The angle subtended by Mercury at the Earth, when the planet transits the Solar disc

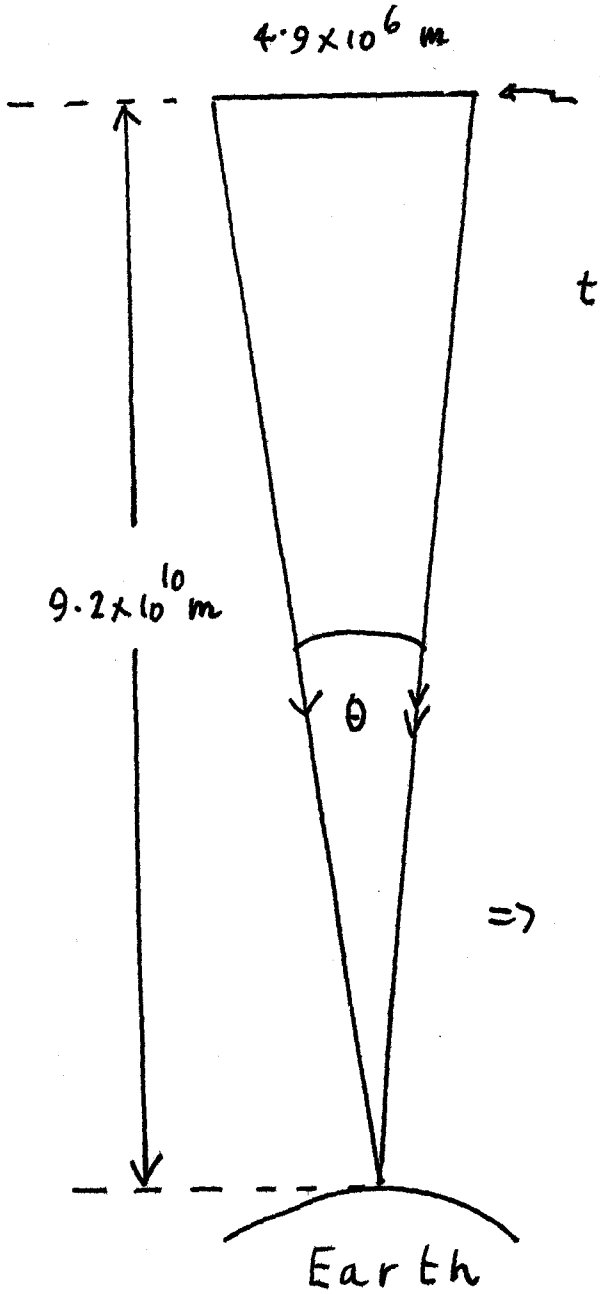
The Earth-Sun distance $= 1 \cdot 5 \times 10^{11}$ m.

The Mercury-Sun distance $= 5 \cdot 8 \times 10^{10}$ m $\left(= 0 \cdot 58 \times 10^{11} \text{ m} \right)$

$\therefore$ The Earth-Mercury distance $= \left(1 \cdot 5 \times 10^{11} \text{ m}\right) - \left(0 \cdot 58 \times 10^{11} \text{ m}\right)$

$= 9 \cdot 2 \times 10^{10}$ m

The diameter of Mercury $= 4 \cdot 9 \times 10^{6}$ m



The small disc of Mercury, seen against the Solar surface

From the diagram,

$$\tan\theta = \frac{4 \cdot 9 \times 10^{6} \text{ m}}{9 \cdot 2 \times 10^{10} \text{ m}}$$

$$= \frac{4 \cdot 9 \times 10^{6}}{9 \cdot 2 \times 10^{10}}$$

$$= 0 \cdot 5(3) \times 10^{-4}$$

$$= 5 \cdot 3 \times 10^{-5}$$

$$\Rightarrow \theta = 3 \times 10^{-3}{}^{\circ}$$

We can now express θ as a fraction of $0 \cdot 5^{\circ}$. That is, a fraction of the angle subtended by the Sun at the Earth.

$$= \frac{\theta(^{\circ})}{0 \cdot 5^{\circ}}$$

$$= 6 \times 10^{-3} \left(= \frac{1}{17} \right.$$

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