

Reading (version 3)

Read the newspaper article and answer the questions on the next 2 pages.

Riddle of ancient mariners

① AUTUMN is here. Pegasus, Andromeda and Cetus appear – barren, sprawling constellations of stars. Yet the creatures represented by their patterns could not be called dull. According to classical mythology, Cetus is a fierce sea monster, Pegasus a winged horse, Andromeda a princess tied to a rock by the seashore waiting for Cetus to devour her. It prompts the question: why do the constellation patterns usually bear no resemblance to what they supposedly portray?

Time was when the world's different cultures each had their own constellation patterns. North American Indians 'joined up the dots' in a way peculiar to them; the ancient Chinese had myriad tiny constellation patterns, some consisting of just one star; the Aborigines saw the sky as so white with stars that they made patterns out of the places where few stars could be seen.

The patterns we know today are a legacy of the cultures that flourished around the Mediterranean thousands of years ago. But who named the stars, and why?

We first read of our familiar constellations in a poem written by the Greek poet Aratus in 250 BC. Commissioned by the King of Macedonia, *The Phaenomena* celebrates a globe of the stars lost about a century earlier. The globe had belonged to the mathematician Eudoxus, who fortunately left a detailed description of its appearance, which Aratus incorporated into his poem.

The Phaenomena describes the

② constellations and their relationship to one another in a way that enables one to visualise the appearance of the sky very accurately. It contains many instructions alluding to navigation. One researcher describes the poem as 'a manual for seamen'.

Across the sky there are examples of well-known stories pegged to stars. What better aid to memory could a largely uneducated navigator-sailor have than an association of childhood stories with star patterns in the sky?

Who were the astro-navigators? It is certain that they were not contemporaries of Aratus, or even the earlier Eudoxus; a discovery by a later Greek – Hipparchus – makes that clear. Hipparchus found that the constellations 'slip' relative to the horizon, over timescales of thousands of years. The reason is that the Earth is wobbling in space like a spinning-top – a result of the gravitational pull of the Sun and the Moon on the Earth's equatorial bulge. Over a period of 16,000 years, the Earth's north pole traces out a cone in the sky. This means that the 'celestial pole' (and with it, the Pole Star) and 'celestial equator' are always changing position with respect to the constellations.

The descriptions of the constellations in *The Phaenomena* are all consistent – but not for the time of Aratus, and not for his latitude. It seems that the globe represented the sky as seen from 36 degrees north in about 2800 BC. Evidently, the globe was an

artefact from a much earlier civilization – but which?

③ One possibility is the Egyptians, who flourished at that time. But their astronomical interests lay in timekeeping, not navigation, and their latitude (30 degrees north) is too far south. The Phoenicians used the stars for navigation and lived at the correct latitude – but their civilization reached its peak much later than 2800 BC.

The Babylonians – or the Sumero-Akkadians, their fore-runners – are a better bet. But they did most of their navigation in the Indian Ocean, where a globe showing the Mediterranean stars would be of little use.

But there was one great Mediterranean civilization – possibly the greatest – that flourished during the second and third millennia BC: the Minoans. Crete's latitude, 36 degrees north, fits exactly that of the globe-makers.

Were the Minoans the globe-makers? We may never know. Much of what we might have learnt about them must have been destroyed in 1450 BC, when the nearby volcanic island of Thira (Santorini) erupted and overwhelmed the eastern part of Crete, wiping out the Minoans.

If they did make star globes with which to navigate the Mediterranean, it is the Minoans whom we can thank for the familiar layout of the constellations, a legacy from almost 5,000 years ago.

Reading 3

I Now answer the questions - only one answer is correct each time.

1. What prompts the question at the end of the first paragraph?
 - a Pegasus, Cetus and Andromeda are dull constellations with exciting names.
 - b Pegasus, Cetus and Andromeda have no connection with autumn.
 - c Only Pegasus is connected with the sky.
 - d Many people find astronomy boring and incomprehensible.

2. Why does the writer mention the North American Indians, ancient Chinese and Aborigines?
 - a to demonstrate that ancient Chinese technology was the most advanced
 - b to illustrate different ways of describing the stars
 - c to prove that southern cultures produce the most original astronomers
 - d to show that all cultures study astronomy

3. The constellations and their names familiar to us originate from
 - a Europe
 - b Asia
 - c South America
 - d Australia

4. What was Aratus's source for *The Phaenomena*?
 - a the royal house of Macedonia
 - b an ancient globe
 - c the writings of Eudoxus
 - d a lost poem

5. The *globe* was
 - a a manuscript about star constellations
 - b a poem
 - c an ball-shaped object
 - d a painting

6. The writer makes the assumption that the seamen of ancient times
 - a were very superstitious
 - b made up stories about the stars
 - c loved poetry
 - d had little formal education

7. Which is the correct chronological order?
 - a Hipparchus, Aratus, Eudoxus
 - b Aratus, Hipparchus, Eudoxus
 - c Eudoxus, Aratus, Hipparchus
 - d Aratus, Eudoxus, Hipparchus

8. Thanks to a discovery made by Hipparchus we know that
 - a the positions of the constellations alter over a long period of time
 - b the gravity of the Sun and Moon cause the Earth to bulge at the equator
 - c constellations disappear over a period of 26,000 years
 - d stars change position within constellations

9. What is puzzling about the descriptions of the constellations in *The Phaenomena*?
 - a They are not consistent with those of Eudoxus.
 - b They are not correct for 250 BC.
 - c They match those on the globe.
 - d They show that Aratus did not understand latitude.

10. What does the writer suggest about the Minoans?
 - a They were better astronomers than any other ancient civilisation.
 - b They sailed from the Mediterranean to other parts of the world.
 - c Their view of the stars was used later by the Greeks.
 - d They used accurate maps of the Mediterranean.

II Find the words or phrases in the article that have the following meanings. The numbers indicate which section you should look at.

1. frightening, strong and powerful (1)
2. eat sth eagerly (1)
3. inspire, make sth happen, cause (1)
4. prospered (1)
5. mention in an indirect way (2)
6. shaking, moving from side to side (2)
7. destroy completely, bring devastation (3)
8. sth that stays from an earlier time, part of your history (3)

III Answer the following questions in your own words.

1. Explain the word *riddle* in the title.

2. Give reasons why the writer doesn't see the following civilizations as the likely astro-navigators.

The Egyptians

The Phoenicians

The Babylonians

KEY

1. 1pt/each

1a 2b 3a 4c 5c 6d 7c 8a 9b 10c

2.

1. 1pt/each

2. fierce

3. devour

4. prompt

5. flourished

6. allude

7. wobbling

8. wiping out

9. legacy

3.

1. = 2pts

2. = 3pts (1each)