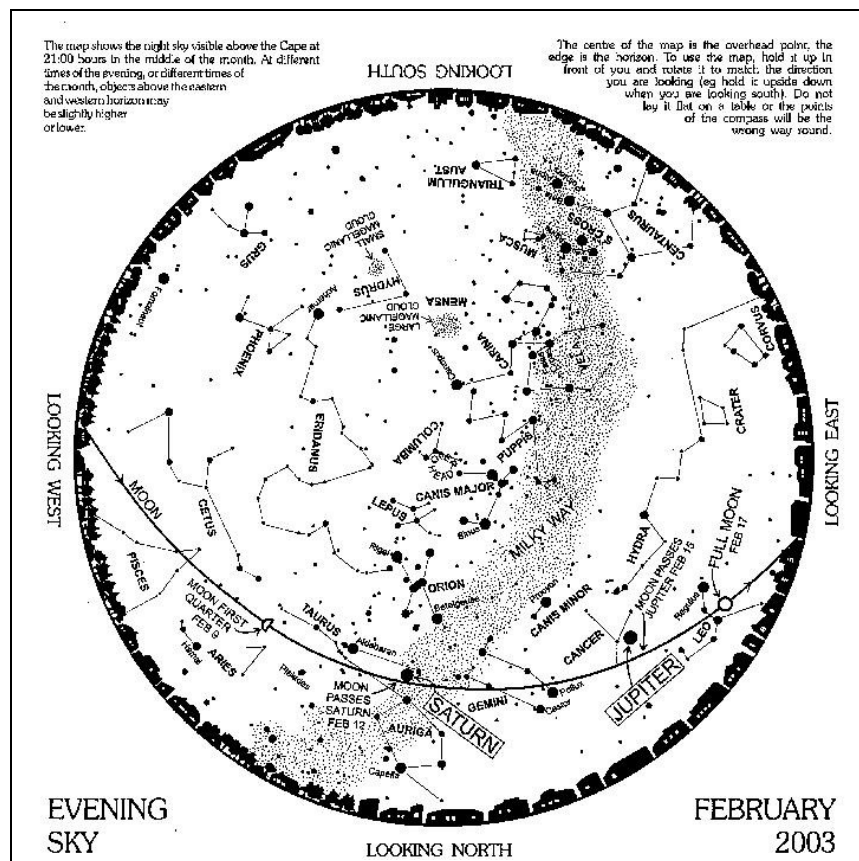




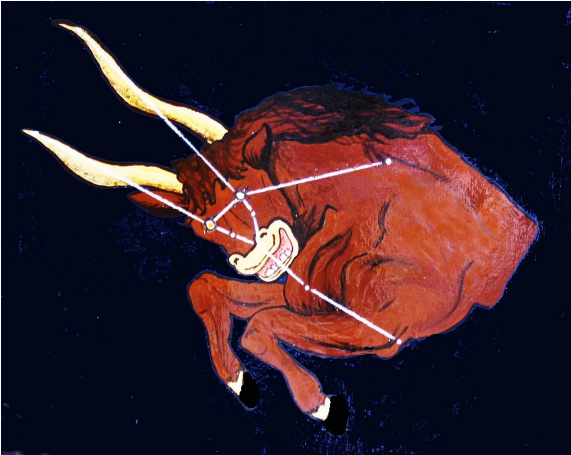
# Astronomy Notes for Educators

## Star patterns in the sky

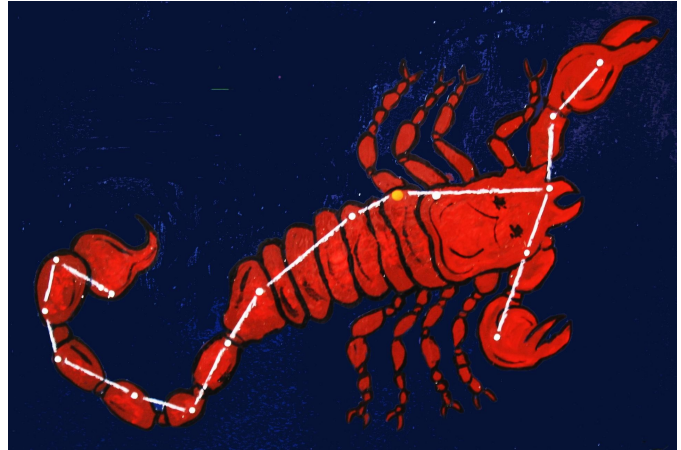




# Star patterns in the Sky



*Figure 1: Taurus “the Bull”*



*Figure 2: Scorpius “the Scorpion”*

On a clear dark night, you can see many stars. Particularly bright stars appear to make patterns. Patterns such as Orion “the Hunter”, the Southern Cross, Scorpius “the Scorpion” and the Taurus “the Bull” are called constellations. They are named according to the shape of the thing that they look like.

**Specific Outcomes**

At the end of this module, the educators should be able to:

- ◆ Recognize and point out the brightest star patterns in our night sky, such as the Southern Cross, Orion and Scorpius.
- ◆ Explain how to use the Southern Cross and pointers to find the South Pole in the sky.

**Ideas**

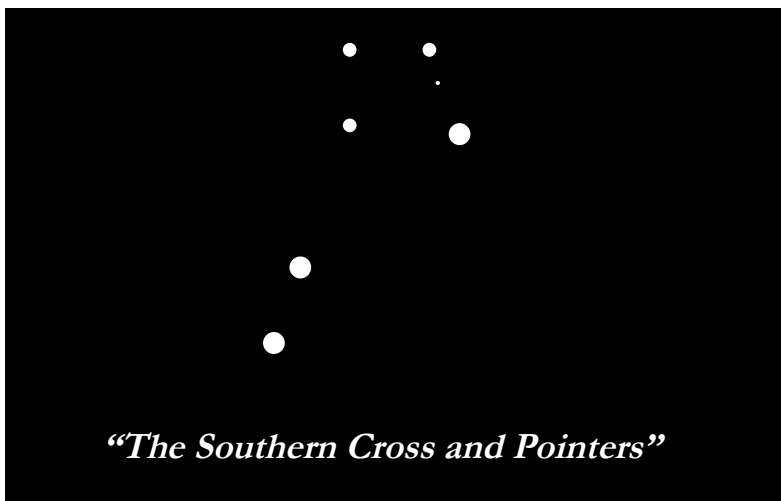
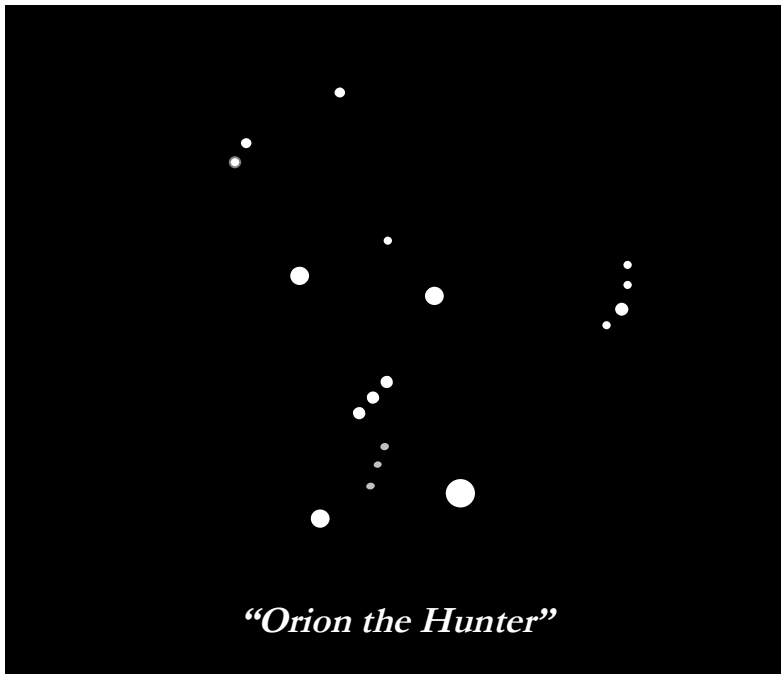
- ◆ Some star patterns may be difficult to see if you are in the city. The best place to study the night sky is away from city lights, where the skies are darker.

**Educator Notes**

- ◆ Stars are all around us. We only see them at night, when the bright Sun has set, leaving the heavens dark.
- ◆ We see specific star patterns at certain times of the year. Constellations visible during winter are different from those seen in summer.
- ◆ The Southern Cross is the bright cross in the sky that shows us where to find the South Pole in the sky. Two pointer stars nearby always point to the Cross.
- ◆ A trip to an astronomy observatory is a wonderful experience for the learners to do “stargazing” with telescopes.
- ◆ Visit a planetarium where we can learn about the solar system and stars even during the day.

### Activity 1: Making flashcards of Orion and the Southern Cross

Look at the two black cards below. Diagrams of the star patterns or constellations “*Orion the Hunter*” and “the *Southern Cross and Pointers*” are traced on the cards, using circles to represent each star of the constellation.



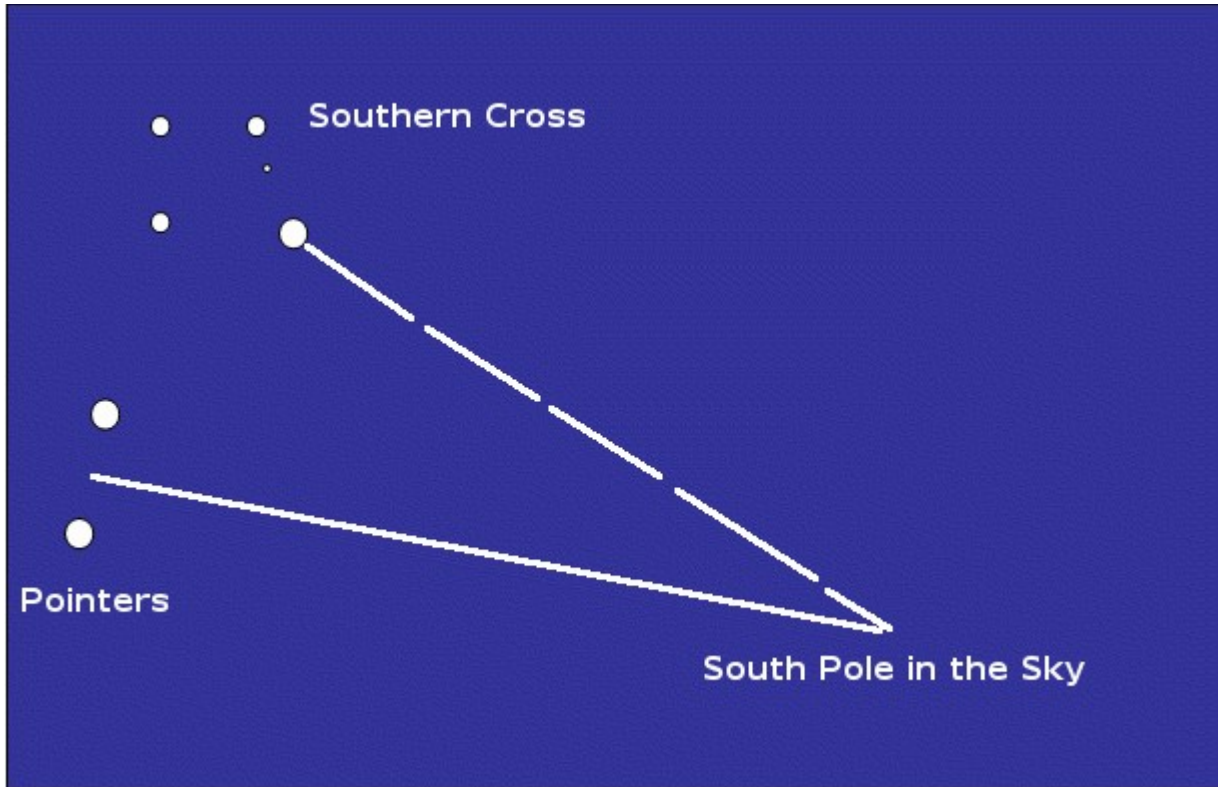
- Step 1:** On the black cards provided, use a sharp pencil or pen to **punch holes** at each of the stars of the constellation.
- Step 2:** **Recognizing Star Patterns using Flashcards**
- At home:** You need to be in a **dark corner** of a room!  
Lift the constellation flashcard of **Orion** up to your eyes. Follow the dots, and join them in your mind.
- Step 3:** Repeat as in Step 2, but use the flashcard of the **Southern Cross and Pointers** instead.

Activity 3:



If you were lost at night, how would you use star patterns to find your way?

Use your Southern Cross flashcard and at the diagram below to answer the above question:



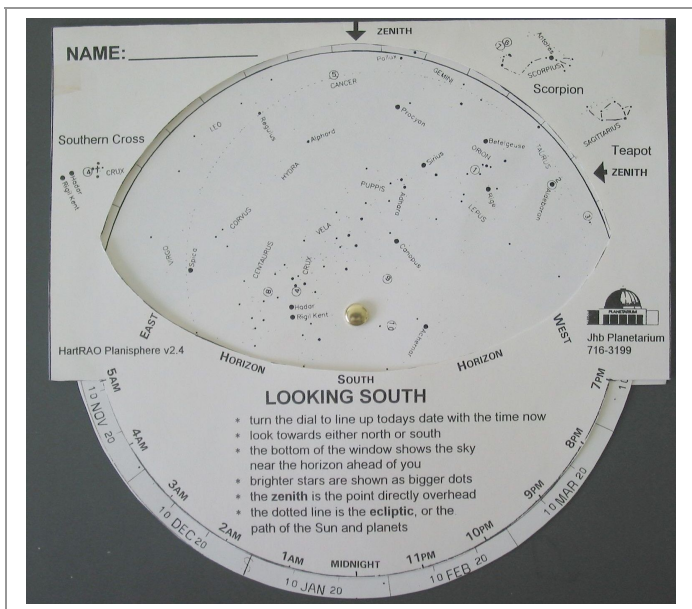
**To find the South Pole in the sky**

- Step 1:** From the star at the bottom end of the long arm or the **Cross**, draw a line four and a half times the length of the long arm.
- Step 2:** The end of this line is also where a line bisecting the two pointers meets the line from the **Cross**. This is the South Pole in the sky, a point that would be straight over your head if you were standing at the South Pole.
- Step 3:** Face the South Pole in the sky. You are now facing due South. East is to your left and West is to your right. North is behind you.

# The Starfinder (Planisphere)

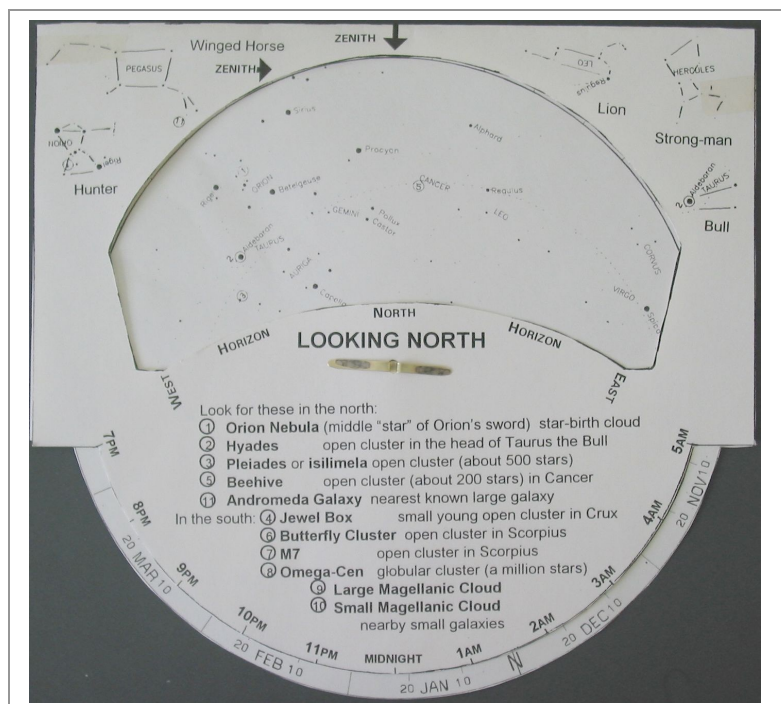
The starfinder is a map of the stars in the sky. It is also called a planisphere, because it maps the stars on the “celestial sphere” above us onto a plane, or flat surface. It helps us locate the positions of stars in the sky. It can be used to show us what stars will be up in the sky at any given time.

The starfinder described here is available for a few Rands each from the Johannesburg Planetarium and from HartRAO. It is designed for use in Southern Africa. On one side it shows what we will see if facing North, and on the other side it shows what we will see if facing South. When looking towards the North side of the sky, the East would be to our right-hand side while the West is to our left. In looking Southwards, however, East would be to our left and West to our right. See the pictures of the assembled planisphere below.



*The assembled starfinder showing the side used when looking south.*

*The assembled starfinder showing the side used when looking north.*



**Activity 4: Skywatching - using the Starfinder**

**Notes:** The inner circular disk of the starfinder is the star map. The outer card holder has horizon masks cut out. These are different shapes for looking north and for looking south. The lower part of the outer card holder has times marked on it, from 7pm to 5am. The part of the circular star map card visible below this has dates marked on it from January to December.

**Step 1:** Note the **current time** (for practice, imagine it is 8pm) and line it up with the current **day of the month** (for practice, imagine it is March 1).

**Step 2:** Which **bright stars** and **star patterns** or “**constellations**” are shown in:

- ◆ The window “Looking South”? \_\_\_\_\_  
(For our practice date and time, three examples of constellations are *Centaurus*, *Crux* and *Vela*.)
- ◆ The window “Looking North”? \_\_\_\_\_  
(For our practice date and time, three examples of constellations are *Gemini*, *Orion* and *Taurus*.)

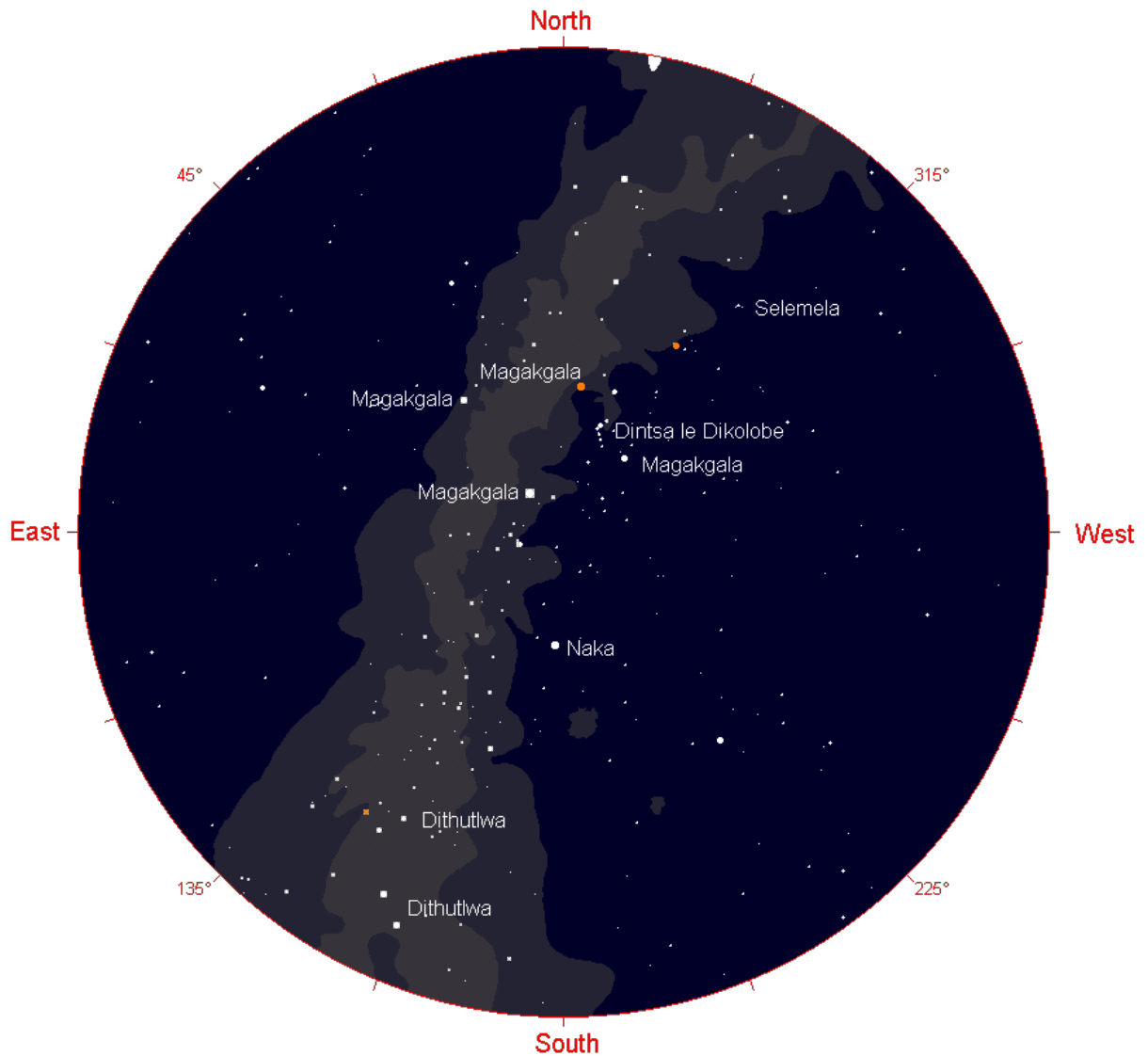
**Step 3:** Take your starfinder out at night. As it is a map of stars above you, you need to hold it above your head to match the starfinder’s stars to the real stars.

**Step 4:** Identify the brightest stars and constellations shown in the starfinder window. Write down their names in the table below:

Looking South: Bright Stars	Looking North: Bright Stars
Looking South: Constellations	Looking North: Constellations

**Step 5:** Look for any bright stars that don’t match the bright stars shown on the starfinder. These could be “wandering stars” – in other words, planets such as Venus, Mars, Jupiter and Saturn, which can be very bright.

**Activity 5: Identify the Stars in your home language**



**The map** above shows us the star patterns in the Summer night sky with Setswana names. The Table below gives examples of information about the stars and constellations shown on the map.

Star Name	Meaning / Stories about the stars
<i>Naka</i> (Canopus)	Its predawn rising is eagerly awaited. The first person to see it was awarded a cow by the chief. <i>Naka</i> signals the time for many “coming of age” ceremonies.
<i>Selemela</i> (Pleiades)	<i>Selemela</i> are called “the digging stars”, as their sighting in the evening coincides with the time to plough.
<i>Dithutlwa</i> (Southern Cross & Pointers)	The Pointers are the male Giraffes and the Southern Cross stars are the female Giraffes, which are seen grazing above the trees.
<i>Dintsa le Dikolobe</i> (Orion’s sword and belt)	Three hunting dogs chasing three piglets.
<i>Magakgala</i> (bright stars around Orion, plus Sirius and Procyon)	Mopane “worms” (edible caterpillars that live on Mopane trees)

**Complete the Table below by filling in your own information**

- About names of the stars or star patterns you know in your **own home language**
- When you see these stars
- What their meaning is

<b>Star or Star Pattern Name</b>	<b>Season or time when seen</b>	<b>Meaning or Story about the star</b>

## African Star Lore

All cultures have their own stories about the stars and planets. The Western ones come from ancient Assyria and Egypt via ancient Greece and Rome, and most recently from the age of exploration several centuries ago. But here some more stories from Southern Africa.

### Legends of the Khoi and the San

A girl child of the old people had magical powers so strong that when she looked at a group of fierce lions, they were immediately turned to stars. The largest are now in Orion's belt.

A strong-willed girl became so angry when her mother would not give her any of a delicious roasted root that she grabbed the roasting roots from the fire and threw the roots and ashes into the sky, where the red and white roots now glow as red and white stars, and the ashes are the Milky Way.

When the Pleiades appear in the east, little ones are lifted by their mothers and presented to the stars. The Pleiades are considered friendly and the children are taught to stretch their hands toward them.

According to the Namaquas, the Pleiades were the daughters of the sky god. When their husband (Aldebaran) shot his arrow (Orion's sword) at three zebras (Orion's belt), it fell short. He dared not return home because he had killed no game, and he dared not retrieve his arrow because of the fierce lion (Betelgeuse) which sat watching the zebras. There he sits still, shivering in the cold night and suffering thirst and hunger.



### Legends of the Sotho, Swazi, Nguni

Venus in Zulu is *iCelankobe*, or “Asking for mealies”. As with the Sotho *Se-falabogogo*, or “Crust scrapings”, the idea is that someone who arrives for supper by the light of the evening star will do rather badly. The Tswana believed that if Venus were in the evening sky at hoeing season, there would be a good harvest.

To Xhosas, the Milky Way seemed like the raised bristles on the back of an angry dog. Sotho and Tswana saw it as *Molalatladi*, or “the place where lightning rests”. It also kept the sky from collapsing, and showed the movement of time. Some said it turned the Sun to the east.

A legend of the Karanga people held that the stars were the eyes of the dead, while many Tswana held that they were the spirits of those unwilling to be born. Other Tswana believed that they were souls of those so long dead that they were no longer ancestor spirits. The Venda pictured the stars as hanging from the solid dome of the sky by cords, while other groups believed the stars to be holes in the solid rock dome of the sky.

(Compilation by Dave Laney, SAAO)