The OBSERVER

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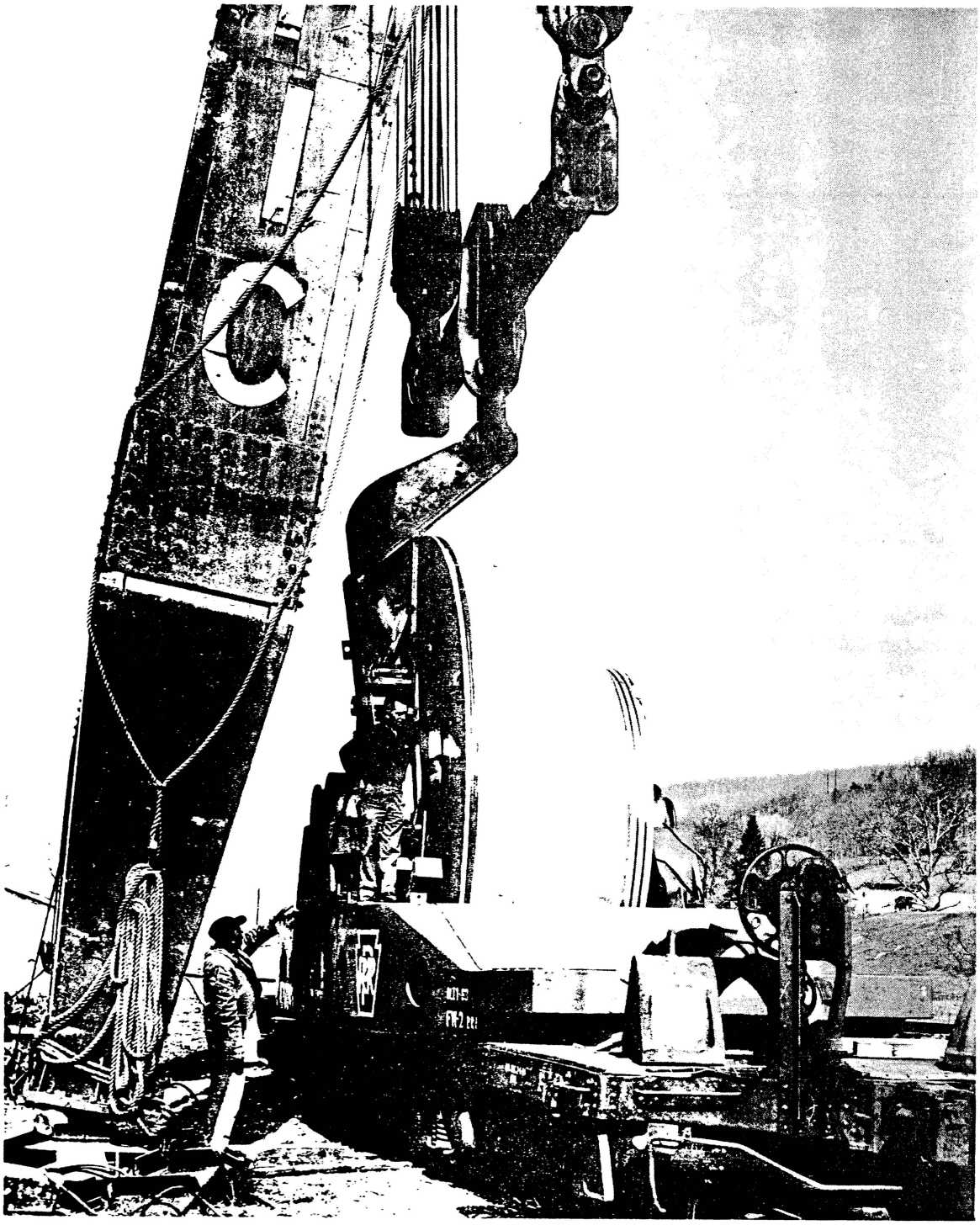

THE 17-FOOT SPHERICAL BEARING

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SPHERICAL BEARING

for

140' RADIO TELESCOPE

The 17-1/2 foot sphere is the heart of the 140' telescope. It was cast of 3-1/2% nickel steel alloy by General Steel Industries, at Eddystone, Pennsylvania, in January of 1963. Because of its size, a special railroad car was cast in a single piece to transport it from the foundry to the Westinghouse plant at East Pittsburgh where it was machined.

In order to get the required density and quality of steel, the original casting,from which the sphere was machined, weighed about 350 tons, making this the largest nickel steel casting ever poured, and one of the largest castings ever poured of any alloy. Several melting furnaces were required which created great problems of quality control from several melts. Following rough machining at the foundry this casting was examined by radiograph,where possible, by magnaflux over all surfaces,and by reflectoscope. Despite these precautions,which resulted in repairs at the foundry, during machining at Westinghouse, the sphere was found to have flaws and it was shipped back to Eddystone for further welding repairs and heat treating.

Final machining began last fall and was not completed until April of this year. As finished, the sphere weighs over 150 tons. It has been machined to within 1/8" of design diameter and is within .003" of being spherical. Its surface has been polished to between a 10 and 20 microinch finish which is now protected by a coat of anti-corrosion compound and a layer of glass cloth and resin for protection.

It arrived at Bartow on April 22 and is now in custody of Pacific Crane & Rigging Company for erection as soon as weather permits.

SOFTBALL

Spring has sprung - the grass is riz -

I wonder where your sporting blood is?

* * *

If you are one of the complainers about the persistent winter weather we have had over the past months, now is your chance to get outside and enjoy some of the very pleasant weather we are going to have.

Softball season is rolling around again and we would like to start play within the next few weeks.

Here's your chance to get out there and lose some flab, flex your muscles and show that you aren't as soft as all your fellow workers say you are. It will be great fun and a ball for everyone who attends, plays or simply watches the sports show their stuff - or lack of it. We invite everyone out to make every game a gala affair.

Anyone interested in playing call Carl Davis on 229 or Len Howell on 259, no later than May 10.

Don't bring money, just bring yourself and the kids and have a ball.

* * *

GREENVALE KINDERGARTEN

Greenvale Kindergarten will be open for visitors on May 19, 1964. All persons interested in enrolling children for next year are asked to bring the child to the school on this day. (9 AM - 11:30 AM)

If you have any questions concerning entry call 456-4699.

LAB GAB

We are hoping for a good recovery for Jim Dolan. Thankfully, there were no broken bones. Should you like to purchase a slightly scraped "bike", see Jim.

Carl, Bill, and Omar are still talking about Moondawg; where's those pictures "Cheef?" There are so many characters in New York that the people never noticed them. Ask Bill how many Bagles in a half dozen.

The digital lab is open for business now, having finally cleared out their mysterious black boxes.

Ralph, Bill, and Carolyn are on diets, again. They, of course, include these with their regular meals.

The occultation receivers have been installed on the traveling 85' dish, and are getting ready for operation "Black Magic." Go get 'em fellows.

Neal the Knife, and Carl, in the millimeter lab, are wondering why someone doesn't add a few more receivers and tech's to their spacious lab - they have plenty of room!!!!

* * *

300' TELESCOPE

After eleven months of planning, building, and testing by Art Shalloway, and his crew, installation of the autocorrelation receiver was started at the 300' on 14 April. Trouble shooting is now in progress, and Dr. T. K. Menon's program will be on the telescope very soon. The only changes to the previously used six receiver system have been minor cabling and retuning of the 1410 mc paramp to 1421 mc. Since alterations were minor,the operator, with a minimum of difficulty, can switch

between the old system, and the correlator, depending on the requirements of the astronomers.

The autocorrelator is a very sophisticated, transistorized, back end, feed by a normal receiver. It consists of a variable local oscillator (L.O.), and 100 channels feeding a magnetic tape, and analog recorder. The L.O. can be tuned to compensate for the velocity of a source. The 100 channels spread the source, at the hydrogen line frequency, into a spectrum. The magnetic tape samples all 100 channels every ten seconds, making the previously used paper tapes much too slow, and modification of the IBM computer necessary. The analog is a conventional, two channel, pen recorder reading total power from the normal receiver, and hydrogen power from the correlator. This function gives the operator a general idea as to the proper operation of the equipment.

The hydrogen line we will be observing was proposed in theory by H. Van de Hulst, a student at Leiden Observatory, Holland, during the fascist occupation. (Hydrogen composes 93% of the total atoms, and 76% of the weight of the universe) Harold Ewen, a research student at Harvard using a 24 foot parabolic antenna, found the hydrogen line at 1421 mc (21 cm), exactly as predicted by Van de Hulst. (Hydrogen atoms have one electron with two energy levels. The electron is excited to its top energy level when the atom comes close to another atom. The electron drops back to its original level on its own accord after approximately a million years, and in the process releases energy at the hydrogen line frequency.) Mapping of matter in the cosmos gained a new perspective with this discovery, and radio astronomy took a big step forward.

Everyone connected with the autocorrelator hopes for the same success that was enjoyed by its predecessor - the 24 channel hydrogen line receiver. Dr. Mort Roberts, previously of Harvard, successfully used the 24 channel receiver last fall, and stated that the discoveries he made warranted more investigation, and greatly influenced his decision to join our staff. The correlator is indeed the instrument to make further investigations with.

We, at the 300,are looking forward to the return of Dr. Gart Westerhout, Head of the Astronomy Department, University of Maryland. Dr. Westerhout is very much interested in the autocorrelator, and did the preliminary reduction of the magnetic tapes some months ago. This was our first real check as to the reliability of the system.

A camera crew, making a movie about NRAO for the Astronomical Society, and the National Science Foundation, was here from 7 to 11 April. Dr. Roberts was technical advisor on the project, and several people at the 300-foot made their film debuts. The film will be shown to high school students around the country to arouse an interest in radio astronomy. Publicity of this kind is needed, and greatly appreciated.

* * * *

ENGINEERING ESSENSE

1. Interferometer

The new telescope was remotely operated from the existing control room for the first time on April 1. The operation was smooth and satisfactory. Initial astronomical observations were made successfully on April 11.

New River Electrical, subcontractor on the cabling, completed their work and departed April 3.

Plans are now being finalized to have the coaxial signal cable installed underground by an electrical subcontractor. Now that the concrete manholes have been eliminated, it is believed that this work can be completed a few days prior to June 1.

ENGINEERING ESSENSE (con't)

The surplus aircraft towing tractor that will be used to tow the interferometer from one station to another was received at NRAO on April 15.

2. 36 Millimeter Wave Project

A letter from Dr. Mar of MIT substantiates our calculations that a cast aluminum dish will meet the surface tolerance requirements of this project. Dr. Low and the writer will arrange a meeting with Dr. Mar early in May to discuss his findings in more detail.

3. Automotive Lift

The new automotive lift and the new overhead door to provide access to it were complete and in operation by April 1.

4. Airstrip

Continued wet weather has made it impossible to restore the airstrip to service. Engineering work has been completed and the bid packages are ready to send out as soon as funds are made available for paving it.

5. Jet Engine

The jet engine was tested for the first time on April 16. Some trouble was experienced with the compressed air starter, but otherwise it operated satisfactorily. Temperature and velocity measurements are being taken to determine the best way to position it to de-ice the 300-foot telescope.

6. Organization

John Echternach, a new Drexel co-op student, started work on April 1. Robert Johnson, the other student who has been here since January 1, will continue for another three months.

A new machinist, Dorman Williams, reported for work April 13.

7. Cryogenics Storage

Construction of this building was suspended during the winter, but has now been resumed. It should be ready for occupancy by April 23.

8. Charlottesville

TAMS is working on designs for the new laboratory building and will be here April 30 to review them in preliminary form.

* * * *

BIRTHDAYS FOR MONTH OF MAY

E. J. Tyson	6
John Ralston	7
Richard Grabe	8
Brown Cassell	10
William Pleasants	17
Janice Galford	22
Spencer Greenwood	22
Beaty Sheets	23
Jerry Shears	24
W. Sheets	25
Clifford Barkley	26

* * * *

MISCELLANEOUS

There is lots of talk about interference with radio telescopes. There will, we predict, in a few years, be no interference from the residence hall section. If pines grow as we have seen them grow in the past, even a snake couldn't get through the forest.

We propose to award Air Force wings and appropriate medals and decorations to all who have worked, or will work with the jet engine, and who may consider themselves to be qualified jet pilots. We hope no wings or decorations will be awarded posthumously.

We feel all personnel should be well informed of the potential danger of a jet engine.

MISCELLANEOUS (con't)

We have traveled the highway (?) between Bartow and Green Bank daily for several months now. Improvement is needed very badly. We've contributed tax over the past four years to the State in the following categories:

Sales Tax (when car was bought new and when traded	$104.85
License (four years)	80.00
Personal Property Tax (3 of the 4 years)	84.00
Gasoline Tax (using a figure of 7¢ per gal.)	332.50
Total	$601.35

This total is a minimum, not a maximum, since it does not include tax on tires, repairs, oil, lube jobs, etc. The actual figure would perhaps be nearer $1,000 for four years, a tidy sum to say the least.

In the county, in which I live, the SRC (your tax money and mine), provides transportation to and from work for Paul, Dick, Lewis, Charles, Bill, Curtis, and Carson. These are the ones that immediately come to mind - I'm sure there are others. Personally, I'd rather see more of my tax money put in road pavement and less in free transportation for the SRC employees.

Use of the above names is not coincidental and similarity to persons living is intended.

As a parting thought, I haven't seen as much of this free transportation in the past month or so. Could it be that this is an election year?

* * * *

140' TELESCOPE

Max Small, Fred Crews and John Ralston traveled to Kennedy Antenna Division in Cohasset, Massachusetts, in April to inspect work on aluminum panels. It is expected that the first panel will arrive on the site early in May.

Mr. Alf Christofferson and Mr. Boris Yakovleff, of Brooklyn, visited the 140' during April to assist Peter Good in preparation for applying sound to his film of construction at the 140'. Peter traveled to New York during mid-April, where a sound recording studio did the narration and sound for the film. Dr. Heeschen plans to present the film to NSF during the latter part of the month. This presentation is of work progress through April. Final work on the film and accompanying sound will be done after work is completed.

All major components of the 140', including the long awaited spherical bearing, have been received and it is now expected that work will progress rapidly.

Mr. Grabe traveled to Westinghouse on April 13, 14, and 15 to expedite shipment of the spherical bearing. There was great concern that this shipment might be held up enroute by the threatened rail strike.

To those of us who had hoped to see a very brightly polished surface on the sphere when it arrived, there is slight disappointment. The sphere was covered with a compound designed to protect the surface and then sprayed with fibre glass to further protect it in handling and shipment. Other work was done also to protect it, including a "bathtub" arrangement under the car to protect the sphere from flying gravel, and a house built over it.

* * * *

A SHORT STORY WITH NO MEANING

Photographer went on weekend drive,
  Listening to that "Oprie" jive, (he says)
Came to a river he could not cross,
  Must have thought he was driving a hoss,

(con't on next page)

Pulled out the choke -- put her in gear,
Then got out and shoved from the rear,
He tried to hold her but away she went,
Underneath the car got bent,
Ran on a rock pile that stopped her dead,
Photographer should have stayed in bed,
(again).

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FOR SALE

1952 Oldsmobile, in excellent condition. Only 38,000 miles.

See: Virginia Irvine
Cafeteria

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Cushman "Trailster" scooter. Ideal for hunters and fishermen. Price reasonable for quick sale.

See: Jerry Shears
Room 114
Lab Building
Ext. 227

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Tube Tester - Model 71 - "Professional" National Radio Institute
"Like New" - will sell very reasonable.

See: Jerry Shears
(Above location)

* * * * * * * *

RCA B/W Television set. Practically a give-away.

Regulation size Pool Table. Another give-away for quick sale.

See: Sis Michael
Room 112
Lab Building
Ext. 228

"BUT SERIOUSLY" GOES WEST by Snodgrass

However mythical the glamour of Hollywood, the appeal of California is very real, and from the aesthetically satisfying campuses of Berkeley and Stanford to the eeery gloom of the fog-enshrouded Golden Gate Bridge, San Francisco is the generous queen of the west. For here the United States lets its hair down; the laughter and gaiety are a match for Paris and Copenhagen; the sailing is comparable with that at Stockholm or Cannes; there is fine food to please all palates, and the wines rival all but the very best from Europe. The climate (despite the increasing incidence of smogs) is usally delightful, as is fitting for one of the world's delightful cities.

Typical San Franciscans are Claude Allen and Carol Johnson. Claude works in the Jazz Workshop, and if ever there was a man with warmth and laughter to spare it is he. Carol is a United Airlines hostess with a difference (vive la difference), and this columnist is still slightly lacking in equilibrium as a result of her acquaintance ..... Some city!

Denver is a vertical city with tall buildings, as if in competition with the neighboring Rocky Mountains. It has that special hustle, that leaves the faint tang of the Old West; one still has the feeling that cowboys might appear in the lobby of the Cosmopolitan Hotel -- although, a very modern and efficient police force would be on hand before you could say "Wyatt Earp", should any trouble occur. The air in Denver is crisp and clear, as is appropriate for a straightforward, if unsophisticated, city.

The air in Los Angeles is equally appropriate to its city, but very different from that in Denver. For Los Angeles is the sophisticated giant, sprawled out in the sun, bronzed and restless. Thirsty for the love and understanding which are indigenous to its Northern neighbor and rival. There is no real Los Angeles; there is only an enormous litter of houses, stores

and motels, suckled by ubiquitous freeways spewing forth cars. Sunset Strip is far less interesting than Broadway, San Francisco, or New York City, and the Pacific Ocean,in the Los Angeles area, tastes of detergent. On the credit side, California Institute of Technology must be one of the world's great academic institutions, and it was indeed stimulating to meet some of the many 'Great Ones' who pass through.

Back in the restricted environment of Green Bank, specific impressions fade, but the general impression grows stronger; we have much admiration for the achievements of California, but only love is the appropriate description for our feeling for San Francisco.

May is COLOR month at the NRAORA FILM FESTIVAL!

~ MAY 4th ~

HUMPHREY BOGART • VAN JOHNSON

IN

"The Caine Mutiny"

TECHNICOLOR®

~ MAY 18th ~

ROBERT STACK

DOROTHY MALONE

IN

"The Last Voyage"

TECHNICOLOR®

The new summer film schedule includes bigger and better films than ever before.

FOR YOUR CONVENIENCE, FILMS WILL COMMENSE AT:

8:00 P.M.