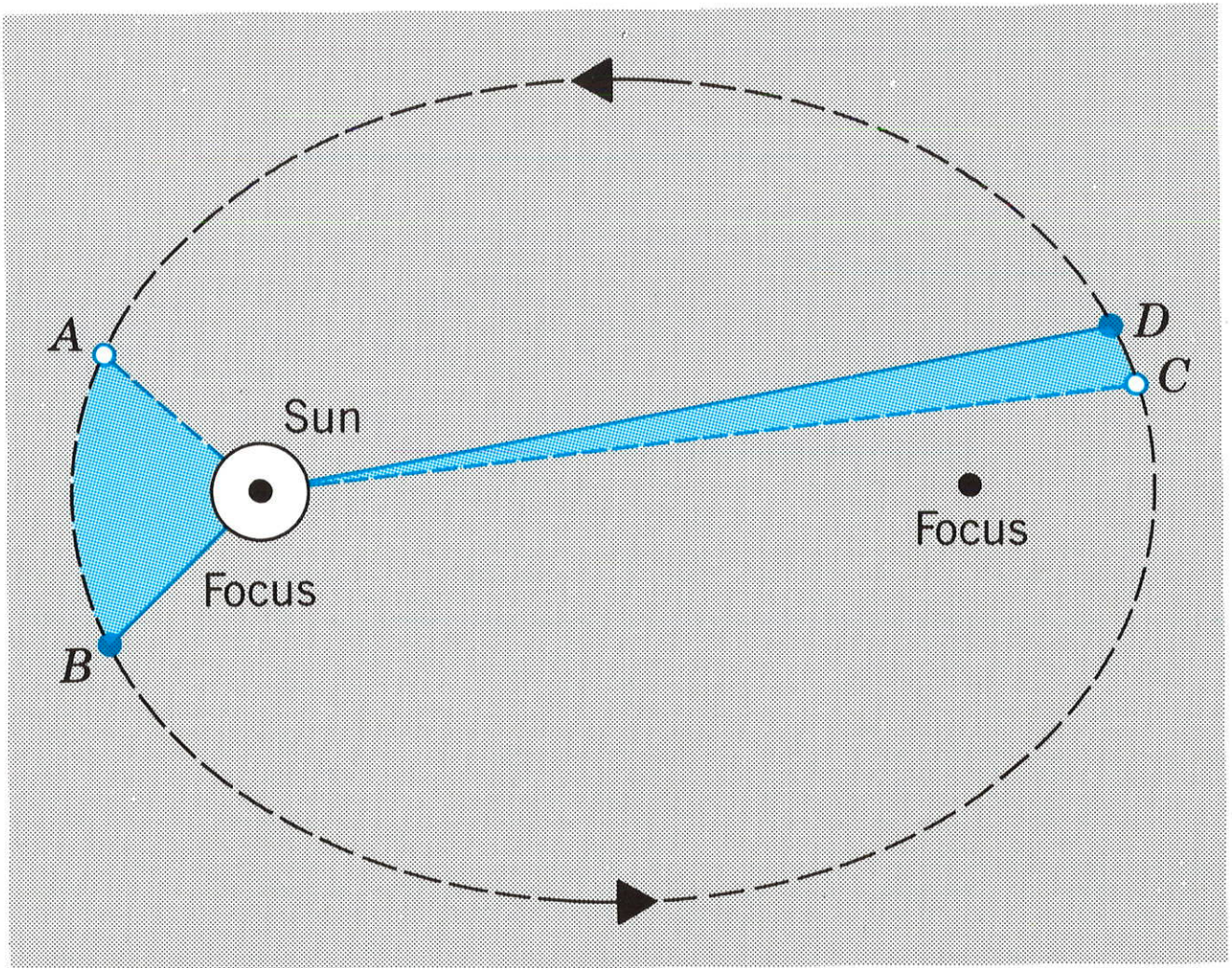
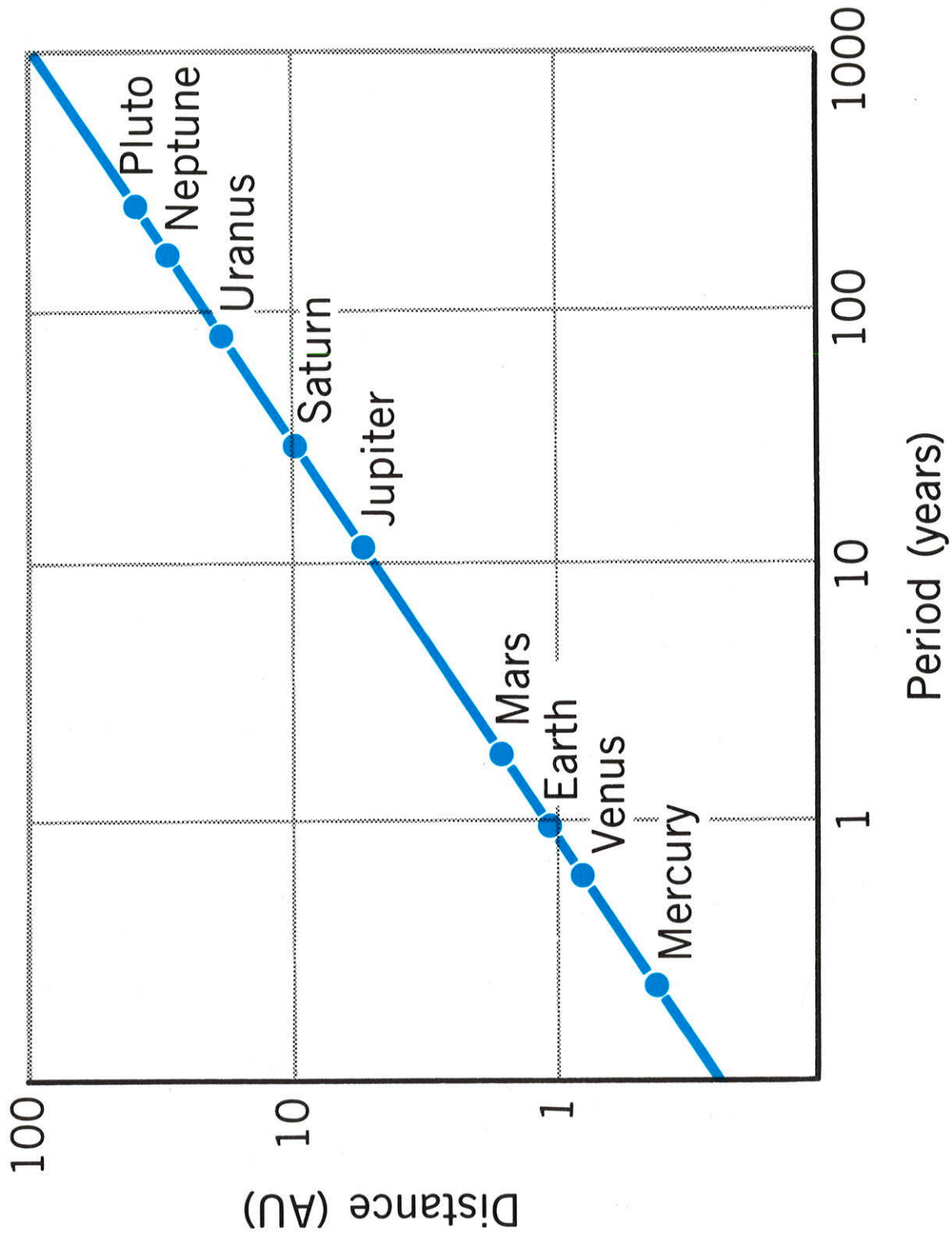


Kepler's first law.



Kepler's second law.



Kepler's third law.

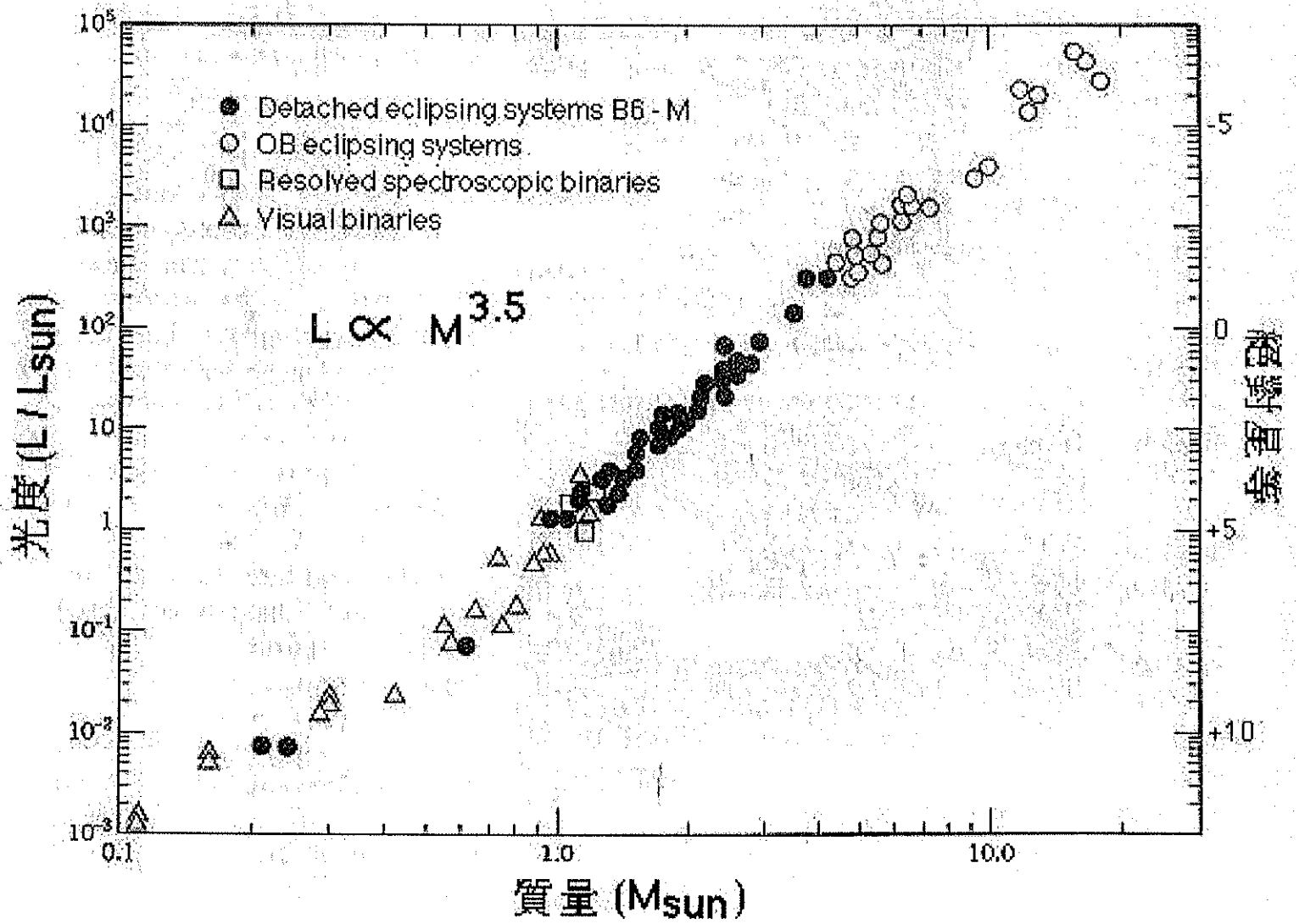
Mass Determination

$$\mu \ddot{\vec{r}} = - \frac{G m_1 m_2}{r^2} \hat{r}$$

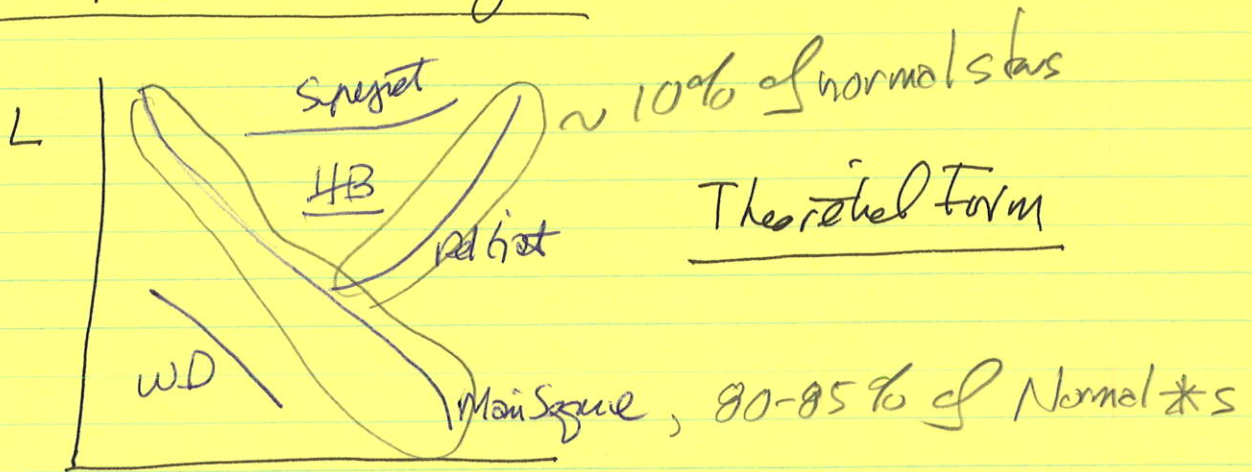
$$\vec{r} = \underbrace{\vec{r}_1 - \vec{r}_2}_{\text{measure } a_1, a_2}, \quad \Omega = \frac{2\pi}{P}, \quad \text{know } m_1 a_1 = m_2 a_2$$

↑
measure P

⇒ can find m_1 & m_2



Hertzsprung-Russell Diagram

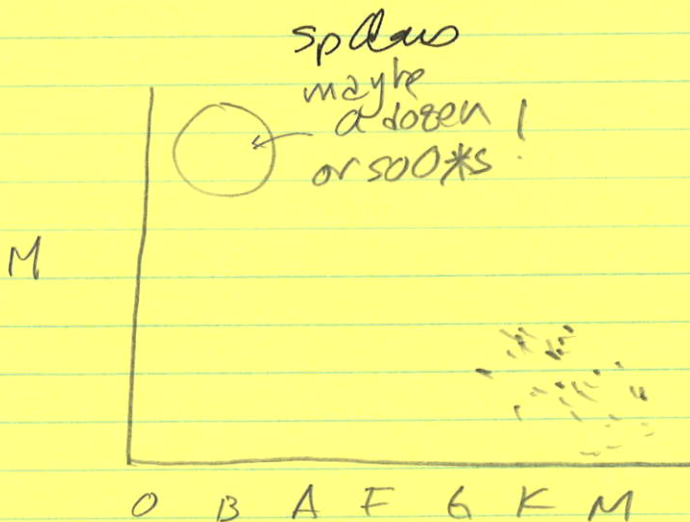
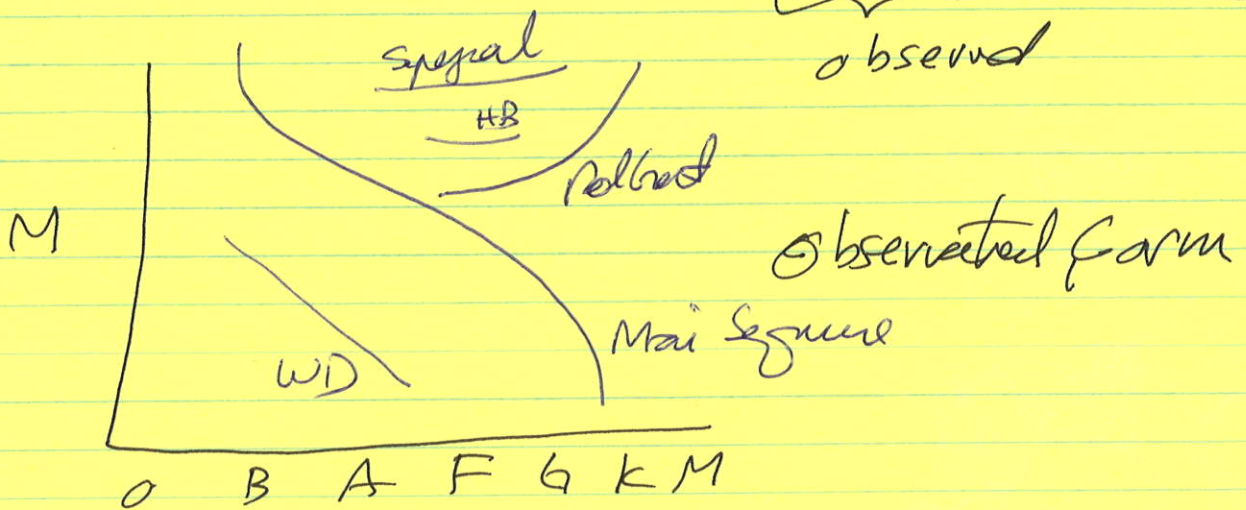


note: $L \equiv$ Magnitude

$T_{\text{eff}} \leftarrow$ observed

$T_{\text{eff}} \equiv T_{\text{color}} \equiv T_{\text{line}} \equiv$ Color \equiv Spectral class

observed

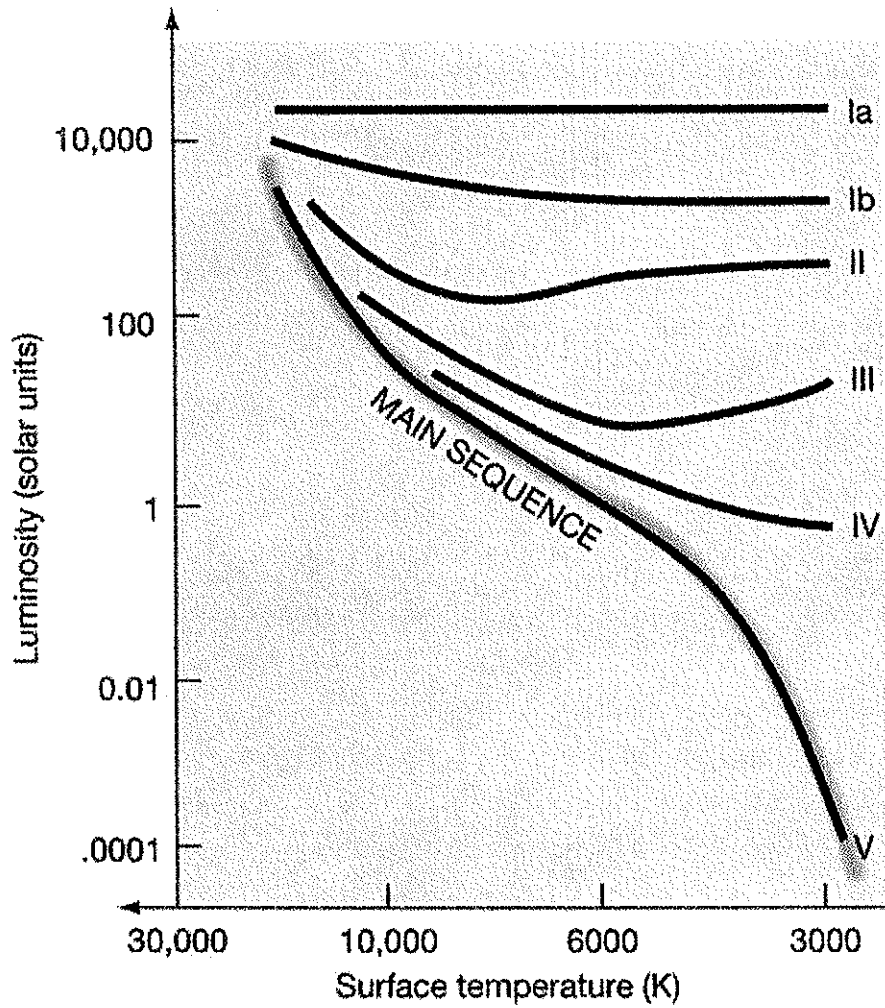


nearby stars, volume limited survey

\Rightarrow low L stars are closest together

\Rightarrow highest space density

\Rightarrow most common



⊙ B A F G K M

Spectral classification

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TABLE 17.3 Stellar Luminosity Classes

Class	Description
Ia	Bright supergiants
Ib	Supergiants
II	Bright giants
III	Giants
IV	Subgiants
V	Main-sequence stars and dwarfs

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