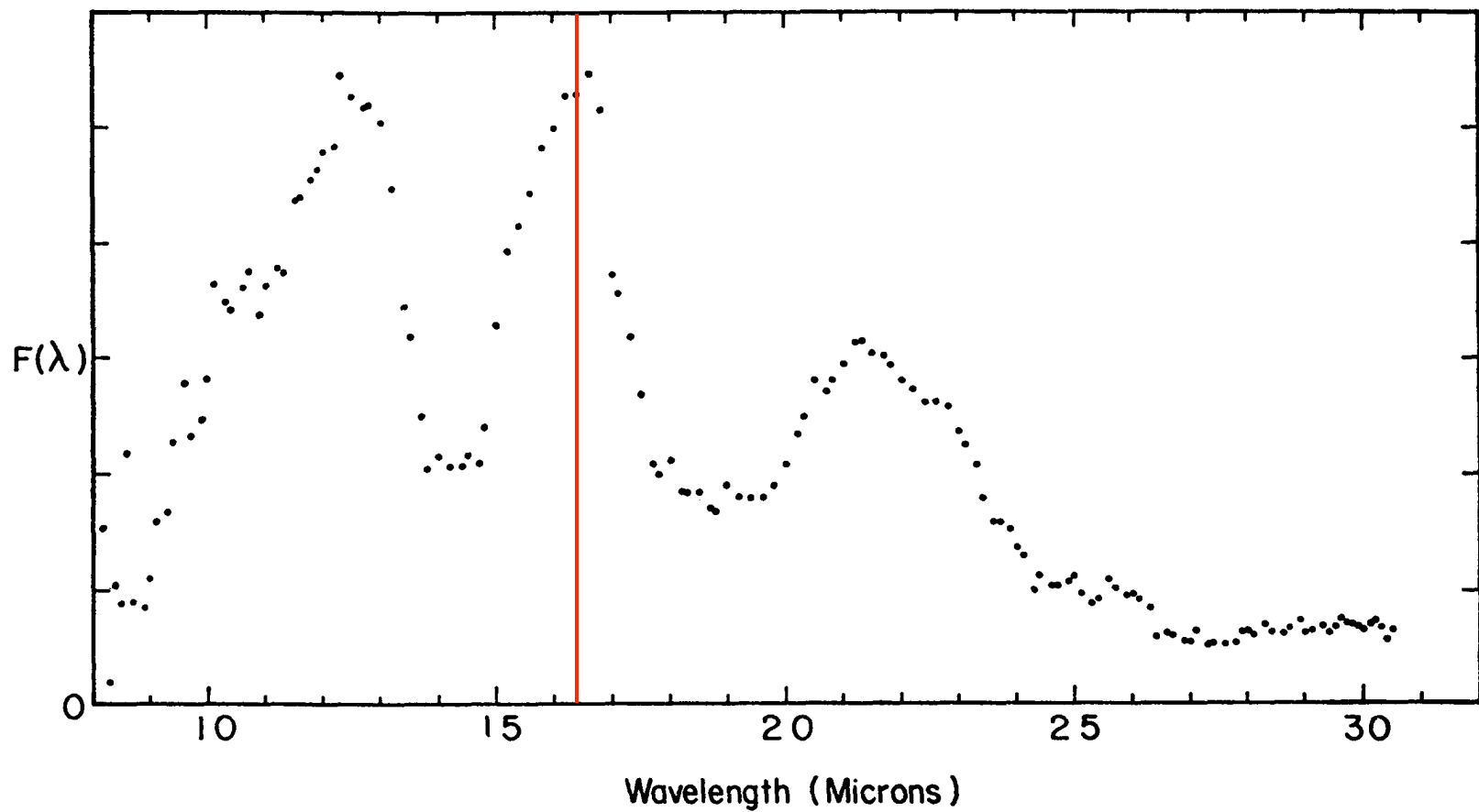


FIG. 9.—Infrared spectrum of *o* Ceti (Detector A)

Princeton Stratoscope 1964



And finally,  
congratulations to those  
still harvesting the Infra-red!

Fazio Festival, 2009