

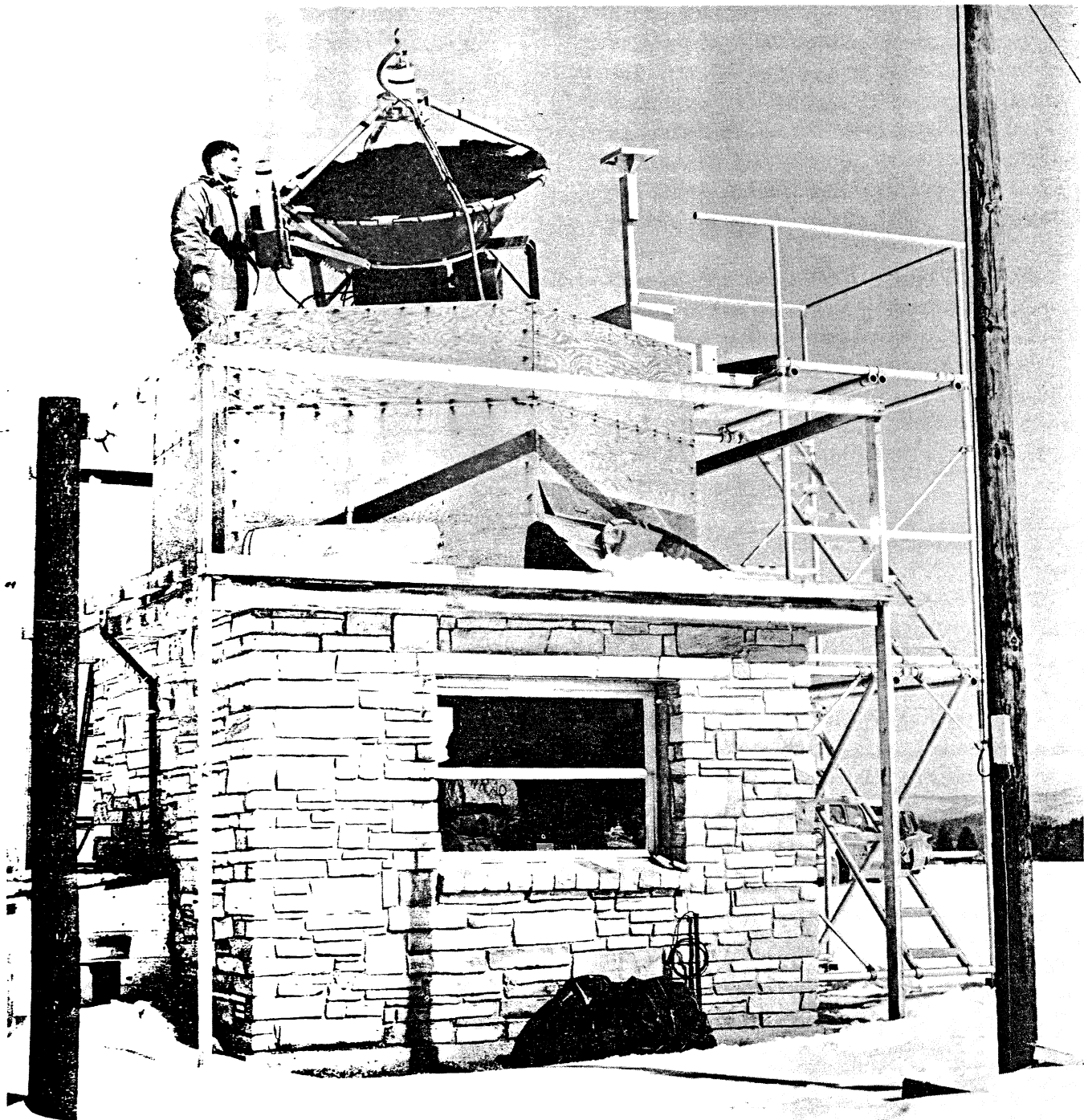
The OBSERVER

Volume 2, No. 3

February 28, 1963

Page 1

Published monthly by the National Radio Astronomy Observatory Recreation Association.



THE MILLIMETER WAVE PROJECT

THE MILLIMETER WAVE PROJECT

By Arnold Davidson

The current millimeter wave project is a direct outgrowth of a theory proposed by J. Van Vleck in 1947 and proven by William Sinton in 1952 that a partial radio window exists in the 1-3 mm region of the electromagnetic spectrum. Sinton was able to detect the Sun and the Moon by means of a Golay infrared detector mounted at the focus of a 24-inch modified search-light mirror. However, the inherent ultimate sensitivity of the Golay detector is such as to preclude its use on other fainter thermal sources such as Venus, Jupiter, etc.

In 1960, Dr. Frank J. Low of Texas Instruments, Inc., developed a new low temperature bolometer, using as the temperature sensitive resistive element, a gallium doped single crystal of germanium. This device, by virtue of its low noise and fast response, possesses a figure of merit at 2 °K (-455 °F) two decades greater than any other thermal detector and three decades greater than the Golay cell. At Dr. Drake's invitation, Dr. Low arrived at NRAO in October of this past year to investigate the use of his bolometer in the millimeter wave region. A 5-foot radio telescope was purchased, and subsequently mounted on the old 12-foot radar mount. This telescope possesses a highly accurate gold-plated surface necessary for working at such short wavelengths. A feed support system was constructed for the detector housing or dewar as it is called. Just as the common thermos bottle keeps coffee hot, this dewar keeps liquid helium at its very low temperature for a number of hours. The germanium detector is mounted in a special chamber where it is cooled by the liquid helium to its operating temperature below 2 °K. The millimeter waves enter this chamber through special windows and filters. Facilities for handling liquid helium as well as vacuum and other necessary equipment

are housed in a new laboratory located in the basement of the main administration building.

First observations were made in the closing days of November, and early results on the Sun and Moon were very encouraging. Fluctuating sky background at higher receiver sensitivities has as yet prevented detection of the fainter sources, but this, as well as other experimental problems are in the process of solution.

One rather unique feature of this telescope is the fact that it must be guided optically at the mount rather than from a heated control room. This is due primarily to the rather narrow beamwidth of 5 minutes of arc and to the alti-azimuth type mounting which does not allow sidereal tracking.

To overcome this rather inconvenient feature, a closed circuit TV system was purchased, and recently installed. By mounting a long focal length lens in front of the TV camera, and aligning the camera with the telescope beam, it is now possible to view on a TV monitor in the control building the field of view of the 5-foot telescope. The camera and lens arrangement have sufficient sensitivity to allow viewing of celestial objects of magnitude +2 or greater.

Finally, special thanks are extended to the many people who assisted in getting this project underway; in particular, the carpenters, plumbers, and electricians from the Works Area; Ed and his crew at the Machine Shop; and the receiver back-end boys at the laboratory.

In 1960, 500 books were received from the West Virginia Library Commission. These books were to serve as a standing basis for a community library and, in the words of the Commission, act as a part of the "Traveling Library Schedule" serving rural communities. As a part of the program, about 75 new books are added to the library every 3 months with an equal number then returned to the West Virginia Library Commission offices. In addition, specific books may be ordered; these books must, however, be returned following the immediate period of loan. Also at our disposal is a collection of LP records sent at our request; these must also be returned following the immediate period of loan.

In January 1963, the library was closed for inventory. It is to be reopened on Tuesday, March 5, 1963 under the auspices of the NRAORA. Mrs. R. L. Uphoff will act as Librarian with Mrs. C. M. Wade acting as Assistant Librarian. The Green Bank Community Library will be open to the entire community -- with residents of Upper Pocahontas County invited to use its facilities.

The library is presently located in the basement of the Lab Building; however, we soon hope to move it to a more comfortable and convenient location. The receptionist in the Lab Building can give directions to the library to anyone interested.

Since we have far less than the maximum number of books the Commission is willing to provide for a community of this size, the number of books may be increased as facilities allow and interest indicates the need.

The Green Bank Community Library will be open as follows:

Tuesday -----	3:00 to 5:00 PM
Wednesday -----	9:30 to 11:30 PM
Thursday -----	3:00 to 5:00 PM

In accordance with usual library practices, the following will apply:

Books may be borrowed for a 3-week period.

2 books may be borrowed by any one person at one time with a maximum of 6 books per family.

Borrowers of books kept over the 3-week period will be fined two cents per day per book with a maximum at the value of the book.

Books lost, mutilated beyond use, etc., will be replaced at the expense of the borrower.

NOTICE

With the cooperation of the NRAORA OBSERVER, new books added to the Green Bank Community Library every three months will be listed in the issue immediately following their arrival.

NOTICE

All books borrowed from the Lending Library should be returned immediately.

The \$.02 fine per day will become applicable after Thursday, March 7.

FOREIGN FILM FANS, PLEASE

Foreign films are available for rental at a very low cost if a group is formed to rent them for showing on a non-profit basis.

Would all persons interested in attending a series of foreign films please contact: Mrs. C. M. Wade, 456-4877.

THE COIN CORNER By L. W. Mc.

I continue my column on the Roosevelt dime, and will try to cover the basic steps to encourage beginners. The Roosevelt dime was designed by John R. Sinnock. His initials "JS" appear on the obverse (front) side of the coin which bears a portrait of Franklin D. Roosevelt. The initials of Sinnock will be found to the left of the date beneath the neck of Roosevelt.

Mint marks on this dime series will be found on the reverse side near the bottom and to the left of the Liberty Torch. Surrounding the torch are laurel and oak sprays. Since the San Francisco mint closed in 1955 the only mint mark after that date will be the "D" of Denver, as Philadelphia does not use a mint mark. There should be little difficulty in assembling this series, as there are only a few dates becoming scarce. (I will list those at the end of column.)

The easiest and least expensive way to complete this series is by going through pocket change, and by going through change from your grocer or rolls from your bank. To a beginner the bank teller is usually very courteous. The beginner should now purchase a folder to hold Roosevelt dimes. These usually sell for thirty-five cents. Now you can start to assemble your collection.

The Scarce

The scarce Roosevelts include:

The 1949-S	Mintage - 13,510,000
The 1950-S	Mintage - 20,440,000
The 1951-S	Mintage - 31,630,000

Becoming scarce are the 1955-D and 1955 plain.

Now let's determine the location of the mint marks, starting with the Indian Head Cent.

Although Indian cents were minted from 1859 to and including 1909, a mint mark did not appear on this series of cents until 1908. Indian cents of 1908 and 1909 are found both with and without mint marks. They were minted at Philadelphia with no mint mark and at San Francisco with the "S" on the reverse side of the coin underneath the wreath near the bottom of the coin.

(A good magnifying glass will prove helpful when searching for mint marks.)

Moving along to the "Lincoln Cent" series, which began in 1909 and continuing to the present time, we find this coin was minted at Philadelphia, Denver and San Francisco. Mint marks, if any, are all located underneath the date on the obverse side of all Lincoln's.

On some of the first 1909 Lincoln's, the initials V. D. B., which are the initials of the designer, Victor D. Brenner, may appear on the reverse side of some of these cents near the bottom rim. They were removed from some later issues of 1909 Lincoln's. So you may find some with and some without initials. The initials were again placed on the Lincoln 1918, but were placed beneath the shoulder of Lincoln on the obverse side. Here the magnifying glass really needs to be used.

The 1909 Lincoln bearing these initials are minted at Philadelphia and are fairly common, but the 1909 minted at San Francisco is extremely hard to find.

Liberty Head Nickle

Let's jump from cents to Liberty Head Nickles. These were minted from 1883 to 1912, inclusive. All are without mint marks except the 1912 issue. These

Continued from page 4 --

may be found from Denver, San Francisco, and Philadelphia. The mint mark will be found on the reverse side to the left of the word "cents". The Philadelphia nickle again has no mint mark. It is worthwhile to remember that the first year's issue, 1883, came in two different types. One does not bear the word "cents" on the reverse. The word "cents" was added later during 1883.

Indian Head or Buffalo Nickle

The Indian Head or commonly called Buffalo Nickle was minted from 1913 to 1938. The mint marks are located on the reverse side beneath the words "five cents". The first issue, 1913, is found in two varieties. One has the Buffalo standing on a slight mound, and the other standing on level ground. Other Buffalo variations include the 1918-D, over-date, which has the 8 struck over a 7 in the date, and the Buffalo of 1937-D, which has only three visible legs. (This is a good example of "variations" which you will find in many other issues of coins.) In looking for the above variations, remember that normal coins in both years were struck.

Jefferson Nickles

The final mint mark study is on the Jefferson series, minted from 1938 to the present time. Mint marks of Denver, and San Francisco, are found to the right of Monticello, on the reverse side except the war years, when Philadelphia, Denver, and San Francisco all, put mint marks above Monticello to denote a change of metal. Jefferson nickles returned to their pre-war composition of copper-nickle in 1946. Mint marks returned to their place to the right of Monticello.

The Scarce Jefferson's

1938-D, 1938-S, 1939-D, 1939-S and 1950-D. I do not have space to discuss grading this month, but will do so later.

Did You Know?

Except where Congress determines otherwise, the design on a coin cannot be changed more often than once every twenty-five years.

The edges of coins were "reeded" to prevent the sharing or clipping of silver or gold from the coins. Nickles and cents are not reeded because the metal value is so small that it would not pay to shave it off.

The last U. S. Gold Coins were minted in 1933.

GIRL SCOUT TROOPS BEING ORGANIZED

Two girl scout troops are being organized in the Green Bank area: A Brownie troop for girls from 7 to 10 years of age, and an Intermediate troop for girls from 10 through 14 years of age. Both troops will be sponsored by the Rebecca Lodge.

Scouting is a worthwhile activity for young girls. Planned girl scout activities are fun and educational. If you are interested in fun and learning, you are invited to join one of the two troops. Only one requirement is necessary to join -- you must be in the age group from 7 through 14.

Meetings will be held in the Green Bank School. Date and time of meetings will be announced by a notice to be distributed at the school.

Anyone interested in helping with troop leadership or troop committee work should contact Mrs. Omar Bowyer, 456-4649, or Mrs. Wally Oref, 456-2239.

LAB GAB

We've had some snow in the past few days.

Dewey Ross returned from a recent trip to AIL for a parametric front end. He wished he had a Rambler -- they can go through snow anytime, in any State. Dewey also states that AIL stated that the state of the stated amplifier is in a fine state and will perform as stated. Is it possible that TWT's are passe?

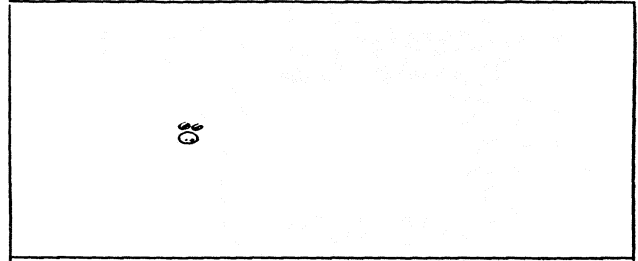
Most of the boys in the lab have had their share of the flu. It can be treated in either of two ways -- by a doctor or by Gay Wooddell's method. The latter is purported to be the happiest way by far, according to the latest "Gulp" poll.

The 10 cm receiver is about to be put out to pasture according to the last piece of passed down info, much to the relief of all persons concerned. Of course, this will result in our telescope operators becoming more lonely during the wee hours -- they won't have the technicians to talk to anymore. Poor Howard, and Dick, and Bill, and etc.

The polarization system is going up for awhile and then the 85-foot dish will be fitted with the big Jasik antenna for a time also. Then the whole dish will be renovated to take the vaunted maser system, which we understand will be a real cool gasser!

The situation with the transportation for the lab and dish sites is a little tight. We ask that all concerned do their best to cooperate with one another and if you will be gone for an hour or more, as inconvenient as it is, have someone take you down and call to have someone pick you up.

How about a boxing exhibition between Dick "Sarge" Skaggs and "Toikey" Oliver?



The above is Al Roth's entry for West Virginia art -- Title - POLAR BEAR IN THE SNOW.

140-FOOT

Congratulations are in order for Spencer Greenwood for his work producing a new shaft and hydropads for the 140' telescope model. He "eyeballed" his work on the lathe for the new shaft and hydropads to within .002 of an inch. Pretty good "eyeballing" wouldn't you say? He was ably assisted by John Ralston who furnished moral support during this tedious work. John also made the molds for the hydropad supports. Much "penetrating oil" was used during the course of this work to keep tools in good operating condition.

Max Small phoned Mr. Greenwood on Monday, Feb. 11, 1963 from a hospital in New York and advised him that he had broken a leg while skating on the previous Saturday. Max stated that he had gotten a skate into a crack in the ice which suddenly turned at a right angle. Max went round in a circle with his skate stuck in the crack (ouch). The result was a spiral break of both bones in the right leg between the ankle and the knee.

We here at the 140' know that Max has a tremendous capacity for work and loves to work. We're sure that he may be on his back for several weeks but you can't keep a good man down and he won't be neglecting his work. We hope that he recovers quickly and satisfactorily.

TELESCOPE OPERATIONS

The Engineering Division and Works Area people have finished the installation of a spring-operated chain-tightening device on the 300-foot. Preliminary adjustment and tests indicate the device to be effective. This device has been found desirable to reduce telescope movement while observing at certain attitudes.

The Observatory's second closed-circuit TV system is now in operation at the 300-foot, and has been given the call letters of WOB for obvious reasons. Up until now the operator has not been able to see the telescope or to know weather conditions. The operator can now survey the dish and other areas which might involve the safety of the structure and people at work. With the system one can zoom, pan, tilt, focus, and control the lens opening on the remotely positioned camera from the observing console.

Everyone is enthused over the prospect of having another 85-foot telescope working in conjunction with the existing 85-foot as an interferometer. Present thinking is that such an arrangement will most likely be in operation one year from now.

Congratulations to Mrs. Howard Brown and partner on their 20th Wedding Anniversary.

Mr. William Kuhlken, renowned Sanborn gazer, visited the 85-foot intermittently during the months of January and February.

Leonard Howell has received repeated attractive offers to return to the Red Raiders basketball team but thus far he has held out. What now, Meadowlark?

Shortly after his return from a "lost weekend" in Ohio, cosmopolite Richard Spurlock visited his parents in Jacksonville, Florida.

THE WEATHER -- Brrrrrrrr.....

No one needs to be reminded that January and February were cold, cold months. Below are a few statistics obtained from Nettie Sheets, who runs the local U. S. Government weather station.

January

Coldest day - 29th - temp. -20 °F
 Warmest day - 12th - temp. 56 °F
 Highest one day snow accumulation - 4 in.
 Total accumulation for the month - 8.2 in.

February -- as of the 22nd

Coldest day - 16th - temp. -22 °F
 Warmest day - 6th - temp. 55 °F
 Highest one day snow accumulation - 7 in.
 Total accumulation to 22nd - 17 in.

Weatherman's prediction for March

Rising temperatures, clear, blue skies, and warm winds from the South.

MARCH MEETING - OBSERVATORY WIVES

The monthly meeting of the Observatory Wives will be held Wednesday, March 13, 7:30 PM - 9:30 PM in the upstairs lounge of the Residence Hall.

CONSERVATION NEWS

March 17-23 has been proclaimed "National Wildlife Week".

Invitations to the Governor's Centennial Conference on Conservation Education to be held April 3 in Charleston are available through Mr. H. E. Edwards, Room 210, Capitol Building, Charleston.

Spring Forest Fire season begins March 1. Only you can prevent forest fires.

ACTIVITIES CALENDAR

Announcements of forthcoming Observatory or community activities will be announced in the Observer. Dates and times of activities should be given to Mrs. Bob Uphoff, 456-4210.

Information on activities to be announced for any particular month must be given to Mrs. Uphoff by the 15th of the preceding month.

WANTED

Girl's ice skates -- size 9 children and size 3 misses.

Utility trailer with hitch - 4 ft. x 6 ft. or larger.

Wally Oref, ext. 211 or 456-2239.

FOR SALE

A 1960 Deluxe Model Vauxhall in excellent condition. See Dick Bird or call 456-4493.

Anyone interested in having an action re-barrelled with a Douglas barrel, see Bill Meridith or Fred Crews.

NEW EMPLOYEES

Sandra Rose from Stony Bottom, W. Va. -- Scientific Services Division.

Douglas Keener from Fairmont, W. Va. -- Engineering Division.

New Employees, Continued

Thurmond Cosner, Business Services -- from Cass, W. Va.

Jack Daniels, Business Services -- from Marlinton, W. Va.

In observance of the President's Physical Fitness Program, a member of the Pocahontas Country Club has suggested that you stay inside and off the highways during this cold weather and get your exercise next summer by joining the Club and playing golf. For more information see Wally Oref or any NRAORA Board Member.

The OBSERVER again is appealing to all NRAORA members to support your paper. We desperately need news and suggestions.

FOR PEOPLES' SAKE

I.

In time I hope the day will dawn,
When thinking men will happen on,
The truth of what it takes to make
A man humane, for peoples' sake.

II.

On nuclear strides we swell with pride,
For space shots too, we beam inside,
Yet in the quest, some seldom take
Their manners too, for peoples' sake.

III.

And though your job's light years away,
And so important -- let me say,
It's worthless as a toothless rake,
Unless it's done, for peoples' sake.

IV.

Put first things first, like kids and wives,
And friends, who need you in their lives,
Keep civil tongue, and heart awake
To one and all, for peoples' sake.

V.

For those around you, keep in mind,
A human will respond in kind;
You'll find it pays to give and take,
And really care, for peoples' sake.

A. N. Onymous

HOBBY IS VITAL

Everyone can afford to enjoy a hobby! In fact, few people can afford not to.

Free time presents a challenge. Doctors warn against too much inactivity which can produce boredom. You may enjoy being lazy now and then, but excessive boredom makes many people cranky, depressed, even physically ill.

How can you invest your leisure hours? Why not put them to work to make your life happier, more complete? Your Recreation Association is presently offering basketball, ceramics, reading, pool, ping pong, and some dancing. You can find satisfaction in these hobbies.

As an emotional safety valve, a tension reliever, a pleasure always ready to lie savored, hobbies are unbeatable. Hobbies are practically gilt-edged insurance that you will win friends and influence people. When you have a hobby, you become a specialist of a sort, you have something new to talk about, something that will interest others.

Hobbies come in just four varieties. You can decide you want to do something, make something, learn something, or collect something. In each case, your hobby is for pure enjoyment.

How many actual hobbies are there to choose from? Almost as many as there are people to enjoy them, and probably if more members showed interest a Hobby Shop could take shape here, where you could work with woods, leathers, oils or metals, for your own enjoyment or to produce valued gifts.

Anywhere your fancy takes you - go there the hobby way - by allotting some of your leisure time to constructive activities; you will be a happier and more interesting person to know.

ARCHERY - by The Old Archer

One of the first things anyone has to learn about archery is the proper selection of equipment. If you want to go trout fishing, you don't buy a tuna rig. And if you go on an African safari, you don't depend on a 22 rifle. The selection of proper tackle in archery is, stangely enough, even more important than either of these, if you really want to enjoy the sport.

Many of us make the grave error of selecting a bow that is far too heavy. In the first place, a bow pulling seventy-five pounds (in archery the pull of the bow is determined by pounds of energy required to bring the bow to full draw) isn't necessary, except under very special circumstances. The average man feels he has to select a heavy bow in order to prove his manhood, and that's a fallacy from beginning to end. A forty-five pound bow will kill most game just as easily as a seventy-five.

Most of us, buying a first bow, forget that much practice is needed before we can step into the field and bring down our first game, and in those long hours of practice a difference of five pounds between bows can mean an awfully lot. We'll assume that you are new to the game. You're big and strong. You've probably been active in one form of athletics or another.

The idea that you should choose a bow with maximum pull of thirty-five pounds seems ridiculous. You pick up a bow that pulls sixty pounds and you draw it, easily. A lot of us take that sixty pound bow and regret it.

There are two reasons for that regret. The more important is this -- if you are over-bowed you cannot concentrate on the essentials, which must become automatic before you can hope to become a successful archer.

NRAORA BASKETBALL

February 21st concluded the eleventh week of basketball competition for the NRAORA. At this point of the season, all teams are fighting for final standings prior to the tournament. Four weeks of the regular scheduled season remain with the tournament tentatively set for the first week of April to close the season.

During the past month the Blue Devils have managed to narrow the lead of the Red Raiders to one game by winning three of four games. The Brown Bombers lost three of four games and dropped to last place. The Red Raiders and Green Hornets have each won two of four games.

The competitive spirit of each team has increased as the season progressed. This point is verified by the final scores of all games played during the past month. The remaining games should be very interesting. Attend the remaining games and support your team either as a player or a spectator. Everyone is welcome.

The league standings and top scores follow.

Several participating members of the NRAORA basketball league have joined together in forming a team to play independent ball. Two games have been played to date with the local team on the losing end of both.

A good Marlinton team has been victorious in the only contests played in the Cass gym with the following score:

Marlinton -- 93, Observatory -- 87

The Marlinton team got good balanced scoring from Welder, Simmons, Ratliff, and Underwood. The local team attack was led by B. Cassell, Monk, and Arbogast.

With more experience of working together, this local team will certainly improve and account for itself in any game it participates. Other games are scheduled and will be posted.

PARTY PLANS

Plans are being made for a square dance, and possibly a sledding party if the Hannah House is available. Notices will appear on the bulletin board when arrangements are confirmed and final.

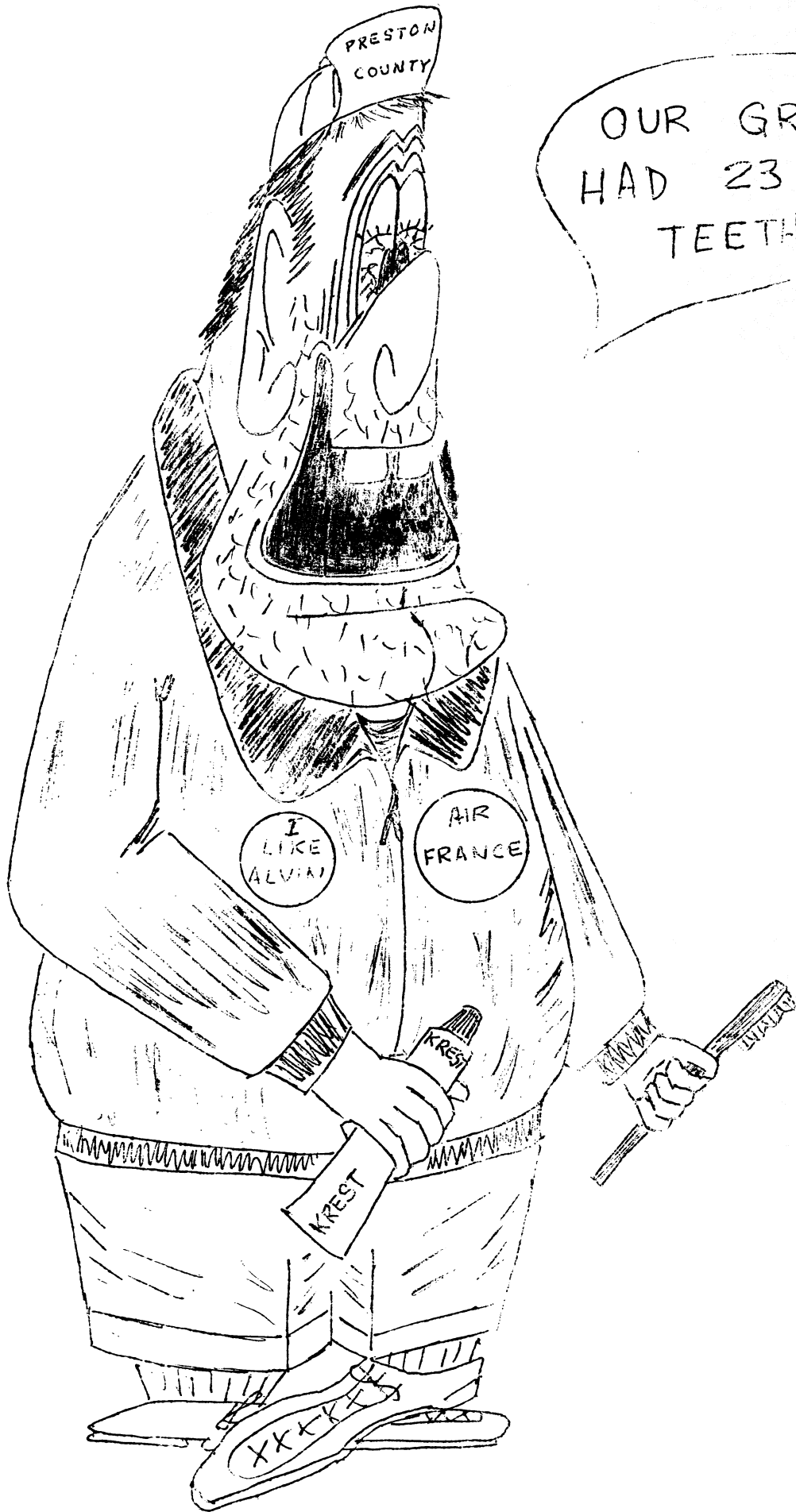
NRAORA BASKETBALL

LEAGUE STANDINGS

<u>Team</u>	<u>Won</u>	<u>Lost</u>	<u>Games Back</u>	<u>Points</u>	
				<u>Scored</u>	<u>Allowed</u>
Red Raiders	7	4	-	487	433
Blue Devils	6	5	1	437	486
Green Hornets	5	6	2	512	521
Brown Bombers	4	7	3	500	496

TOP FIVE INDIVIDUAL SCORERS

	<u>Points Scored</u>	<u>Games Played</u>	<u>Point Average</u>
Brown Cassell, Red Raiders	175	9	19.4
Ronnie Monk, Green Hornets	172	10	17.2
Chester Cassell, Blue Devils	160	10	16.0
John Cassell, Brown Bombers	140	8	17.5
Jim Arbogast, Brown Bombers	133	11	12.1



OUR GROUP
HAD 23% LESS
TEETH!