

YEAR 1973

May 1973

Tino Jubera joined FLWO as a Building Maintenance Mechanic.

June 1973

Dewayne Kurtenbach was transferred to the technical support group.

June 1973

Don Hogan was designated as the Support Supervisor. A mostly day job.

July 1973

Kenneth Goodwin, a Baker Nunn and Site Testing Observer left the as a result of reductions in the observatory staff.

October 1973





AMADO YARD EXCESS PROPERTY

Center for Astrophysics

JW
Harvard College Observatory
Smithsonian Astrophysical Observatory

MEMORANDUM

To: Mr. John G. Gregory

14 December 1973

From: Robert T. Ayer *RA*

Subject: Excess Personal Property Disposal at Mt. Hopkins Observatory

During late 1971 and early 1972 when I was Acting Field Manager at the Mt. Hopkins Observatory, we collected, segregated, inventoried and tagged a massive amount of property most of which was attributable to the Tougas affair. We then prepared Form 120's for each item in anticipation of disposition through the General Services Administration (GSA) in spring 1972. The Justice Dept., however, required that the property be held in place for possible use as evidence during the Grand Jury hearings. The property was located at our Amado facility and Davis-Monthan AFB (D-M) in Tucson

It took approximately three weeks to remove the inventory from Petersons Junk Yard and place it at Davis-Monthan AFB with Pres Clark heading up a crew of between 8 and 10 men daily. Re: R. Ayer's memo to John Gregory at CFA.

Tino Jubera and Don Hogan inventoried hundreds of items and

tagged them in accordance with instructions. Several weeks into job, when we were nearly finished at both sites, it rained. The ink on the cardboard tags ran making them unreadable. We started again using water-proof labels.

Pres Clark, Bob Ayer and Ralph Dumas rotated to and from CFA during this period and acted as Field Mangers. They were not happy campers.

UNITED STATES GOVERNMENT

Memorandum

TO : John Gregory

DATE: Dec. 11, 1973

FROM : J.T. Williams *JTW*

SUBJECT: The Lester Jackson/Smithsonian Bus

On August 16, 1971, Chuck Tougas transferred a two ton bus to Lester Jackson as payment for miscellaneous welding, fabricating and mechanic services performed at Mt. Hopkins during the July 1973. The exchange value was established at \$407.00 and due to repairs and mechanical improvements made by Lester the value is still about the same.

The attached copies of release documents describe the bus as:

1949 Ford Model 1M4TF5
Engine/serial No. 85MIN - R17421
W/29 Passenger Hakney bus body No. 8481
6 Cylinder engine, 87 hp, gasoline

So far as I can determine, Lester entered into the exchange agreement in good faith and accepted the bus as reasonable compensation for services in lieu of cash payment as originally agreed to.

In order to clear the air surrounding this matter, I recommend that S.I. pay Lester for past services (\$407.00) and reclaim the bus so that it can be disposed of properly.

Lester has agreed to this solution.

Encl.

JTW/dm

cc: T.C. Weekes
H. Rosenthal
R.T. Ayer ✓
D. Hogan
L. Jackson
T. Butler

*M. Miller report
file report*



Buy U.S. Savings Bonds Regularly on the Payroll Savings Plan

November 24, 1973

Steve Criswell started at FLWO (STADAD) Satellite Tracking Group

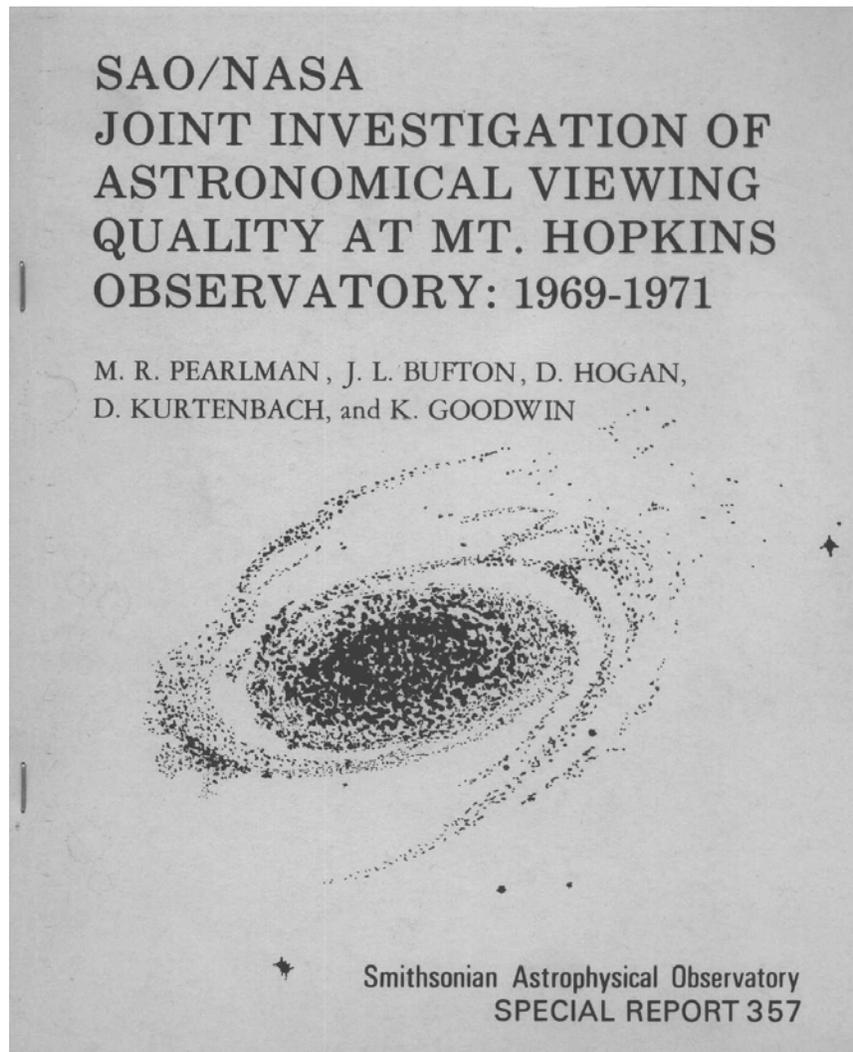
YEAR 1974

January 22, 1974

The verification of the remaining surplus property was completed. Several more months were required to dispose of this property. Operation Sandstorm was declared complete in April 1974.

January 23, 1974

The final report on the results of seeing tests were published. An earlier report on meteorological conditions on Mt. Hopkins was published in July 1972 as a SAO Special Report # 345



Excerpts taken from an extensive interview with Chuck Tougas by the Arizona Republic dated January 20, 1983.

But that was before his first interview with the FBI or the trial that led, a few years later, to his being convicted of conspiracy to trade, sell or otherwise dispose of excess government property without proper authority.

In 1974, Tougas stood before a federal judge in Tucson.

"At that point, I was saying to myself, He's going to say convicted but sentence suspended, or a year's probation, or 10 years' probation. I don't give a damn. Just let me loose. I'm sick up to here of the whole thing. How did we get this far!"

"I'm standing there, parade rest-style, my left thumb in my right hand, heels a foot apart, toes, 18 inches, and braced for the worst. And I got it.

"He said two years. 'I sentence you to two years in prison,' and I was waiting for him to say, 'Suspended.' But no, it just hung there, and suddenly he rapped, and that was it. The trial was over."

Federal court records show that the prosecution moved to drop any testimony about what use was made of the government property, saying that was not at issue.

Federal court records also show that Tougas went on trial along with his assistant, Ray Morrison; Carl S. Petersen, the owner of a truck salvage company in Tucson; and Joseph A. Zappia Jr., a truck driver for Petersen.

The government offered Morrison immunity if he would testify against Tougas. He refused.

Morrison was given a one-year suspended sentence; Petersen was sentenced to two years but changed his plea to guilty and had his sentence reduced to one year suspended and a \$1,000 fine; Zappia was sentenced to one year in prison but appealed and won a dismissal.

Tougas ended up spending 14 months in federal prisons and four months in a halfway house in Tucson. He had his time shortened for good behavior and for construction projects he completed for the prison system.

He now does some construction work and works in a lithography shop in Tubac.

June 24, 1974

Dr. Rudy Schild was evacuated by helicopter after being knocked down and unconscious by lightning outside the Gamma Ray Building. Al Almazon, Steve Criswell, Don Hogan, Ed Horine and others were involved in this rescue.

Just after sunset with a thunderstorm in progress Ed Horine called the 60-Inch and asked Rudy to go down to the Gamma Ray building and switch off power to the building. Rudy was to call him back when completed. A period of time passed and there was no call from Rudy and Ed could not contact him after several tries.

Ed was very concerned, called me and we left Amado for the mountain. I believe we set a speed record getting to the ridge. We drove directly to the Gamma Ray building. Rudy was not there. We checked the 60-inch building but we did not find him there either. We returned to the Gamma Ray building's power panels. Using flashlights we found Rudy about 8 feet over the side lying on his back head down unconscious. We thought at the time that he probably took an indirect hit when the power line was hit. His pulse was weak and breathing shallow. He was unresponsive after we pulled him up to level ground. Ed threw a glass of cold water on Rudy's face still no response.

Ed called the satellite tracking building. Steve Criswell and Al Almazon rushed over to assist. Medical assistance was at least two hours away by road in Tucson. The decision was made to try to get a helicopter and airlift him to a hospital. Steve went to the Wickiup and started to call different organizations to get a helicopter. Most of them did not want to fly because of the weather. Finally the Forest Service agreed to come to our aid.

While Steve was on the telephone we transported Rudy to Knoll #4. This was the largest cleared area on the mountain. We arranged several vehicles in a way that lit up the area.

The rain thunder stopped but we were still in the clouds. Soon afterwards we could hear the chopper but could not see him. The pilot did a remarkable job flying between the peaks of Mt. Hopkins and Mt. Wrightson in low broken clouds. Steve coordinated communications between the dispatcher and the pilot.

The pilot saw our lights when the clouds broke unexpectedly. He hovered high above us and told us to turn off our lights. He had his own floodlight and used it to set down beside a large pine tree.

We quickly loaded Rudy behind the pilot in the Helicopter and strapped him down. His condition had not change. It was decided that I would ride with them to the University Medical Center.

Enroute to Tucson the Forest Service's third man in the compartment with Rudy and me became alarmed when he could not feel a pulse. He suggested mouth to mouth resuscitation. Unfortunately for me, I was strapped down closest to Rudy's head. I did what I was trained to do and his pulse returned. There's a world of difference between doing this to a dummy and a real person!

After landing a team of medical people loaded Rudy on a gurney and rushed him into the Emergency Room. In a matter of a few minutes they stripped him down, hooked him up with wires, inserted tubes everywhere and did other things. Rudy came to almost immediately. They asked him a bunch of questions and he gave the proper replies. A day later Rudy returned to the mountain.

I don't remember who came in to give me a ride home. I do recall later, the next day, delivering a case of beer to each

member of the helicopter crew and apologizing for the mess I made as a passenger.

Everyone involved in this incident received a letter similar to the one below. Don Hogan

Center for Astrophysics

60 Garden Street
Cambridge, Massachusetts 02138

Harvard College Observatory
Smithsonian Astrophysical Observatory

28 June 1974

Mr. Donald F. Hogan
Smithsonian Institution
Mt. Hopkins Observatory
P.O. Box 97 Amado Road
Amado, Arizona 85640

Dear Don:

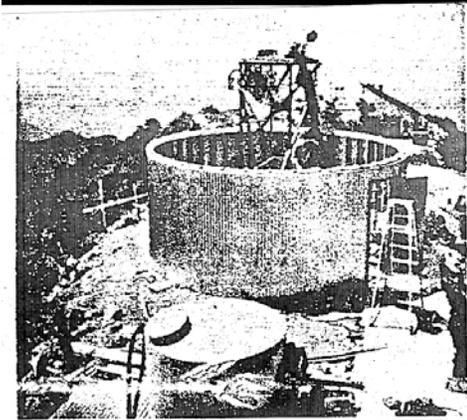
The effort you put forth in helping to save Rudy Schild's life was truly extraordinary. An act of real heroism like that requires not only the will and courage to move decisively, but also the skill and judgment to carry out the necessary measures successfully. I gather that you held his very life in your hands on the helicopter trip, and saved it. Your actions bind to you the rest of us who come to the mountain, as well as Rudy, with the strongest ties of gratitude and affection.

Sincerely,

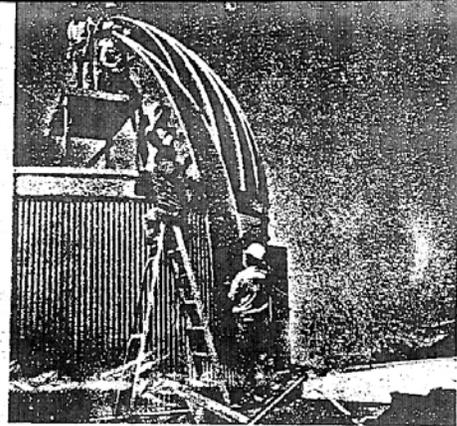
Nat

Nathaniel P. Carleton

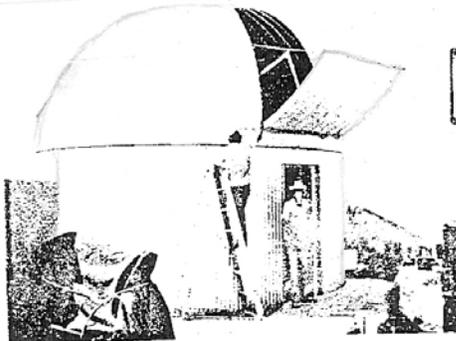
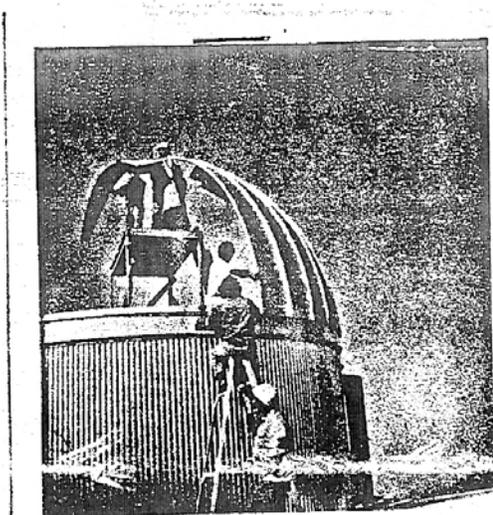
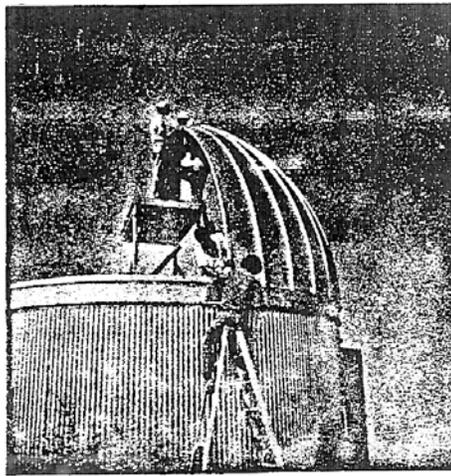
NPC/pem



From 24" to 48" Dome



AUG 1974



August 1974

A new dome was installed for the 48" telescope project replacing the 24" facility.

YEAR 1975

March 19, 1975



DUMP TRUCK SIZE ROCK

This rock stopped all summit road traffic for a day. A crew from SM&R drilled holes in it and then blasted it into manageable pieces with a large front-end loader.

March 1975

Underground power line was installed in the road and on the ridge.



• MAR • 75



• MAR • 75



• MAR • 75



March 1975

Fifteen miles of electrical power line was placed mostly in a road ditch to the ridge. Steady reliable power will soon be provided to the mountain.

May 1975

Open Days at Mt. Hopkins broke all attendance records. On the first weekend in May more than 500 visitors, including 70 students from local schools on Friday and hundreds of other people on Saturday and Sunday motored up the road to tour the facilities.

The following photographs are taken from a "Sky and Telescope" article by Nathaniel P. Carlton and Thomas E. Hoffman, dated July 1976



Above: The MMT site on Mt. Hopkins was leveled and prepared for construction in late 1975. The large circular depression roughly outlines the rotating building's foundation. In the background is Mt. Wrightson, 9600 feet, the highest point in Santa Rita Mountains, about 40 miles south of Tucson.



The disassembled parts of the MMT mount and drive system were shipped by sea as deck cargo to Mt. Hopkins in late 1974.



OBSERVATORY STAFF 1975 & 1992

Year 1976



March 1976

A Time Capsule was buried in the concrete pier of the MMT to commemorate the start of construction. Personnel shown are from the Smithsonian Astrophysical Observatory and the University of Arizona.

September 8, 1976

The second 20,000 gallon tank, shown below enroute to site, the water tank was installed at the Aspen Grove. Planted eight small evergreen trees with grass in the disturbed area.



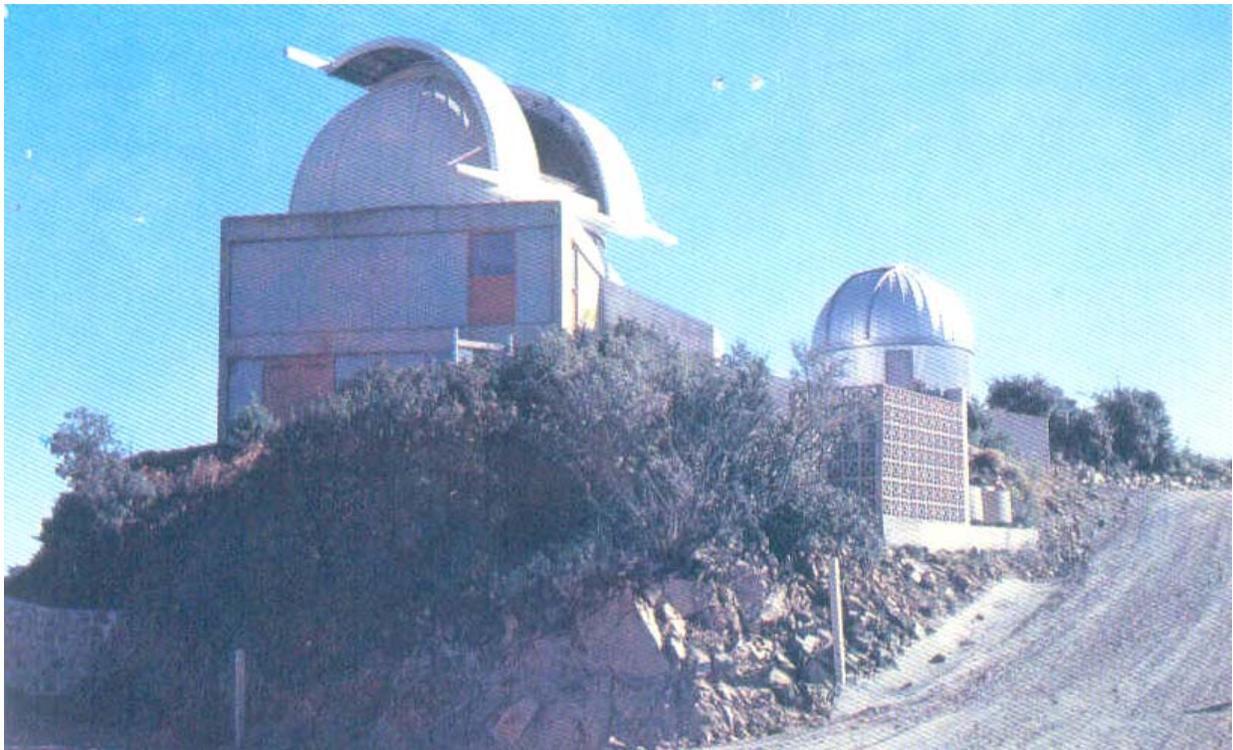


September 22, 1976

Concrete picnic tables, 2,000 lbs. each hauled to bowl for use by visitors and staff.

September 24, 1976 (Friday 4 PM)

A large crane owned by Tucson Transfer and Warehouse Co. was discovered stuck and hung-up on the road edge near the bifurcation. Eiler Harris with a bulldozer pulled it up on to the road. The crane continued uphill Monday to the summit unassisted.



1.5 METER TILLINGHAST TELESCOPE WITH 60CM DOME IN BACKGROUND

POST CARD PHOTO BY TOM BUTLER

October 1, 1976

Nat Carlton assumed duties of Resident Director of Mt. Hopkins Observatory. He relieved Trevor Weeks after serving nearly 10 years as Director.

The single bed in one room was replaced with a double bed in the Wickiup. At about the same time we tore out a wall downstairs, installed a larger shower, and replaced the wall as requested.

October 2, 1976

Open House for the General Public. The weather was cool, cloudy and windy. A total of 101 cars and an estimated 275 people drove to the ridge. Road traffic was controlled by staff members. Only uphill traffic was allowed before noon. Only downhill traffic was allowed after 1 PM. Shuttles and a 24 passenger bus were used to transport people around the ridge. The road to the summit was wet muddy and dangerous. No tours were conducted at the MMT. The MMT lectures were held in the ridge support building by Dr. Nat Carlton

No major problems occurred with the visitors. Restroom usage was a minor problem in all buildings. Despite the poor weather the day was considered very successful.



The Mt. Hopkins camera-laser crew (plus two Cambridge visitors) pose in Amado after receiving awards for participation in the LAGEOS program; from left, Joe Delgado, John Gregory, Chad Poland, Jake Wohn, Don Patterson, Jim Peters, Al Almazan, and Station Manager Steve Criswell.

Photo from SAO CENTERLINE -December 1976



RIDGE WATER TANKS INSTALLATION BY SUPPORT GROUP
October 10, 1976

Started screening and hauling sand for use on the winter roads and for the power distribution system extension scheduled for next March. Dump trucks called "Smokey", "Son of Smokey", "Papa Bear", "El Rapido" and "Jimmy" or "GMC" were used daily.

October 25,1976

Dug trench from the Gamma Ray Building area to Nat Carlton's new small telescope site south of the 24" dome. A large concrete pier and floor was poured.



NAT'S SHACK

The roof on this small building slid down and behind the building. The top of the building sides were hinged and opened outwards. Upon doing both operations the telescope could observe the sky.

November 22,1976

Removed the guy wires and allowed the 100 foot weather testing instrument tower on Knoll #2 to fall. The remains were removed and the tower was placed on the surplus property list.

December 8,1976

Set survey monument foundations on summit. Started removing Site #2 "A" frame seeing test tower. The culvert pipe pier is still standing on site.

December 20,1976

The Wickiup floor flooded with about one inch of water. The

entire mountain support crew spent the day cleaning the floor and carpet. The water pressure was too high for the building's system.



A large generator trailer enroute to Knoll #4 on a tight turn. The bulldozer behind the trailer was used to push when necessary and to lift the read end of the trailer around tight turns.

At this time more than 100 cubic yards of sand was hauled to the mountain by the support dump trucks for the Power Distribution

System. Another 100 cubic yards will be required to complete the project.

1977

ORY MT. HOPKINS OBSERVATORY

PERSONNEL AT MT. HOPKINS

Dr. N. Carleton (Resident Director)

Field Manager

Don Hogan - Support Supervisor

MMT

J. T. Williams, Site Manager

V. Chacon

E. Hackett (neighbor's phone)

J. Hadden

E. Horine

L. Vaughn

D. West

GAMMA RAY

Dr. T. C. Weekes

STADAD

Steve Criswell, Mgr.

Al Almazan

Joe Delgado

Don Patterson

Jim Peters

Chad Poland

Steve Ward

Russ Warner

1.5m/61cm TELESCOPES

Dr. Fred Chaffee

Bastiaan van't Sant

Gary Ladd

SUPPORT

Don Hogan, Supervisor

DeWayne Kurtenbach

Myron Clark

Laurie Cota

Cleo Jensen

Antonio Jimenez

Faustino Jubera

Mike Megariz

Dorothy Merchant

Bill Omann

Cathy Sitter

~~Ken Sparks~~

Arnulfo Valdez

THE 1977 OBSERVATORY STAFF
YEAR 1977

January 11, 1977

SM&R completed a new by-pass road in Montosa Canyon. This new route is longer but not as steep as the old route. Most of it is sun-lit and safer, no ice, during the winter months.

January 24, 1977

The new Montosa road was accepted by the U.S Forest Service by Bob Feathers and Norm Curran. Sandy Evans and Lynn Harris outlined the project and problems encountered with them.

January 27, 1977

"The Great Cable Pull" was completed from the Gamma Ray building downhill to the 7,200 foot gate area. Approximately 4,500 feet of 2 inch power cable was pulled downhill by Kurt, Bas, Myron, Trevor, Sal, Don, Duane, Ed, Steve, Jake, Mike, Tino, Tony, Bill, J.T., and Arnie.

A Beer Bust followed in the Amado motor pool area.

February 11, 1977

Completed 15 concrete and rock culvert entrances along the new Montosa Canyon Road. About 220 feet of stone work 12" thick and 3 foot tall. Six more, 55 feet of wall, was finished later.

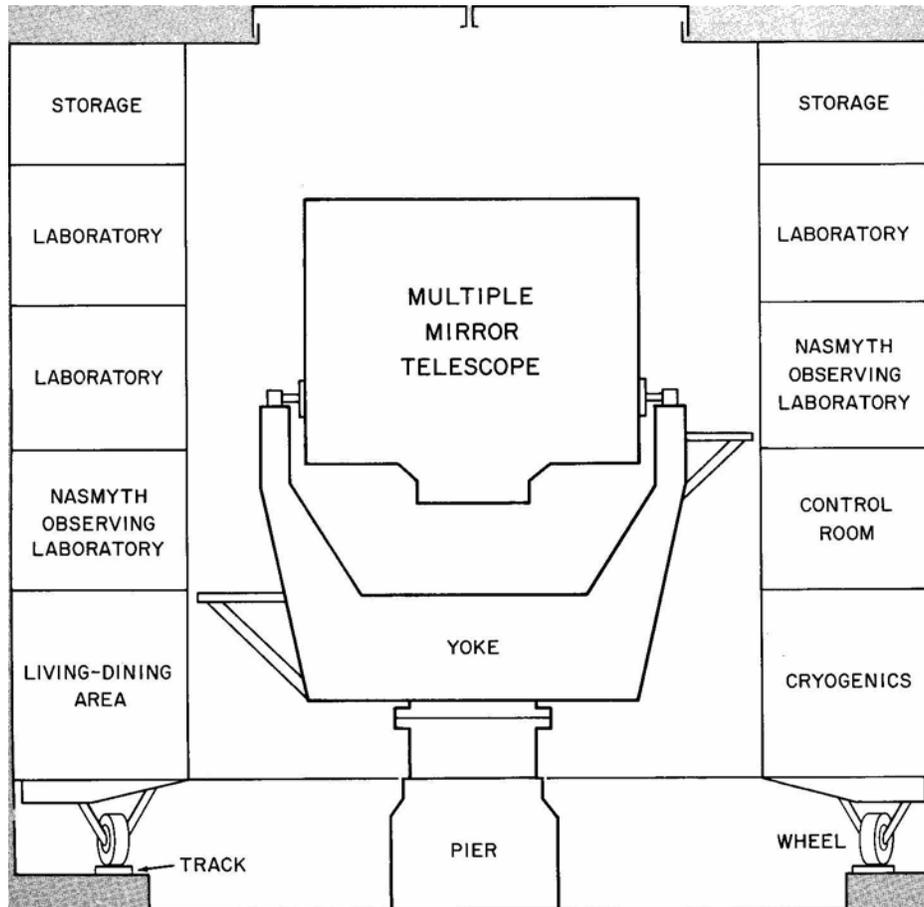


February 21, 1977

Two 14 Ton "Arms" of the MMT, a 90 ton crane, and four large loads started uphill from Amado. Support hauled water and compacted the dirt road to the summit.

March 9, 1977

This was the last day for Salvador Gayton as Observatory Field Manager.



The MMT is a four story rotating (on 4 wheels) building 63' long, 43' wide and 54' high. It has 7500 square feet of usable floor area plus 4000 square feet of non-rotating basement and service area. This building rests on a foundation of 200 cubic yards of concrete. It also has an elevator that is not shown in the drawing above. The primary purpose of the elevator is to move equipment and things not people.

A more complete description of the building follows.

UNIQUE SCOPE GETS UNUSUAL HOUSING

The Multiple Mirror Telescope (MMT), perhaps one of the world's most unusual optical instruments, will be housed in what may be one of the world's most unusual structures.

A joint project of the Smithsonian Astrophysical Observatory and the University of Arizona, the MMT is an instrument of radical design that clusters six 72-inch mirrors symmetrically around a central core, which contains a 30-inch guiding reflector, to create a light-gathering capability equivalent to a single telescope with an aperture of 175 inches.

The MMT will be used for both optical and infrared research at SAO's Mt. Hopkins Observatory in Amado, Arizona.

To house this telescope, the Smithsonian Institution has contracted with Aeronutronic Ford Corporation's Western Development Laboratories (WDL) of Palo Alto, California, to construct a rectangular, four-story structure that will co-rotate with the instrument during all operations.

The departure from the conventional design of astronomical domes is made possible by the MMT's altitude-azimuth mount, a system substantially more compact than the usual equatorial mounting of astronomical telescopes. The altitude-azimuth mount also allows using a rigid, lightweight optical support system for the six mirrors, since the direction of gravity forces will change in only one plane with telescope orientation. Although such a mount requires computer control, current technology renders this easy to do.

In normal operations, the entire MMT facility above the foundation will rotate via wheels riding on a stationary track, thus following the motion of the telescope in azimuth direction as it scans the sky. The offices, control rooms, laboratories, and public areas of the completed facility will all turn slowly with the telescope throughout the night.

This unique rotating structure--part machine and part astronomical dome--permits placement of the control and service rooms adjacent to the telescope, a feature conventional astronomical domes do not permit, because the area at the observing level is necessary to provide swing space for the telescope.

The \$1,326,590 contract with Aeronutronic Ford calls for the design and construction of a support-drive system and construction of the basic structure, which is essentially a shell 54 feet high, 44 feet wide, and 63 feet long, having a pitched roof with offset ridge.

The support-drive system is an Aeronutronic Ford patented suspension system, consisting of four 36-inch diameter wheels, supported from the structure's frame, so that they move without significant variation over any slight irregularities in the flat, machined track. This wheel-and-track system allows a heavy structure to be supported and smoothly rotated on a minimal number of wheels and has been used successfully by Aeronutronic Ford on several large steerable antennas. The system is driven by electric motors, geared directly to two of the support wheels.

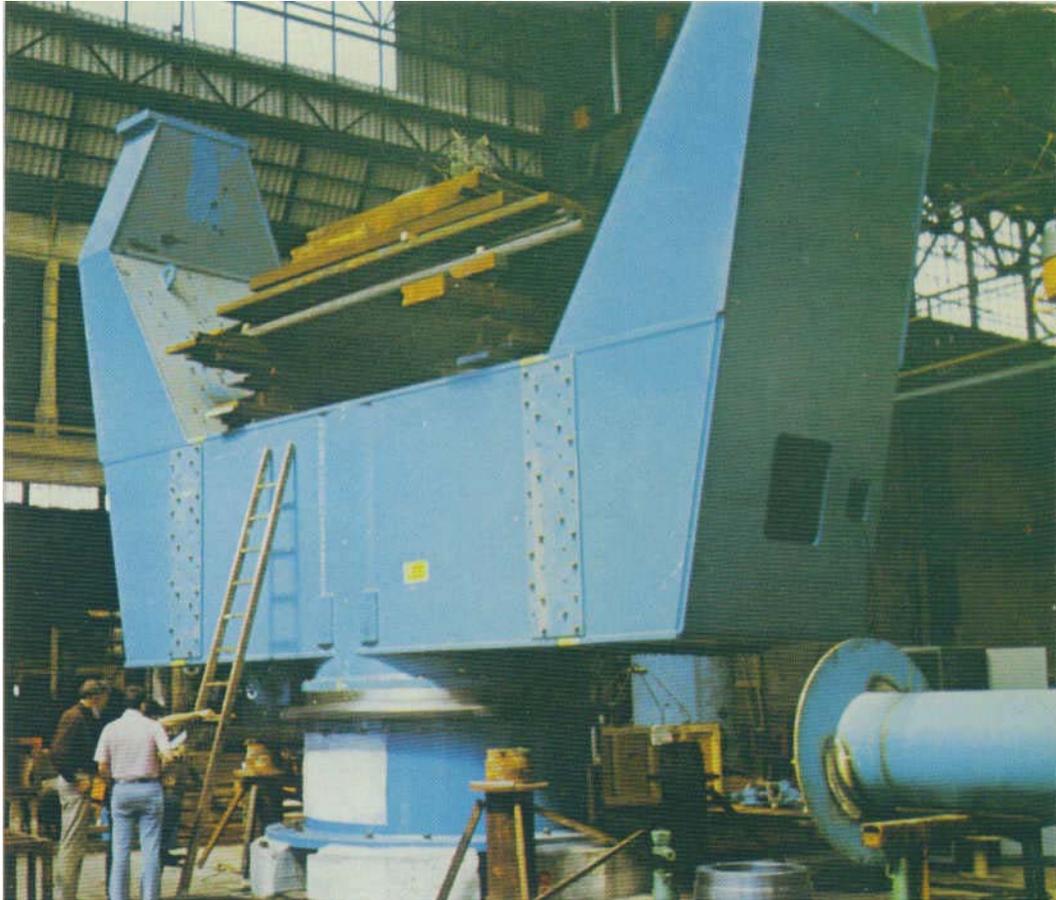
The structure's exterior walls, designed to withstand storm winds with gusts up to 140 mph, are trussed vertically. Gravity loads are carried to the four wheels by the vertical trusses. Wind loads that might tend to twist the structure are resisted by concrete floors, which act as diaphragms.

The exterior walls are all metal siding, except for those directly shielding the telescope chamber; the walls of this area are steel-faced sandwich panels with polyurethane cores. These panels provide low thermal mass and good thermal insulation for maintaining accurate temperature control within the telescope chamber.

A sliding, bi-parting steel shutter, shaped like an inverted L, opens the wall and roof of the telescope chamber to allow viewing. The shutter is also clad with sandwich panels.

All electrical and fluid conduits will enter and exit the structure through the center of the telescope pier and mount via flexible cables draped in a maypole arrangement.

The telescope facility is expected to be usable by autumn 1976, although final interior finishings will require additional time. When completed, the facility will be operated jointly by the Smithsonian and the University of Arizona, with observing time shared between the two institutions, as well as by visiting astronomers.



The 90 TON MMT YOKE UNDER CONSTRUCTION IN ITALY 1974
April 1977

Water meters were installed in all buildings. Accurate usage rates are now available. Tino Jubera hauled 2,400 gallons of water to the ridge as a daily routine procedure.

May 7, 1977

Another successful Open House brought more than 120 vehicles and 300 people to the ridge. Port-A-Potties solved the past restroom problems.

June 1977

Duane Gingerich, transportation coordinator, resigned. He was replaced with Ed Hackett who has been working as a laborer at the MMT.

June 6, 1977

Harry Martin (UA-MMT) had a breathing problem. He was given oxygen in the support building and driven to the Tucson Veterans Administration Hospital in Tucson. He recovered nicely afterwards.

The Wickiup cat, used for mice control, was taken the vet in

Green Valley with a head cut. He was treated, given rabies shot and returned to mountain three days later.

August 1977

The loading dock at the 60 inch telescope building was enlarged and improved.

September 1977

The Ridge Restroom was completed by the Support Staff. The Armco steel type building cost \$3,143.

A second building was also purchased and installed later behind the Baker Nunn/Laser Building to house air compressors.

October 1, 1977

Observatory Open House. 156 cars, 450 people, with a visitor accident in Montosa Canyon. A dentist with three passengers just drove off the road at the bottom of Montosa Canyon. Nobody was seriously injured. This incident ended "Open House Days" with people driving their own vehicles.



October 9, 1977

Sunday, after four days of heavy rain (est. 9-12 inches) the east half (60 feet) of the Amado bridge washed away. We used helicopters to transport the staff to the other side of the river.

Hurricane Heather coming up and out of Mexico was responsible for the flooding the Santa Cruz Valley. Many homes in the valley were destroyed.

The river is running fast and deep to the railroad tracks 500

yards from the west-end of the bridge.

Following photographs were received from the Tucson Citizen newspaper.



BROKEN BRIDGE IN AMADO

The Observatory Road Bridge, crossing the usually sluggish (in fact, virtually dry and non-existent!) Santa Cruz River was swept away by an unexpected and truly extraordinary flood.

This sixty-foot bridge was one lane constructed with large timbers similar to a railroad trestle bridge. It did not have handrails.



DR.FRED CHAFFEE RIDING THE TIRE ON HIGHLINE

Staff members were pulled over the river, from one side to the other, utilizing a Navy type Highline. Shuttles were available for drivers on each side. Fuel, water, and service trucks had to drive north or south to cross the river using bridges that survived. It was an all day round trip to deliver things to the Observatory.

October 11, 1977

Deer hunting season started. Counted 60 vehicles and camps along the mountain road below the gate.

October 13,1977

Thursday. The Amado crossing was reopened to traffic after borrowing six large culverts from the county and backfilling over them to build a road bed. The state's estimate of damage to southern Arizona was \$15 million.

October 18,1977

New Pueblo Construction set new larger six-foot concrete culvert pipes in river at the Amado Crossing. The next flood washed them away. The observatory was back to square one!

December 21,1977

Used the observatory's crane to hoist a 28-foot trailer to the site between 60 and 24-inch telescopes. The trailer is to be used as annex for storage and as electronic workshop between both buildings.

The Bowl trailer installed earlier in the month was tied down and made operational for MMT staff.



SUPPORT BUILDING

This building served as an office, shop, and garage. Two snow plows, in standby, are shown on the right. When a snow storm was anticipated all snow equipment was topped-off with fuel and a the fluid levels checked. In addition extension cords were run to various machines to supply power to engine oil dip-stick heaters, battery chargers, and to the cabs clip-on red bulbs. The 150 watt bulbs produced enough heat to keep the windshields from icing up. All machines, with chains on, were ready to go when needed.

Memorandum (A typical annual report excerpt)

To Dr. Trevor Weeks
From: Don Hogan - Support Supervisor
Subject: Mt. Hopkins Support Force Summary - 1977

The following is a summary of the major tasks completed by the support force in 1977. The average labor force on the mountain consists of seven people including the Support Supervisor. Two others usually worked in the Amado motor pool area. This report does not include the office staff, Mr Kurtenback or the field manager's time.

The actual manpower distribution breaks down as follows:

<u>Project or Task</u>	<u>Man Days</u>	<u>Percentage of Total</u>
Gamma Ray	41	2%
60" and 24" Telescopes	119	5%
Laser Baker Nunn Station	17	1%
MMT Project	306	13%
Routine Road Work	264	11%
Snow Work (Plowing, etc)	46	2%
Road Scar Revegetation	46	2%
Leave - Annual, Sick, Jury Duty, Administrative	269	11%
Tucson Trips (MT. Supplies)	140	6%
Open House-Setup & Cleanup	66	3%
Public Restroom (Ridge)	115	5%
Excess Property Inventory	52	2%
U.S. Forest Service Visits	24	1%
Water System, All work	26	1%
Training, 1 st aid, Fire, etc.	23	1%
Shipping and Receiving	20	1%
Routine Maintenance, Buildings Vehicles and Services, Cleaning	737	31%

* Small amounts of time, less than two hours, are included in the routine maintenance totals.

Vehicle Notes

Shuttles (4500 miles per month and increasing)	54,000 miles per year
Tucson Trips	20,000 " " "
Tucson Vehicles	5,000
Trash Trailer	2,000
Dump Truck trash hauling	1,500
Ridge/Summit Transportation	7,300
Sand and Gravel Hauling	5,600
Equipment Hauling	42,000
Telescope supplies(Ice, Gases, etc)	2,000
Routine Supplies(Water, Coke, Linen, etc)	2,000

The minimum number of miles traveled in 1977 - 142,000
This minimum does not include road tractors, miscellaneous small vehicles and odd trips.

YEAR 1978

January 1,1978 Marion Rice started at FLWO.

January 28,1978

Power restored to mountain after finding a mouse in the

mountain's electrical switch gear by J.T. Williams and Kurt.

February 8, 1978

Poured concrete pad for Bullock Garage in Amado.

February 11, 1978

Saturday. Amado river crossing washed away after two days of heavy rain. Snow drifted to 3 feet on ridge. Used "Ficketts Crossing" and then drove south along the railroad tracks to the Rex Ranch. We were unable to move or clean and repair the Amado crossing concrete culvert pipes. Started construction of foot bridge using excess steel, landing mats, and other materials.

February 12, 1978

The road is closed above the ridge. Fickett's Crossing (now called the Elephant Head Crossing) was used by the staff and large 6X6 military type trucks to get to ridge. We plowed snow all weekend. No attempt was made to plow the summit road.

Monday we plowed snow to within one mile of summit.

Tuesday, more snow, 6 inches, re-plowed the road. The trackster, snow cat, got stuck (high centered) 200 yards below bowl. Don Hogan and Ken Sparks hiked downhill, several miles, to the Wickiup on the ridge.

The snow continued Wednesday with a minimum of 3 feet of snow at the Bowl trailer. We set the snow cat free. Only two machines, the John Deere tractor and the A/C loader, remained operating for snow plowing. The Support staff was divided between working on the mountain and the Amado river crossing.

Friday it was still unsafe to drive to the summit.



SNOW CAT

February 12, 1978

Claude Hutchins first day as Observatory Field Manager.
Visited mountain with Trevor Weekes.

February 26, 1978

A 1967 Chevrolet pickup truck rolled off road near the 7,000

foot level. The driver was camping near the gate overnight.



February 27-MARCH 3,1978

More rain in valley. Snow on the mountain.

FEBRUARY 28,1978

Road between Knoll #3 and Knoll #1 closed by a huge 200 cubic yard rock and mud slide. A large crack and a road edge slip was discovered 300 feet north of the 60-inch telescope building. The road was closed until the edge could be stabilized.

March 1,1978

A Navy type "highline" was rigged and used *again* to transport people and things across the river in Amado.



"HANG ON TIGHT"- KINDA SCARY

Heavy rain during the night, the river started to rise. The Amado Crossing was closed. We started to use the Fickett Crossing (later called the Elephant Head Crossing) which is four miles north of the Amado office. Hauled the 60-inch dewar and other mountain supplies using a large, all wheel drive, 6X6 military truck. An estimated 200 cubic yards of rocks and mud slid down on the ridge road from the Knoll #3 road to the Baker Nunn Building. Many other rock slides occurred on the mountain road. The minor slides to the ridge were cleared using the observatory's front end loader.

The water continued to rise making all crossings unusable. Late in the afternoon the river was running deep and fast. The closest and only bridges available for our use were in Green Valley and Rio Rico. There are no public roads on the east side of the river that parallel the river.

A jeep trail was cleared with a front end loader that went up and over Knoll #2 for access to Knoll #1 by jeeps only.

The rain continued all night. Four wheel drive vehicles were left on the east side of the Amado Crossing for use the next day. All staff members used the high-line and rode the tire to get to and from the mountain until the crossings were repaired and usable. Myron Clark and many other people that live on the east side of the river were unable to get to work or out for groceries for several days.

March 4,1978

A foot bridge across the old bridge sections was constructed and completed using large wooden utility poles and miscellaneous other lumber by the satellite tracking staff, Santa Cruz County, and the support group.

This was not another boring commute to work.

March 5, 1978

Sunday. It started to rain in the afternoon. It snowed above the 6,000-foot level. Four to six inches accumulated on the ridge the next morning. Twice that amount was plowed off the summit road that afternoon. Nat Carlton with AURA-Kitt Peak visitors used four wheel drive to visit the summit as scheduled.

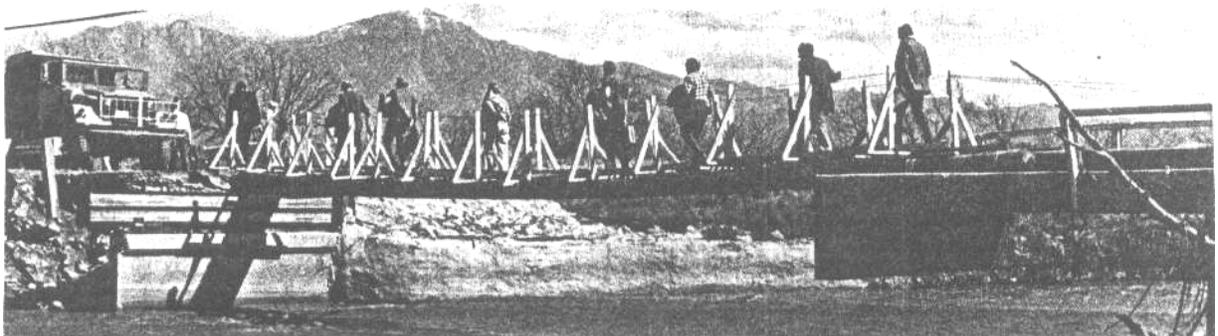
Sandy Evans and Lynn Harris inspected the massive rock and mud slide on the ridge road. The road would remain closed until a concrete retaining wall could be constructed.

March 17, 1978

We were finally able to use the Fickett river crossing with large military all wheel drive trucks. Extensive road repair work was started by the support crew. Plugged culverts were also cleared with our backhoe.



ROAD CLOSED - ROCK SLIDE ON BACKHOE - STARTED PLOWING AND SANDING



Top Photo: Duane Kurtenback tests an early landing mat version of the footbridge over the Santa Cruz.

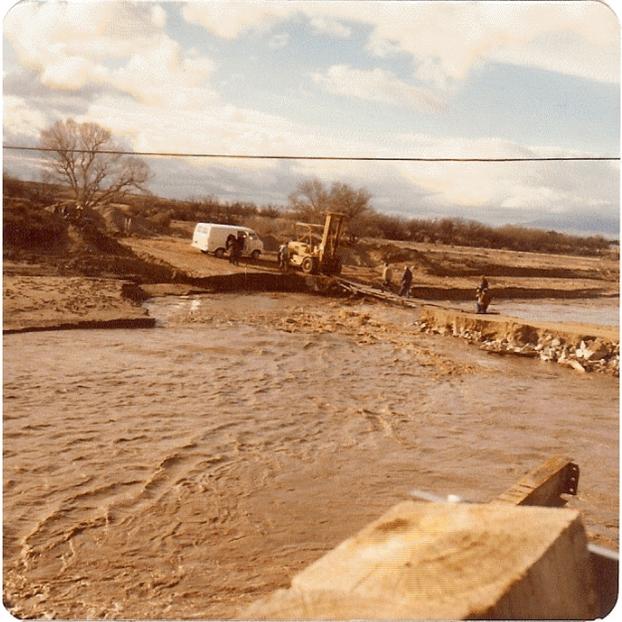
Next: Hand rails and walkway are carried into place on the temporary foot bridge

A sure-footed MHO staff member tests the first stage of the new bridge.

Bottom: AURA members test out the completed bridge on tour of MMT.

April 4, 1978

Lynn Harris drove a large frontend loader to the ridge and started to clear the 200 cubic yard rock slide.



MORE AMADO CROSSING PHOTOGRAPHS

Buddy Williams, a local carpenter, was hired by C. Hutchins to work on the interior of the Amado Office. No money was available to place him on the observatory support staff

May 13, 1978

The river dried up. This was the first day of 100-degree heat in the valley.

Santa Cruz County continued to work on a design for a bridge at the Amado Crossing. When construction will begin is unknown.

May 21, 1978

Stewart Observatory and Mt Hopkins Staffs had a picnic in the bowl about 80-100 people and kids attended. Lots of fun and great food was available.

The following day a hang glider was discovered on Knoll #3. Claude talked him out of jumping off the site or from the summit road.

9PM. A woman about 25-30 years of age hiked to the saddle near the Mt Bell site from Maderia Canyon. She had a pistol and planned to commit suicide in the forest. She changed her mind and hiked to the Wickiup. She met an idle astronomer, it was cloudy, and spent the night with him. She had been listed as a "Missing Person" with the local police. They learned that she was on the mountain We were contacted, woke her up, and drove her to Amado.

June 1978

Ken Sparks resigned. He set posts for a yard loafing shed before leaving. The shed will be used for tire storage.

July 2, 1978

Ken Sparks was replaced with Daniel West, in the Amado Motor Pool. Dan worked at the MMT for about a year before joining the Support Group.



DAN WEST ON MMT ROOF

Arnie Valdez was transferred from mountain support group to the motor pool after working in Amado for the past year.

The Fred Lawrence Whipple Observatory

The Fred Lawrence Whipple Observatory, located on Mt. Hopkins, 35 miles south of Tucson, Arizona, is the largest field installation of the Smithsonian Astrophysical Observatory outside Cambridge, Mass. Since October 1968, the Observatory has been used as the site for experiments requiring extremely dark skies, dry climate and good "optical seeing."

The observatory, formerly known simply as "The Mt. Hopkins Observatory," was renamed in late 1981 in honor of Fred L. Whipple (1906-), noted planetary expert, space science pioneer, and director emeritus of the Smithsonian Astrophysical Observatory, under whose leadership the Arizona facility was established.

Mt. Hopkins is the second highest peak in the Santa Rita Range of the Coronado National Forest and is one of three major mountaintops in southern Arizona now developed as astronomical observatories. Both the Kitt Peak National Observatory to the west and the Catalina Mountains installations of the University of Arizona to the north are within lines-of-sight from Mt. Hopkins.

Research activities at the Whipple Observatory's 4744-acre Mt. Hopkins site include spectroscopic observations of extragalactic, stellar, and planetary bodies, gamma-ray and cosmic-ray astronomy, solar energy research, and environmental studies. Most instruments are located on a half-mile-long ridge at the 7600-foot level and include 1.5-m and 61-cm reflecting telescopes, a 10-m optical array, a Baker-Nunn satellite tracking camera (now inactive), plus other telescopes and meteorological instruments. In addition, the 8550-foot summit of Mt. Hopkins is the site for a large multiple mirror telescope (MMT) jointly built and operated by the Smithsonian and the University of Arizona.

Multiple Mirror Telescope. The Multiple Mirror Telescope is an observing instrument of radical design, combining six individual 1.8-m reflecting telescopes in an array to produce the light-gathering capacity of a single 4.5-m telescope, making it the world's third largest. This instrument, intended for research in both infrared and optical astronomy, promises to be the prototype for still larger telescopes utilizing this revolutionary concept.

The MMT cost a fraction of the estimated expense of producing a conventional single-mirror reflector of equivalent size. The focal length is basically that of a 1.8-m telescope, thereby making the MMT extremely compact. The instrument's unconventional altitude-azimuth mounting (it can move vertically in altitude and horizontally in azimuth) both contributes to its compactness and permits the use of a rigid, light-weight, optical support system for the six mirrors. The alt-azimuth mounting also allows a departure from the traditional style of astronomical domes.

The MMT is housed in what may be one of the world's most unusual structures: a rectangular, four-story building that co-rotates with the instrument during all operations. The offices, control rooms, laboratories, and public areas of the facility all turn slowly with the telescope during normal observations.

The telescope began test operations in 1977, and was formally dedicated on May 9, 1979. It is used by Smithsonian, University of Arizona, and guest astronomers.



1.5-m and 61-cm telescopes. Smithsonian observational astronomers utilize a variety of instruments in addition to the MMT to carry out their investigations of galaxies, quasars, stars, interstellar gas, and solar system objects. The 1.5-m telescope with its spherical mirror is designed primarily for spectroscopy of galaxies, stars, and planets and is equipped with an extremely sensitive digital detector for use on its two spectrographs. The 61-cm telescope, which is owned by the State University of New York and operated in cooperation with the Smithsonian, is now fitted with a CCD (charge-coupled device) camera. This camera, also used at the MMT, records more than half the light that falls on it, as compared with the few percent recorded by traditional photochemical methods.

The CCD camera has been used on both the MMT and the 61-cm telescope to survey quasars, clusters of galaxies, and both active and normal galaxies. In addition, many quasars have been surveyed with the MMT to search for multiple images produced by the gravitational lens effect. (Multiple images may result when a large mass — such as a galaxy or even a cluster of galaxies — on the line-of-sight between us and a distant quasar acts as a lens to bend and split the light from the source.)

The 1.5-m telescope and its galaxy spectrograph known as the "z-machine" were used to complete a survey of redshifts of galaxies in a large region of the Northern Hemisphere's sky. (The redshift of a galaxy, usually denoted by the letter z , gives its distance from our galaxy.) The survey substantially improved our understanding of the actual distribution of galaxies in space and of the motions of galaxies with respect to each other. These measurements not only allow better determinations of the density of matter in space and thus the eventual fate of the universe but also provide

the data necessary to test theories of the formation of galaxies, clusters of galaxies, and other structures in the universe.

High-energy astrophysics. Smithsonian scientists are using a 10-m optical reflector at the Whipple Observatory to study cosmic radiation. The source of this flux of very high-energy particles has been a mystery since its discovery at the turn of the century. Work with the 10-m reflector centers on locating sources of high-energy gamma rays. Since this radiation cannot penetrate the atmosphere, detection must be by an indirect method. When a primary particle strikes the top of the atmosphere, a cascade of secondary particles is generated, which produces a flash of visible light as it traverses the atmosphere (Cherenkov radiation). These bursts of light are extremely short — a few billionths of a second — and too faint to be seen by the naked eye. The feeble radiation can be observed, however, by specially designed optical detectors. Whipple Observatory's 10-m reflector acts as a "light bucket" composed of 248 individually adjustable spherical glass mirrors. By mapping the arrival directions of the light bursts, the Smithsonian team has found one bright source to be associated with the Crab Nebula. This object is the remains of a supernova explosion, seen on Earth in AD 1054. Visible at its center is a pulsar — the rapidly spinning core of the original star, collapsed now to a neutron star.

The gamma-ray project is part of a larger Smithsonian high-energy astrophysics program using rocket- and satellite-borne detectors to observe cosmic x-ray sources. Several sources have been discovered that appear to be associated with extremely dense, collapsed stars orbiting (or being orbited by) normal stars — objects tentatively identified as "black holes."

June 3, 1978

An Observatory staff picnic was held, 3 -9:30 PM, at Anamax Park in Sahuarita. Another fine time was had by all.

June 1978

A pocket door was installed as an entrance to the 60-inch dome.

A mountain lion was sighted on the summit road.

July 27, 1978

Ref: Myron Clark's logbook notes. All hell broke loose last night. There was one hell of a thunderstorm on the mountain last night. We had rock slides that almost made the road impassable. All the culverts plugged up making the water run over the road causing extensive damage. There were rocks as big as a jeep at the Montosa arroyo. Myron Clark, Mike Megariz, Tony Jiminez, Ed Hackett and Tino Jubera started road repairs with any equipment available. Claude Hutchins hired SM&R, Roger Harris, to clear the road with a large Huff front end loader. He did in a day what would have taken us a week to do. An estimated 8-10 inches of rain fell during this storm.

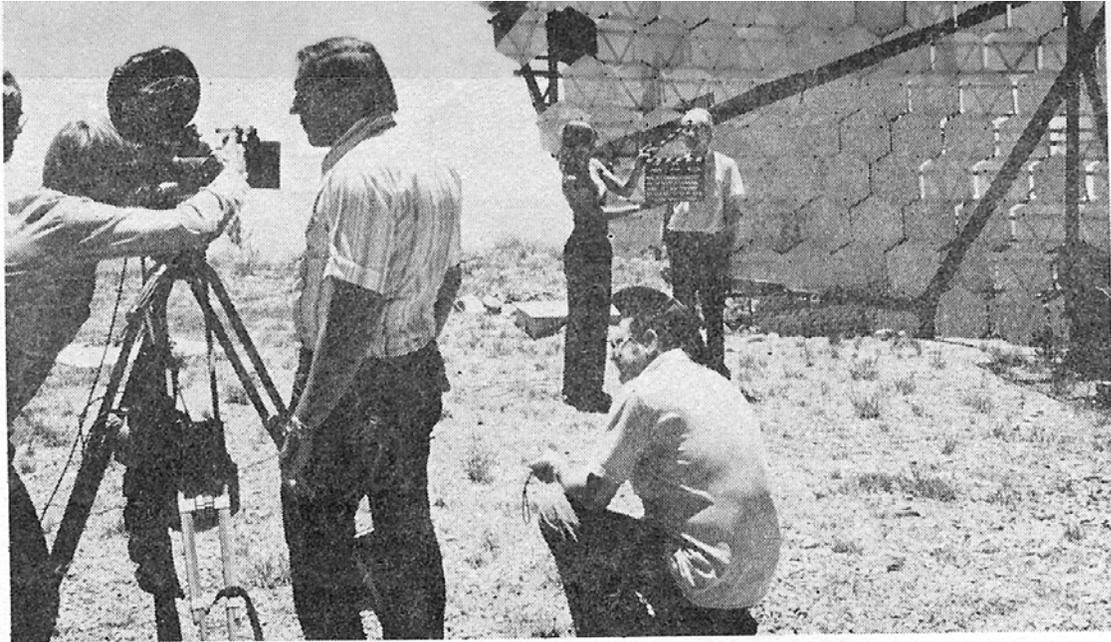
August 2, 1978

It rained like hell again last night washing out the Amado Crossing. We now have to use Fickett's Crossing which is four miles north of the office.

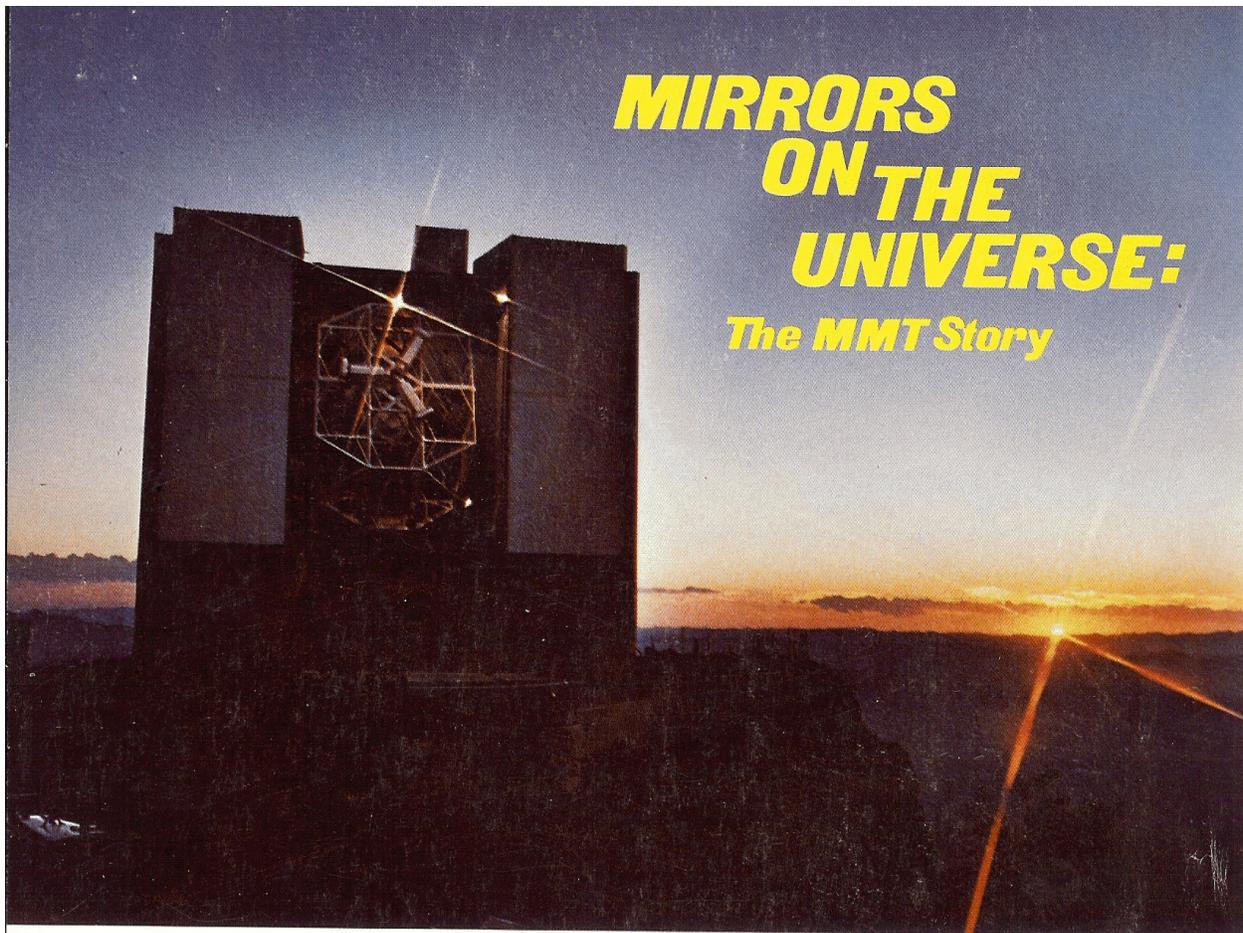
Don Hogan, while trout fishing in the White Mountains, met a member of the SM&R crew that stated that the road had been washed out in several places. I had not caught my limit yet so I continued fly fishing. Not much I could do!

August 3, 1978

Road repairs continued in preparation for large loads of concrete slabs for a new *heated* road on the summit. It was determined that more and large culverts needed to be installed along the new Montosa road.



MMT MOVIE — With funding from the Smithsonian Institution's Office of Telecommunications, production expertise from the University of Arizona's Film Bureau, and coordination from SAO's Jim Cornell, the MMT story is now unfolding before the cameras. Above, Fred Whipple, one of the MMT's first mentors, prepares for a segment shot in front of the 10-meter dish, an early MMT of sorts. The 30-minute documentary is scheduled for completion next May in time for the telescope's formal dedication. (Photo by Vicki Chacon)



MIRRORS ON THE UNIVERSE:

The MMT Story

1979 Color 16mm
28½ minutes

Produced by Ted Offret
Directed by Alex Hankocyc
Written by James Cornell
Edited by Linda Jean August

A co-production of:
Office of Telecommunications
SMITHSONIAN INSTITUTION
and the
Radio-TV-Film Bureau
UNIVERSITY OF ARIZONA

For purchase or rental information contact:
Radio-TV-Film Bureau
University of Arizona
Tucson, Arizona 85721
(602) 626-1434

In the four centuries since Galileo first turned his rough, handmade optical telescope towards the heavens, astronomers have sought ways to see into the far reaches of the universe.

Today, high atop Mt. Hopkins in southern Arizona, the Multiple Mirror Telescope, or the MMT, represents both the most modern development in telescope creation and the first major design change in more than 100 years.

"Mirrors on the Universe; The MMT Story," a joint production of the University of Arizona and the Smithsonian Institution, documents the construction of this most extraordinary telescope. Using animation, historical footage, and film shot on location in Arizona, Italy, California, and elsewhere, the movie describes the monumental task of building this 500-ton facility on the very peak of a rugged 8,500-foot-high mountain. The 20th century scientific and engineering innovations incorporated in the MMT make this telescope one of the most advanced astronomical instruments in the world.

The film is ideally suited for high school and college courses in astronomy, physics, engineering and general science. Groups from planetariums, science museums, and amateur astronomy clubs as well as general audiences involved in the progress of American research programs, will also be interested in viewing this film.

Q & A

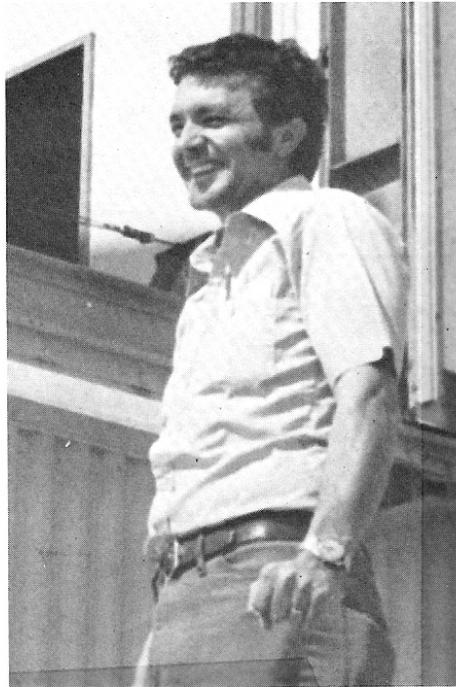
J.T. Williams spends a lot of his time on an isolated mountaintop in Arizona . . . but he's not alone. Williams, as on-site project manager for the innovative Multiple Mirror Telescope, is aided by 12 other staff members, nine of them on-site, from the Smithsonian Astrophysical Observatory and the University of Arizona. During his 19 years with the Smithsonian, Williams has worked at field locations around the world, spending the last seven years at the Mt. Hopkins facility. He was interviewed by *Torch* staff writer Kathryn Lindeman.

Q. What makes the MMT a unique telescope?

A. The MMT is the first astronomical telescope to use a multiple mirror system. Its six 72-inch mirrors are equivalent to a 176-inch mirror in a conventional one-mirror telescope. It is difficult and costly to cast, handle and grind a single mirror this size which has a diameter equivalent to 15 feet. So, in a joint effort, the University of Arizona and SAO designed the MMT to meet their common goals: both needed a large telescope and neither had much money. In size, MMT is third largest in the world, following a 236-inch Soviet telescope and the 200-inch telescope on Mt. Palomar in California.

Q. At what stage is the MMT project now?

A. The six mirrors are installed and the telescope is assembled, but it's housed in a shell without all the partitions or trim—that's like occupying a house before it's finished. Now we are in the alignment and testing phase which we expect to complete in a year. It took two years to test and align the larger Palomar telescope.



Vicky Chacon

J. T. Williams

Q. How did you become interested in working on the MMT?

A. My interest since childhood has been in the area of electronics and optics. I never took a degree in either, but I've learned by experience and lots of study. I was very lucky during my tour in the Navy to be trained in electronics, and most of my experience at SI has been in electronics and optics, taking and analyzing data in the field and sending it to Cambridge.

I was managing the Mt. Hopkins Observatory when we began planning the MMT, and when construction started, I gave up that position and became MMT on-site manager. I have been intimately involved in the design, planning and construction of the telescope. I'm not a construction engineer, but this is a means to an end: an operational MMT taking good and valuable data. My involvement with the people on this project is very important to me. People really are what makes it happen.

The truck hauling the first load of concrete slabs for the heated summit road broke down above Montosa Canyon. The road was blocked. Six vehicles were delayed on the on the road above the truck. Shuttles were sent from Amado to bring people downhill to the Amado Office.

Mt. Hopkins Open

BRING YOUR OWN CLUBS

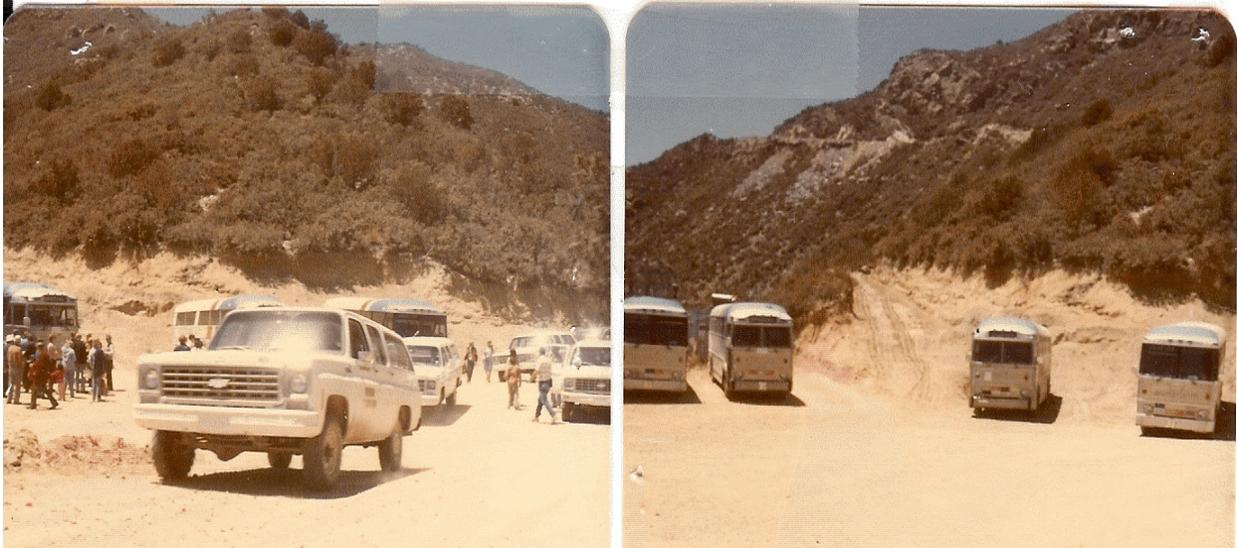
The Smithsonian Observatory on Mt. Hopkins will be open to the public on Saturday, October 7, for the Annual Fall Open Day. PRE-REGISTRATION IS REQUIRED.

Buses will provide transportation from the Amado Field Office to the Observatory on a space-available basis, so prior registration is a must. The buses will leave PROMPTLY at 8am and 11 am. A very limited number of private vehicles, primarily for the handicapped, will be permitted to follow the buses at 8am only. Due to road construction, a 10-15 minute hike will probably be necessary to reach the Multiple Mirror Telescope site at the summit.

The present facilities at the 7600-foot level include a 10-meter reflector for gamma-ray astronomy, 1.5-meter and 60-centimeter optical telescopes, and a laser-photographic satellite tracking complex. At the 8550-foot summit, the unique Multiple Mirror Telescope, a joint project of the Smithsonian Astrophysical Observatory and the University of Arizona, is being constructed.

Visitors are encouraged to bring lunch. Mt. Hopkins will also provide some refreshments. Warm clothes and sturdy shoes are recommended as high-mountain weather can be quite changeable this time of year.

For information and registration please call the Amado Field Office at (602) 398-2432 or (602) 792-6743. Mt. Hopkins Observatory appreciates the public's interest and support and wishes an enjoyable visit to all.



The bus drivers did not like driving our mountain road.



Ed Horine manned the control console of the MMT for the October Open Day at Mt. Hopkins. (Photo by Jim Cornell)



Cathy Sitter of the Mt. Hopkins staff doles out coffee and information to one of the 400 Mt. Hopkins visitors. (Photo by Jim Cornell)



SUPERIOR PERFORMANCE—Bastiaan van't Sant (left) received a Smithsonian Sustained Superior Performance Award last summer for his continued contributions to research programs on the 60-inch telescope at Mt. Hopkins and particularly for his efforts to correct—and to cope with—computer problems plaguing the CCD camera and Red Shift experiments the previous spring. Fred Chaffee presented the award in a short ceremony at Amado. (Photo by Jim Cornell)

Amado bridge replacement is scheduled

G.V. News
11/8/78

Diversified Design Corp. of Tucson was the successful bidder for construction of a bridge over the Santa Cruz River at Amado to replace the bridge washed out in the October, 1977, flood.

The company's bid of \$182,770 was the lowest among five bidders.

Flood damage to the bridge was estimated by a federal damage survey report at \$117,000, but Santa Cruz County officials had expected construction costs to surpass that amount.

The county board of supervisors approved specifications last month for a two-lane bridge 130 feet long with new approaches and improved supports.

Construction of the bridge will be paid for by federal disaster funds.

Contracts are expected to be signed within two weeks and construction to begin 10 to 15 days after that. Construction should take about 120 days, a county spokesperson said.

WORKING THE BORDER PATROL

J. T. Williams, Site Manager for the MMT, was on a busman's holiday, hiking over the trails lacing the Santa Rita Range of Southern Arizona, when he stumbled upon a sizable cache of an illegal substance.

Six bags of cannabis, neatly bundled together with a CB transmitter, lay half-hidden beneath the scrubby brush on an upper slope of Mt. Hopkins. The grass apparently was air-dropped into the wilds, with the homing beacon intended to allow retrieval later by some enterprising local dealer.

Unfortunately for Tucson-area smokers, the transmitter smashed on impact and the marijuana went unbound by its intended customer. Good citizen Williams called the Border Patrol and the contraband was duly confiscated and presumably destroyed.

October 28, 1978

Dan Brocious started at FLWO.



This accident occurred with Dan's truck about a year after joining the staff.



DAN BROCIUS'S PICKUP ACCIDENT

Not all accidents occurred on the mountain road.

Arizona

Nov. 29, 1978

Train narrowly misses killing two

An Amado man and his 6-year-old daughter narrowly escaped death yesterday morning when the rear of their pickup truck was struck by a freight train at a dirt crossing on Canoa Road about a mile west of Interstate 19.

Denny Hitchner, 27, and his daughter, Joann Moreno, were taken to St. Mary's Hospital after their truck was pushed 67 yards by the train, then slid down a six-foot embankment at the unguarded crossing.

Hitchner was reported in satisfactory condition last night with fractured ribs and possibly a punctured lung. His daughter, treated for minor cuts and bruises, was released.

Hitchner told Sheriff's Deputy George Collaco that he did not see the train until

just before impact. He tried to accelerate through the crossing, said Collaco, but could not avoid the Southern Pacific locomotive traveling north at about 20 miles per hour.

"If he had seen the train a second later, they would be dead," said Collaco, a traffic investigator who works out of the Santa Rita district.

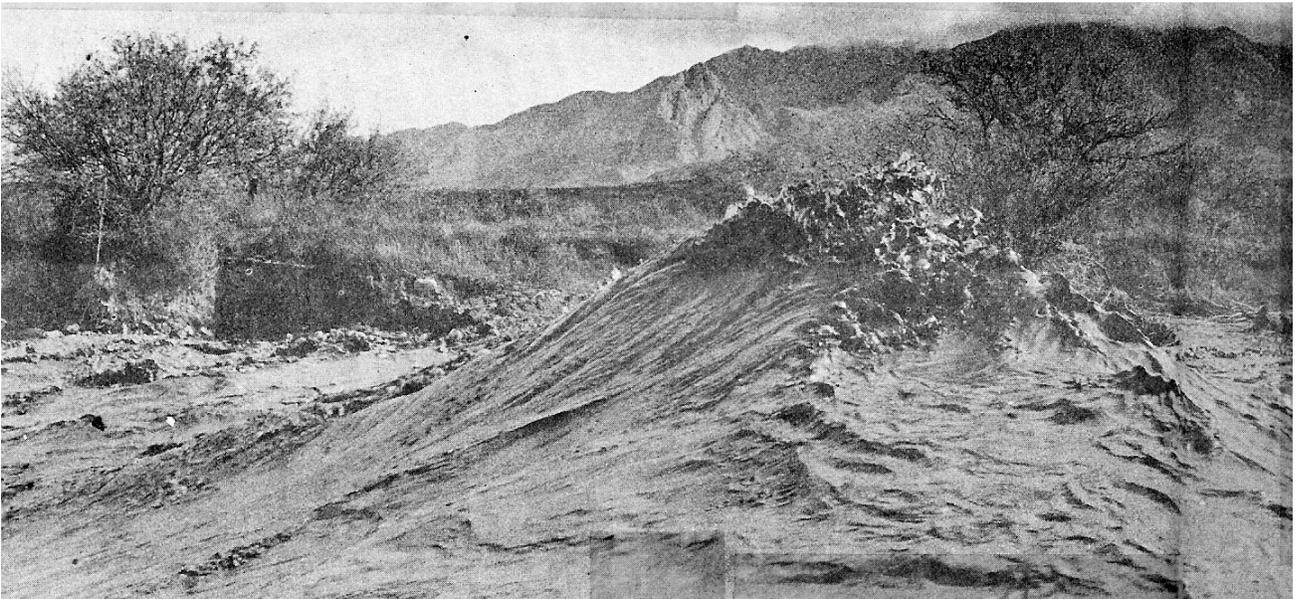
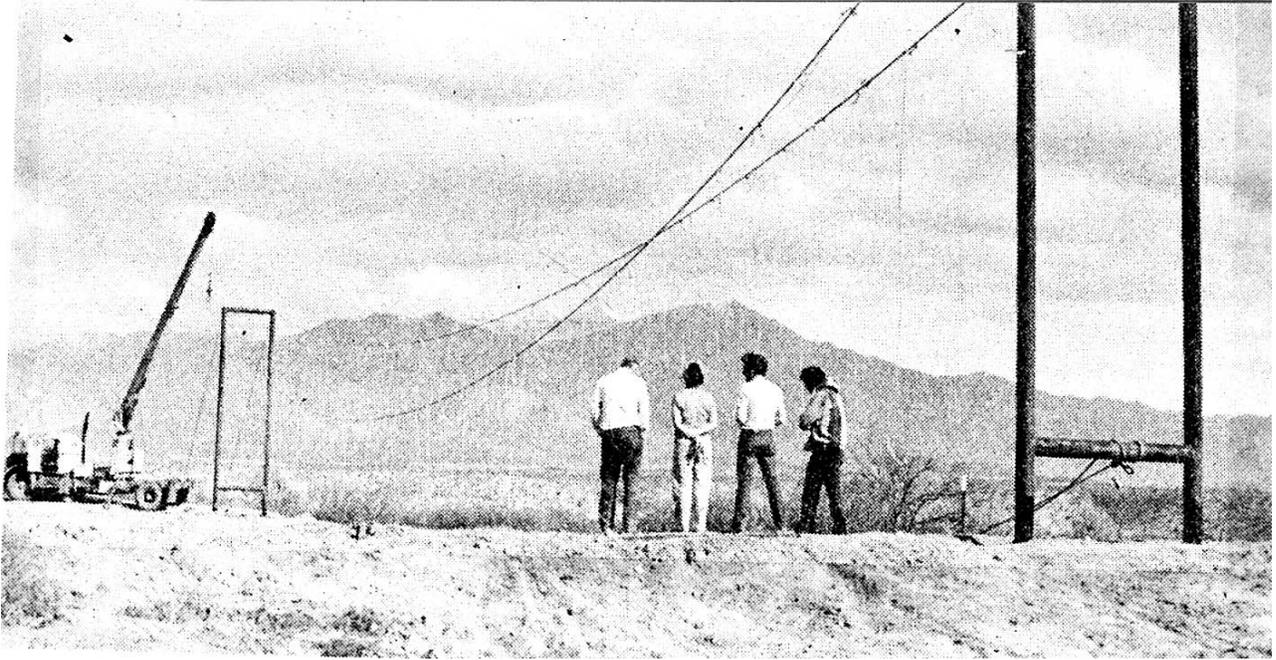
Hitchner told the deputy he had slowed to under 10 miles per hour and had looked north down the tracks. The train came from the south.

The crossing is essentially blind for drivers, the deputy said, and approaching trains emerge from a long curve concealed by bushes.

YEAR 1979

January 5, 1979

Steve Criswell was designated the observatory Support Manager. Claude Hutchins left MHO after 11 months on the job. Russell Warner assumed Steve's duties at the Satellite Tracking Station.



GREAT WAVES IN THE MIGHTY SANTA CRUZ RIVER



February 28, 1979

The "Amado Golden Gate" Walking Bridge was completed and used today for the first time. Bridge spans 200 feet over river. River depth under bridge 2 feet 9 inches. Bridge designed by John Harris and built by Sierra Mining and Ranching. Three weeks were required at a cost of \$9,000. All materials provided and paid for by Smithsonian.



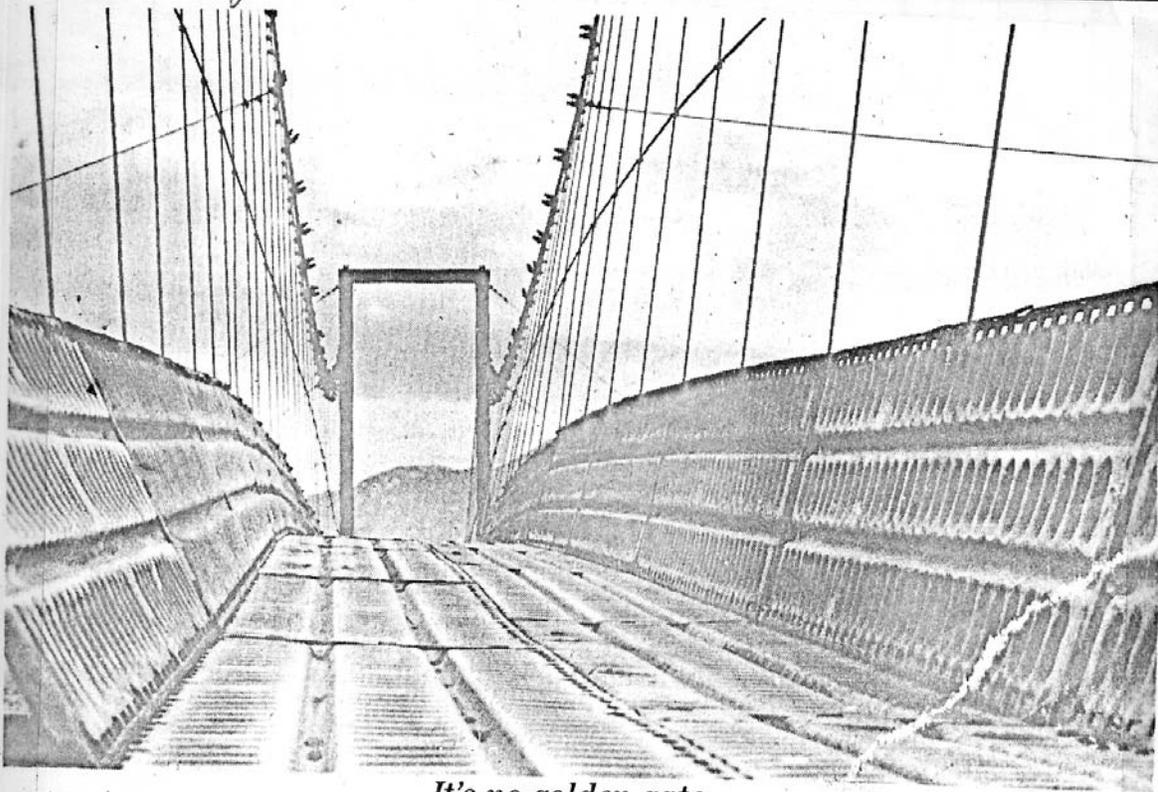
AMADO GOLDEN GATE FOOT BRIDGE PHOTOS

Bridge Photos from John Harris(SM&R).



ANOTHER VEHICLE STUCK AT FICKETT'S CROSSING

Green Valley News - 3/8/79



It's no golden gate

Pedestrians will now be able to cross the Santa Cruz River at Amado since the completion of this foot bridge earlier this week. The bridge was built by the Mt. Hopkins Observatory staff for pedestrian use only.

Santa Cruz County will accept all liability for crossing until a two-lane bridge now under construction is completed. (NEWS staff photo by Chris Kemberling)

Unfortunately this foot bridge was washed away in the great flood of October 1983. The entire structure is now buried upstream in the river sand.

Believe it or not we had to weld a steel railing on each end of this bridge to prevent people from driving motorcycles across. Winter summary of events:

The support group plowed lots of snow. Snow storms occurred almost on a weekly basis. The road was closed twice to the summit until the snow and rocks could be cleared. Four-wheel drive vehicles got stuck or slipped into the ditch frequently.

December 19th. The crossings and the road were closed. Nat Carlton hiked in the snow to the summit from Madera Canyon.

December 31st we plowed snow all day and into the evening. We got home about 11PM. Dan West missed his New Year's Party...he went to bed instead.

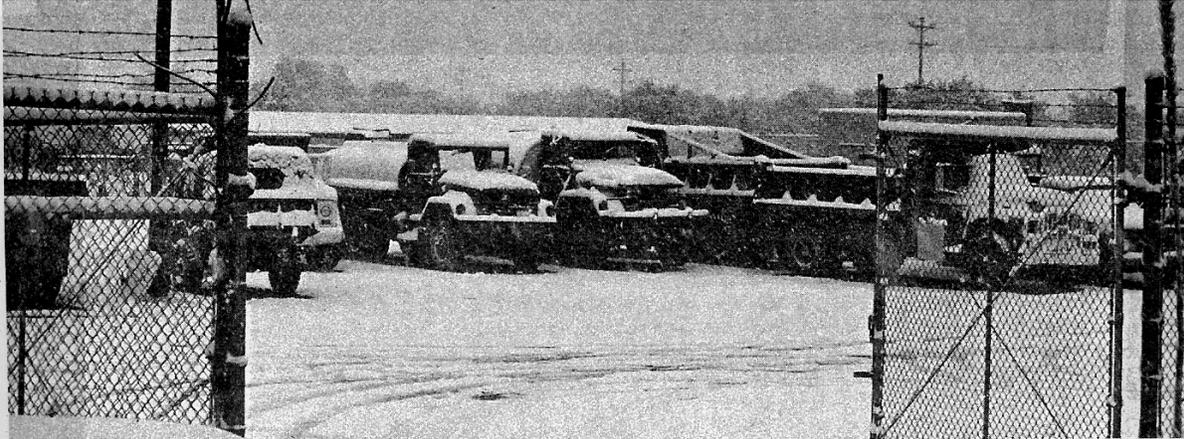
These storms also created problems with the river crossing in the valley. Many vehicles were stuck at both crossing. One third of the summit concrete road heaters did not work properly. Waterlines froze in several building when on one occasion the

temperature dropped to 6 degrees (F) on the ridge.

Generators were used when the power line failed.

January 29, 1979

Snow in the Valley.



SNOW COUNTRY-Could this be Chicago? Or Boston at the height of the Great Blizzard? No, guess again. This is sunny Arizona in the winter of 78-79. The Mt. Hopkins area, like the rest of the state, was plagued by northern style weather from November to February, with record rains and snow flooding the Santa Cruz River and, as above, often covering the motor pool at Amado. Obviously, the skies were less than perfect for astronomical observing, and the raging waters of the Santa Cruz made getting to work difficult, dangerous, and sometimes impossible. (Photo by Dan Brocius)

The summit has been completed, tested, and has been melting snow. Snow plowing should no longer be required on this final and dangerous stretch of road.

A 120-day contract has been let by Santa Cruz County to build a permanent vehicle bridge in Amado. Work has not started due to high water in the river. It's not guaranteed to be completed for the MMT dedication

The Amado Crossing has not been used for a month due to high water.

Reflector posts were installed along the ridge and summit roads.

January 23, 1979

MEMORANDUM

Steve Criswell SC

Times and Distances via various river crossings

R. McCrosky

-1) Via Continental

<u>Point</u>	<u>Distance from Amado</u>	<u>Time from Amado</u>
Amado	0.0 miles	0.0 minutes
Canoa Rd.	3.5 "	3.5 "
Continental Rd.	12 "	12.0 "
Fickett's (via Continental)	24 "	60.0 "
Amado Rd. (via Continental)	28 "	74.0 "

-2) Via Fickett

<u>Point</u>	<u>Distance from Amado</u>	<u>Time from Amado</u>
Amado	0 miles	0.0 minutes
Fickett's	4 "	5 "
Amado Rd.	7 "	15 "

-3) Via Rio Rico

<u>Point</u>	<u>Distance from Amado</u>	<u>Time from Amado</u>
Amado	0 miles	0 miutes
Amado Rd.	Approx. 60	Approx.120 "

SJC/dm

cc: MHO Distribution
P. Sozanski
N. Carleton

F. Chaffee
J.T. Williams
R. Warner

May 9, 1979

MMT Telescope was Dedicated. It rained and snowed on the mountain. Never the less the planned show will go on...slowly and safely! The three helicopters could not fly in the clouds so they discharged the VIP's at the Amado Dog Track. They were then taken to the mountain via shuttles ahead of the Greyhound Buses.



MULTIPLE MIRROR TELESCOPE (POST CARD PHOTO)

The Multiple Mirror Telescope (MMT) on the 8550-foot summit of Mt. Hopkins. The combination apertures of the six mirrors are equivalent to a 4.5 -meter (176-inch) single mirror reflector, thus making the MMT the world's third largest optical telescope. The first of its type, the MMT is a joint project of the Smithsonian Institution and the University of Arizona.

The MMT building and telescope rotates, more than 360 degrees, similar to a large Navy gun mount.

MMT DEDICATION WEEK SCHEDULE OF EVENTS

The Smithsonian Institution and the University of Arizona will officially dedicate the Multiple Mirror Telescope on May 9, in Tucson, but a variety of events is scheduled for the entire week and thereafter.

The main event, of course, is the banquet and ceremony featuring an address by Senator Barry Goldwater. Other activities include a special one-day scientific symposium, three public lectures, and the premiere of a movie documenting the MMT's conception and construction. In addition, bus tours to the telescope site at Mt. Hopkins will be conducted for guests and members of the public. A Press Preview day is scheduled for May 8.

Tuesday, May 1

Preview of "Mirrors on the Universe: The MMT Story," a co-production of the Smithsonian Institution and University of Arizona for Mt. Hopkins and MMT staff members only; 3:30 pm, Amado, Arizona.

Sunday, May 6

Preview of "Mirrors on the Universe" for the Smithsonian Institution Board of Regents; Washington, D.C.

Monday, May 7

Public Lecture: "Some Remarks Preliminary to the Dedication of the MMT" by Peter Strittmatter, Director of the Steward Observatory; 7:30 pm, Steward Classroom, Tucson.

Tuesday, May 8

Press preview of film and bus tour of the MMT facility, followed by a reception; 8 am to 6 pm, Amado and Tucson.

Public Lecture: "Stonehenge and Its Cousins: Megalithic Observatories?" by Owen Gingerich, CFA; 7:30 pm, Flandrau Planetarium, Tucson.

Wednesday, May 9

Symposium: "The MMT and the Future of Ground-Based Astronomy"; 9 am to 5 pm, Modern Languages Auditorium, University of Arizona, Tucson.

Special tour of MMT site for the Regents of the Institution and the University; 8 am to 3:30 pm, Amado.

Reception for guests and Symposium participants; 6:30 pm, Arizona Inn, Tucson.

MMT Dedication and Banquet, address by Sen. Barry Goldwater; 7:30 pm, Student Union Ballroom, University of Arizona

Thursday, May 10

Tours of the MMT facility hosted by J. T. Williams, Site Manager; 7:30 am to 5:30 pm, Amado.

Public Premiere of "Mirrors on the Universe," and Public Lecture: "Life in the Universe" by Frank Drake, Cornell University; 7:30 pm, Main Auditorium, University of Arizona.

Friday, May 11, and Saturday, May 12

Tours of the MMT facility by bus from Tucson.

Four Greyhound Buses made it to the ridge Thursday, Friday and Saturday without problems.

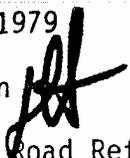


The OMANNMOBILE — Following the dedication of the MMT, information specialist Dan Brocious began conducting thrice-weekly public tours of the Mt. Hopkins facility using this reconditioned 26-passenger bus. But you should have seen it before! Master mechanic Bill Omann transformed an olive-drab, rattle-plagued, Army surplus transport into a safe, silent, shining white beauty, complete with carpeting on the floor, public address system, and cassette tape player. Below, Omann finishes installing the carpet. (Photos by Dan Brocious)



May 16, 1979

MEMORANDUM

Don Hogan 

Mountain Road Reference Markers

All MHO Staff

The observatory road has recently been marked with Kilometer sign posts starting in Amado and ending on the summit. These reference points can be used to describe events on the road (i.e. vehicle breakdowns, fires, etc). Common names are listed for further clarification.

<u>KM Post</u>	<u>Common Name/Location</u>
1.	100 Ft beyond Amado bridge
2.	Rex Ranch pasture
3.	Hill above Rex Ranch
4.	150 yards beyond power line
5.	
6.	Near Cattleguard
7.	County road borrow pit
8.	200 yards beyond large corral
9.	Near steel water tank
10.	
11.	New spring/culvert - Tino's truck stop
12.	Dirt loading ramp
13.	Old searchlight site
14.	Wash - bottom of Montosa canyon
15.	Below lowest gate - Montosa
16.	Dentist Scout crash site
17.	100 feet below Rocky Point - Montosa
18.	800 feet below Montosa information sign
19.	
20.	300 feet above Iron Springs
21.	Bifurcation
22.	100 feet above Lobo Canyon
23.	400 feet below Jessie's Mine
24.	Directly across Toyota Canyon
25.	
26.	Near 7200 foot information sign
27.	500 feet directly <u>above</u> lower spring
28.	100 yards beyond Chaffee's spring
29.	Road below Knoll #1
30.	100 yards beyond the Wikieup
31.	Turn above Generator Building
32.	Below Bowl - dirt cut
33.	Summit - no marker



BOWL DOMITORY TRAILER REMOVED

The rented, 40 foot trailer, shown above was used in the Bowl

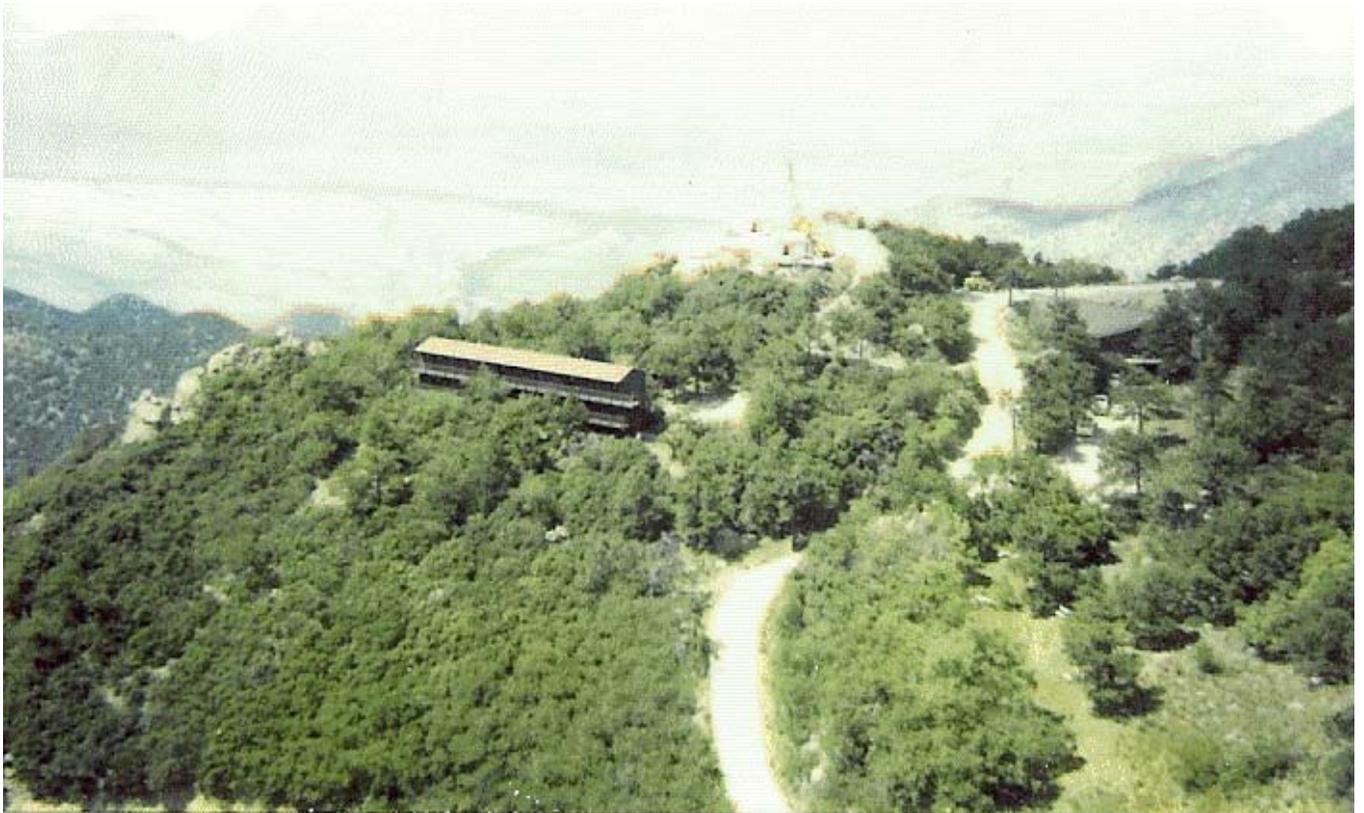
for several years as a dormitory for MMT personnel. Although the driver was instructed to use ALL of the road including the outside edge to get downhill he failed to do so. The trailer sides were badly raked against the rocks and ledges by this inexperienced mountain driver.

June 1979

Kevin Harris joined the Gamma Ray Project in the "Summer Intern Program".

July 7, 1979

Bowl dormitory built by Sierrita Mining and Ranching was completed. Ten nice bedrooms, motel style, are now available west of the Bowl in a quiet area away from the road.



BOWL DOMITORY



BOWL DOMITORY LOOKING DOWN FROM THE HEATED CONCRETE ROAD



COMMON BUILDING AND BOWL AREA

1530092

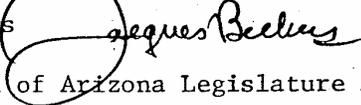
MULTIPLE MIRROR TELESCOPE OBSERVATORY

Smithsonian Astrophysical Observatory and Steward Observatory, University of Arizona

Reply to: University of Ari
Tucson, Arizona
(602) 626-1558

DUM TO: S. Criswell, J.T. Williams, MHO and MMTO Staff.

F. M. Beckers



October 3, visit of Arizona Legislature Appropriation Committees.

October 4, 1979

The October 3, visit to Mount Hopkins was a complete success. Everyone who took part in the tour (including the astronomers) had a very exciting day. We made a very positive impression on the visitors. The visit to Kitt Peak went well and we received some real positive support by the KPNO astronomers. I very much appreciate (like: "The 4 meter telescope is a one element MMT.") University administration also sensed a real bullish attitude of the visitors towards what they had seen that day. I very much want to thank all of you who helped in the tour in making that possible.

Seven helicopters from the Arizona National Guard were used for this two hour visit to the MMT.

Started to charge over night visitors \$9.00 per night. This fee was used to pay for linen and supplies like Peanut Butter.

The average water usage on the mountain is now 319 gallons per day. Tino usually hauled 2,300 gallons to the ridge tanks three times a week since the spring dried up.