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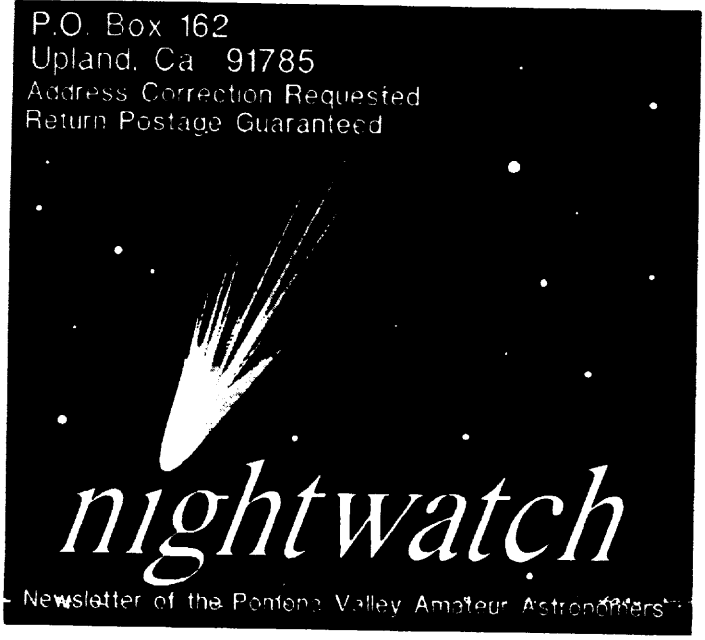

Amateur astronomers get better looking...

Volume 18 Number 2 ***nightwatch*** **February 1998**

President's Message

The Death Valley "extra" Star Party of January 23/24 was a moderate success. The reasons for the word "moderate" are twofold: (1) The sky was clouded over the first night, and (2) participants were few. Joe and Ron both assure me, however, that the beautiful sky available on Saturday night was worth the trip!

Joe Hillberg, Bob Branch, and I reluctantly agreed to cancel the January 31st Star Party, in view of predictions of overcast and rain on Saturday, with probable rain on Sunday as well. That dry lake bed can be treacherous during or after a rain, and it's no fun to sit in your truck or van and listen to the rain drumming on your roof. In such cases, my suggestion is: stay home, fire up your computer, and visit all the web sites we have links to on our web pages, starting with "Astronomy Picture of the Day". You'll feel like you've been invited aboard the Hubble Space Telescope!

Of course, some people always get overlooked! I failed to mention, in my write-up of the December PVAA dinner, that two of the major contributors to the event were Ray and Irene Magdziarz. They came to the church early in the afternoon, stayed 3 hours, helping to get things together, then came back for the event. As you might expect, it was Irene that jumped in to wash the pots and pans, after everything else was done. Thanks to both of you, Ray and Irene!

Next event on the schedule is our February 7th Star Show at the Rancho Santa Ana Botanic Garden. RSABG had 20 families registered for the event, as of last Wednesday, with five telescopes committed by PVAA at that time. We would like to see more of you come out. The site is a cleared area just East of the "Outside Classroom" (a new structure). We will have access to the rear-projection screen there, so we can show slides. Someone at the gate will want to verify your PVAA membership, so wear your badge. He will direct you to follow the service road along the east border of the garden, then turn left to climb the mesa on its north end. Park and unload next to the "Outside Classroom", then move your car down the hill to park. Please DO NOT drive off the paved part of the road!

How many of you have checked our Web Site? In case you haven't, please observe that the address is **case sensitive!** That is, if you type "PVAA" in lower case, you won't find it. The correct address is: http://www.cyberg8t.com/patrick/PVAA.htm I would appreciate

PVAA Events Calendar

Month	Star Party	General Meeting	Board Meeting
February	28	13	6
March	28	13	6
April	25	10	3
May	23	8	1

your feedback and suggestions for improvement.

It is apparent that we need to look for an alternate site to Yesterday Ranch. Even though Freck and Beverly Cross have been most gracious in offering us an open invitation to come whenever we want, their unfortunate experiences with "desert vandals" has forced them to make access to their property next to impossible. Ron Hoekwater and Joe Hillberg are heading up the search for alternate sites. Please bring in your suggestions.

Patrick Nicholson

PVAA 24 HR. Hotline...
Get the latest news on the star party, club meetings, special events and astronomy happenings.
call 909/985-1684
Visit or website at:
http://www.cyberg8t.com/patrick/PVAA.htm

January General Meeting

The January General Meeting was called to order on time, even though only about a dozen members were present. Outside, the rain was pouring down, soaking member's shoes as they crossed the courtyard to Galileo Hall. A wonderful evening to stay home with a book by the fireplace--and that, evidently, is what many members did. Nevertheless, we welcomed two new members, Ernie and Susan Reinke, as well as returning members Marjorie Comerzan and Claire Stover.

The holidays made lining up a speaker even more difficult than usual, according to Program Chairman Roy Schmidt, so we were left with the option, so often prescribed by parents, to "amuse ourselves." This approach became literally true as Roy launched into a review of his recent, $250.00 acquisition, *The Millennium Atlas*. Through a continued barrage of jokes and one-liners from Roy, we learned that this atlas provides maps on a scale approximately 5 times more expanded (that is, zoomed-in upon) than *Uranometria*. That means that, should you choose to take such an expensive group of books out on a star party, you would be doing a lot of shifting from map to map, to figure out what you're looking at. My conclusion, like that of others, I suspect, is that I can do without that one!

What's Up?

Roy presented a detailed discussion of the constellation Canis Major, starting with a challenge to try to see the dim companion of blazing Sirius. It would seem that an eyepiece with an insert to block off half the view would be valuable, if one can place the occlusion so it blocks Sirius, while permitting the companion (Sirius B) to come into view. But how do you know where to look for the companion, if you can't see it? (According to *Burnam's Handbook*, it should be just about due south of Sirius in 1998). Much patient searching will be needed, as well as tolerance for excess light into the eye--a situation not for everyone.

Roy enlightened us as to how the constellation "Big Dog" came to be: It seems that a dog was given to the goddess Aurora, and he was, in Roy's words, "one quick mutt". Impressed with his speed, Jupiter "rewarded" him by placing him in the sky. (A good marrow bone would probably have been better received). Within the constellation, we find bright M41, an open cluster of about 50 stars, straight down the constellation from Sirius. Near Beta Canis Majoris, we find a large cluster of approximately 350 stars, NGC 2204. Finally, near Delta, we find two nice clusters: NGC 2354, and right next door, NGC 2362. It isn't easy to know which one you are observing, unless you keep in mind that NGC 2362 surrounds a 4th magnitude star, which shines like a beacon in the midst of the dimmer cluster stars. Further south, in Puppis (which means "Poop Deck", not "Puppy") is one of the rare globulars in winter skies, NGC 2292. Roy found it to be right on the edge of resolution in his 13-inch Dob.

After a coffee break, with sliced fruit-cake provided by John Viselli, President Patrick Nicholson presented a review of the book, *Darkness at Night*, by Edward Harrison. This book is based on the various attempts to resolve "Olber's Paradox," which goes like this: In an infinite universe with unlimited numbers of stars, how does it happen that the night sky is dark? Our line of sight should be intercepted by a star in every direction, no matter where we look.

The answers that have been proposed, of which

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Harrison presents 15, can be grouped into categories as follows:

- The "covered sky" interpretation: the dark gaps are filled with invisible stars, whose light is blocked from us.
- The dark gaps are filled with stars that are dark, because they are "dead", or never illuminated (brown dwarfs).
- There are not enough stars to fill in all the dark gaps.

Answers have ranged from Fournier d'Albe's facetious response (the missing stars are lined up behind the visible ones), through obscuration by dark stars, to Kelvin's (The stars don't live long enough for the light from the more distant ones to reach the earth), to Bondi's theory that the light from the distant ones has been redshifted into invisibility.

We should note that the laws of thermodynamics tell us that any absorbing matter between us and a source of radiation will absorb that radiation as heat until it gets hot enough to radiate in its turn. (That's why an oven's walls get hot enough to bake your cake evenly).

Regarding Kelvin's remark that the stars don't live long enough, keep in mind Kelvin died before the theory was developed that stars are powered by nuclear fusion. He thought the source was gravitational collapse. This led to an estimated age of the sun of some 500 million years. When other scientists objected that geologists believed they could prove that the earth was several billion years old, Lord Kelvin, with secure self-confidence, proclaimed: "Their numbers are wrong. They need to correct their calculations."

The final answer appears to be option 3, above: There aren't enough stars. The latest calculations show that the average density of matter in the universe is 1 atom of hydrogen per cubic meter. At that density, even if all the matter were converted into energy, it would raise the average temperature to only 20 degrees Kelvin (20 degrees above absolute zero). The universe is a cold place--and, therefore, a dark place.

It is probably a good thing that Olber's Paradox is wrong: If the sky were bright at night, we would be subjected to radiation 90,000 times as intense as the sun! The earth will be toast in any case, when the sun becomes a red giant--but, at least, we have about 4 billion years to enjoy life before that happens!

Patrick Nicholson

At the Eyepiece - the February Sky

The stars of winter always seem to be the brightest. Shining after a cleansing rain storm or a chilly Santa Ana blowing in from the east, the sky though bereft of many of the spectacular heavenly apparitions of the summer has its own grace and subtle charm.

The constellation of Canis Major has origins that date back to the beginnings of written records. Canis Major (Latin for the big dog) has been associated in Greek mythology with the dog that was given by Cephalos to Aurora. Now this wasn't any ordinary dog, nope..... he was one heck of a quick little mutt. The fact was that he was about the fastest dog around. To prove that this was so, Cephalos set the dog racing against a fox. Folk's ; it was neck & neck for the longest time, all the way to the finish line. Jupiter was impressed enough with this bit of speed to place the dog in the sky.

Sirius is the brightest star in the sky, shining at a magnitude of -1.5. Now being at 8.6 light years away from the earth makes this most notable of stars 23 times brighter than the Sun. As an interesting aside; the dog days of summer are so named for the idea that the rays from Sirius (which during the summer is in the day time sky) commingle with those of the Sun making the temperature that much more unpleasant (hey..... it's a theory). The Spectral type of Sirius is A1 which computes to the surface having a temperature of 10,000 degrees. Combining the before mentioned facts about the spectral type and the brightness of Sirius it would be reasonable to assume that the life time of the noble dog star would be a bit shorter than our very sedately behaved Sun. Although I didn't find any life span for Sirius listed, I will continue to look and report back when I have it in hand.

Sirius has another kinda interesting thing to look for..... a white dwarf companion. This shy little fellow is separated from big brother Sirius by about 4 arc seconds. Shining at 8.6 magnitude, Sirius B (or " Pup " star as it is also known) is somewhat difficult to see with a 13.1 inch telescope at 300X power. It helps to stop down the aperture a bit... but not much. Its just amazing to think that this star packs the mass of the Sun in a diameter of about 19,000 miles (a quick calculation makes the " Pup " star 125,000 times denser than water) .

As you all remember from your elementary science classes, most of matter is made up of empty space. Under the proper conditions (tremendously strong gravity) a lot of the space in the atoms can be squeezed out. A simple calculation of the strength of the gravitational field of Sirius B at it's surface shows the force exerted to be more than 2000 times greater than at the surface of the Sun. Sirius B is very dim in spite of having a surface temperature of between 8,500 and 9,000 degrees. The very small diameter of the dwarf makes the radiating surface area of the star much smaller than the Sun or Sirius itself. Spend a moment with one of the stranger objects in the sky on your next star party experience.

The most famous deep sky object in Canis Major is the open cluster M41. Discovered in 1654 by Giovanni Hodierna (an Italian astronomer in the court of the Duke of Montechiaro) and described by Charles Messier as being only a cluster of stars , M41 appears to be a gathering of about 50 stars in an sort of circular clumping. Near the center there is a slightly red star that contrasts with the majority of the faint members of the cluster. With some imagination, the stars can be seen to fall in vague arms that radiate from the center.

There are several other open clusters that garner the attention of the interested amateur. NGC 2204 lies to the east of Beta Canis Major (named Murzim , " The Announcer") . A grouping of over 350 stars over a 13 ' area of the sky. Even with all these stars this cluster collectively glows at a magnitude of 8.6 (its about 2080 parsecs distant). A 10" telescope can see an unresolved haze with about ten stars standing out (just barely) .

In the 13.1" telescope the cluster is a haze of very faint stars with the brighter ones forming a cross pattern.
NGC 2362 is a very pretty sight with the cluster built around a fourth magnitude star (Tau Canis Major. With a diameter of 8' and glowing at 4.1 magnitude, the fifty stars that make the cluster form an interesting sight in any telescope.

There are several galaxies that are rather uninteresting except to those individuals (like myself) those find the challenge of locating these faint fuzzies particularly entertaining. NGC 2207 is one of a pair of interacting galaxies located south south east of NGC 2204. Glowing faintly at 10.7 magnitude, the 4.3' X 1.9' diameter smudge can be seen with a 13' telescope at moderate power. About 1.4' away is I2163 an altogether difficult object to spot (magnitude of 13.5 and an extent of 2.7' X 1.2').

NGC 2217 is about the brightest galaxy in Canis Major, shining at 10.4 magnitude. The difficult object is oval (and covers 4.8' X 4.4' area) and shows no clear-cut core in my 13 inch telescope.

A final object is actually not in Canis Major but merits inclusion due to it being a globular cluster. NGC 2298 is a small globular cluster in the constellation of Puppis. The unusual appearance of this type of gathering of stars glows faintly at 9.2 magnitude while subtending an area of 6.8' In the 13' telescope the cluster hints at resolution with a mottled surface texture and hints of stars coming in to view. It is worth finding simply for the fact that globulars are a rarity in the winter sky.

FEBRUARY STAR PARTY DEEP SKY OBJECTS

NGC	CON.	R. A.	Dec.	Dia.	Mag.	Misc.
2287	Ca Maj.	6h 44.9'	-20 Deg 41'	38'	4.5	M41
2204	Ca Maj.	6h 13.5'	-18 Deg 38'	13'	8.6	Open Cluster
2362	Ca Maj.	7h 16.7'	-24 Deg 51'	8'	4.1	Open Cluster
2207	Ca Maj.	6h 14.2'	-21 Deg 21'	4.3' X 2.9'	10.7	Galaxy
2217	Ca Maj.	6h 19.7'	-27 Deg 13'	4.8" X 4.3'	10.4	Galaxy
2298	Puppis	6h 47.2'	-35 Deg 57'	6.8'	9.2	ClassVI Glob

Roy C. Schmidt

School Scopes Near Finish

In December, 1994, the PVAA Board approved a plan to build a series of five 8-inch Dobsonian telescopes, to be loaned to local school system, using money obtained from the sale of Shamu, a 17-inch Dobsonian donated to the club by the widow of Harvard Pennington. The objective is to try to increase the interest in astronomy among local students--and teachers, too! This is a progress report on the project.

The first two telescopes are nearing completion. Spider and secondary mirror holders, as well as crayford-style focusers are complete for all five. These difficult items were designed and built by PVAA's ace mechanical designer, Ray Magdziarz. Two primary mirrors are completed; they were donated in a semi-finished state, then polished and figured by Board members. Final assembly is being done by John and Janis Seaton, with help from Joe Hillberg. Pictures (next page) show the status, as of January 17th.

Scope parts, including completed wood work, are shown in the accompanying photo by Ray Magdziarz: Front end of tube shows the specially-designed spider. Not shown is focuser, which will be installed later. From back to front, wooden pieces are: Tube box, with round bearings cut from plywood by John Seaton. The tube box slides onto the tube, centered at balance point and is held in place by a couples of wedges (shingles). Next is the rocker box, which will hold the concave side-bearings, designed to support the tube box. In front is the ground board, a stationary square of plywood with three plywood feet. The ground board stays stationary while the rocker box rotates in azimuth. The bearings on the tube box permit the tube to move in elevation, completing the necessary movements. All parts movement is cushioned by small Teflon squares..

The spider, shown in the close-up of the tube, holds the secondary mirror. This unique "stressed-wire" design was developed by Ray Magdziarz, based on an earlier PVAA design used on the 24-inch telescope, "Mira". The tube is waxed card-board "Sonotube" normally used as a form for cast concrete columns.

The over-all scope design is based on the "Dobsonian" design developed by John Dobson, to make a rock-bottom-priced "People's Scope", in order to facilitate the spread of astronomy. PVAA members have enhanced the original design to improve the durability--essential in a scope intended for use by school children.

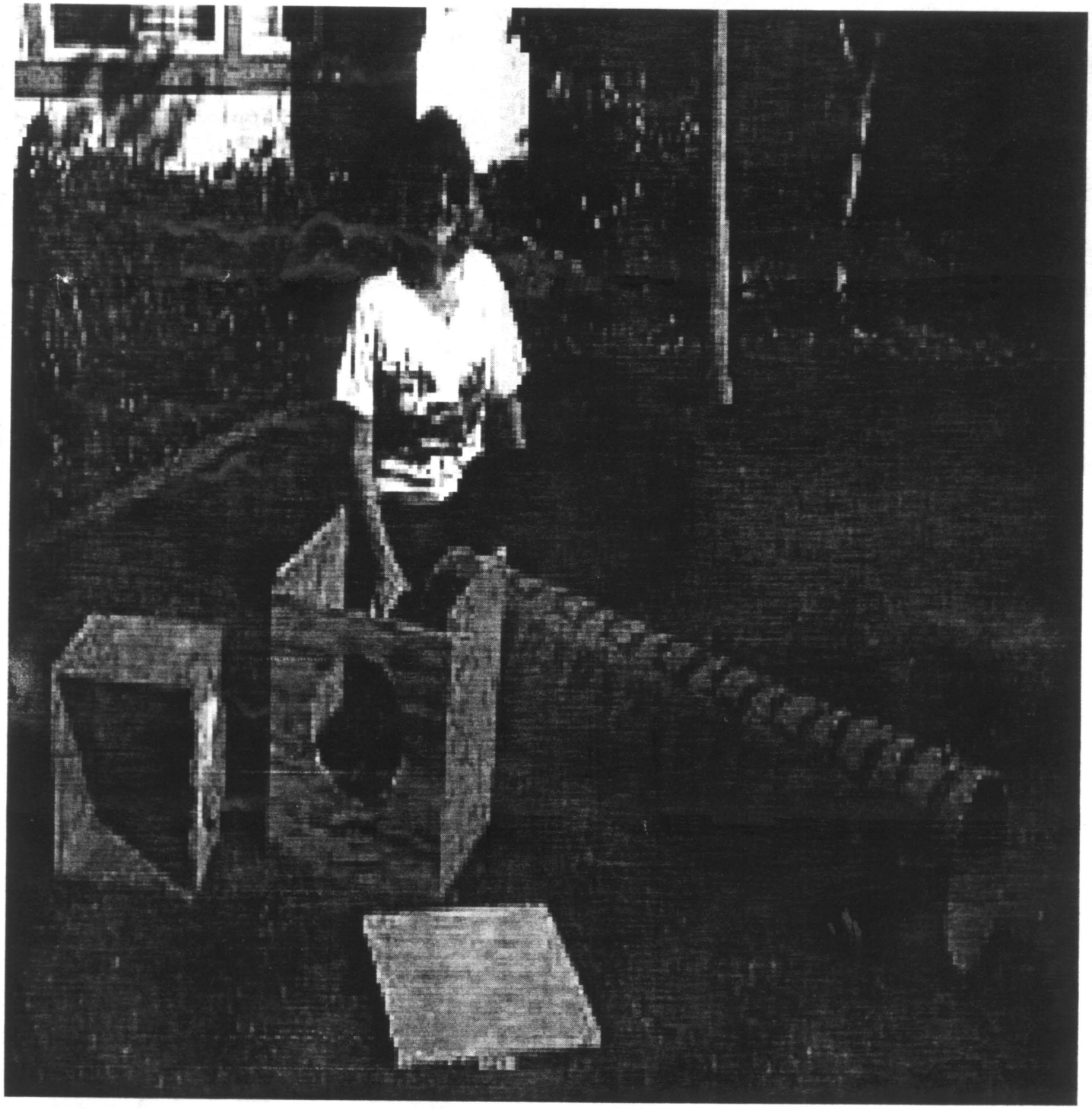
Both the waxed-cardboard tube and the plywood used for construction are vulnerable to water damage. For both protection and appearance, a good coat of paint is an important feature. Janice Seaton, shown here, has agreed to do the needed painting.

The primary mirror and mirror cell, as well as the focuser, must be installed as a coordinated final step, in order to match the structure to the exact focal length of the mirror. The mirror cells were fabricated by Joe Hillberg.

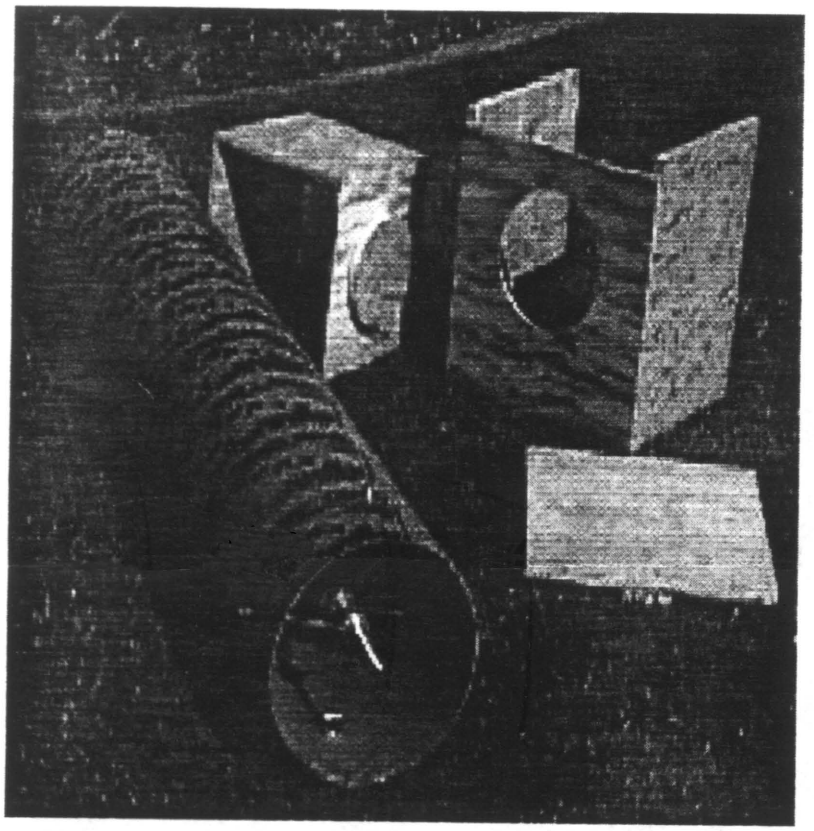
Digital photos by Ray Magdziarz.

Primary mirrors for the last three school telescopes will be ground by commercial services, then polished and figured by Board Members. Finish date is not yet known. However, it is a worthy accomplishment to have the first two telescopes approaching completion, in good time to go into use during the next school year!

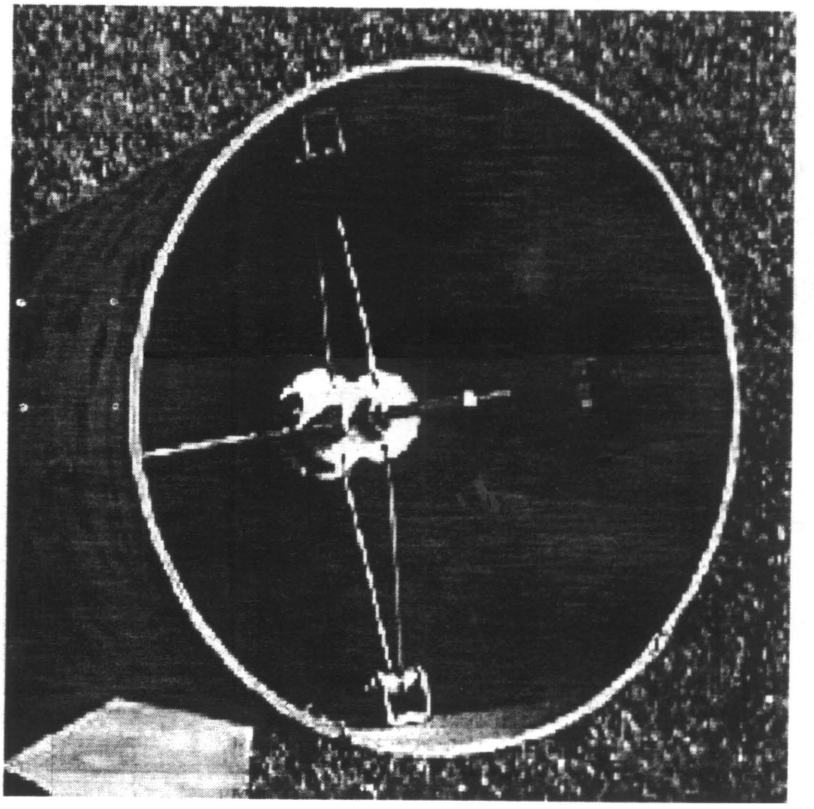
Patrick Nicholson



Janis Seaton with telescope parts.



Telescope parts including (from back to front) tube box with rounded bearings cut from plywood, the rocker box, the ground board and the tube. Note spider assembly mounted at opening of tube.



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