A BRIEF HISTORY OF THE TELESCOPE

By Gonick & Kalculeh

For Eons, Stargazers Relyed on the Naked Eye, an Instrument Whose Story Has Yet to Be Told.

In September 1608, a Dutch Optician Named Hans Lippershey Presented His Prince with a Gadget: Two Lenses Mounted at Either End of a Tube.

I See National Security Implications!

Lippershey Prospered; So Naturally His Lens-Grinding Neighbor Zacharias Janssen Claimed Priority.

I'll Take 50 of 'Em!

At the Time, Heliocentrism Was Rolling Science, So Galileo Quickly Knocked Off a Copy and Pointed It Upward, with Famous Results.

Holy Seeing!

In fact, astronomers were fine with their eyes for a full six centuries after Al-Haytham described lenses in his "Optics."

Aim Aigh! Look Down!

Kepler Suggested Mounting a Convex Eyepiece Behind the Primary's Focus, for Potentially Greater Magnification (But an Upside-Down Image).

No Problem!


Or Maybe Here Is Better... Wait... How About Here? No...

Bigger, But Blurry: Spherically Curved Lenses—The Shape Generally Ground at the Time—Lack a Precise Focus.

Besides, Any Simple Lens Acts As a Prism, Producing Rainbow Fringes or "Chromatic Aberration."

How Sad... I Thought Planets Had Halos...

Where Do You Want the New Scope?

Astronomers Minimized These Aberrations by Using Low-Curvature Lenses...

Over There Is Fine...


Or Maybe Here Is Better... Wait... How About Here? No...

Newton's Second, Larger Reflector, Like the First, Had a Polished Metal Mirror That Absorbed Some 60% of the Incident Light.

Ideal: Bright!

Execution: Dim!

Still, He Had Hopes for Reflectors. Chromatic Aberration, He Believed, Would Forever Afflict Every Lens.

Haven't You Deballed My "Optics?"
IN 1733, MATHEMATICIAN CHESTER HALL PROVED NEWTON WRONG.
ALL RIGHT, DON'T RUB IT IN!

HALL'S Idea ABOUT TWO LENSES OF DIFFERENT REFRACTIVE INDICES WAS UNDERTAKEN TO AVOID CHROMATIC ABERRATION OF THE OTHER.
I'M HERE FOR MY LENS!

MIRROR SHAPING IMPROVED TOO. IN THE 1770s AND 1800s, WILLIAM HERSCHEL MADE BIG REFLECTORS, EACH WITH A PARABOLIC MIRROR VIEWED FROM THE LIP OF THE TELESCOPE.
Blast!

DESPITE SOME FINE REFRACTORS, THE FUTURE CLEARLY LAY WITH BIG REFLECTORS, THOUGH MAYBE NOT LIKE THE GREAT MOUNT WILSON REFLECTOR OPENED ITS EYES UPON WHICH ITS OBSESSIVE DESIGNER GEORGE HALE CHECKED INTO AN ASYLUM WITH AN IMAGINARY GREEN FRIEND.
LET'S GO... I'M TIRED... WHOOP! NOT ME! LET'S BUILD ANOTHER ONE!

AND THEN WHAT? THESE GIANTS HAD LIMITS: THEIR NARROW FIELD OF VIEW HAMPERED SKY MAPPING, AND THEY HAD TO PEER THROUGH A FUZZY, FLUID BLANKET OF AIR LIKE EVERYONE ELSE.
I HATE AIR...

IN THE 1920s, BERNHARD SCHMIDT SOLVED THE WIDE-ANGLE PROBLEM WITH FAST CALCULATIONS, ALL BY HAND (NOT SO EASY, SINCE HE HAD BLOWN OFF HIS HAND IN A YOUTHFUL EXPERIMENT)...
TALK ABOUT A GRIND...

BIG TERRESTRIAL REFLECTORS NOW USE MULTIPLE MIRROR SEGMENTS: THIN, NEARLY FLOPPY THINGS SUPPORTED BY COMPUTER-CONTROLLED LIFTERS THAT MAINTAIN PERFECT CURVATURE.

COMPUTERS CAN EVEN TWEAK SECONDARY MIRRORS TO 'DETWINKE' THE EFFECT OF AIR TURBULENCE IN REAL TIME, FOR IMAGES NEARLY AS CRISP AS THE HUBBLE.

WHAT AM I SUPPOSED TO DO NOW?

OF COURSE, NO GROUND-BASED TELESCOPE CAN COMPETE WITH THE NUMEROUS ORBITING EYES POINTING DOWN.

WHO KNOWS WHAT THE FUTURE MAY BRING? DON'T ASK US. THIS IS A HISTORY, NOT A PREDICTION!

AND QUITE A BIT OF HISTORY IT IS, FOR 31 PANELS!

WARNING: ONLY DRINKING WATER

WELL, WE TELESCOPED IT...

CREDIT: ASTRONOMER WILLIAM MILLER (LEFT), TEACHING AT CAL ARTS, WEIGHING HIS FIRST TELESCOPE LENS IN 4TH GRADE.

AND FINALLY, MOUNT PALOMAR’S MONSTER, WITH ITS 5-METER, 12-TON MIRROR.

NOW ZIP AHEAD TO COMPUTERS AND ROCKETS... THE HUBBLE HURDLES THE STORMS OF THE ATMOSPHERE... CLEAN IMAGES AT LAST (ONCE THE ORIGINAL FAULTY OPTICS WERE FIXED)!