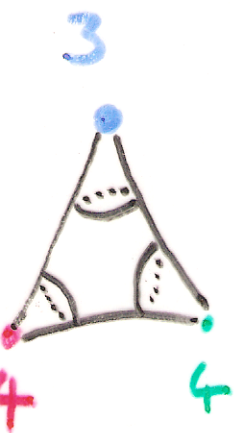
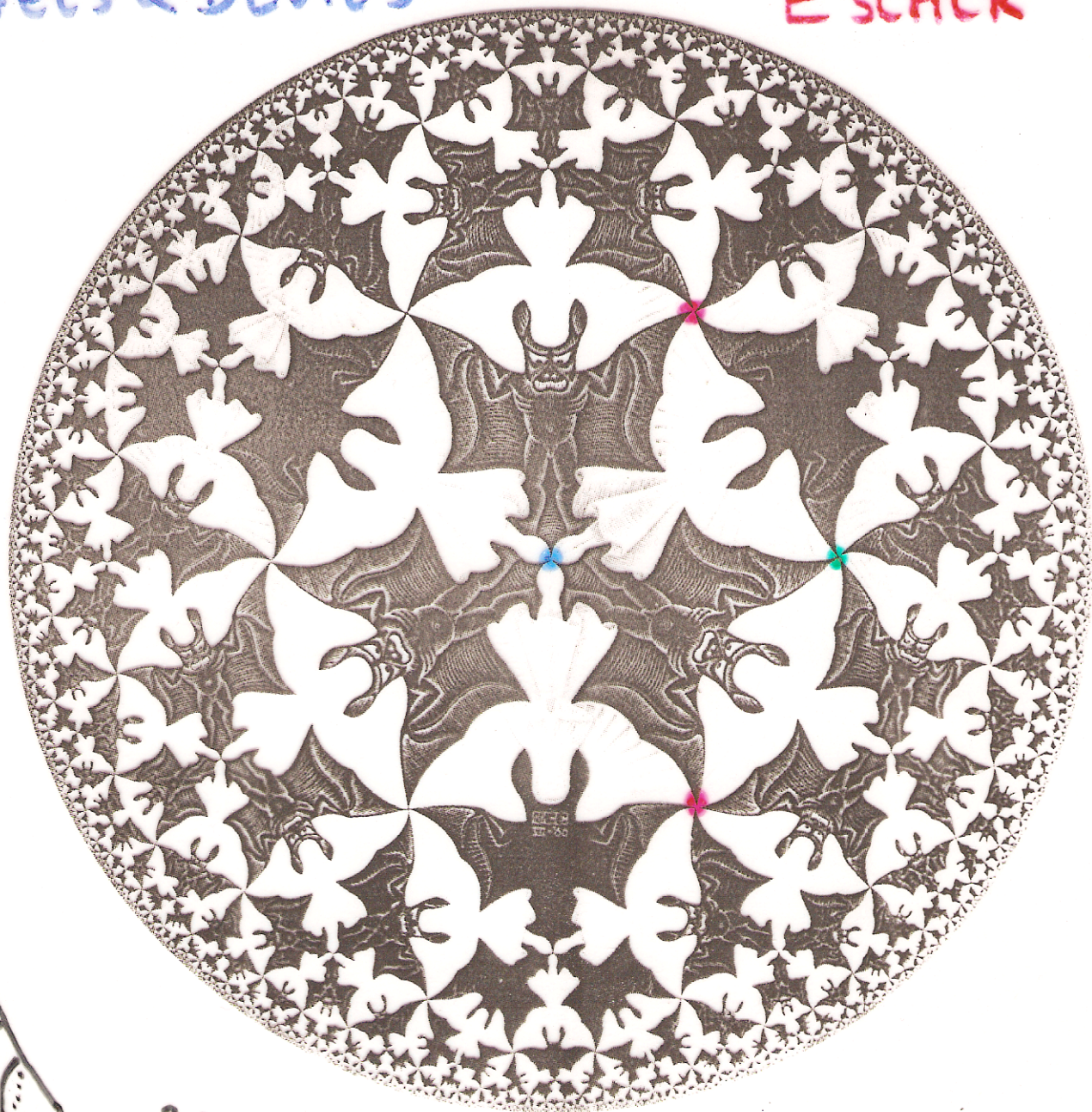


ANGELS & DEVILS

ESCHER



$$S^2(3,4,4)$$

Figure 1.2.5. M. C. Escher: Circle Limit IV

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Hyperbolic
Wallpaper

The Upper Half-Plane Model

The points of the upper half-plane model are the complex numbers above the real axis in the complex plane. The lines of the model are the open rays orthogonal to the real axis together with the open semicircles orthogonal to the real axis. See Figures 1.2.6 and 1.2.7. The orientation preserving congruence transformations of the upper half-plane model are the linear fractional transformations of the form

$$w = \frac{az + b}{cz + d}$$