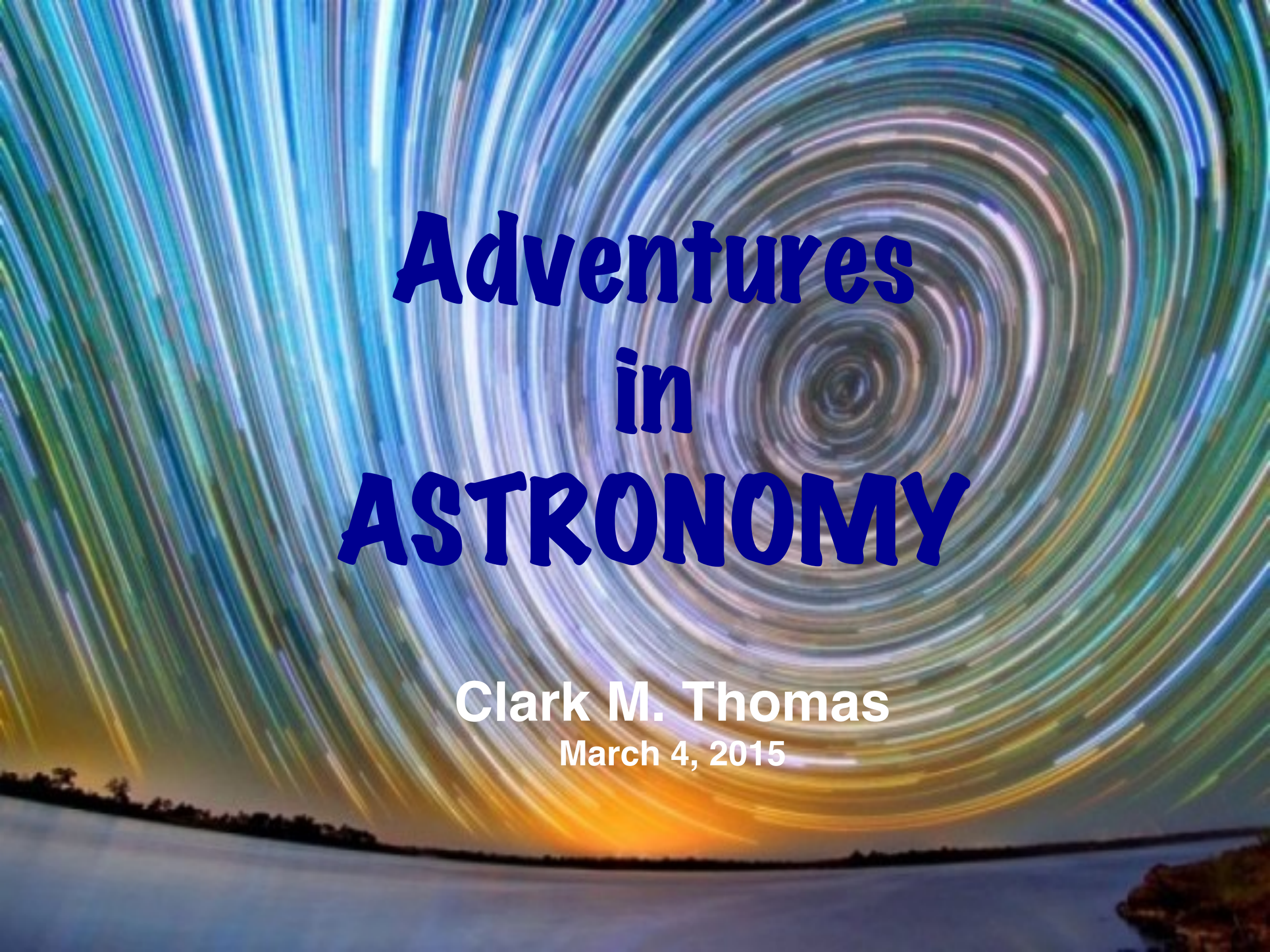


Adventures in ASTRONOMY

Clark M. Thomas

March 4, 2015

The modern world has made people afraid of the dark. Very few people "look up." Very few American children today have ever directly seen the Milky Way.

When I was a boy I lived at the base of Mill Mountain, just below the giant neon Star. Even with the star, I could see the Milky Way on a clear winter night. Now I need to drive miles from the city for the same view.

Real amateur astronomers are like vampires. We live for the night. We also live for cool stuff, such as random bright meteors, comets, the aurora borealis, and even the planet Venus crossing the Sun.

I am now going to introduce you to **six** things I have found very interesting "up there."

You would be amazed how much of astronomy is like science fiction. It involves a lot of imagination and wonderment, as we look out billions of light years toward billions of stars.

As we look at "them," are they also looking at us in equal wonderment?

So why haven't I seen one?

ONE

Roanoke's first name was Big Lick.
It was named after a salt lick near the river where prehistoric animals and their Indian hunters would gather.

One of my fellow astronomers, John Goss, noticed there is nothing in the sky celebrating our big salt lick.
We couldn't let that travesty go on for long.
Thus was born the **Big Lick Galaxy Group.**

John found an overlooked galaxy group not far from the handle of the Big Dipper. I put together in 2005 a web page describing these galaxies, and celebrating our local origins.
We essentially forgot what we had done.

Several years later the Canadian national astronomy magazine surprised us by featuring our Big Lick Galaxy Group as their back cover!

TWO

THE FIRST CONSTELLATION

Today we recognize 88 constellations. For tens of thousands of years people under pristine skies looked up and saw representations of their hopes and fears.

Perhaps the first recorded constellation was what we today know as Taurus, the bull. Back in 3900 B.C. the Akkadians in present day Iraq called our Taurus "The Furrow of Heaven."

Not only does the V-shaped asterism therein resemble a plow blade, this area of the sky was where the Sun stood on the vernal equinox, which was time to plant in the Fertile Crescent.


Pleiades
Hyades
Aldebaran
Betelgeuse
Orion's belt
points the
way to
Taurus
M78
M42
Rigel

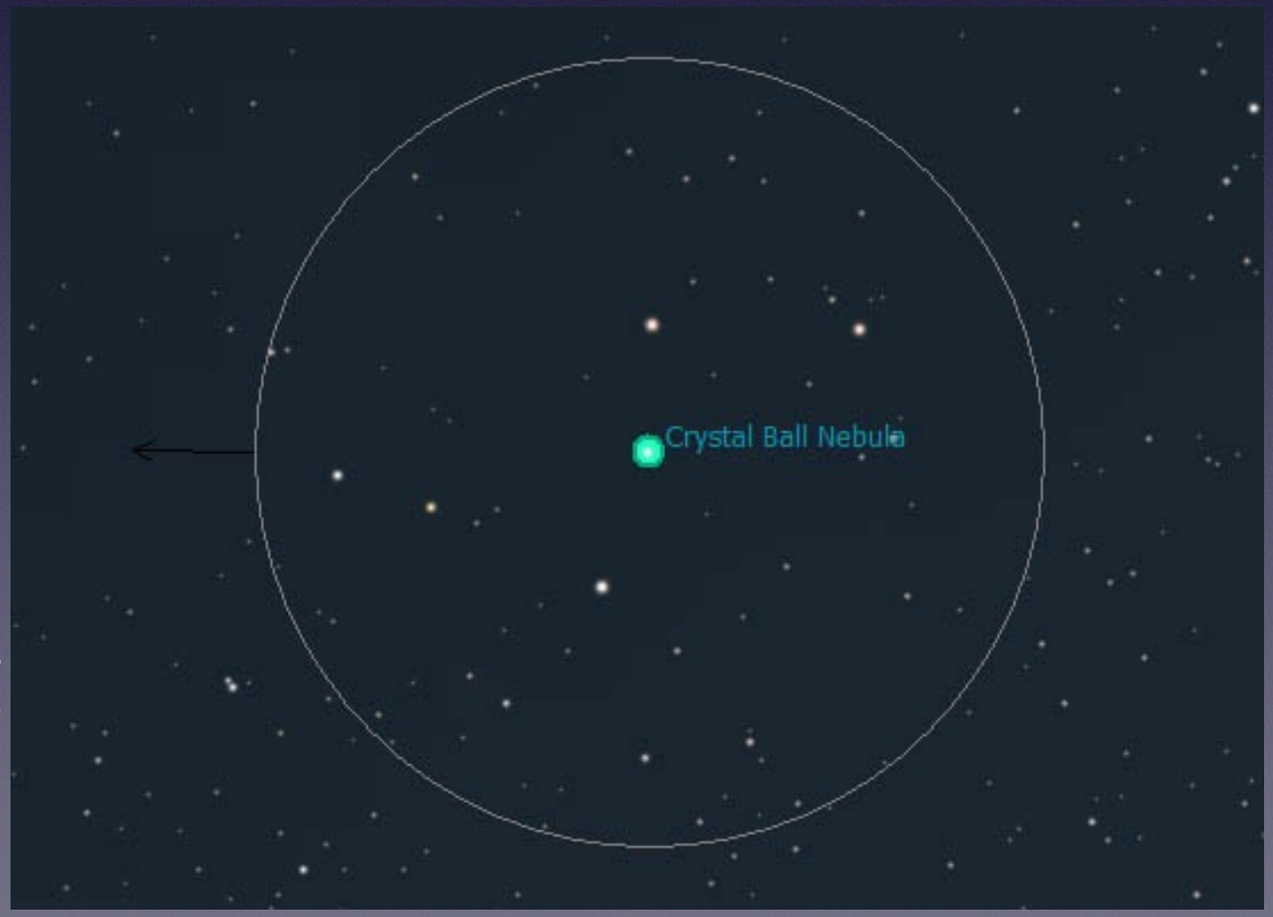
THREE

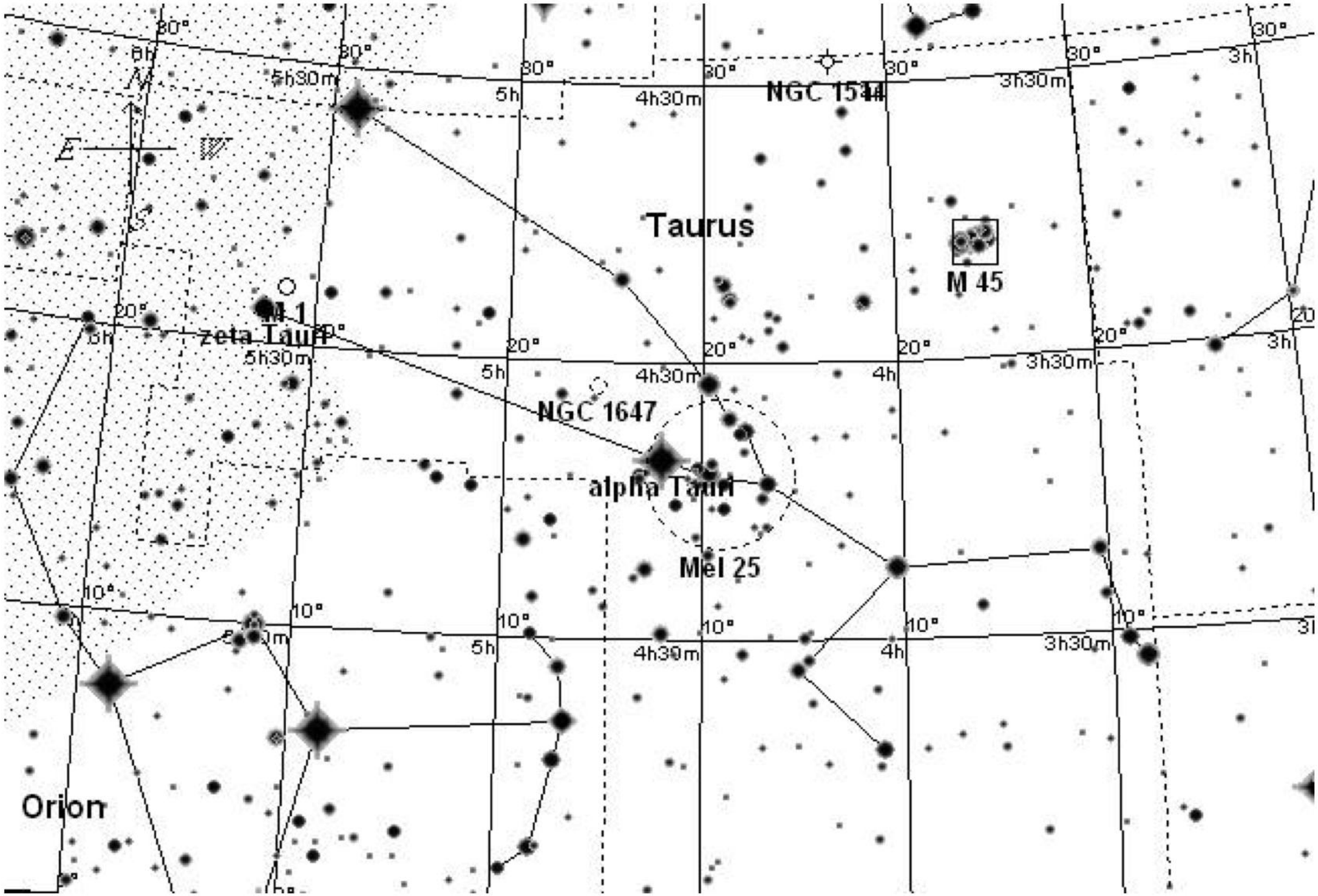
The best astronomical story in the Bible is that of the Star of Bethlehem.

1) When was Jesus' birth date?
2) Did only these three wise men see it?
3) From where did they come?
4) Was there no star, just a planetary alignment?
5) How bright was it, and for how long?
6) Is there any remnant evidence to see today?

REMNANT STAR OF BETHLEHEM: NGC 1514. In Taurus. Discovered in 1700 by William Herschel. Helped establish that some nebulae are not just collections of stars. Sometimes called the Crystal Ball Nebula.

What shows in a eight-inch reflector at 50x.




Taurus
NGC 1544
M 45
M 1
zeta Tauri
NGC 1647
alpha Tauri
Mel 25
Orion
E
W
S
30°
20°
10°
5h30m
5h
4h30m
4h
3h30m
3h
4h30m

FOUR

In 1965 Halton Arp, using the 48-inch reflector on Mt. Palomar, saw a line across M81, a famous galaxy near the Big Dipper. He speculated that this line was caused by interactions with the "nearby" M82 galaxy. He was wrong.

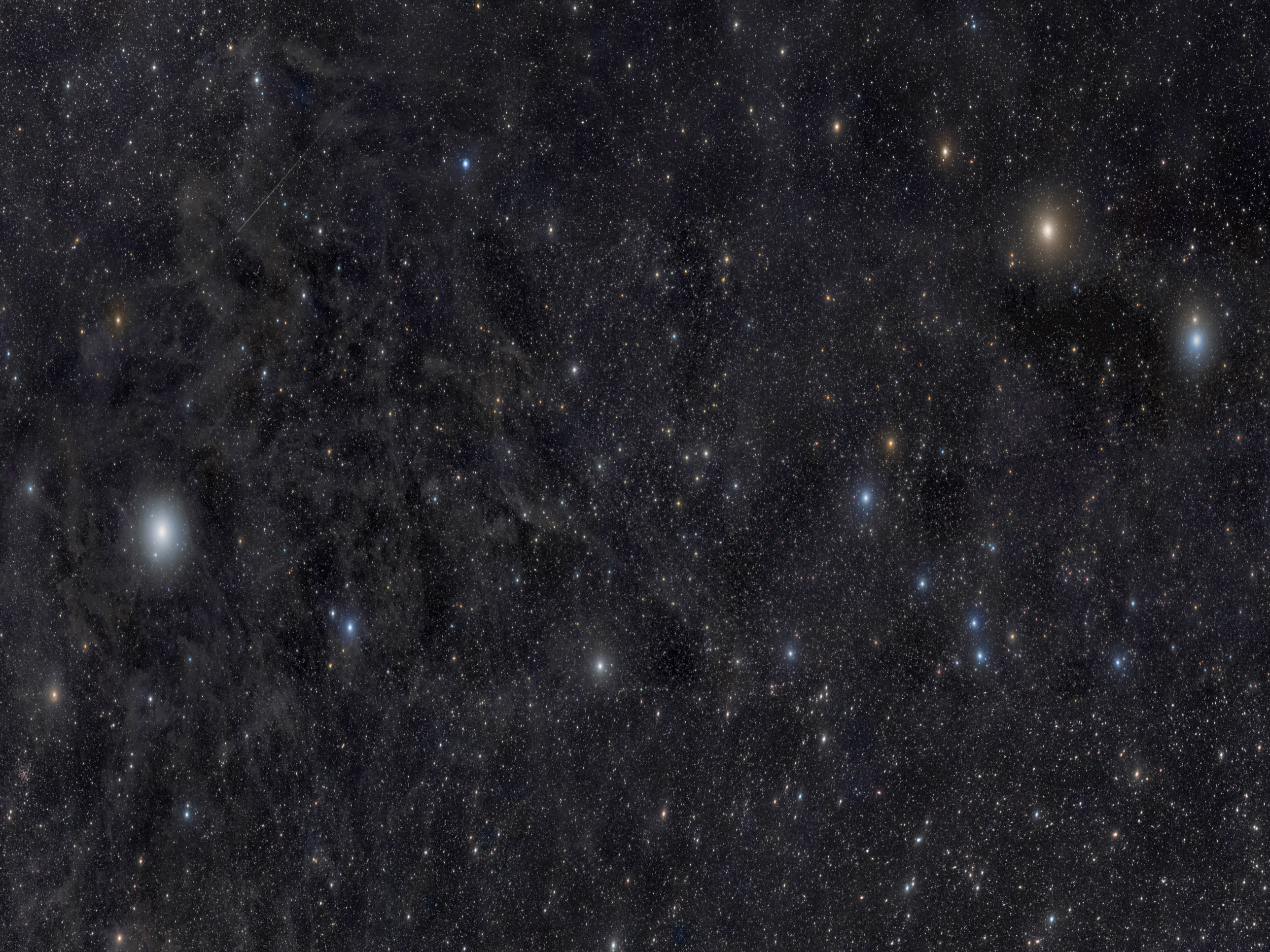
In early 2010 a group of amateurs saw that this line was not in or directly over M81 – but here in the Milky Way, in the galactic cirrus clouds more than 200 light years above our galaxy's plane. Arp's Loop is a line-of-sight illusion. That was all they noticed.

In November of 2010 I independently reached the same Arp conclusion without knowing what had been discovered a few months earlier. I also noticed and discovered an additional phenomenon:

I had also discovered the fingerprints of nova explosions in the galactic cirrus. These nova events are much less powerful cousins of supernovae. Of course, my discovery has been ignored among professionals.

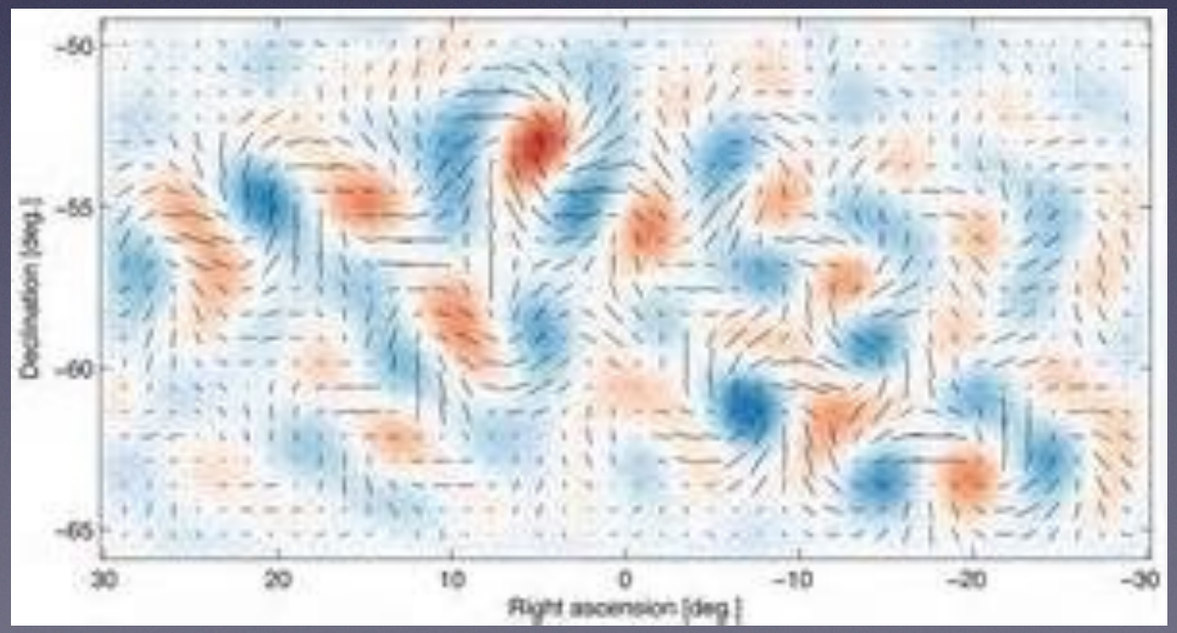
The Star of Bethlehem is a two-star nova that has left a visible star, as it brightens periodically. Many single-star novae only blow up once, but if they are inside the galactic cirrus they leave a circular ring.

Amazingly, there are many of these ghost nova rings to be found with the right type of time exposure. They can't be seen visually, and need wide-angle exposures. Here's another example:



Early in 2014 the world of science was buzzing over the **BICEP2 experiment at the South Pole.** That instrument seemed to discover the first evidence of primordial gravitational waves in polarized patterns of microwave energy. The BICEP2 scientists were quickly showered with millions of dollars in prize money, and a private audience with the President.

Subsequent and more sensitive data from the Planck **space** observatory, and now the Keck Array, indicate that the BICEP2 data most likely only came from the galactic cirrus we have discussed, **not** from the inflationary Big Bang. I wonder if any portion of the hasty prize money has been returned.


-50
-55
-60
-65
Declination [deg.]
30
20
10
0
-10
-20
-30
Right ascension [deg.]

FIVE

When "Out There" is "Right Here"

Not everything in astronomy requires binoculars or a telescope. Meteorites come to us from many sources, such as the asteroid belt, or even from Mars.

In the next slide you will see the Muslim meteorite which is at the center of Mecca's Kaaba, a holy shrine built by Abraham. This rock is said to have been cast down from the skies by Allah in ancient times, and has long been revered. Muhammad kissed it. Therefore, many hajjis kiss this meteorite to be closer to heaven.

The next slide also shows a basaltic Martian meteorite (DAG 735) from which I own a very tiny speck – a piece of Mars itself.
No telescope required.

SIX

Einstein said: **"There are two ways to live:
you can live as if nothing is a miracle;
or you can live as if everything is a miracle."**

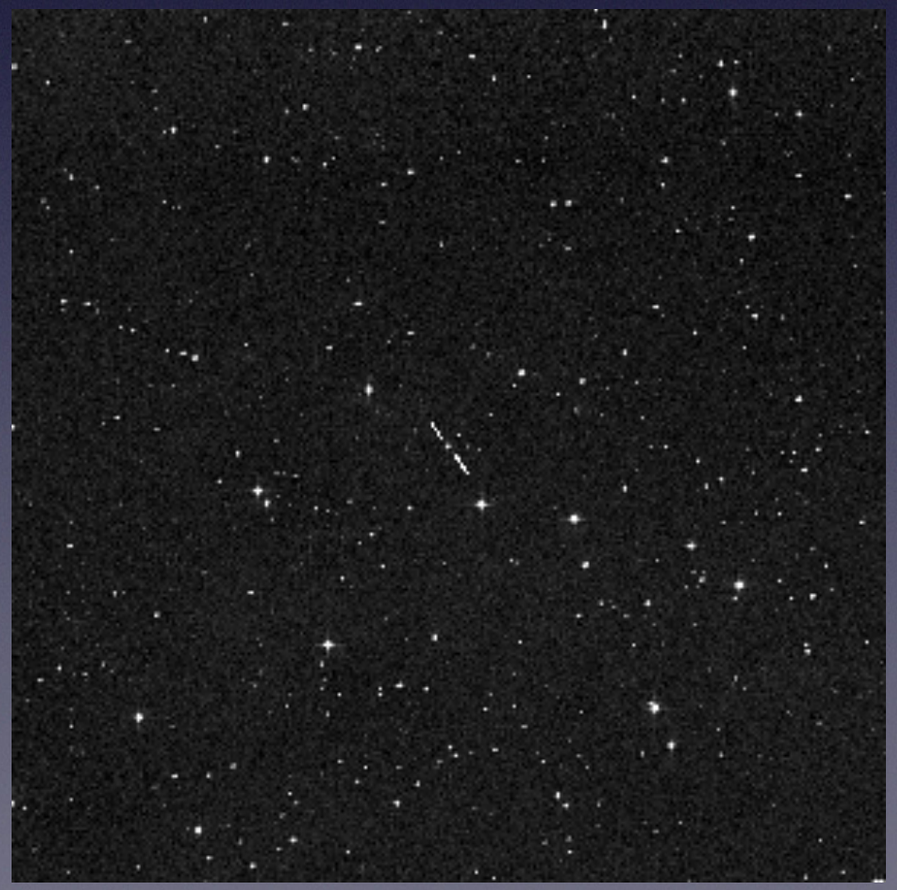
The word "amateur" means doing what we love.
Professional means getting paid for what we do.
I am a pure amateur astronomer of the miraculous.

The most miraculous thing I have seen through my telescope is not Jupiter and its moons, or Saturn with its rings, or craters on our Moon, or any other obvious object.

The most miraculous thing I have ever observed goes by the weird name "MSH 04-12," or even worse by "Q0405-0012."

Few people have manually found and observed it, but I did with my 16" telescope from the Devil's Backbone Overlook on the Blue Ridge Parkway, on a clear winter night.

This quasar is inside Eridanus, aka The River. It is 15th magnitude, surrounded by hundreds of stars of similar brightness



30’ view of the field around this quasar. Object is between two white lines.

This unremarkable speck of light is a **quasar, a very active galactic core.** It is not a star, but appears visually *like* a star.

This powerful quasar is 5 BILLION light years away.
I looked at it directly, not with the help of any gravitational lens, or digital photograph.

Our Solar System — the Sun and Earth itself — was born from a local dirty gas cloud about 4.5 billion light years ago.

That means, as I was DIRECTLY OBSERVING this speck of light, *there were photons hitting my retina that began their journey a half-billion years BEFORE our Solar System existed.*

That's the amazing thing about astronomy.
We can instantly travel through space and time, unlike any other science.

Five Bonus Images

Some famous objects may not be what they appear to be.

They are what they are.

It is up to us to see them correctly.

Here are five examples:


This is Mercury, not our Moon.


This is Omege Centauri, a remnant galaxy core, not a typical globular cluster.
NGC 5139 | LRGB | AP175 | FLL29050 | © Christoph Kaltseis 2014


This is part of the Andromeda galaxy,
which used to be considered a spiral nebula.


This is the nearby Trapezium galaxy, more easily
seen with binoculars than a telescope.


Earth and its Moon directly to the right.
Moon dimly visible, to Earth's lower left.
We are NOT the center of everything.

His last tweet:

"A life is like a garden.
Perfect moments can be had, but not
preserved, except in memory. LLAP."