

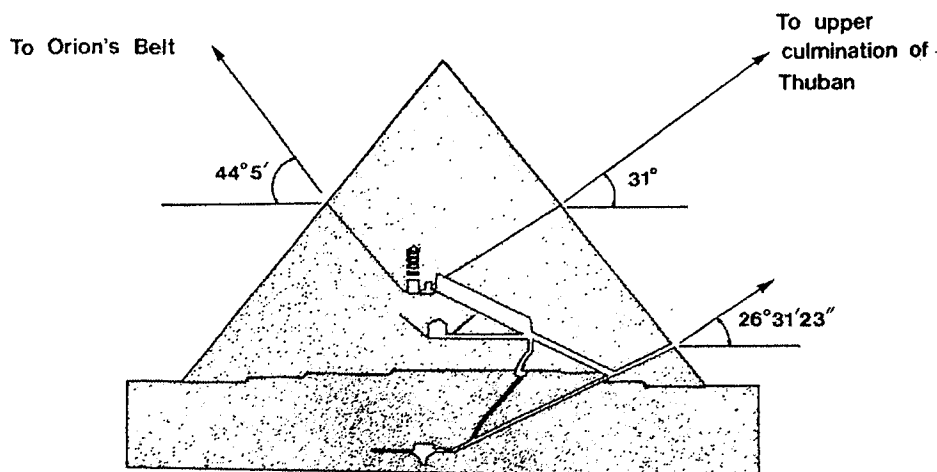
ASTR 130: INTRO TO ARCHAEOASTRONOMY

Homework #2

Thursday, November 5, 2009

- Pyramid Alignment** (40 points) The Great Pyramid at Giza in Egypt is said to have airshafts leading from the King's Chamber that display alignments with a star or stars in Orion's belt, and with Thuban, the Pole Star for that time. Giza is at a latitude of 30° . Using this fact, examine the appended diagram, and answer the following questions. Give a brief explanation for your reasoning.
 - a) Was Thuban located at the North Celestial Pole at the time of the pyramid's construction? Symbolically, why did the Pole Star and stars in its vicinity represent the realm of the undying?
 - b) At the present time, Orion's Belt is on the Celestial Equator (0° declination, or celestial latitude), so that a present day pyramid built at Giza might have one shaft pointing to Polaris (at 30°) and a shaft pointing to Orion's Belt (90° away from that (or 60° above the southern horizon, not $44^\circ 5'$). What effect is responsible for this difference? What did the constellation of Orion symbolize to the Egyptians?

From his pyramid, the pharaoh Khufu departed for the sky. His two celestial destinies were symbolized in the "air shafts" that emerge from the King's Chamber. One pointed to Thuban, the "north star" of the Old Kingdom, and the other was oriented toward the belt of Orion. (*Griffith Observatory*)



- Pyramid Alignment Methods** (20 points) Give a detailed description of the ways that might have been used to align the construction of the pyramids with the cardinal directions (north, east, south, and west). Discuss the measured accuracy of the pyramid alignments. What is the evidence that your hypothesis might be correct?