

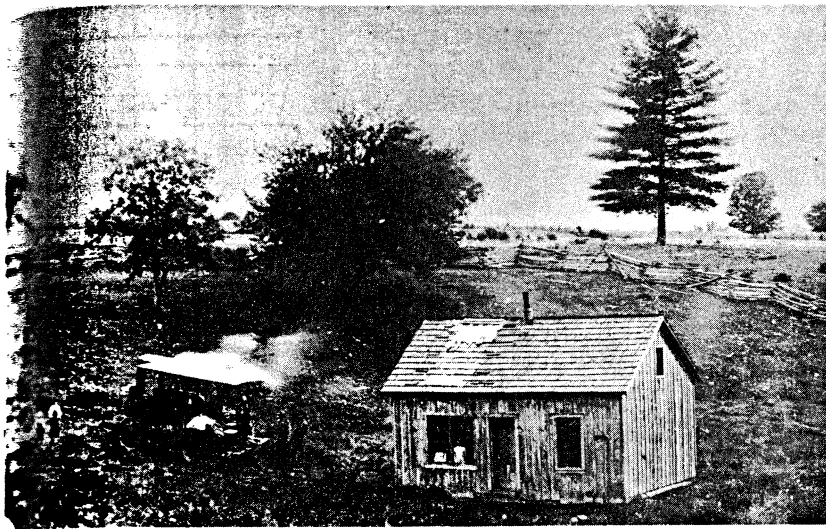
The OBSERVER

Volume 2, No. 6

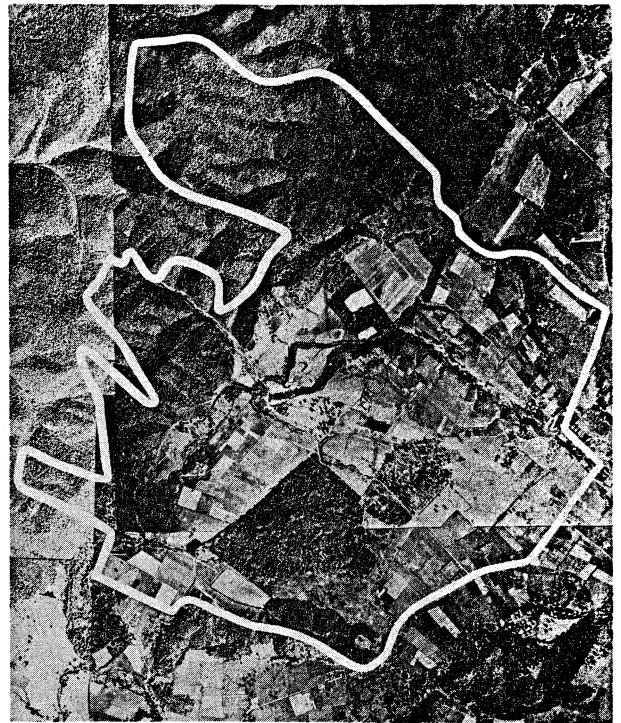
May 31, 1963

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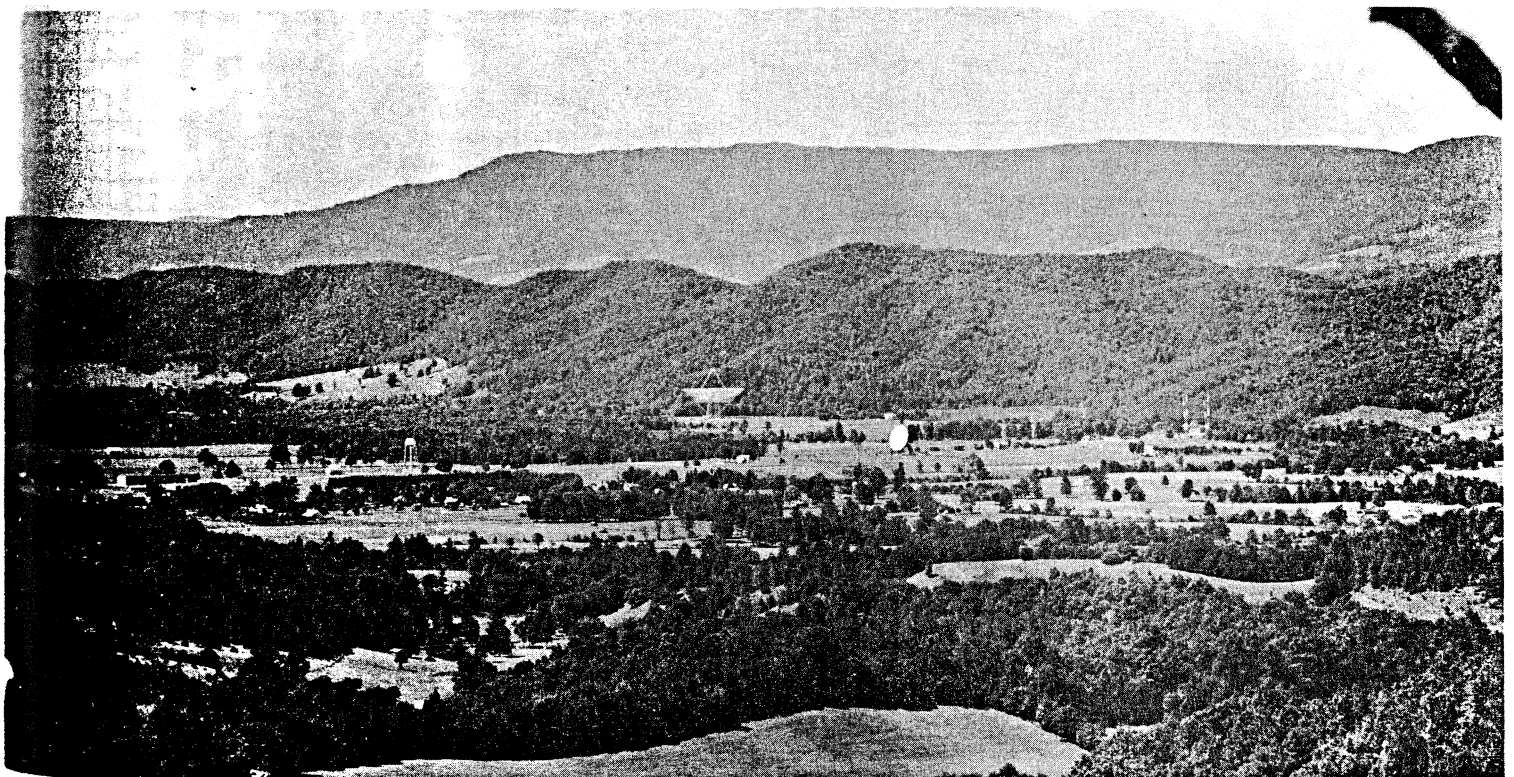
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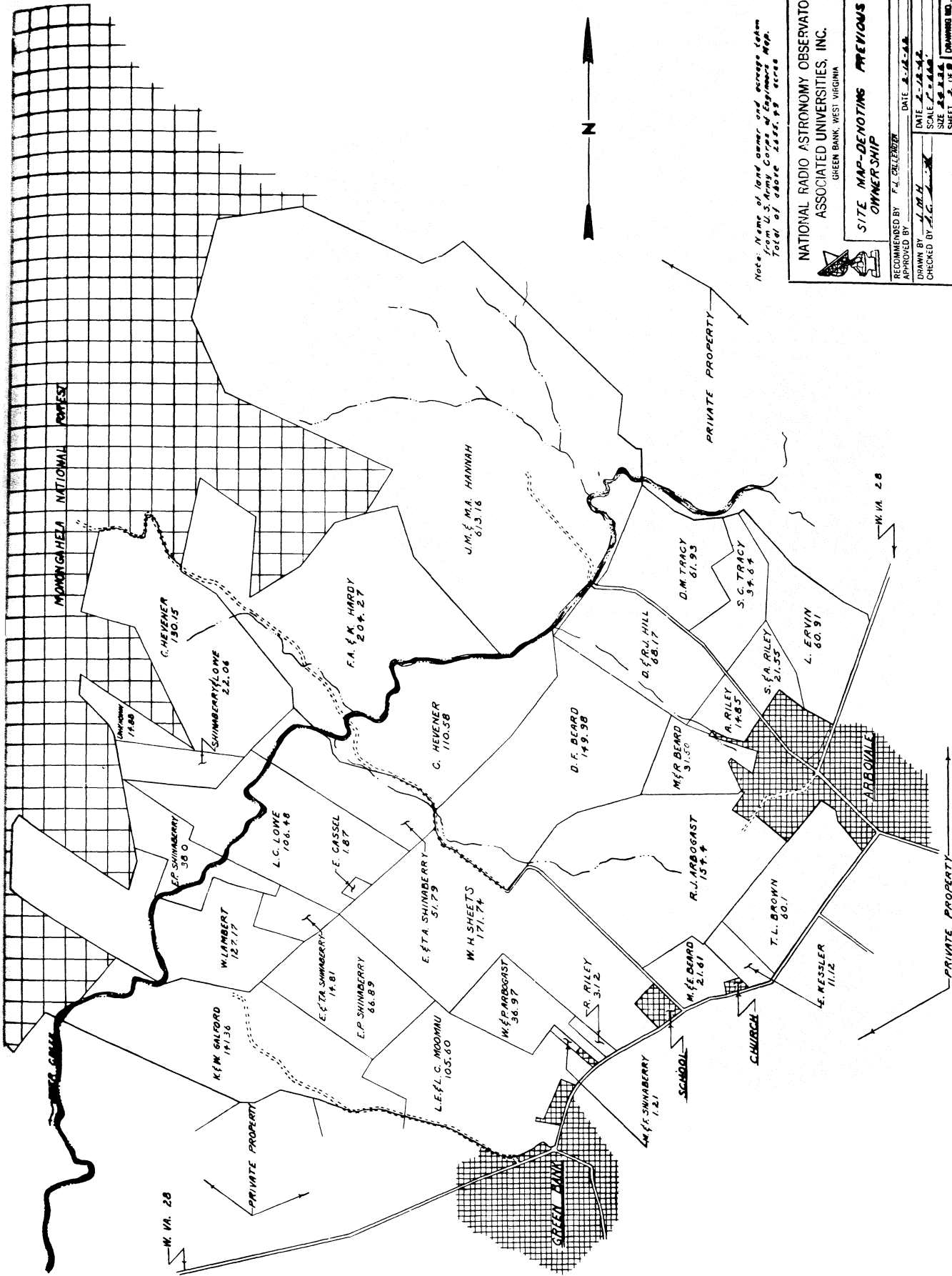
Arbovale, early 1900's.



Aerial map of site at purchase, 1957.



National Radio Astronomy Observatory, 1963.



Note: Name of land owner and acreage taken from U.S. Army Corps of Engineers Map. Total of above List, 99 acres

NATIONAL RADIO ASTRONOMY OBSERVATORY
ASSOCIATED UNIVERSITIES, INC.
 GREEN BANK, WEST VIRGINIA

SITE MAP-DENOTING PREVIOUS OWNERSHIP

RECOMMENDED BY: F.J. CLEGG
 APPROVED BY: J.D.H.
 DRAWN BY: J.D.H.
 CHECKED BY: J.C.C.

DATE: 2-22-54
 SCALE: 2" = 1 MI.
 SHEET 2 OF 2

NRAO site showing land owners prior to AUI-NSF purchase.

SITE HISTORY

In observance of the West Virginia Centennial, we will give a short history of the NRAO site.

The Shawnee Indians were the first inhabitants of this area, and the county was named for Chief Powhatan's daughter, Princess Pocahontas. The first white man to scout the area was Knapp Gregory, and thus Knapps Creek. Stephen Sewall and Joseph Marlin crossed over the mountains from Frederick County, Virginia in 1779. They camped all winter in a spot which was referred to as "Marlin's Bottom" and was renamed Marlinton.

By act of the Virginia Legislature at Richmond, assembled Dec. 21, 1821, Pocahontas County was formed from Bath, Pendleton, and Randolph counties. The first county seat was at Huntersville. Early settlers were of German, English, Scotch, and French origin.

Pocahontas County consists of 942.61 square miles, of which 2655.49 acres belong to the NRAO.

Mr. Adam Arbogast was an early pioneer who settled this area in 1796. He lived to be nearly 100 years old. He owned most of the land which is now the NRAO site, much of which he gave to his 4 sons and 5 daughters. One of Adam's great, great grandsons, Jerry Shears, is employed here.

As the area became more civilized, more people settled, and Arbovale was founded -- "Arbo" for Arbogast and "vale" for valley. Cass received its name from a New York lumber man, and Bartow was known as "Traveler's Repose."

The Civil War took its toll and land began to change hands much more so than before.

Page 2 shows a map of the NRAO site and the land owners previous to purchase by AUI-NSF. Our records are incomplete; however, the land owned by Frank Hardy was sold in 1868 by W. W. Slaven, son of another pioneer to the area, John Slaven. The land owned by Joel and Mary Hannah (site of our recreation area) was sold by Uriah Hevener in 1886. We can find no record of where he obtained this tract.

The land owned by Clyde Hevener was sold by Lee Burner, son of the pioneer, Abram Burner, in 1884. The land owned by R. J. Arbogast (site of the Works Area and surroundings) was sold by John Arbogast, son of Adam Arbogast, in 1894. The land owned by Moro Beard was sold by M. Arbogast in 1898.

With the help of interested parties, we hope to be able to find the ownership of land back to the time of the original land grants.

The pictures on page 1 show the general site area from the early 1900's to present.

The National Science Foundation acquired the site in 1957 (official groundbreaking ceremonies were on October 17) and construction of roads and offices were started.

The small white house on Route 28, just north of the Liberty Presbyterian Church, served as administration offices and lab until 1958 when the lab moved to the "Nut Bin" (house between the 5-foot and 85-foot telescopes).

Construction was begun in 1958 on the 85-foot telescope and the Works Area building, and was completed in early 1959, at which time the lab moved to the

Continued on next page --

Site History, continued

Works Area. The Little Big Horn, Jansky Lab, and Residence Hall were also begun in 1958 and completed in late 1959. At this time the electronics, scientific services, and administration departments moved into the Jansky Lab building.

Construction of the 300-foot telescope started in 1961 and it was completed in 1962.

A more detailed report of early site history can be found in the Annual Report, 1959.

IN SEARCH FOR QUIET BANDS AT LOWER FREQUENCIES by Sebastian von Hoerner

While all my colleagues were able to get beautiful observations of radio sources, Mike Waslo and I have observed nothing but noise and interference. But there was a purpose, of course: to find a relatively quiet band for lunar occultation work.

When the Moon, on its monthly way around the sky, crosses the position of a radio source, this source will disappear behind the Moon and reappear on the opposite side an hour later. This is called an occultation of the source by the Moon (occultation means darkening or loss of brightness, see occultism).

If you watch the times of disappearance and re-appearance, you can tell exactly the position of the source since the path of the moon is known very accurately. And by watching the rapidity of disappearance and re-appearance, you can tell the diameter of the source; and if it is not occulted smoothly but in two steps, then you have a double source. The accuracy of this method (its resolution) is given by the sharpness of the Moon's shadow. For radio waves, the edges of the shadow are smeared out over about 9 seconds of arc, thus

one should get positions accurate to about 2 seconds of arc, and diameters down to the same limit. This extremely high accuracy is almost unattainable by other means; and whereas other means require immense efforts and money, the Moon yields this resolution gratis. But, as usual, there is also a disadvantage: the Moon's path covers only a narrow strip of the sky, and the selection of sources to be occulted is made by the Moon and not by the observer.

The number of observable occultations per year is given by the brightness limit of the antenna system ("how weak a source can you see?"). For the 85-ft. dish and a parametric amplifier, this number has a maximum of 30 occultations per year at 210 Mc and drops down for both higher and lower frequencies. Between 174 and 216 Mc are all the high band TV channels. Thus we scanned from 216 to 420 Mc in order to find out for which frequency an occultation receiver should be built.

Many manual scans were made, with equipment borrowed from the Navy at Sugar Grove, to determine the most cluttered parts of the spectrum. The rest was covered with the same equipment by motor driven frequency scans of 24 hours duration and 4 to 10 Mc scan-width, in order to find "holes" with less interference. These holes then were investigated at the Lowe House with a total power receiver (crystal mixer, stub against image, filter against higher harmonics) and a vertical dipole. The overall system noise temperature is 750-1300 °K, the stability is 0.1 - 0.3 percent. We observed single interferences (mostly air-craft and radar) as well as general background noise (cars, motors;

Continued next page --

Continued from page 4

mostly unidentified noise). In the best conditions (not always attained!) we observed down to 1 °K. But now to the results.

1. On the average, about 15% of observation time would be lost by interference. The lower the frequency, the larger this time loss.
2. The best spots are: 218 Mc (10% of time lost); 225 Mc (6%); 242 Mc (4%); 256 Mc (4%); 332 Mc (1%); 405 Mc (0.2%). In order to avoid the hazard of interference, one should always observe at more than one frequency.
3. Quite a lot of our cars need shielding of ignition systems.
4. The general background noise is somewhat below 1 °K at night, and between 1 and 5 °K during working hours. There is a broad minimum around and after noon, a high peak at 8:00 a. m. and a much higher peak at 4:30 p. m.

From which I draw the following conclusions: During working hours, people are only up to 5 times busier than while asleep; they idle around at lunch time much longer than they ought to; they arrive in the morning in a hurry, and that is nothing compared with the hurry when leaving work.

OBSERVATORY WIVES MEETING

The monthly meeting of the Observatory Wives will be held Wednesday, June 12, 1963, 1:30 PM to 3:30 PM, in the upstairs lounge of the Residence Hall.

The hostesses will be Mrs. Edmund Gardner and Mrs. William G. Horne.

300-FOOT TELESCOPE

The 300-foot radio telescope is currently being used to measure the polarization of discrete radio sources at a wavelength of 21 centimeters. The observations are being made by radio astronomers from the U. S. Naval Research Laboratory in Washington, D. C., with the aid of the staff of the NRAO. Included in the N. R. L. group are Edward F. McClain, who is Branch Head of the Radio Astronomy Branch at N. R. L., Russell M. Sloanaker, Joseph M. Bologna, and Dr. William K. Rose. In addition, James E. Kenney and Joseph H. Nichols, also of N. R. L., assisted in building the radiometers and installing them in the telescope.

Measurements are made simultaneously at two orthogonal polarizations. Two identical radiometers are connected to orthogonal outputs from a circular waveguide feedhorn at the focus of the telescope. The planes of polarization accepted by the two radiometers can be rotated by rotating the feedhorn about its axis by remote-controlled, motor drive. The observations are obtained in the form of drift curves on approximately 65 sources each day. The different planes of polarization are observed for each source by rotating the feedhorn in 30 degree steps on successive days. Only linear components of polarization can be measured in this manner. The radiometers, which were designed by McClain, Bologna, and Kenney, are modified Dicke type radiometers employing crystal mixer, superheterodyne receivers. Each radiometer input is switched at a rate of 29 times per second between the feedhorn and a reference horn pointed at the sky at an angle of about 45 degrees above the axis of the telescope reflector. The local oscillator frequency is 1413.8 Mc and the I. F. amplifiers have

Continued on next page--

300-foot, continued

a center frequency of 10 Mc and a 3.5 Mc bandwidth. The radiometer noise temperatures are about 450 °K, giving output fluctuation levels of 0.7 °K peak to peak with a 4 second receiver time constant.

Using the 300-foot telescope, it should be possible to measure the effective linear polarization of several hundred sources with these radiometers, although the present project is aimed at measuring possibly 100 of the more intense sources. The observations should provide new information on the structure of the magnetic field of our galaxy and on the nature of the radio sources.

LAB GAB

How about that? -- Dewey has spent more time in the 85' pillbox than Cooper spent in the capsule. Reckon we ought to have a parade for D.R. ?

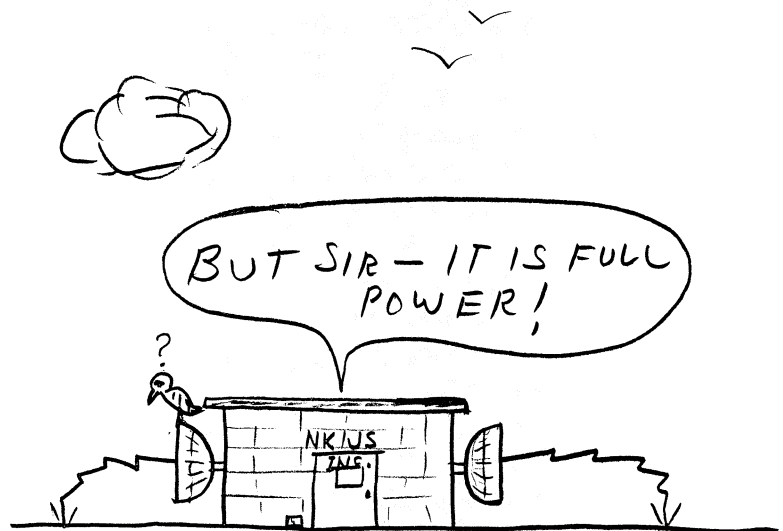
What ever happened to all those people who were waking up in the morning all bright-eyed and bushy-faced? Never underestimate the power of the little woman. All other excuses, we know, are void! Ask "Turkey" whose hand fits the hoe handle now?

Ole Sarge says -- "Please I'm doing the very best I can, by myself" and by the way he's doing alright; he's filling up those cabinets as fast as we get them. (Has he bought stock in the Bud Company?)

Instead of sitting around watching the one-eyed idiot box -- let's get out to play some softball, and harden up some of that flab. For those whom exercise would be detrimental, come out and watch the fun. Last Tuesday the 21 we had a great time, even without both teams being fully there. We had lessons on how to drop fly balls, and miss

easy grounders. By the way -- we give brownie points for every time some one hits J. Hensley with a batted ball. John says you can't do it! (Oooh -- pass the horse linament!) How come Miz Blue and Caroline didn't get on the teams -- they signed up didn't they? They feel that they've been slighted.

Hey, How about all those new cars that are sprouting up like spring flowers -- everybody seems to be getting one. I guess the Democrats were right when they said we never had it so good -- except those from Preston County.



Members of the NRAO staff attending the joint Kitt Peak National Observatory-NRAO staff meeting in Tucson last week, May 24, were D. S. Heesch, F. D. Drake, D. E. Hogg, W. W. Pleasants, H. Hvatum, B. Hoglund, I. Pauliny-Toth,

140-FOOT TELESCOPE

The main ring truss of the superstructure has been moved within reach of the derricks and Pacific Crane and Rigging Co. is in the process of fitting up various other components of the superstructure preparatory to continuation of production welding.

On May 23, with assistance of the derricks and Pacific Crane and Rigging Co. ironworkers, work was started in moving the two old cantilever arms to the vicinity of the 300' telescope where they will be used as culverts under the roadway which will be part of the 85' Interferometer Project. Everything worked smoothly and the move was completed on May 24th.

Messrs. N. B. Cleveland, M. Giannattasio and R. DeLuca of Stone and Webster Engineering Corporation, Boston, Mass., spent May 22nd and 23rd at the 140' in conference with Mr. Small, Mr. Ponsford and Mr. Greenwood.

Mr. E. E. Ponsford, S and W engineer at the 140', and his wife are pleased to announce the birth of their second child and first daughter on May 14 at Marlinton. She has been named Mary Katherine.

Mr. Walter Stanford, accompanied by his wife and four children, has moved into house No. 19. Walter is Internal Auditor for AUI. He is spending a great deal of his time at the 140' working on past records as well as current records.

Mr. Peter Good has joined the staff at the 140'. Mr. Good is a photographer who will be assigned the duty of taking progress photographs at the site, in the various manufacturer's shops and at any other locations as may be assigned. He is a graduate of UCLA's motion picture course and will assemble a motion picture of fabrication and erection of the 140'. Welcome aboard Mr. Good.

CAMPING IN W. VA.

The camping and vacation season is here again, and W. Va. has much to offer in public tenting, camping and fishing areas.

The state offers, among its many attractions, 20 beautifully developed state parks and 9 forests, in addition to 15 public fishing areas. They provide relaxing contentment to the vacationing family but there are also vigorous activities such as hiking, swimming, golfing, nature study, boating, horseback riding and the ever popular hunting and fishing.

There are 261 tent and trailer sites available in 7 state parks and 7 state forests. They provide excellent facilities. The tent site is raised above the surrounding ground, is well drained and covered with fine stone or gravel to make a suitable floor for a tent.

There are hot shower facilities, cool drinking water, a picnic table at each site, a fireplace, and either firewood or charcoal for the fireplaces.

Playgrounds are located near the tent sites, and laundry facilities are available at all the parks in or near the forests.

The camping areas are open from May 1 to October 31 in the parks and from opening day of trout season until the last day of the deer season in the state forests.

PICNIC

The results of the recent survey showed that enough people are interested in an Observatory picnic to warrant having one. A committee is now being appointed to work out the numerous details -- so watch out, you may be chosen. More information will be given out later.

SOFTBALL

First a notice was posted on each bulletin board asking for names of interested softball players and dates they preferred to play. Then four captains were chosen, on the basis of their interest and ability. They are Jim Dolan for the Brown Bombers, John Gallagher for the Red Raiders, John Hensley for the Green Hornets and Jim Simmons for the Blue Devils. At a meeting of these four captains, teams were chosen. A system of 1st, 2nd, 3rd, 4th — 2nd, 3rd, 4th, 1st — 3rd, 4th, 1st, 2nd — 4th, 1st, 2nd, 3rd, etc., was used to pick teams.

Four practice games were played during the first weeks of May. The Regular Season games started 23 May. Everything was working very well up to this point. But for the first game there were only three players from the Blue Devils team. Consequently, the game was given in forfeit to the Brown Bombers.

Your Recreation Association has done all it can do for you that are interested in softball. The remainder and the success of this season will depend fully on your captains and you. Game schedules will be posted on your bulletin board.

EMPLOYEE'S BIRTHDAYS -- JUNE

- 2 Pat Hall
 - 4 Pearl Clarkson
 - 4 Howard Lambert
 - 4 Bill Lowman
 - 13 J. Cassell
 - 19 Tom Carpenter
 - 22 John Plunkett
 - 25 Howard Brown
 - 26 Dick Irvine
 - 27 Herman Coleman
-

RELOADING

If anyone is interested in ordering reloading supplies, see Bill Meredith.

FOR SALE: 5.2 acres of rolling pasture land -- a miniature Calumet Farm, lacking only white rail fencing, buildings and horses. (Sorry, we can't provide these.) 1 1/2 miles out North Fork Road from the Observatory, a corner lot bordered by paved road, right on the school bus route.

We had planned to build on a natural rise at the back corner of the lot, but the lure of the city and an already existing house brought us to downtown Green Bank. Toward the center of the lot, the land drops to within 18 inches of the water table (runoff from Drake's Hill, just behind, provides the source). A minimum amount of earth-moving should result in a natural pond ideal for fishermen who don't like to hike too far.

Green Bank acreage runs \$1000 an acre, if you prefer the metropolitan areas. Three years ago we paid \$500 an acre for the North Fork land (check the Court House records in Marlinton); naturally, we want to recover this amount. We can assure you that the title is clear.

C. M. Wade
456-4877

FOR SALE: 2 at 760 x 15 in. conventional thread tires. New, first line. Less than 100 miles on tires. One mounted on 1956 Buick wheel with tube. See John King -- 456-4750.

FOR SALE -- Quantity of 16D, 8D, roof nails and blue lath nails -- and

- 4 at 2" x 6" x 10" - new lumber
- 1 at 2" x 6" x 16" - new lumber
- 1 box, 64' sq., ceiling tile
- .22 cal. lever action rifle - \$25
- 2 at 2" x 6' piano hinges

Teo. Zatta -- 456-4147

The Observer staff is again making an appeal to the NRAONA membership for news and other items of interest. We need your support.

Next month we will reserve at least one page, and more if needed, for each department.

FOR SALE -- Mo-Ped Motor Scooter - \$95
2-horse tandem wheel trailer - \$475

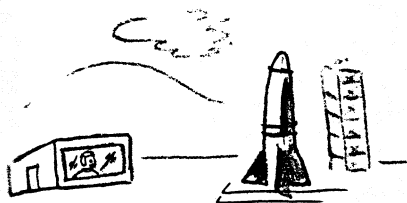
See Gene Crist

FOR SALE -- One Zenith transoceanic - portable receiver - \$60

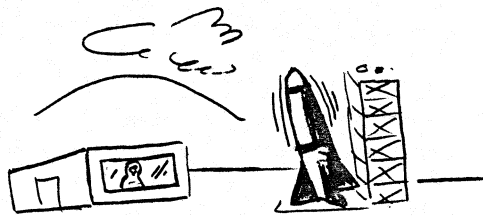
See Carl Wooddell

FOR SALE -- 1957 Chevrolet.
Jim Arbogast, 456-4312

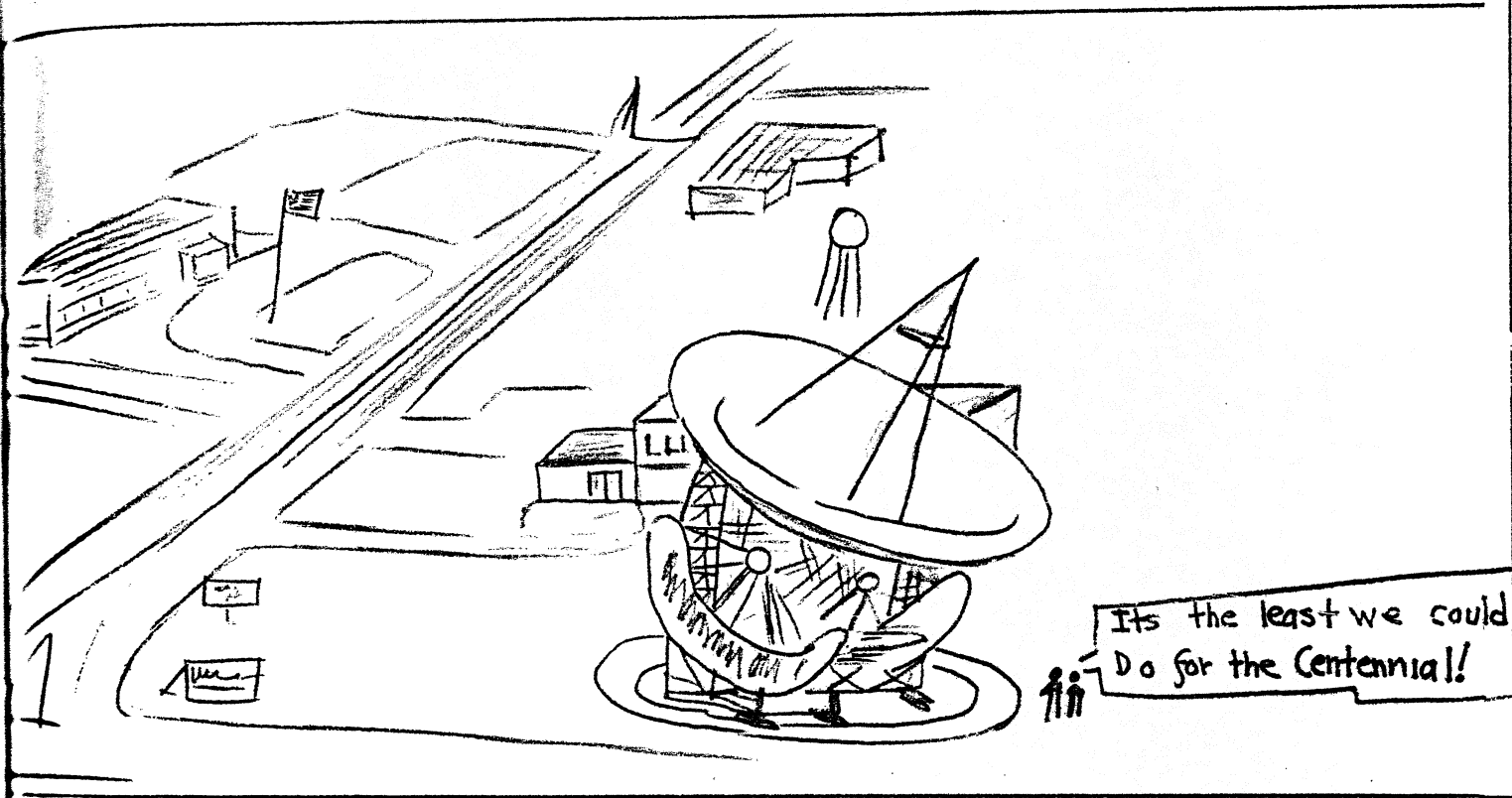
Virginia Irvine flew to Stillwater to attend graduating exercises for her son, William Conley, at Oklahoma State University. Bill received his degree in engineering. She is a proud mama.



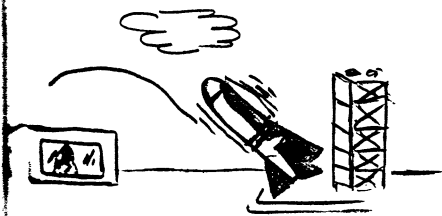
"... four ..."



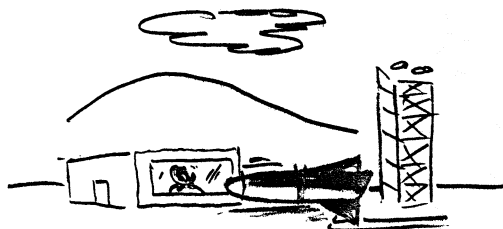
"... three ..."



It's the least we could
Do for the Centennial!



"... two ..."



"HOLD IT! HOLD IT!"
(LOOK)