The Warren Astronomical Society

The Warren Astronomical Society is a local, nonprofit organization of amateur astronomers. The Society holds meetings on the first and third Thursdays of each month. The two meeting locations are listed below:

1st Thursday
8:00 p.m.
Cranbrook Institute of Science
500 Lone Pine Road
Bloomfield Hills, MI

3rd Thursday
8:00 p.m.
Macomb County Community College-South Campus
K Building
14500 Twelve Mile Road
Warren, MI

Membership is open to those interested, in astronomy and its related fields. Dues are as follows and include a year's Subscription to Sky and Telescope.

Student ................ $11.00
Individual .............. $18.00
College ..............$13.00
Family ..............$23.00
Senior Citizen ..... $15.00

Stargate

Lectures are given at Stargate Observatory each weekend. The lecture will be either Friday or Saturday night, depending on the weather and the lecturer's personal schedule. If you cannot lecture on your scheduled weekend, please call the Chairman as early as possible or contact an alternative lecturer. Those wishing to use Stargate must call by 9:00 p.m. on the evening of the observing session. The lecturers for the coming months are:

March 28/29 ........... Don Misson
April 18/19 ............... Lou Faix
727-9083
781-3338

April 4/5 ............... Ray Bullock
April 25/26 ............... Dave Harrington
879-9458
879-6765

April 11/12 ............. Bob Dennington
April 25/26 ............... Paul and Judy Strong
779-6345
791-0091

May 2/3 

Cover

Which members of the Warren Astronomical Society would give up the clear and beautiful skies of Michigan to have their own observatory on Kitt Peak, Arizona? Rick and Dolores Hill, that's who. This month, they supply the cover photograph taken at the Warner & Swasey Observatory and give us a "Peak at the Peak."
MINUTES OF THE JANUARY 17, 1980 MEETING OF THE WARREN ASTRONOMICAL SOCIETY:

The meeting was opened at 8:20 p.m. and the program was outlined for the evening. An announcement was made of a $250 bequest made to our society by the late John Searles' parents.

A report on the Bradfield Comet of December 29 was made by John Dombreal. Frank McCullough reported on his observing group which will be meeting at his home on Saturday January 19. The time has been set for 7:30 p.m. and refreshments are being served. Loretta Caulley read a letter from Edmund Scientific regarding a forthcoming contest. Open to all amateur astronomical societies, this contest would feature group effort and distinctive awards are being offered.

A plea was made again for hosts and hostesses for refreshments. Frank McCullough gave a special tribute to Observatory lecturers and assistants. The following were named for outstanding contributions: John Root, L. J. Faix, Dennis Jozwik, Marty Kunz and Douglas Bock.

An announcement was made concerning the success of Cranbrook's special telescope program. Robin Bock, treasurer, disclosed that our treasury stands at $505.08 with the Christmas bills still coming in. Frank McCullough gave a slide presentation of the Holiday Banquet. The next item on the program featured L. J. Faix who gave a talk entitled "Deep Sky Photography for $2.06". A copy of a device featured at Dayton was used by Mr. Faix in his talk which stressed economy in deep sky photography.

After the 9:15 break, it was made known that the February 21 general meeting would again feature "Chasing the Eclipse", a film highlighting this society's group trip for the purpose of viewing the 1979 Eclipse in Canada. Bill Whitney gave an informal talk on the grazing occultation of Aldebaran on Dec. 30, 1979. Kim Dyer spoke of an organized group which gives special attention to occultations and invited members to join. Dr. Paul Strong gave a slide presentation on the "Earliest Telescopic Views of Saturn."

The meeting was adjourned at 10:40 p.m.

Respectfully submitted,

Loretta D. Caulley
Corresponding Secretary
I would first of all like to express my sincere appreciation for the beautiful flowers that were sent during the funeral of my father, Frank Skonieczny. It is always a comfort in difficult times to know that friends care. Since it was impossible for me to edit the W.A.S.P. last month, other club members took over the temporary responsibility. Special thanks go to Dave Harrington and Paul and Judy Strong for a job well done. Certain articles which were to be included in last month's issue could not be located at that time. Those articles, by Brian Vorndam, Jonathan Baditoi and Lou Faix, are included in this issue.

Although it is almost impossible to believe, summer is just around the corner. As you may know, the W.A.S.P. is printed at the Wyandotte Planetarium and at other schools in the School District of Wyandotte. These facilities are closed during the summer months and will make printing the W.A.S.P. more difficult and expensive. A page printed at a commercial printing shop costs approximately six times more than a page printed at the Planetarium. I therefore would like to ask that articles be submitted before June simply to reduce costs. As always, articles already printed are especially welcome. If you would like to print your own articles, please print about 130 copies. Do not have them printed at a commercial printing shop. Any articles submitted before June will be printed at the Planetarium and held for the summer months, if requested.

I have seriously looked into printing the covers and selected pages in color. The inexpensive way of doing it by the 3-color process with a mimeograph machine produces a final copy that is not worth the trouble. Unless the photograph is extremely vivid and of high contrast, it reproduces poorly. Therefore, we will continue printing the covers in black and white. One of the main features of the W.A.S.P. is intra-club communication. The W.A.S.P. Exchange is one way of letting others know that you are interested in selling or buying some astronomical product. This is a free feature of the W.A.S.P., open to all club members. If you would like to have something included in the W.A.S.P. Exchange, just drop me a line or send a note specifying what you would like included and for how long your ad should run. If your ad takes an entire page, we do ask that you cover the cost of the printing.

An exuberant Equinox and good writing to all!

Sincerely,

Timothy D. Skonieczny
Editor

W.A.S.P. Exchange

Available: Reputed 5 inch Alvin Clark refractor for sale. Condition unknown. Inquire with Mr. and Mrs. Shuck Martin, North Olmsted, Ohio. (216) 777-6258. Serious inquiries only.
PIONEER SATURN

Saturn, long one of the most glorious sights in the heavens, has been seen for the first time from beyond the Earth. The beautiful ringed planet, second largest in the solar system, was visited by Pioneer II on August 31-September 1, 1979. This is a brief summary of two histories, of the planet and the spacecraft, and of their encounter.

SATURN. The giant planet has been studied from Earth for centuries. Appearing to the Earth observer as a bright yellowish star of the first magnitude, Saturn is the sixth planet from the Sun, around which it revolves at an average distance of 1.4 billion km (886 million mi) completing one orbit every 29½ years. The years are long but the days are short—it rotates on its axis every 10 hours, 14 minutes.

Saturn is an immense, diffuse body whose volume is 815 times that of Earth, but whose mass is only 95 times greater. It is the only planet in the solar system less dense than water. Like Jupiter, Saturn appears to be composed mainly of hydrogen and helium, it also has cloud bands similar to Jupiter's and its general characteristics suggest that it too is a liquid planet.

Saturn's glory and one of the great spectacles of the solar system, is its rings, first observed by Galileo in 1610. The image in his simple telescope showed what looked like three globes, one large and two small, and he called the rings "cup handles. In 1655 the Dutch astronomer Huygens realized that the projections were actually a flat ring slightly separated from the main globe. Twenty years later, Cassini found that the supposedly solid ring was divided into two parts by a dark line, now known as Cassini's Division. In years later he also detected some of Saturn's moons.

The earliest successful photograph of Saturn was taken in 1883, and in 1895 it was first suggested that the rings are a swarm of particles in near-independent orbits. Believed to consist of ice, ice-covered rocks, or ice imbedded with rocks, the rings range outward about 77,000 km (48,000 mi) from Saturn's cloud tops. Total width of the three visible rings is 64,800 km (40,300 mi). The rings are so thin that they are nearly invisible when viewed edge-on from Earth. Astronomers have determined from Earth that the ring particles range from the size of a snowball to that of an automobile. Until the recent discoveries of ring systems around Jupiter and Uranus, Saturn's rings were believed unique in the solar system.

Saturn's ten known satellites include the largest in the solar system, Titan. Titan has a diameter of 5,800 km (3,600 mi), greater than the planet Mercury, and is known to have an atmosphere. With Mars, Titan has been considered one of the most likely places where life may exist.

PIONEER 11. The spacecraft, known both as Pioneer 11 and Pioneer Saturn, began its journey on April 5, 1973, as Pioneer 11. It reached its first destination, Jupiter, on December 2, 1974, passing within 42,760 km (26,725 mi) of the planet's cloud tops and taking the only existing photographs of its polar regions. Jupiter's gravitational field was used to swing Pioneer 11 back across the solar system toward Saturn. Additional maneuvers in 1975 and 1976 place the spacecraft on a suitable path, the final aim point was selected in 1977, and in early 1978 Pioneer was locked into the desired trajectory. It carried a 30 kg (66 lb) scientific payload of 11 operating instruments.

On September 1, 1979, at 2 p.m. EDT the spacecraft, now designated Pioneer Saturn, reached the planet. Since Galileo first used his homemade telescope to view Saturn, there have been many observers. There have also been major advances in
telescopes. Now the planet has been seen for the first time in much closer views by an instrument on a spacecraft, the imaging photopolarimeter on Pioneer 11.

THE ENCOUNTER. Pioneer Saturn’s encounter has immeasurably increased our knowledge of the planet. Scientists have listed 565 new discoveries.

Pioneer passed through Saturn’s ring plane, outside the edge of its A ring and then swung in under the rings as close as 2,000 km (1,200 mi) below them. At the point of closest approach, its speed was 114,110 km/h (71,900 mph) and it came within 21,400 km (13,300 mi) of Saturn’s cloud tops. During its approach, encounter, and while leaving Saturn, the spacecraft took the first close-up pictures and made the first close measurements of the planet, its rings, and several of its satellites, including Titan.

Traveling at the speed of light, Pioneer’s radio signals took 86 minutes to reach Earth from Saturn, a round trip of almost 3 hours.

THE PLANET. Pioneer’s encounter unraveled many mysteries. Saturn has a magnetic field, magnetosphere, and radiation belts. The planet is flattened about ten percent at the poles by its rapid rotation and is not an oval body; it has a depression at mid-latitudes of about 120 km (99 mi). Two and a half times more heat is radiated into space by Saturn than is absorbed from the Sun. Temperature measurements suggest that the planet’s core, extending out about 13,000 km (8.575 mi) from the center, is about twice the size of the Earth, it is so compressed by Saturn’s huge mass that it contains about 11 Earth masses of material. The upper atmosphere was determined to be 60°C (410°F) warmer than expected.

Saturn’s magnetic field is 1,000 times stronger than Earth’s and 20 times weaker than Jupiter’s. The field is unique because its north-south axis, unlike the 10° tilt to the rotation axis of Earth, Jupiter, and the Sun, lines up with Saturn’s rotation axis.

The planet’s radiation belts of high energy electrons and protons are comparable in intensity to those of the Earth, but the region they occupy is about ten times larger. They are several hundred times weaker than Jupiter’s. The radiation belts are completely eliminated by Saturn’s rings because the ring material absorbs them; this is the most radiation-free sector of space found in the solar system.

Close-up pictures showed Saturn’s cloud tops, unlike Jupiter’s, have few details. Saturn’s cloud tops appear to be lower at the poles than at the equator. There appear to be jet streams around 70° latitude, and overall the planet appears to have more and narrower belts than Jupiter.

THE RINGS. Two new rings have been identified. One, called the F ring, is separated from the A ring by a 3,600 km (2,240 mi) gap, called the Pioneer Division. The F ring was clearly visible in a close-up picture taken some 943,000 km (585,000 mi) away from the planet. A second ring, the G ring, also was discovered and lies between the orbits of the satellites Rhea and Titan or about 500,000 km (312,000 mi) from the cloud tops.

A feature called the French Division, a division between the middle and inner visible rings (B and C rings) was seen in Pioneer’s pictures of the shadow of the rings on Saturn’s surface. It was named after French astronomers who first suggested its presence.

Preliminary measurements of the ring mass indicate they have a low density. This suggests they are made up largely of ice.

THE SATELLITES. Saturn has an 11th moon. 1979S1 was discovered in a photo taken of the outer edge of Saturn’s rings and by instrumentation on board the spacecraft. Its estimated diameter is 400 km (250 mi).

Because of the low temperature measurements, evidence for the possibility of life on Titan was discouraging. Its cloud top temperature of -198°C (-324°F) eliminates an internal heat source as a means of warming Titan’s surface. Pioneer measurements are
providing an improved mass and diameter for the large satellite as well as a detailed profile of its atmosphere.

The spacecraft also took photometric and polarization measurements of Iapetus, Rhea, Dione, and Tethys. Like the rings, the moons Janus, Enceladus, and Tethys also absorb large numbers of radiation belt particles.

PIONEER SATURN IN PERSPECTIVE. Information received from the planet is expected to contribute to a better understanding of the origin and evolution of the Sun and its planets. This, in turn, should provide scientists with a greater knowledge of the Earth.

Data obtained by Pioneer Saturn will be useful in planning the encounters of Voyager 1 and 2, which are now Saturn-bound. The more sophisticated instrumentation of the Voyagers and the spectacular results of their 1979 encounters with Jupiter give promise of equally memorable visions of Saturn in 1980 and 1981.

But Pioneer was first. Its mission successfully concluded, it is now headed out of the solar system to interplanetary space. It leaves data that astronomers will be analyzing for years and pictures that excite the imagination. It leaves with an assured place in the history of the 1970’s exploration of the solar system.

VOYAGER 2

1979J1, the designated name for a newly discovered satellite of Jupiter, is the closest to the planet. It is smaller than seven of Jupiter's other moons, but larger than six of them. Estimated to be 30 to 40 km (18 to 25 mi) in diameter, it is orbiting the planet inside the orbit of Amalthea, at about 57,000 km (36,000 mi) above Jupiter's clouds. With an orbital period of 7 hours, 8 minutes, and a velocity of 30 km per second (67,000 mph), 1979J1 is the fastest moving satellite in the solar system.

VIKING

Spacecraft cameras on Mars have revealed a new layer of water frost on the surface of the Utopia Plains landing site of the Viking 2 lander, creating a scientific puzzle for NASA scientists.

It is Martian winter again, and a thin layer of frost can easily be seen in the photographs. In September 1977 (one Martian year ago), Viking Lander 2 found frost on the surface during the Martian northern winter. Scientists associated that frost collection with a major dust storm that had obscured the planet's surface before and during that period. But recent observations have shown no dust storms on Mars this year. So no one is certain just what triggers the appearance of frost.

This much is believed: dust particles in the atmosphere pick up bits of solid water (ice). That combination is not heavy enough to settle to the ground. But carbon dioxide, which makes up 95% of the Martian atmosphere, freezes and adheres to the particles and they become heavy enough to sink. Warmed by the Sun, the surface evaporates the carbon dioxide and returns it to the atmosphere, leaving behind the water and dust.

From NASA Report to Educators, Winter 1979
EARLY OBSERVATIONS OF COMET BRADFIELD

Jonathan Baditoi

Comet Bradfield, 1979L, was discovered in late December, 1979, by Australian amateur W.A. Bradfield. Last seen in 1771, the comet has a period of 210 years. After passing through perihelion on Dec. 21, it began moving northward rapidly, and was first visible from the northern United States in late January.

My first observation of the comet came on the night of January 29-30. Then located in the constellation Eridanus at R.A. 03\(^{h}\)45\(^{m}\) Dec. -20°48'. The object was still too far south to be easily seen. Despite a full moon and haze, I picked up the comet after several minutes of sweeping. Although listed as magnitude 4.6, in my 8 inch Newtonian at 50x it appeared as a very faint nebulous patch, maybe five minutes in diameter with a slightly brighter coma, two minutes in dia. The comets northward motion (15' per hour) was obvious when drawings of the field made at 30 minute intervals were compared. This rapid motion also serves as an aid in identification. No tail was noted that night.

I next observed Comet Bradfield on Feb. 2. By then, it had moved considerably farther northward, lying just south of the celestial equator. Although the sky conditions were no better than before, the comet was easily found in the 8 inch. The dimensions were the same, but the coma seemed to be less condensed. Another check on the following night confirmed this observation. Bad weather and pneumonia have kept me from observing this object since then.

During late February and early March, the comet will be moving slowly northward through Taurus, and will fade from 9th to 10th magnitude. If you hope to get a good look at this object, do it now; moonlight should begin to interfere after February 23rd.

The following is a brief ephemeris of Comet Bradfield, giving coordinates for the remainder of February and early March.

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<th>DEC</th>
<th>MAG. (VISUAL)</th>
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<td>+18°11'</td>
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<tr>
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<td>03°41'.9</td>
<td>+21°22'</td>
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<td>03°47'.9</td>
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Well! I finally saw a comet! Not a big blazer like Comet West (before my time) but, no question about it, a real honest-to-God comet. Visible from 13 Mile and Ryan! (A God forsaken observing location, if there ever was one.) Got a tantalizing first word of it at the January Macomb meeting. Ken Kelly passed along that a 5th magnitude comet was coming visible in Eridanus (Eridanus? Where's Eridanus?) 5th magnitude! I can see 5th magnitude even from 13 Mile and Ryan! I eagerly make a mental note of it.

February 2nd, Sky and Telescope arrives. Sure enough, there it is in Comet Digest. Sure enough it says "Comet Bradfield" is 5th magnitude. For three years I've been reading Comet Digest and every month it says a 13th magnitude comet is now visible in some constellation you have to live in Argentina to see. But look at those declinations! -9.8°, +5.3°, +12.4°. I can see -9.4°, even through the trees, my
neighbors' houses, the wires and sodium vapor street lights! I plot the positions in Norton's. It's heading almost straight north toward the Pleiades. Out I go. Only 20 minutes of searching and there it is! I'll be damned! A Comet! Visible in binoculars, too. Big. Twenty minutes across? Thirty minutes? I don't know. I never looked at anything before that hadn't been analyzed and measured down to the last angstrom by a bunch of astronomers with 100" telescopes. What fun! No books to refer to. No charts (Well, actually I did look at my Skalnate Pleso, and there was nothing there! No galaxies, no globulars, nothing! Something new!) It's like doing original work which will be confirmed or refuted by other to follow. Big. But not bright. Maybe 5th magnitude. 6th? 7th? I never estimated a magnitude before. A new experience! Looks more like 7th. A 7th magnitude star viewed out of focus looks sort of like it. I'll find out eventually. Maybe I'll be right.

February 4th. Now I know it's a comet, because it moved. Five degrees north in 2 days. A little ahead of its predicted position, I don't see a tail. Looks like a fuzzy ball—or does it. Maybe it's sort of fan shaped, Head pointing southwest. Or am I imagining it? I want so badly to see a tail. I make a sketch with a short tail.

I stop analyzing for a minute and just look. A comet. Streaking through the solar system. Wow!

--Bob Wilson
A PEEK at the PEAK
from the Nightside Observatory

So many things have happened since we last wrote. My job on the ‘mountain’ is going very well. But on the whole the myth of Arizona weather needs to be exploded!

In December we had about fifteen clear nights. Of those only about five had really good seeing (2" or better.) Jan. was even a worse story. Our January dark run (lasting from the 3rd quarter moon to the first quarter,) had only four or five nights that were clear. None of them had good seeing. The stars were dancing and boiling like a cauldron in the telescopes. I saw many astronomers come up, spend two weeks of their allotted time and leave empty handed! What heartbreak. The most popular TV show was the weather report. Everyone would gather for it. We had many days of dense fog, high winds (about 40 to 50 mph.) rain, and yes friends good old Arizona SNOW! By the way, it looks just like Michigan snow.

All this bad weather gave me lots of time to work on what is the big news for us this month. I now have my own dome on Kitt Peak for my 12½" telescope. In fact it is one of the oldest domes on the Peak, being erected in 1958. When I found it, it was full of acorns and dead moths. It is attached to what used to be the airflow lab. Now it is used only for storage. The dome I work in is only about 50 yds. away, which is very convenient. I have cleaned it up inside and moved in the telescope but I cannot set it up yet. There is an old pier in the middle of the floor. It is about 3' high and 1' by 2' on its sides made of ½" steel. They really believe in steel and iron up here. Weight is rarely a problem.

Well I have tried to move the pier. I even threw my 190 lbs. at it and only hurt my shoulder. I have given up on trying removing it and I will settle for just shoving it over against the wall and I'll use it for a table. So my telescope will be dormant until I can get a block and tackle.

Another myth needs to be sundered here. Before I came out to Tucson I was under the impression that there was some sort of a rapport struck between Tucson and Kitt Peak National Observatory whereby the city passed a “light ordinance” limiting the hours and wattage of the outdoor lights. It is true that such a law exists, but it is equally true that the same law is not enforced. There are serious problems for those who must use their instruments on the eastern sky. Tucson virtually blots out everything up to an altitude of 30° and even farther for those who use photometers. To the north one can see Phoenix and to the southeast, Nogales. It is a sad state of affairs.

But as sad as that is, you would never know that it bothers the astronomers. Almost everyone up here uses white flashlights. Of course, most work in nice warm control rooms where the weather and light do not matter. I use red flashlights and wear red goggles when in white light. But then I am one of the only observers on the Peak that has to use his eyes to actually observe with. True, I take plates (we use photographic emulsions on glass plates instead of flexible films) but I still guide the telescope the old fashion way with my eye on the eyepiece of the telescope. Most every other telescope has TV guiders or auto-guiders. Of course, they breakdown more often than we do too!

Speaking of breakdowns I had a dandy the other night. We have a motorized lifting platform which lifts you up to the top of the telescope where you load the plates into the telescope. I suppose it lifts to a height of about twelve feet. It has two cables so that if one breaks the other will hold. I have been told that it is impossible for both to break or let go at the same time. As they say, promises are made to be broken ... and so are backs and necks! I went up to the top and loaded a plate and when I hit the switch...
for lowering nothing happened. I continued to push it. I was sure something would happen because I could hear noises coming from below. I jumped, just a little jump to see if the cables were hung up. Well they were hung up all right. In fact the whole hoist was hung up and the cables slacked off so much that they came off the unguarded pulleys. So, when I jumped I got a dramatic demonstration of gravity, and a quick trip to the bottom. I was very lucky, I was holding on to the guard rails at the time and I was not hurt.

I have met many interesting and well known people up here. So many of the Telescope Assistants and Operators (TA's and LTO's) just don't seem to realize what they working at. Some treat it like just another job. There is quite a caste system at Kitt Peak. There are the downtown AURA people, and mountain people, the TA's & LTO's, and I don't fit in anywhere because I am the only one that is specifically up there to observe for others. I hope more jobs like mine open up in the future as it becomes more and more infeasible for universities to fly their astronomers back and forth. I am glad I don't fit into the system. It leaves me more flexibility. The situation is that Case Western Reserve University (who owns Warner & Swasey Observatory) will as of Feb. 1 be splitting the bright and dark moon time 50-50 with KPNO each month. In return we split the costs of operation. I only observe for W&S observatory, but I hope to do some work for Kitt Peak in the future. The job description said it would only be 10 to 12 days a month. There has been many more than that, and long days too.

Many nights are too humid or windy or hazy to operate the Schmidt. So, I have cut some plates to fit my 35mm camera and I put my camera on our 4" finder telescope. I have taken some nice plates of many objects. I hope to put together an album of all the 'M' objects as photographed through the 4". One night I used 103aF in the camera with a 50mm lens and a Wratten 25 filter on the constellation of Orion. I not only caught M42/43, M78, The Horsehead Neb., and Barnards Loop (from Rigel clear around the belt) but I also got the very faint Strömgren Sphere around λOri. All in one hour at f/1.8.

Also on those nights that are too inclement for use of the Schmidt, I do a lot of my own observing. In the last month I have made many drawings of Saturn, Jupiter, Mars, etc. and observed about two dozen occultations, and made a number of variable star observations. It is so nice to have a job where I can do this and not have to worry about getting up for work in the morning.

One of the more interesting events, astronomically speaking, of the month of Jan. was the occultation of Aldebaran. I originally intended to watch it through the 9" refracting telescope on the side of the Schmidt. Then I found out that there would be about five or six other telescopes on the mountain that would be observing the same event. So we, Dolores and I, made arrangements to watch the event on one of the 36" telescopes. I say 'watch' but actually we watched a graph displayed on one of the computer TV terminals. The disappearance of Aldebaran was virtually instantaneous. The first telescope we watched the event on was filtered to accept only light at 3500 Å. After the actual event we went next door, about 100 yds. away, to the #2 36" telescope and watched the event again. That's right, we saw it again on a computer instant replay, and no Howard Cosell! On the second telescope the photometer was filtered to accept light at 1.3 microns. Further down the hill at the 50" the light was at .5 or 6 microns. I do not know what the other telescopes on the mountain were filtered.

Just last week, the first week in Feb., we met a David Levy. He's been writing a column in Star & Sky Mag. on different variable stars. He is a good ardent observer, better than Dolores and me, so I invited him up to the Peak during the first weekend of Feb. We had a very good time. He spent about three hours on an observing run on the nebular variables in Orion. I got some plates of Comet Bradfield for the editor T. Dickenson. Eventually, I had to tell him to quit or we would never be able to get up the next morning to catch the bus down.
Comet Bradfield was quite a sight! It is quite large and diffuse without a hard nucleus. I had to guide on a nearby star. In even a five minute exposure there was movement. This one comet I will be following for the next several months. The tail stretched 2½° across the 5° linear field of our IIaO plate. We found the comet to be a bit north of its predicted position on 3 Feb. 0230 UT. Before taking the plate we thought we could see a short tail to the east, but it could only be glimpsed with averted vision in the 4.5" guide refractor.

The Geminid meteor shower was very heavy at Kitt Peak this year. I even caught one on a circumpolar star trail shot with my 35mm camera. We were seeing about 150-200 per hour. It was certainly the heaviest I had ever seen. There were many fireballs. One night I was taking a plate and I thought a car had driven up and by accident turned on its lights. Then I saw the end of what must have been a fireball of at least -10 mag, the way it lit everything up. However there were no bolides (especially the stroboscopic kind so common at Stargate) or 'whistlers'.

Another astounding thing about the skies up on the Peak is the brightness extent and longevity of the zodiacal light, each night. It is seen here as a bright, brighter than the Milky Way, column of light that extends upwards from the point where the sun set. It is about 10° wide at the horizon and tapers and fades until it merges with the Milky Way just past the overhead point, It can be seen for four hours after sunset. I have yet to try to see the anti-solar glow that is supposed to be overhead at midnight. Dolores is going to be doing some spectroscopic work on the light in the near future.

Having worked on the Peak for four months now, I have heard many amusing and sometimes scary stories about events in the past. I want to share these with you. Many of the people in these stories are still alive and very active in astronomy so all names have been left out.

On one occasion an astronomer had just finished taking a plate and was unloading it when he noticed that there was a ridge running diagonally across the plate. Having determined the plate was no good he turned on the lights and found that the plate was broken and taped on both sides. It seems a night assistant had broken the plate and taped it hoping no one would notice.

Now while this sounds bad, it is reasonable that this person did not understand what he was doing when he taped the plate. However an astronomer should know better right? Well, a particular astronomer, who shall remain nameless, did not know how to cut plates. The morning after he had worked, another astronomer (actually a post-doc. friend of mine) went into his darkroom and found pieces of plates all over the counter. As it turned out this fellow was dropping the plates on the counter and breaking them and then taking the pieces that would fit into the plate holder and using them. On the other end of the counter were other pieces with fragments of spectra on them. He had hand developed all the pieces!

On another observing run this same astronomer dropped a plate on the floor that he had spent the better part of a night exposing. (We presume that he learned how to cut them by this time.) It shattered into many pieces. Having had much previous experience with this type of problem, he swept up the pieces and processed them anyway.

A team of two grad. students had spent a whole night on a plate of the Pleiades. It must have been a very slow emulsion. They dropped it just before they were to process it. As before they swept it up and the next morning a reassembled and taped together plate of the Pleiades could be seen on the counter of their darkroom. It is tempting to speculate at this point as to whether they were students of the above astronomer or related to the aforementioned night assistant!

One incident shows the dedication and perseverance of the true astronomer. It took place at the Boyden Observatory in Bloemfontein, South Africa. It seems that cobras have settled there, transported and left by those who brought them from India. One of the visiting astronomers had spent about three hours exposing a plate and was processing it. As it was developing he left the darkroom. But as he opened the door to
come out a cobra darted in. There he was cobra and plate (in the developer) in the darkroom and he was on the outside. What would you have done!? Well, I would have sacrificed the plate. He didn’t. From what I am told, he went in, reached over the sink and threw the plate into the fixer and left. A few minutes later they turned on the lights and found that the snake was only a few feet from him. That’s too close for me!!

Near the same observatory there is a cave. The cave must be rather deep for I am told that the temperature is cool inside. So cool, in fact, that they would store the processed plates in there, for it was also very dry. Today I understand, the same type of snake has also found that same cave to be a good storage space for snakes. So good that many (hundreds, the person told me, but then ten cobras can look like a million!) that nobody will go in there. There is a whole plate archive guarded by snakes that no one will touch!

In mid-Dec. one evening I was eating my dinner and minding my own business as I was sitting across from the mountain manager and we were discussing some things about the Schmidt. A man came in and sat down next to the manager and began complaining about some items and locations. It didn’t make sense at first until he identified himself as a photographer for the Nat’l Geographic who was supposed to shoot some things for their new book on astronomy. I asked if I could help and the manager was only too glad to turn the whole thing over to me. The people up here cannot stand publicity. So for the next two days Ira Block and I took photos and I introduced him to astrophotography. It may sound surprising but he really did not know anything about astrophotography! He did when we were through. He also took my photo several times around different equipment so I may wind up in the book too.

About a week earlier I had played host to David Healy, a contributor to many astronomical publications. In fact he has an article in Astronomy Magazine for Jan. 1980. He had a good time photographing many things while he was up to see us. Several weeks after his visit he sent some 8x10 prints of some of his shots to me. They are quite nice.

Two of the people I work directly for are C.B. Stephenson and Nick Sanduleak (the two S’s in SS 453). Well Nick (also known as Buk, pronounced ‘boo-ke, because his family is from Bukovina) was up to KPNO to do some observing on his own over the holidays. He has got to be one of the funniest people I have ever met. He and Peter Pesch (also known as P²) the director, really get wound up about 2 or 3 in the morning. Many a good side achin laugh is had before the night is out.

On Thanksgiving, Ken Wilson came out to visit us. He is the first of many visitors we expect to get now that we are settled and can receive visitors. We took him all over the mountain and had him up for a night. Our quarters are quiet and secluded and quite plush. He was surprised. Our life up on the mountain is far from Spartan. Ken and Buk got along well and as you would expect, Buk kept him in stitches.

Meeting all these people and going to all these new and exciting places is like a dream for the two of us. And now that we are settled in we want to extend an invitation to all of you that may travel out this way to stop in and see us. We do miss everyone so much.

Clear skies & good weather,

Sincerely, Rick Hill
Some characters have been known to get carried away with this astrophotography business. They equip their telescope drives with large diameter, fine pitch worm and pinion gears, Synchronous motors, power frequency controls and even analog feedback circuits. All that fancy dancy equipment presumes that if you beat on a problem with enough pounds of money you can master it. While that approach is good and fine for ATM's who are well healed, it's not a very practical approach for the beginner. There's an old belief that any dodo can make something complicated, but it takes a real genius to make something simple. Well, last summer in Dayton, I came across a real simple, Low budget method of wide angle astrophotography.

There are two established methods of taking constellation pictures. One is inexpensive but doesn't produce very satisfying results. The other, produces fine images but costs a mint. The method about to be described produces great images and is dirt cheap. For an investment of only $2.06 (tax included), some odd material found in the garage, and an evening’s labor, we constructed “Father Faix's Little Universal-Doall-Wonder Star Tracker” (patent unpending). It can also be used to peel potatoes, dice carrots and swat flies.

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attaching bolt. At the right side of the platform, a piece of 1/4" x 1" metal with a 1/4" x 20 tapped hole is attached in a way that the tapped hole is 11-7/16" from the hinge axis. A four-inch length of 1/4" x 20 threaded rod, topped with a locked wing nut is screwed in. File the end of the rod to a point. Another metal bracket is attached to the base board to act as a bearing rest for the threaded rod. A 1/8" drill point in the crevice of the angle bracket will act as a socket for the filed rod point. Not shown on the drawing is a 3" tension spring which draws the platform and base together.

Use of the star tracker is very simple. Set it on some solid surface and sight Polaris (North Star) through the two eye screws. I use a massive picnic table in the backyard. You may have to put shims under one edge to get the elevation angle just right. After aligning, clamp the base to whatever it is resting on. If that can’t be done a heavy brick set on the base board under the moving platform works almost as well. Attach the camera to the upper swivel bracket and by rotating the camera and swivel center on the desired constellation. You’re now ready to take pictures.

Open the camera shutter with a locking cable release. Fifteen seconds after starting, turn the threaded rod 1/4th of a turn. Continue doing this every fifteen seconds--one fourth of a minute, one fourth of a turn. Now photograph till your heart's content. I've used a 50mm lens on a 35mm SLR camera for exposures up to eight minutes. There was no evidence of star trails on the pictures. With Ektachrome 400 film and the lens open to f/1.8, the light pollution in my neighborhood limits my useful exposures to 3-4 minutes. If your lens produces chromatic aberration (e.i. (missing page/pages -drt)
Hinge and eye screws must be parallel

Camera Mount
This bracket can swivel

Moving Platform

1/4" thick metal plate
top for 1/4-20 thread

Wing nut locker to threaded rod

1/4x20 threaded rod

Metal block

Base

Eyescrews

Angle equal to your latitude position

11 7/16"