

ASTR 2000 HOMEWORK #9

NAME: _____ KEY _____

1. (15 points) A supernova is due to the massive explosion that occurs at the "death" of a star much bigger than our Sun. Several ancient cultures (notably the Chinese) noticed and recorded these supernovae (plural of supernova).

a). (6 points) Briefly describe the visual appearance of a supernova, including 1. how bright they appear, 2. how frequently that have occurred through history and 3. how long they are visible to the eye alone in the day and night time sky.

1. Very bright point source of light. Typically brighter than the brightest stars. Twinkles like bright stars.
2. Only a few have been recorded through history. Five only are VERY reliable. Chinese recorded 2 or 3 more possible ones.
3. Typically visible for weeks to 2 months in daytime; several months at night.

b). (4 points) Describe the astrological interpretation of the appearance of a supernova that was made by Chinese astronomers/astrologers and so the importance to Chinese government and culture.

Unexpected occurrences in T'ien, the Heavens, were viewed as something being amiss in the Empire. The Emperor was viewed as being responsible for all happenings and circumstances in the Empire so that the sudden, unpredicted and unpredictable appearance of a supernova was a threat to the rule of the Emperor. The appearance of a supernova was an excuse for insurrection that required a positive "spin" to be made publicly to avoid an insurrection.

c). (3 points) Why is it unlikely that the "Star of Bethlehem" was a supernova?

The Chinese did NOT record such an event even though they were recording any and all such events during that time period. Also a supernova lasts for several months in the sky and would not appear and disappear as quickly as described in the Bible.

d). (2 points) The "Star of Bethlehem" may have been a close planetary conjunction, whose importance was interpreted by Babylonian astrologers. Describe what is meant by a planetary conjunction

A planetary conjunction is the close proximity of two or more planets along the ecliptic in the sky. Astrologically, usually defined as being < 8 degrees apart.

2. (15 points) We have been studying the general configurations of constellation patterns of several ancient and indigenous cultures: Navajo, Lakota, Pueblo, Greek/Babylonians, Chinese, Australian Aboriginal, Inca, etc. Rather than focusing on individual constellations and their lore, we have looked for overall patterns in these depictions (types of depictions; e.g., all animals, heroes and heroines, social status, geometric shapes, etc), level of completeness (all or most stars depicted as part of constellations compared with few constellations) and the use of bright star and dark constellations.

a). (5 points) What are “dark constellations” and why do only southern hemisphere cultures have them?

Dark constellations are dark clouds of gas silhouetted against the backdrop of the many stars in the Milky Way. The stellar backdrop produces a nebulous outline of figures described by the Inca and Australian aboriginals, for example.

In the southern hemisphere the bright central regions of the Milky Way, including the Galactic Center, move very high across the sky and so the dark constellations are very easily seen from a dark place. In the northern hemisphere these brightest regions are very low in the sky in the summertime or even below the southern horizon and so do not allow the dark constellations to be seen.

b). (5 points). Think of the different perspectives on the sky that peoples living near the equator might have compared to peoples living much further to the North. Describe any differences in constellation configuration that might exist and justify your statements. You are welcome to use examples from the class if that helps.

Best answers mention the “cosmic whirlpool” around the North Celestial Pole and the circum-polar constellations (e.g., “imperishable stars”).

Examples: importance of circum-polar stars to Egyptians, Native Americans, etc.

c). (5 points) Think of the different perspectives on the sky that an egalitarian (relative equality of political, social and economic rights) society and a more autocratic (ruler has considerable, if not, absolute power) society might have. Describe any differences in constellation configuration that might exist and justify your statements. You are welcome to use examples from the class if that helps.

Best answers mention constellations which are either depictions of great deeds by individuals (e.g. Greeks or Native Americans) or stories that have a moral or common purpose (e.g. Australian aboriginals or Native American warning to youngsters or Inca stellar auguries about crops and animals) as compared to Chinese constellations in which the Emperor was at the NCP or Egyptian “imperishable stars” amongst which dwells the Pharaoh and his Queen.