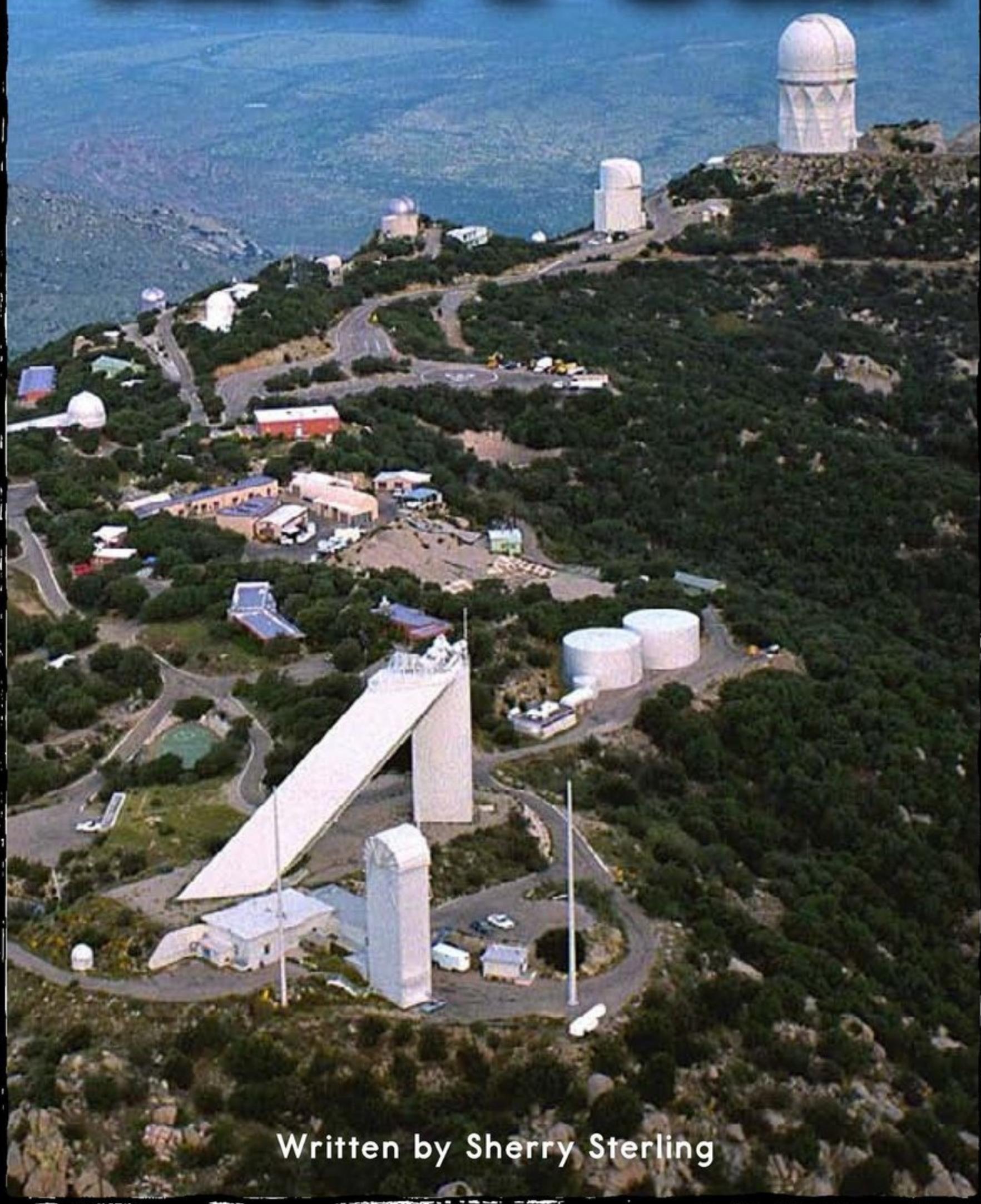


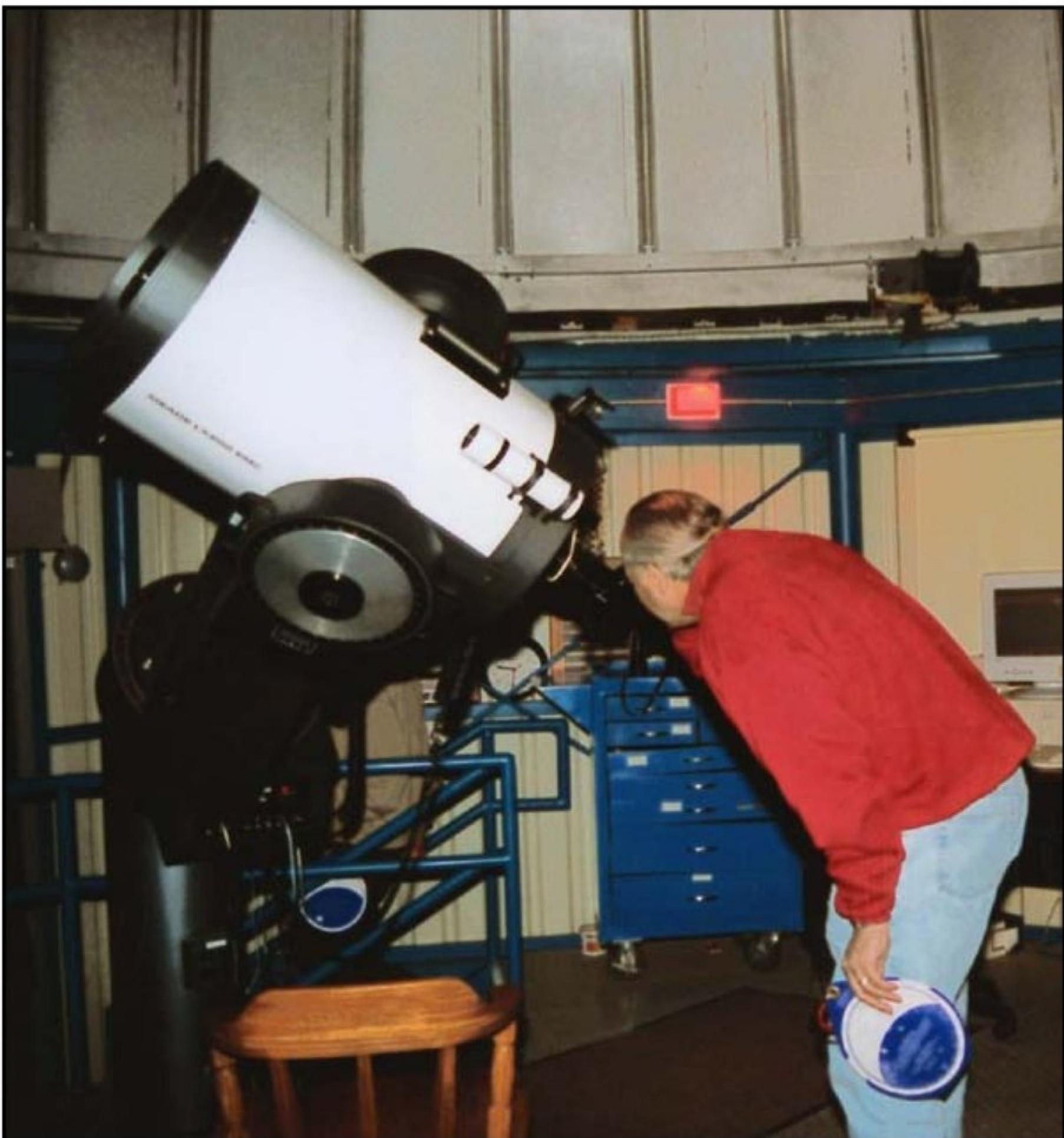
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A Visit to Kitt Peak



Written by Sherry Sterling

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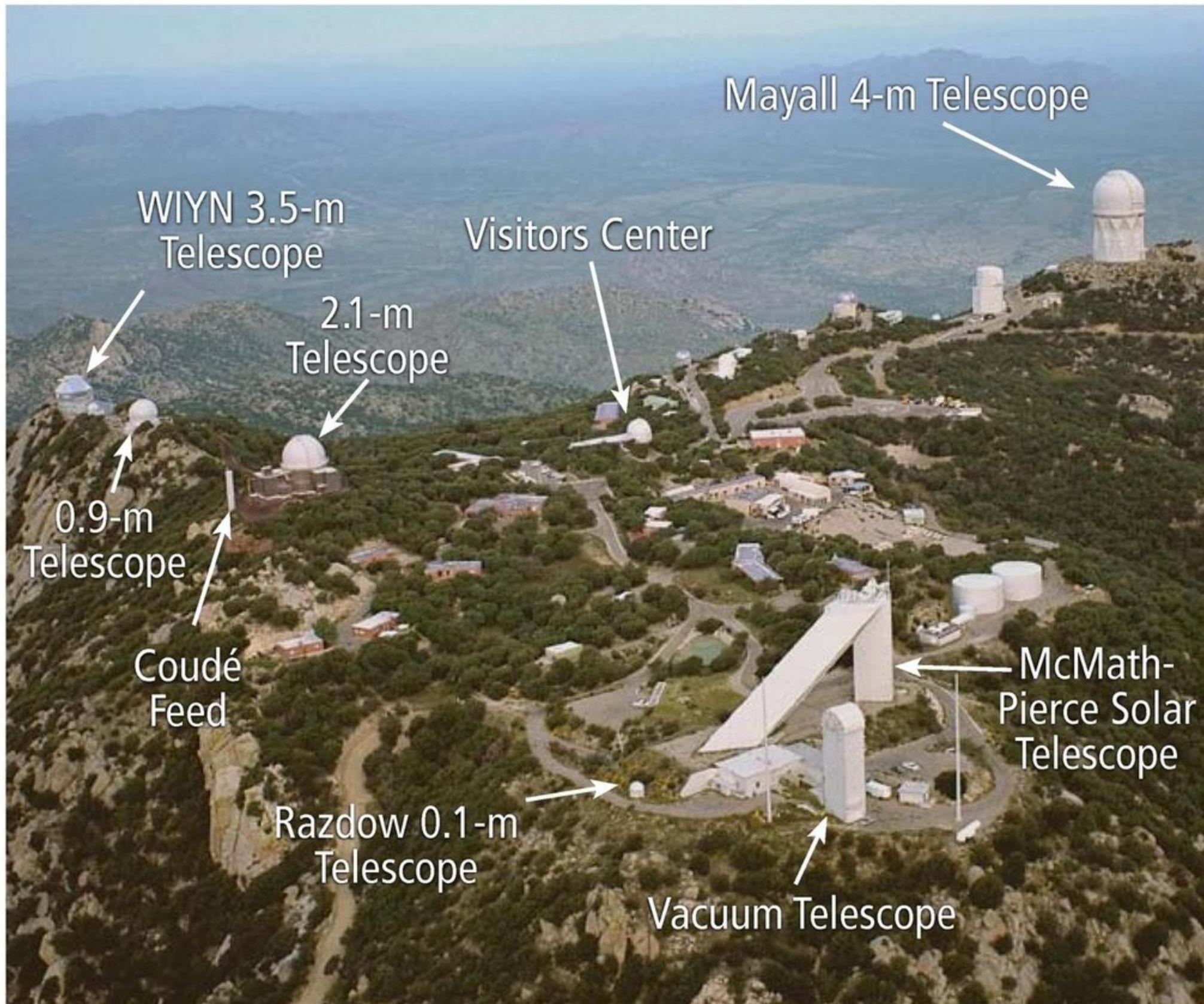


Table of Contents

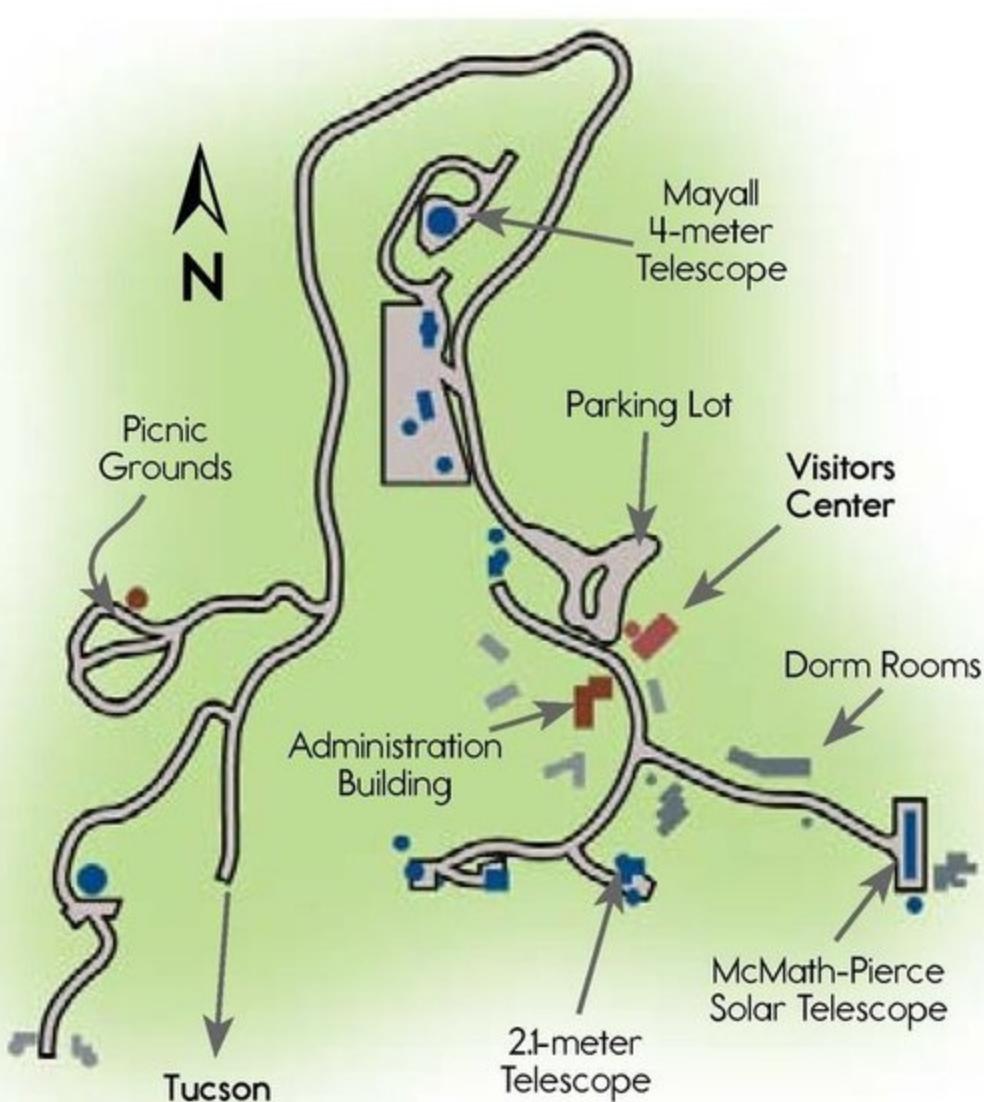
Introduction	4
Solar Telescope	6
Star Telescopes.....	10
Star Searching from Home.....	14
Conclusion	15
Glossary/Index	16

Introduction

Hi, I'm Sherry, and I'm an **amateur astronomer**, which means that just for fun I like to learn about faraway stars and planets and other mysterious things in space. I recently toured Kitt Peak National Observatory. It sits high atop a 6,875-foot tall mountain outside of Tucson, Arizona.

The land the observatory is built on belongs to a Native American tribe. I heard the tribe wasn't going to let astronomers build on its sacred mountain, but the tribe changed its mind after looking through a telescope! They started saying the astronomers had "long eyes," since they could see so far with their telescopes.

That made me laugh. I pictured people looking up at the stars with eyes longer than their arms! But it made a lot of sense because a telescope does make it seem as though your eye can reach the stars.



The mountaintop is perfect for stargazing. Away from city lights, it stays pitch dark at night. Being on a mountain keeps the telescopes above the dusty dirt that the wind churns up in the valley below. Besides, being up high gets you even closer to the planets and stars.

Before going inside the telescopes, we stood at the edge of the mountain to look out at the small city of Tucson in the distance. I could see the base of the mountain near

**How the view
of Tucson changed**

Tucson city lights 1959



Tucson city lights 1980



Tucson city lights 2003



where I live. Though it was a hot and dusty summer day in Tucson, we had to wear jackets on the cool, windy mountaintop. I was glad to have a break from Tucson's heat!

Kitt Peak has a collection of 26 humongous **telescopes**! These aren't telescopes you can hold in your hand. All these telescopes need an entire building to hold them up and protect them.

The tour at Kitt Peak let me get close to three of them. One is a solar telescope that astronomers use during the day for studying the Sun. The other two are star telescopes they use at night for studying stars and planets and other mysterious things in space.

Solar Telescope

I had never heard of a solar telescope before going to Kitt Peak. Since the Sun is a star, I had always thought that astronomers studied it with the same telescopes they used for other stars. But I learned that because the Sun is so bright, scientists need different equipment to look at it.

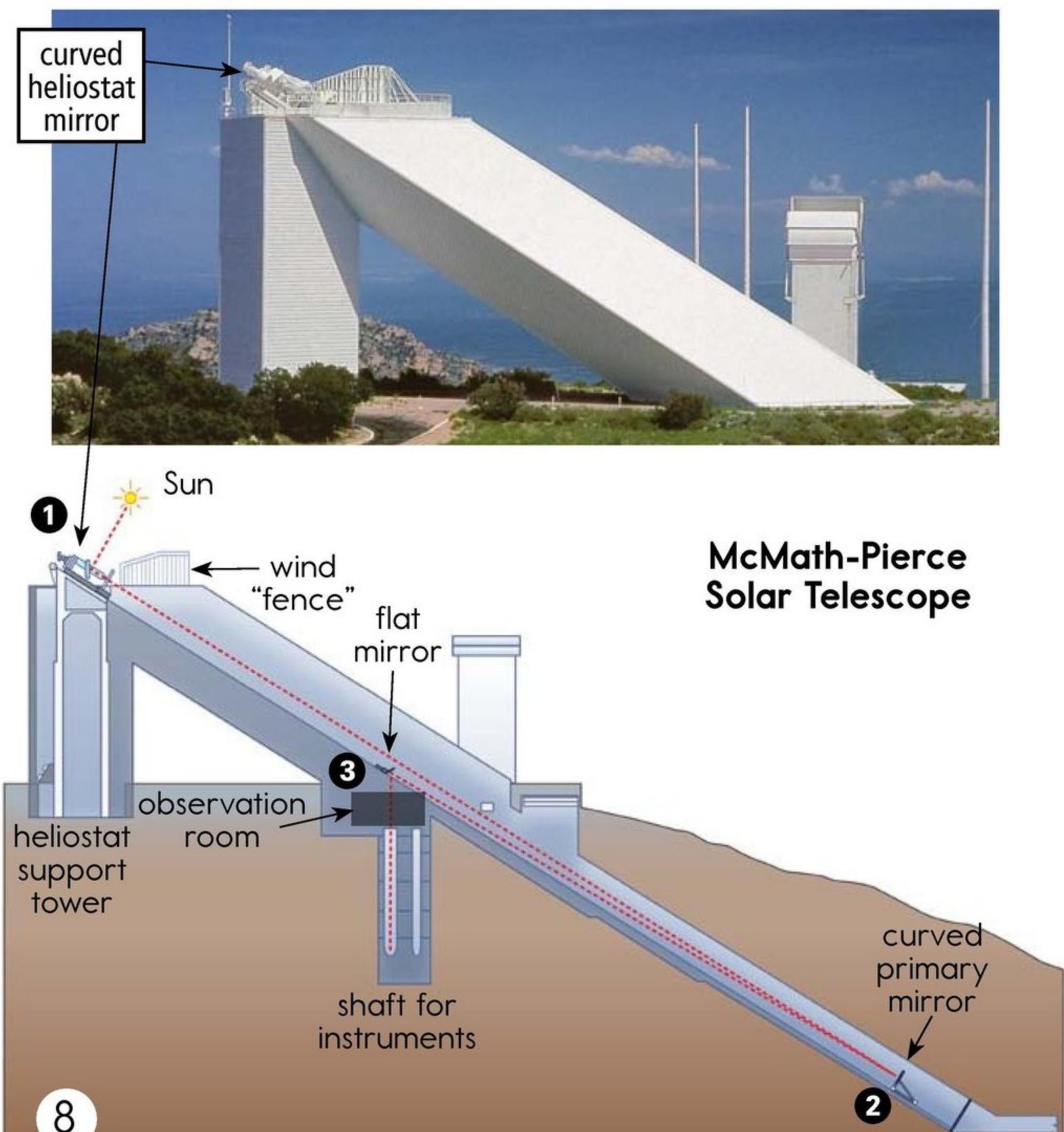
Kitt Peak has the largest solar telescope in the world! Standing next to it I felt like an ant. It is as tall as a ten-story building. On the top of the telescope it looks as if there is a picket fence, which is actually a **windbreak** to keep one of the telescope's mirrors from shaking. Then there is this large ramp that looks like a slide coming off one side. The slidelike ramp actually continues at the same angle four stories below the ground. This thing is huge!

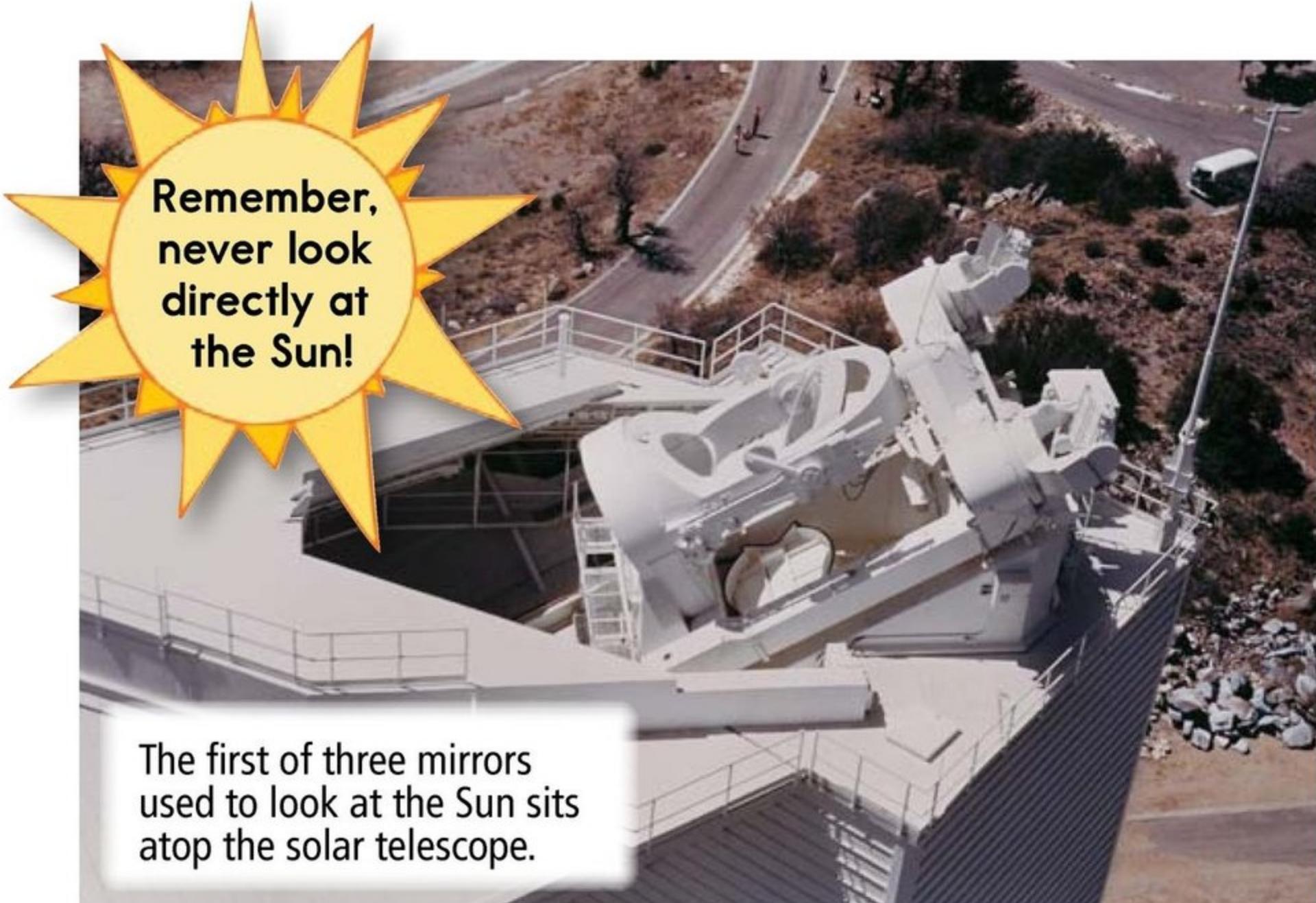


From the air, Kitt Peak's solar telescope looks like a giant slide.

From the inside, the McMath-Pierce Solar Telescope looks like a roller coaster track. It has 200 feet of track aboveground and 300 feet below. It needs that much space to keep the Sun's **reflected light** from burning up the equipment.

The solar telescope has three mirrors that do most of the work by reflecting the Sun's light. The mirrors are on a **trolley** so astronomers can move them along a track. I learned that the trolley moves the mirrors really slowly—four feet per minute. That would make it a really boring roller coaster. I could run up and down the distance of the track at least twice before the mirrors move four feet.

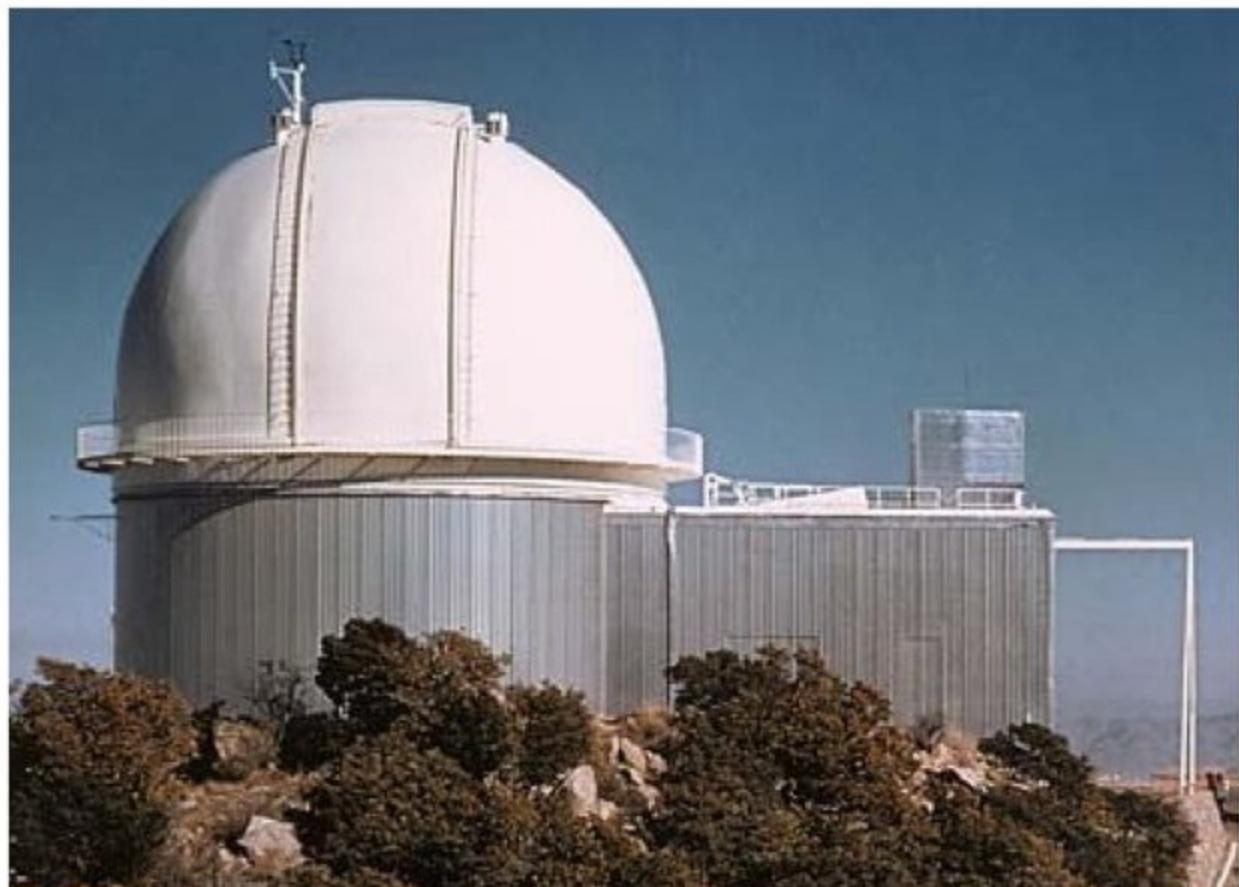




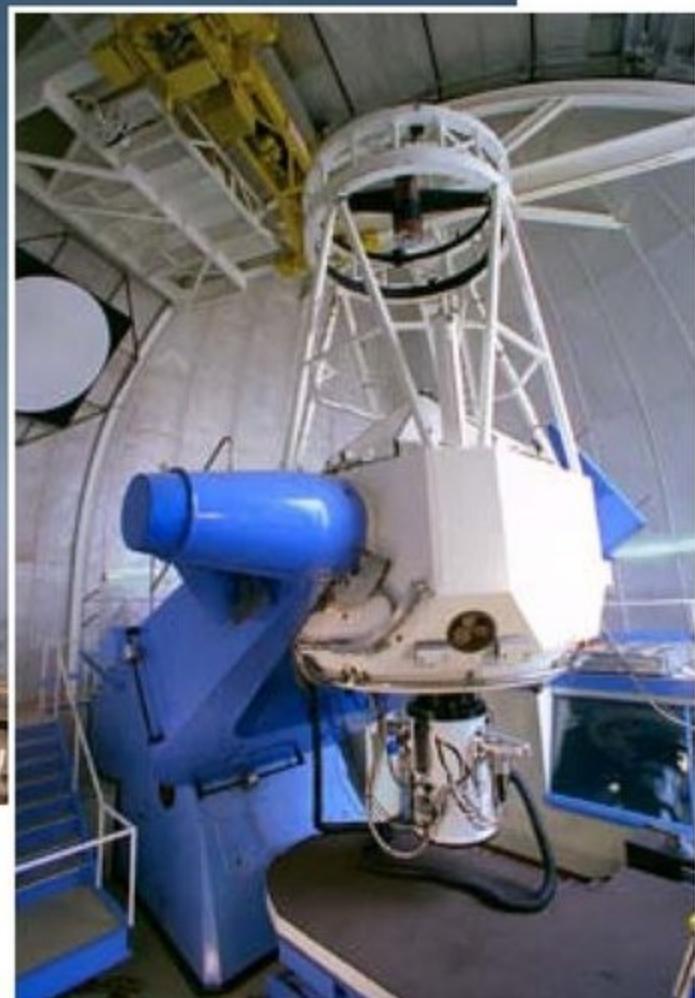
Astronomers move the mirrors so they can follow the Sun across the sky. They sit in an observation room underground and watch the Sun through the telescope. The room is full of computers that position the mirrors and record what the astronomers see. They record things such as sunstorms: when they happen, how long they last, and how large an area the storm covers.

Sunlight from the second mirror reflects off the third mirror to go down into the observing room.

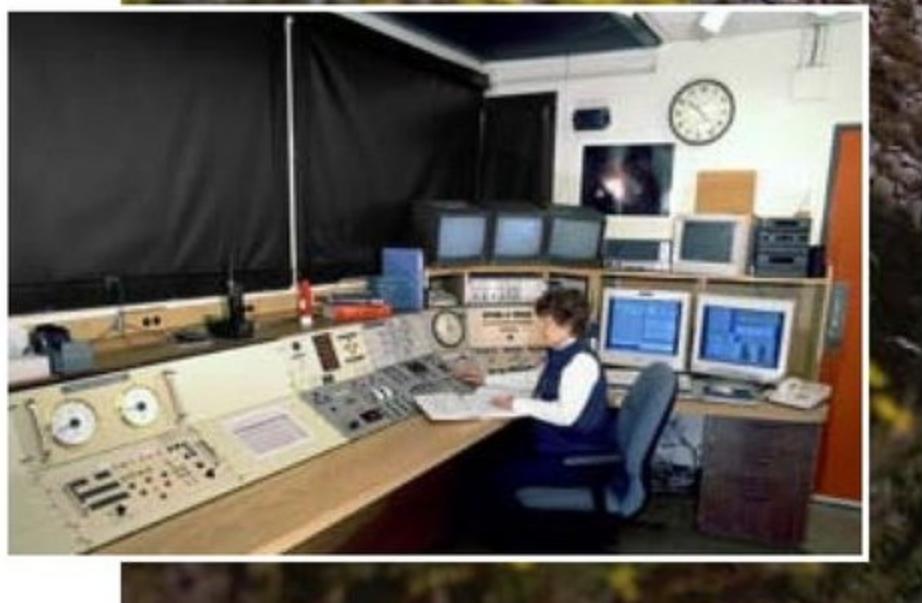
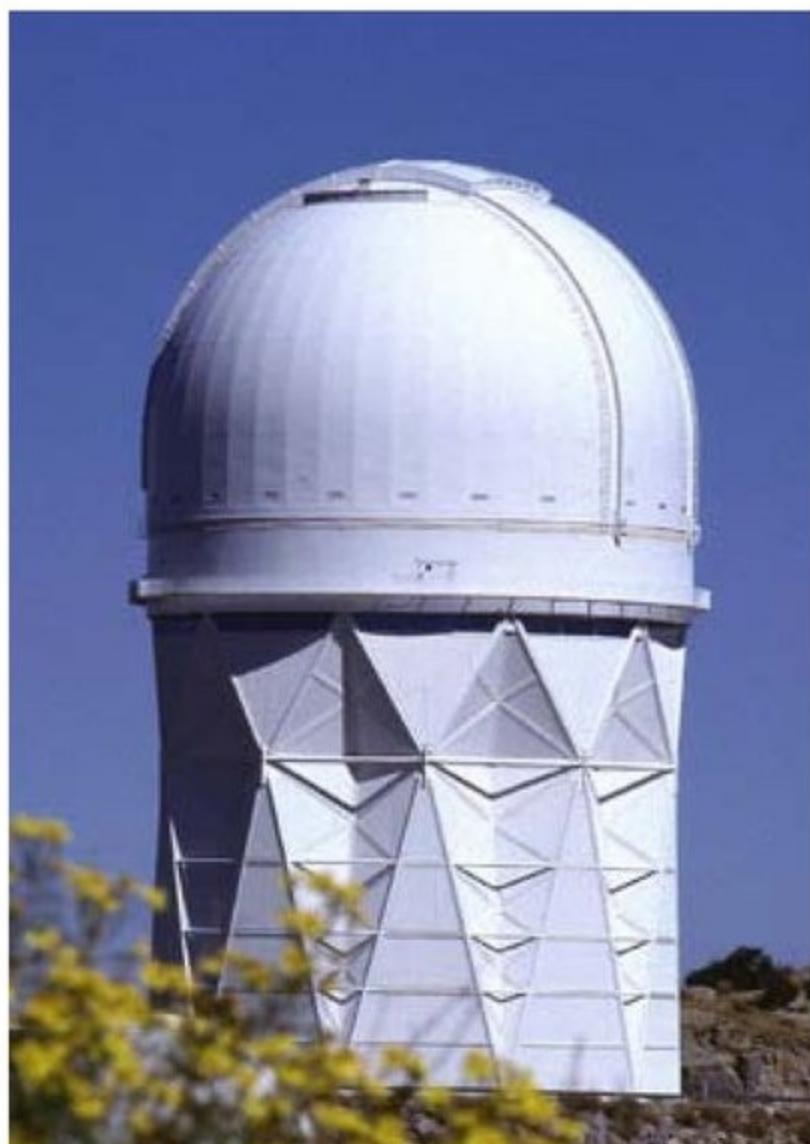




2.1-meter Telescope building and its telescope (inset)



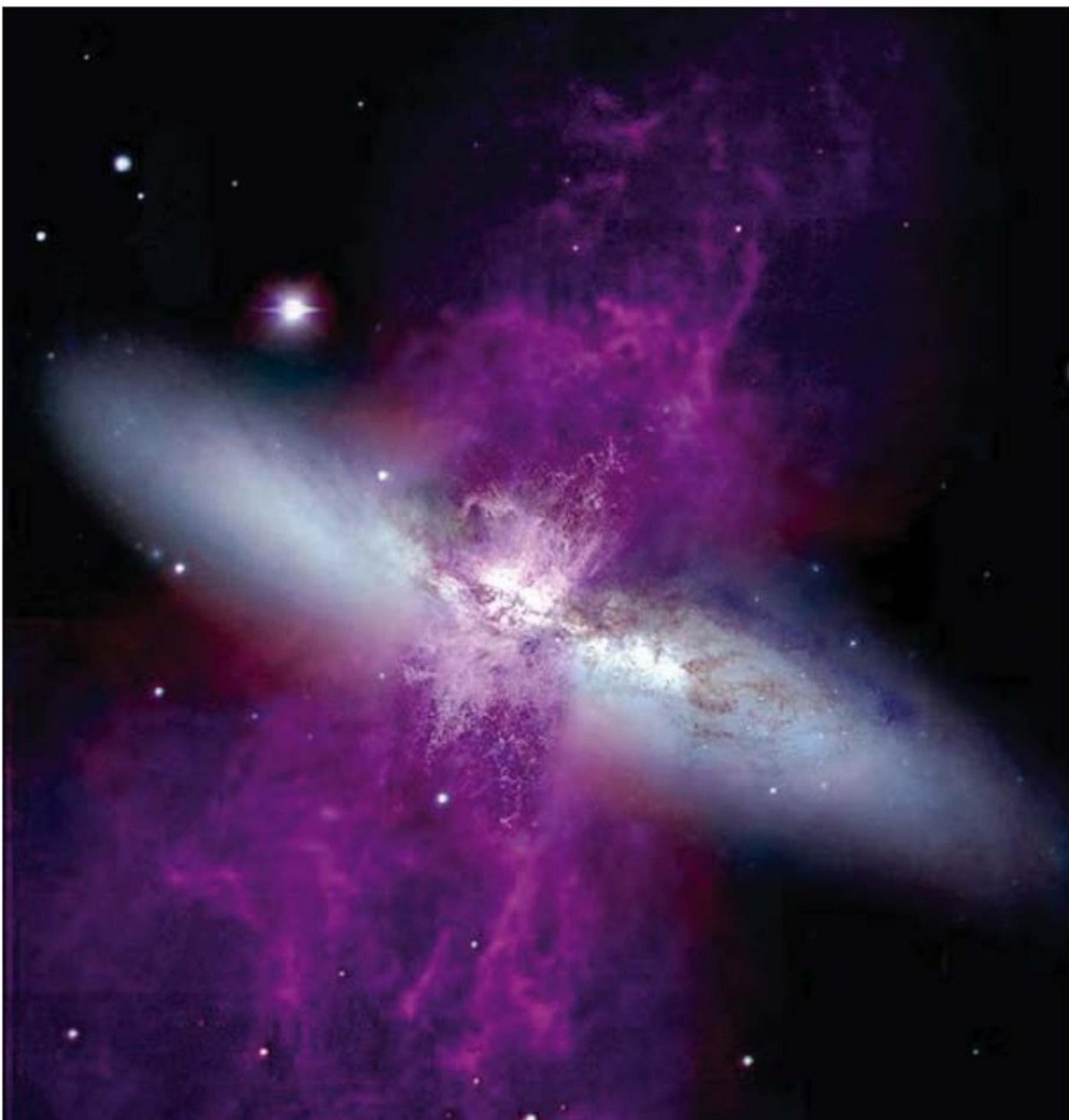
Star Telescopes



On the tour, I also got to see two star telescopes: the 2.1-meter Telescope and the 4-meter Telescope. They look like giant fat pencil tops with rounded erasers. The eraser-looking part is called the dome. The telescope is inside the dome.

Mayall 4-meter Telescope building and its control room (inset)

The building for the 4-meter Telescope is almost 200 feet high. It's so big that you can see it from 50 miles away. These star telescopes are *much* bigger than any telescopes I've seen at my astronomy club meetings. Through my backyard telescope, I can see Jupiter's spot and the rings of Saturn. Imagine what I could see with 90 more feet of telescope!

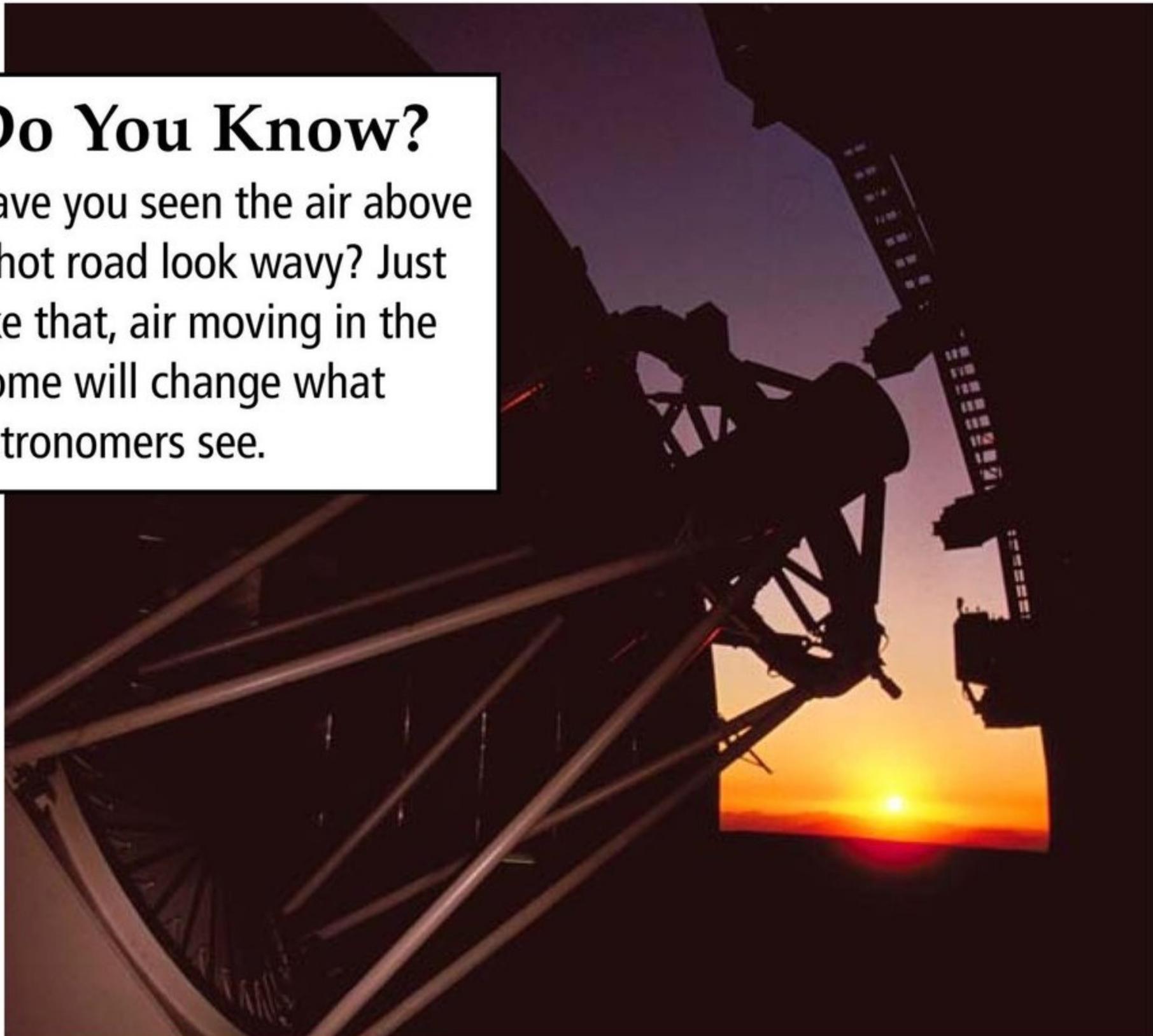


Data from the WIYN 3.5-meter Telescope on Kitt Peak combined with data from the Hubble Space Telescope produced this image of the Starburst Galaxy M82.

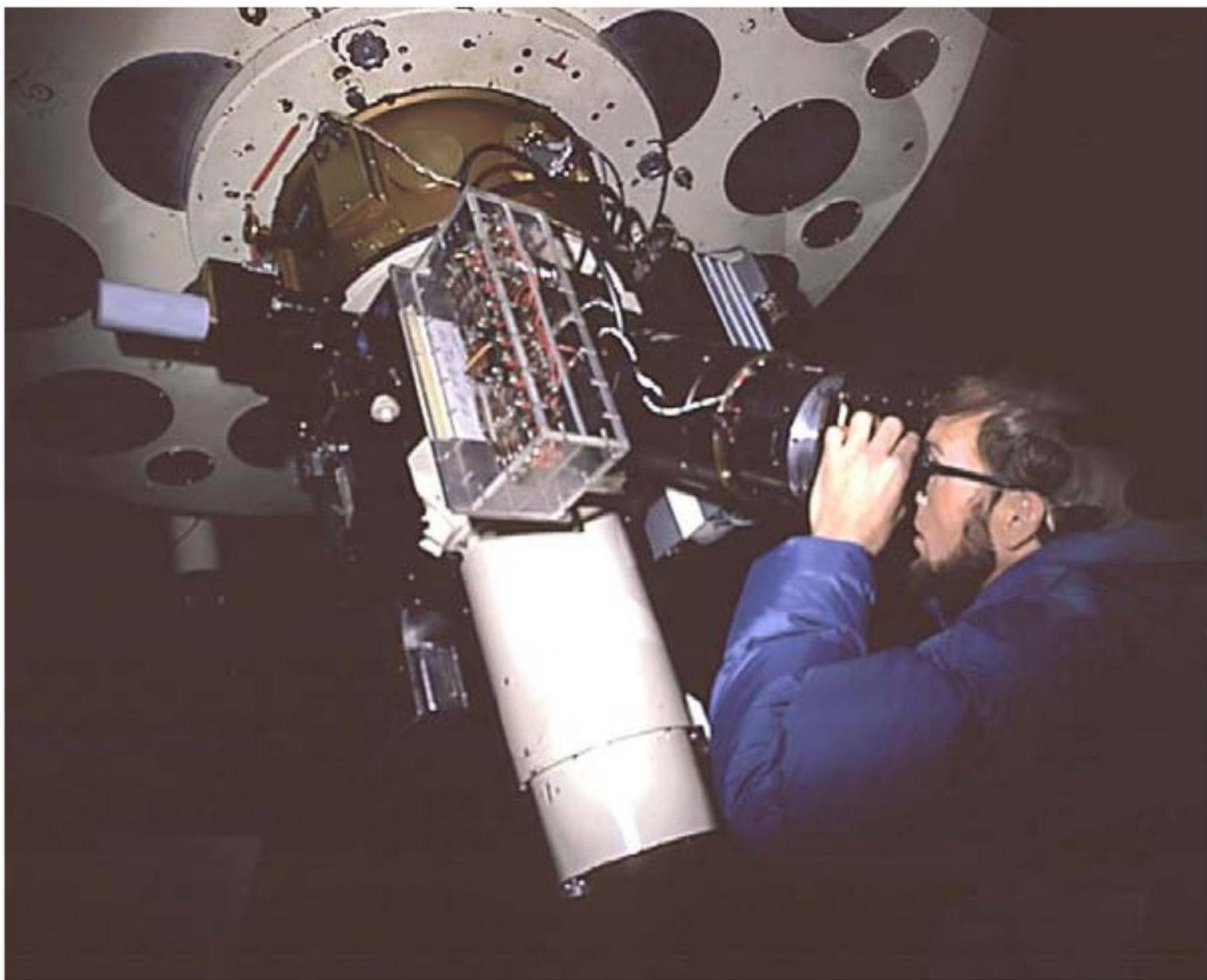
To work the star telescopes, astronomers use computers to turn the dome so the telescope points to the part of the sky they want to study. Scientists open the door in the dome to let in the outside air. The tour guide explained that you need to keep the temperature of the air around the telescope the same temperature as the air outside. If the two temperatures are different, the air will move and change the **image** that is seen in the telescope.

Do You Know?

Have you seen the air above a hot road look wavy? Just like that, air moving in the dome will change what astronomers see.

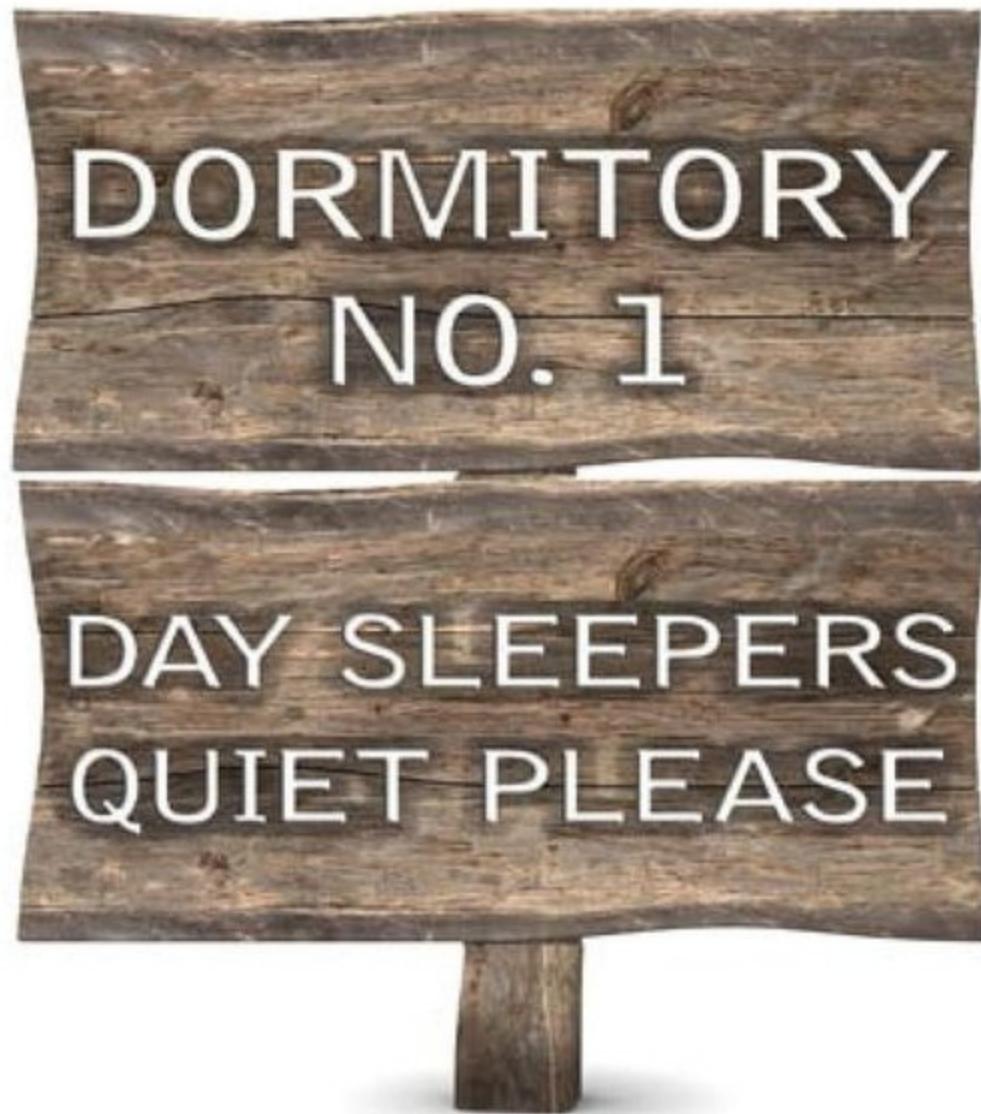


The open dome of the Mayall 4-meter Telescope shows a great view of the sunset.



Astronomer Jim DeVeny pulls an all-nighter at the 2.1-meter Telescope.

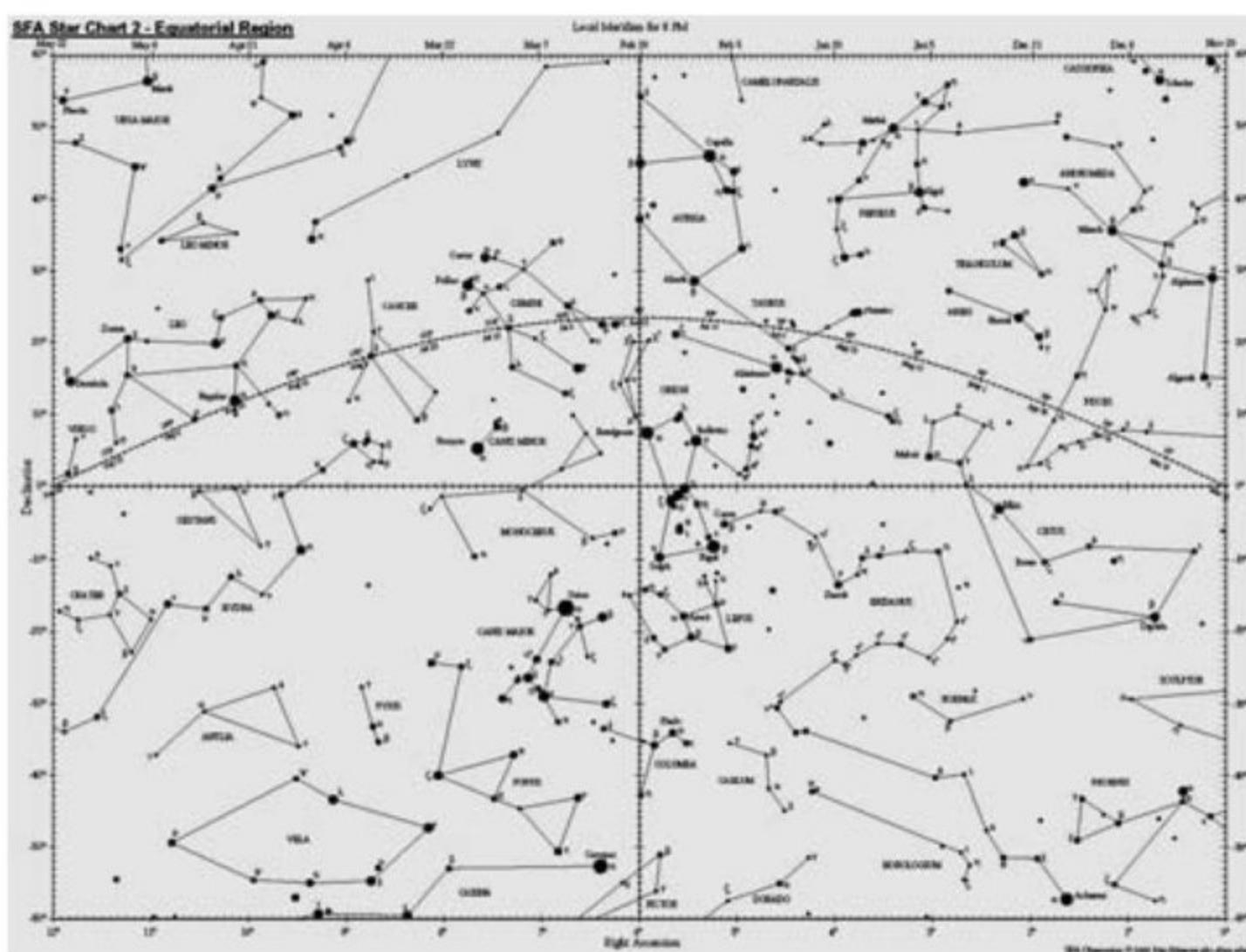
Since astronomers use the star telescopes to look at the night sky, they get to stay up all night and sleep all day! Signs outside say, “Day Sleepers. Quiet Please.” My older brother could use one of those signs on his bedroom door.



Star Searching from Home

I study the stars from home with a pair of binoculars or my telescope. A star chart helps me know where to look for certain stars, planets, moons, or **constellations**. I can see most of these things with binoculars, but I need to use a telescope to see nebulae and most galaxies.

Each season, the evening sky looks a little different. As Earth moves and rotates in its orbit, you can see different things. I make sure to have an up-to-date star chart because I want to know what's in the sky above me each night. I found a cool star chart on the Internet by typing the words *star chart* into a search engine.



Use a star chart made for your area and the time of year you are looking at the sky.



Data from the 0.9-meter Telescope at Kitt Peak produced this image of the Horsehead Nebula.

Conclusion

Are you one of those kids who wonders whether astronomers search for aliens in their telescopes? I actually heard someone ask that question during my tour of Kitt Peak. But most people know that's science fiction, not science. Astronomers, even amateurs like me, study stars, planets, and galaxies, and write about the facts. Science fiction writers study astronomy and use their imagination to tell a story. I think the truth is often much more amazing than any imagined story! Don't you?

Glossary

amateur	a person who does something for fun, not to get paid; not a professional (p. 4)
astronomer	a scientist who studies objects in space, such as stars and planets (p. 4)
constellations	groups of stars that form a shape and are named (p. 14)
image	a picture (p. 12)
observatory	a building with a telescope in it to study stars, planets, moons, and weather (p. 4)
reflected light	light that is picked up on a mirror and bounced to another place (p. 7)
telescopes	instruments used to make far-off objects look closer through the use of mirrors (p. 5)
trolley	a cart that runs on rails (p. 8)
windbreak	something that slows the force of the wind (p. 6)

Index

astronomers, 4, 6, 8, 9, 12, 13, 15	Saturn, 11
binoculars, 14	science-fiction, 15
computers, 9, 12	star chart, 14
Jupiter, 11	Sun, 6–9
Mayall Telescope, 10–12	temperature, 5, 12
McMath-Pierce	Tucson, 4, 5
Solar Telescope, 7–9	

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Front cover: This photograph taken from a helicopter shows many of the telescope buildings that sit atop Kitt Peak.

Back cover: The Sun's light is reflected by three mirrors in the McMath-Pierce Solar Telescope. Here you see the third mirror reflecting the light downward into the main observing room.

Title page: A visitor to Kitt Peak National Observatory peers through the 16-inch Telescope used during tours of the site.

A Visit to Kitt Peak
Level Q Leveled Book
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