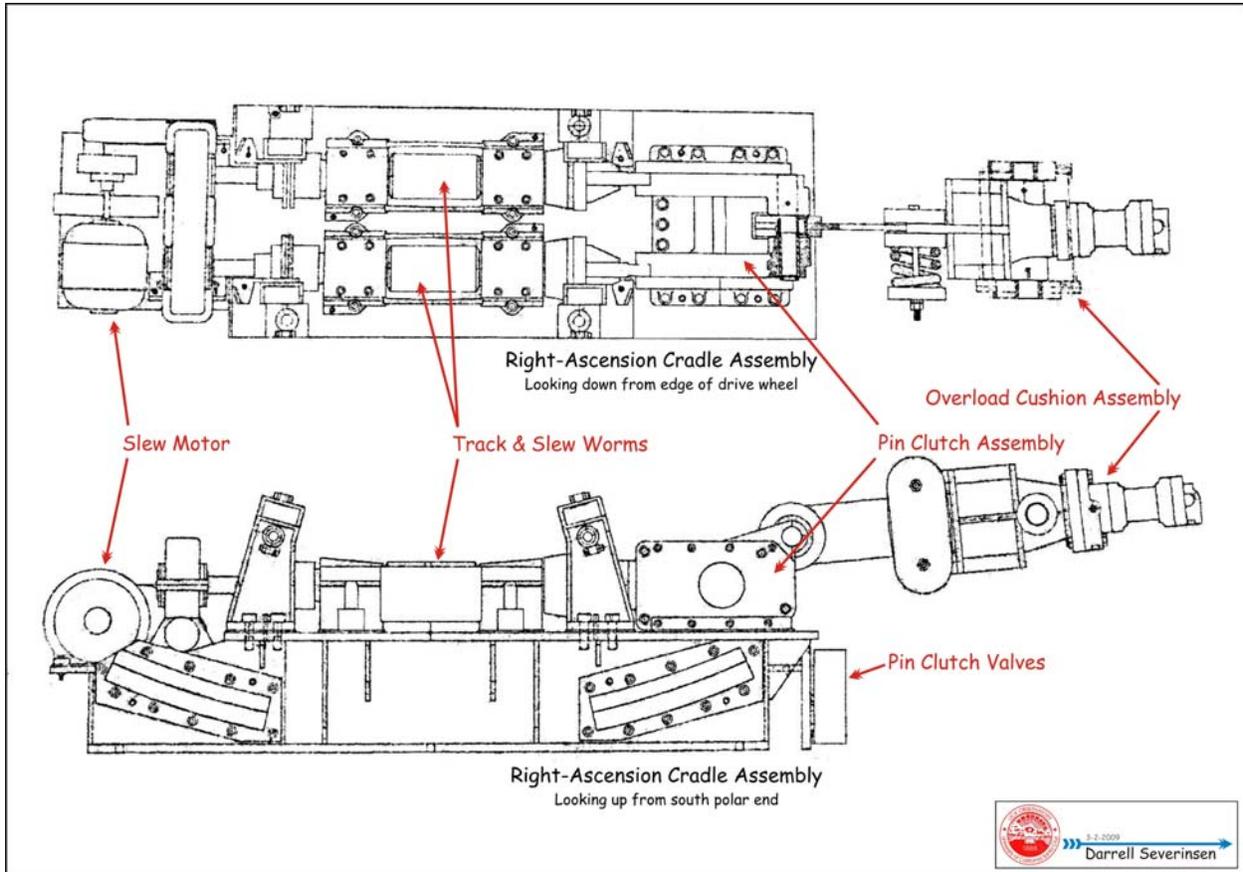


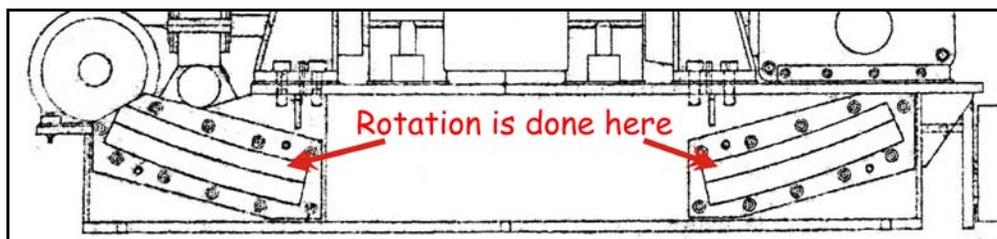
120" CRADLE-SHIFT ADJUSTMENTS

Introduction: The RA cradle of the 120" telescope is a safety device built into the telescope structure to protect the tracking and slew gears and worms from impact of the telescope on immovable objects and from minor earthquake activity. The illustration below shows the cradle without the rest of the telescope structure.

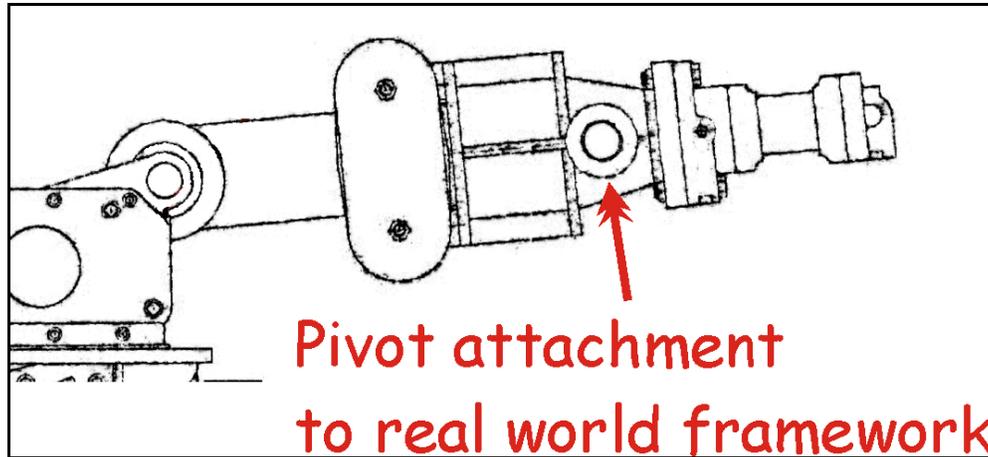


Safety: The cradle is located in the polar axle housing in very confined surroundings. Lighting is reduced in many areas. Exposed oil is prevalent in the polar axle room and may impede safe footing. Lock-out tag-out procedures must be observed when entering the polar-axle room.

Operation: When the telescope is accidentally driven into an immovable or heavy object the cradle is allowed to slip thus avoiding damage to the worm gears and worm wheels. This slippage is controlled by the action of the Overload Cushion Assembly. It's a double acting hydraulic cylinder with needle valves to control the flow of oil for a controlled cushioning of the telescope and rotation of the cradle thus protecting the finely honed gears from damage.

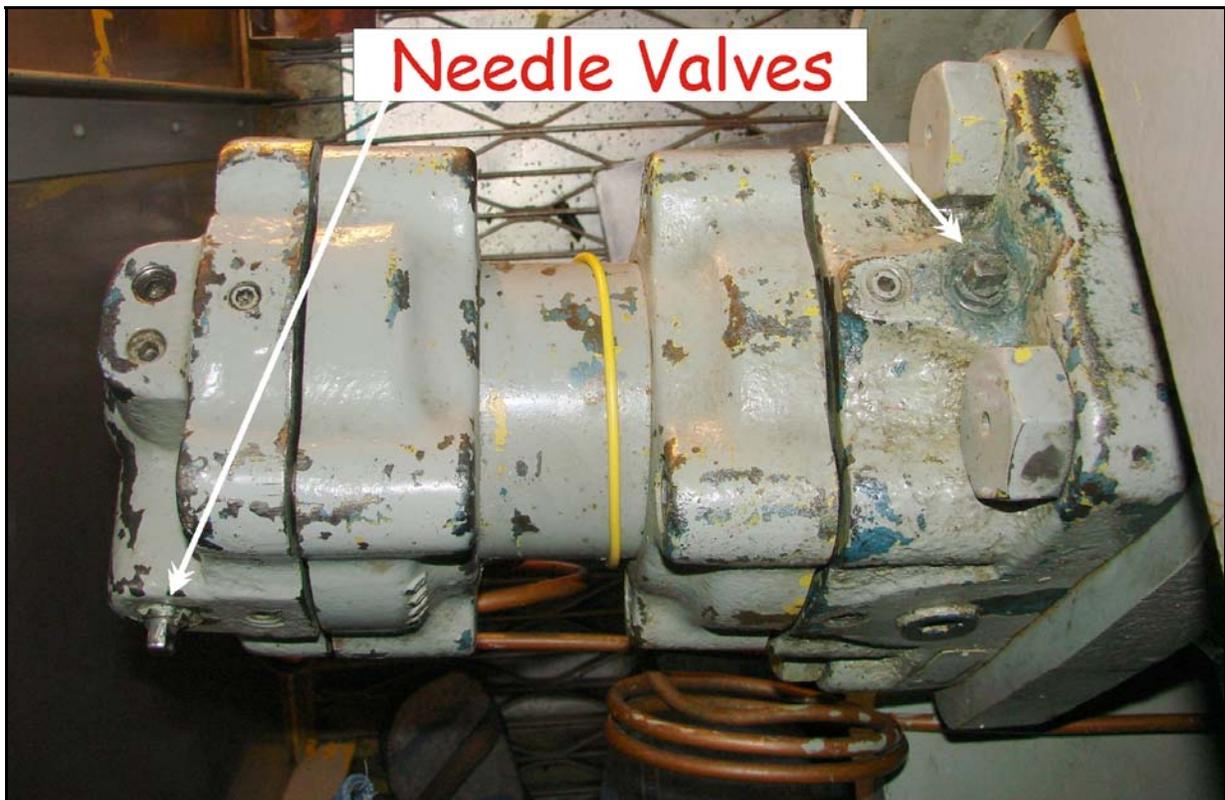


120" CRADLE-SHIFT ADJUSTMENTS



The picture above shows where the cradle attaches to the polar axle framework allowing for the adjustment of the cradle.

Layout: This is the hydraulic cylinder that acts as a cushion and allows controlled movement of the cradle when needed. If the valves are closed no movement is allowed and damage to the telescope drive could result. If the valves are wide open just slewing the telescope could move the cradle. When the cradle makes a big enough move an alarm sounds and telescope movement is disabled until the cradle is re-centered.



120" CRADLE-SHIFT ADJUSTMENTS

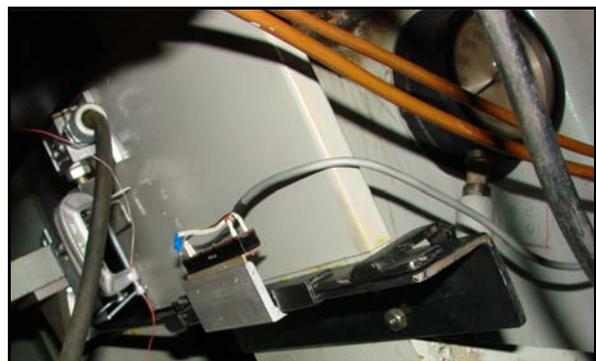
The cradle shift indicator is located near the cylinder pressure gauge. It will indicate the direction that the cradle has moved and by how much. If it has moved enough to sound the alarm you must re-center the indicator needle over the white arrow.



The alarm limit switch is located behind the cradle shift indicator and when installed years ago c-clamps were used to temporarily hold the switch stops and are still there today.



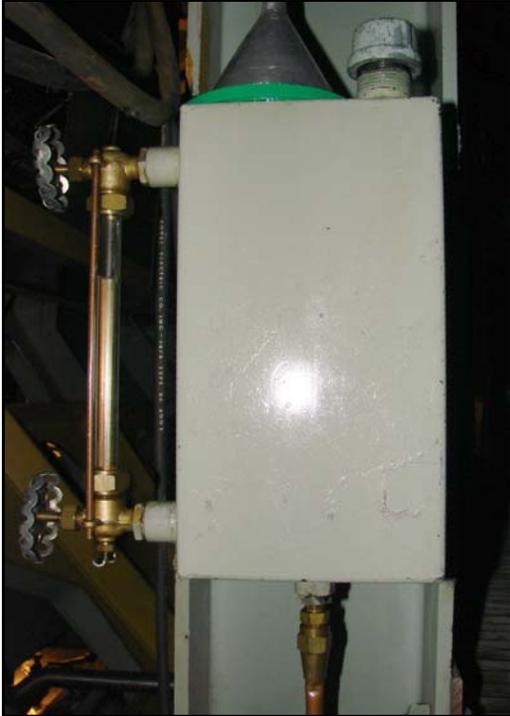
Cradle Limit Switch



Back side of shift indicator

120" CRADLE-SHIFT ADJUSTMENTS

Use our telescope pad oil to replenish the oil in the reservoir that is used for centering the cradle. The fill funnel lives on top of the reservoir and the fill pipe and cap are located there also. The sight glass on the side indicates the oil level in the reservoir and should be topped off when it starts to get low so we don't run out in the middle of the night and lose observing time to refill.



Oil reservoir with sight glass.



Oil reservoir with funnel ready to top off.

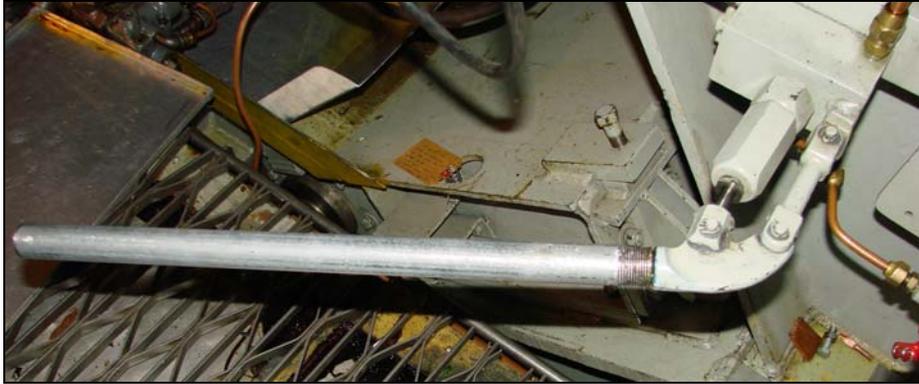


Hydraulic pump.



Pump handle lives to the right of the pump.

120" CRADLE-SHIFT ADJUSTMENTS



Handle on hydraulic pump ready to go.

Cradle Re-center: Normal cradle shifts are mostly in the same direction due to the fact that the preload counterweight is always pulling the telescope in the eastward direction to keep backlash out of the drive system.

Steps to re-center the cradle:

- Check the oil level in the reservoir.
- Close the proper two valves on the valve assembly depending on the direction you need the cradle to move.
- Place the handle on the pump arm and rapidly pump till you see the pressure building in the gauge (It will take a little time). Watch the cradle indicator and make sure you are pumping the cradle in the right direction and center the arrow over the white indicator. If you need to move the cradle in the opposite direction open the valves you just closed and close the other two.
- Once centered open the valves all the way. The alarm will stop sounding.
- Put the pump handle away.
- Turn out the lights and get back to on the sky.

Pump and valve assembly.

The usual valves to close are the upper right and lower left. To move the cradle in the opposite direction open all valves then close the upper left and lower right.



120" CRADLE-SHIFT ADJUSTMENTS

Cushion Adjustment: If you are getting frequent cradle shifts and you are sure that the telescope is in balance it is time to do some adjustments on the cushion hydraulic cylinder needle valves. There is a tool we made just for this adjustment that lives next to the cylinder on the framework. I have never had to adjust the valve on the east side. To make the adjustments place the tool over the rectangular valve shaft and close the valve gently noting the degrees you rotated to close it. Then open a little less than what it was and test, (it should not need to be opened more than ½ turn). You don't want to leave it closed because you will lose the protection for your worm gears.



Tool lives on the beam next to cylinder.



Adjusting tool ready to adjust the valve.