

## STAR GAZERS

SG 1615 – 5 MINUTE (APRIL 11-17, 2016)

“LET’S GO RETRO!”

DEAN: WELCOME TO STAR GAZERS. I'M DEAN REGAS, ASTRONOMER FROM THE CINCINNATI OBSERVATORY.

JAMES: AND I'M JAMES ALBURY, DIRECTOR OF THE KIKA SILVA PLA PLANETARIUM IN GAINESVILLE FLORIDA. AT THE END OF THIS WEEK, TWO PLANETS WILL DO A COSMIC BACK-PEDAL THAT HAD ASTRONOMERS SCRATCHING THEIR HEADS FOR CENTURIES.

DEAN: THAT’S RIGHT, JAMES! ON APRIL 16<sup>TH</sup> AND 19<sup>TH</sup> RESPECTIVELY, THE PLANETS MARS AND MERCURY BEGIN MOVING “BACKWARDS” AGAINST THE BACKGROUND STARS. WE CALL IT RETROGRADE MOTION, AND IT’S A HEAVENLY SIGN THAT GREAT THINGS ARE ABOUT TO HAPPEN.

JAMES: WHAT ARE WE TALKING ABOUT? LET’S SHOW YOU!

(STOP)

JAMES: THROUGHOUT HUMAN HISTORY, PEOPLE HAVE STUDIED THE MOTIONS OF THE PLANETS. THEY CALLED THEM WANDERING STARS BECAUSE THEY APPEARED TO MOVE AGAINST THE BACKGROUND OF “FIXED” STARS. FURTHERMORE, THEY WOULD OCCASIONALLY CHANGE THEIR DIRECTION, SPEED, BRIGHTNESS, AND EVEN THEIR COLOR.

DEAN: ANCIENT GREEK ASTRONOMERS REFERRED TO THESE WANDERING STARS AS 'ASTERES PLANETES', WHICH WE HAVE SHORTENED TODAY TO PLANET. THE

INDIVIDUAL NAMES WE USE FOR THE PLANETS TODAY ARE DERIVED FROM CHARACTERS IN ROMAN MYTHOLOGY.

JAMES: FOR EXAMPLE, MERCURY IS NAMED AFTER THE MESSENGER OF THE ROMAN GODS. HE WAS KNOWN FOR HIS SPEED, AND THIS PLANET LIVES UP TO ITS NAMESAKE. MERCURY IS TRAVELLING OVER 100,000 MILES PER HOUR AROUND THE SUN, AND CAN COMPLETE ONE ORBIT OF THE SUN IN ABOUT 88 DAYS.

DEAN: MARS, THE RED PLANET, IS SPECIAL BECAUSE OF ITS DRAMATIC CHANGE IN BRIGHTNESS AND COLOR. THE REDDISH COLOR OF THE SURFACE OF MARS PROMPTED MANY CULTURES TO ASSOCIATE THIS PLANET WITH THEIR GODS OF BLOOD AND VIOLENCE.

(STOP)

JAMES: BEFORE THE TRUE NATURE OF PLANETARY MOTION WAS UNDERSTOOD, IT WAS BELIEVED THAT WHENEVER MARS BEGAN MOVING BACKWARDS IN THE SKY, WAR, PESTILENCE AND DEATH WERE NOT FAR BEHIND.

DEAN: FURTHERMORE, SINCE MERCURY WAS THE MESSENGER OF THE GODS, IT WAS OFTEN THOUGHT TO BE A BAD IDEA TO DO ANYTHING INVOLVING COMMUNICATIONS WHENEVER MERCURY WAS IN RETROGRADE.

JAMES: KEEP IN MIND, WHEN PEOPLE FIRST OBSERVED THE HEAVENS, THEY BELIEVED THE EARTH WAS IN THE CENTER OF THE UNIVERSE. SO, IN ORDER TO EXPLAIN RETROGRADE MOTION, ASTRONOMERS CAME UP WITH COMPLEX MODELS OF THE SOLAR SYSTEM.

(STOP)

DEAN: FOLLOWERS OF THE GEOCENTRIC MODEL OF THE SOLAR SYSTEM DEVISED A COMPLICATED SERIES OF OVERLAPPING CIRCLES TO EXPLAIN PLANETARY MOTION. EACH PLANET WAS ASSUMED TO MOVE ON A SMALL CIRCLE CALLED AN EPICYCLE, WHICH IN TURN MOVED ON A LARGER CIRCLE CALLED A DEFERENT, WHICH WAS CENTERED ON A POINT IN SPACE CALLED AN ECCENTRIC.

JAMES: AFTER ABOUT 10 MINUTES OF LOOKING AT THIS CELESTIAL WHIRL-A-GIG, IT MAKES MY HEAD HURT. SO, FORTUNATELY, THROUGH THE EFFORTS OF COPERNICUS, KEPLER AND NEWTON, WE NOW UNDERSTAND HOW, WHY AND WHEN THE PLANETS WILL MOVE AS THEY DO.

(STOP)

DEAN: THE CAUSE OF RETROGRADE IS QUITE SIMPLE AND IT'S SOMETHING YOU'VE ALL EXPERIENCED. IMAGINE YOU'RE ON A THREE LANE HIGHWAY. MERCURY IS IN THE FAST LANE ON THE LEFT, MARS IS IN THE SLOW LANE ON THE RIGHT AND YOU'RE IN THE MIDDLE LANE. IF YOU'RE TRAVELING FASTER THAN THE CAR NEXT TO YOU, THAT CAR WILL APPEAR TO BE MOVING BACKWARDS WITH RESPECT TO THE BACKGROUND. THIS IS WHAT IS HAPPENING BETWEEN EARTH AND MARS.

JAMES: SO, EVERY 26 MONTHS, AS WE GET CLOSE TO MARS IN OUR ORBIT, WE PASS IT, AND IT APPEARS TO MOVE BACKWARDS AND IT GETS BRIGHTER AS WE GET CLOSER. AN OBSERVER ON MERCURY LOOKING AT EARTH WOULD SEE THE SAME EFFECT EVERY 4 MONTHS. FROM OUR PERSPECTIVE, SINCE MERCURY IS ALWAYS NEAR THE SUN, MERCURY WILL APPEAR TO BE MOVING FROM EAST TO WEST AS IT PASSES BETWEEN US AND THE SUN. SPEAKING OF WHICH, LET'S SEE WHERE BOTH THESE PLANETS WILL BE NEXT WEEK.

(STOP)

JAMES: OK, WE HAVE OUR SKIES SET FOR JUST AFTER SUNSET, ON TUESDAY APRIL 18<sup>TH</sup>, YOUR LOCAL TIME FACING WEST. JUST BELOW THE STARS OF TAURUS THE BULL, YOU'LL SEE MERCURY CLOSE TO THE HORIZON. STARTING ON APRIL 19<sup>TH</sup>, MERCURY WILL BEGIN GETTING LOWER AND LOWER IN THE SKY EACH DAY AS IT STARTS PASSING US AND ON MAY 9<sup>TH</sup> THIS YEAR, WE WILL SEE MERCURY PASS DIRECTLY IN FRONT OF THE SUN IN WHAT ASTRONOMERS CALL A TRANSIT.

DEAN: NOW, IF WE ADVANCE OUR CLOCK TO MIDNIGHT ON APRIL 19<sup>TH</sup>, YOU'LL SEE THE PLANET MARS AMONG THE STARS OF SCORPIUS THE SCORPION. AS THE WEEKS PASS, YOU'LL SEE MARS MOVING WESTWARD. IT'LL PASS BETWEEN THE STARS GRAFFIAS AND DSCHUBBA AND JUST AS IT NEARS THE CONSTELLATION LIBRA ON JULY 4<sup>TH</sup>, IT'LL RESUME ITS NORMAL WEST TO EAST MOVEMENT AMONG THE STARS.

JAMES: SO HEAD OUTSIDE AND GET RETRO WITH MERCURY AND MARS NEXT WEEK!

BOTH: KEEP LOOKING UP!