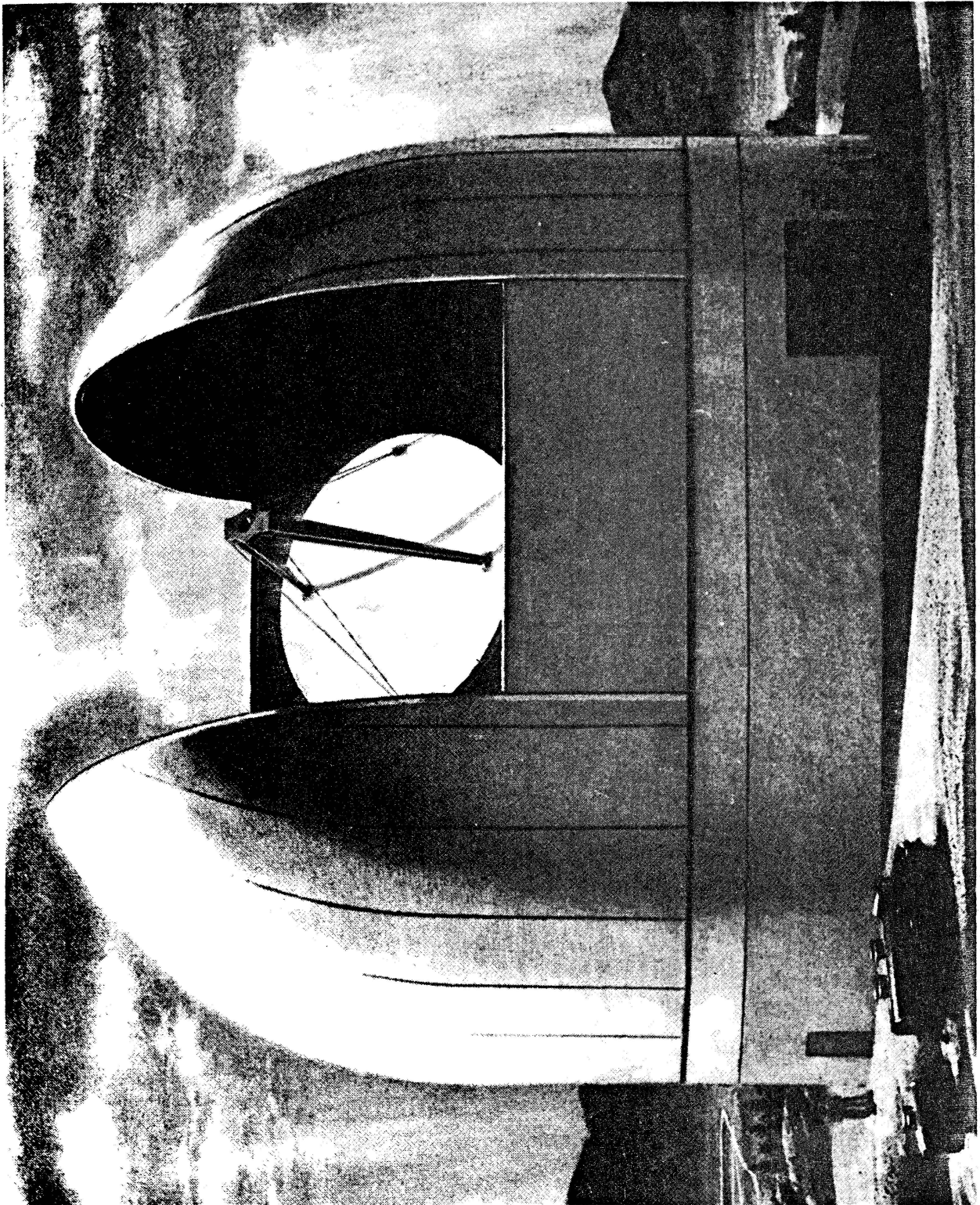


the observer

vol. 4, no. 2

may 28, 1965



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published monthly by the national radio astronomy observatory recreation association

from the editor.....

last month i solicited the help of you the employees to assist me in putting out this newspaper, and i think that the response you have shown deserves equal space. if the observer is a good paper, and i believe it is, the credit goes not to me, but to you who have supplied me with articles, ideas, time, and effort. you are the people who make this paper, and without the cooperation you have shown it would not have been possible. my thanks and the thanks of all who read this paper go out to you for the job you have done.

William M. Lowman, Jr.

editor

cover story. . . .

the 36-foot nrao millimeter wave antenna

the development of improved radio receivers in the 1-8 mm (300 ghz-35 ghz) region, coupled with the need for more and better data at these high frequencies, led the decision in mid-1963 to initiate study and planning for a large precise millimeter telescope. by the beginning of feb. 1964, the size of the new antenna had been set at 36 feet, with a long focal length ($f/d = 0.8$). the requirement to observe in the 1.2 mm radio window set a stringent need for high surface accuracy and very precise pointing precision. in addition, because observations at millimeter wave lengths are mainly affected by the total amount and variability of atmospheric water vapor content, a high and dry site was needed.

a final survey of available locations led to the selection of kitt peak, arizona, as a site for the telescope. this site is located on a ridge about 1 mile southwest of the main kitt peak observatory and at an altitude of about 6200 feet.

in march 1964, specification letters were sent to eight possible suppliers, and in july the rohr aircraft co. was selected as the prime contractor. rohr immediately started design and engineering studies based on nrao requirements, and from this a set of proposed technical specifications were issued. some of these unique specifications are listed below:

astrodome: as noted in the cover picture, the entire telescope will be enclosed in a modified astrodome which rotates in synchronism with the telescope azimuth. this enclosure fully protects the instrument from inclement weather and allows full sky coverage in good weather. it will be about 90 feet in diameter and 60 feet high, and have a 40-foot wide door opening for observing.

mount: the mount will be of the alt-azimuth type similar to the 5-foot behind the lab building. this was necessitated due to the extreme pointing accuracy required, and because the alt-azimuth type offers more stability per unit of cost than the more familiar equatorial type.

telescope operation: because of the extremely small half-power beam widths of the telescope (about 20 seconds of arc at 1.2 mm; 1 min at 3 mm) and the need for precise pointing, operational control will be exercised by an on-line digital computer. manual operation will in most cases be limited to simple type programs involving no tracking.

continued on next page. . .

pointing accuracy: under conditions of no wind and uniform temperature, it should be possible to point the telescope to an accuracy of 2 seconds of arc r.m.s. the 85 foot pointing accuracy is 60 seconds r.m.s. as a comparison.

surface accuracy: with the dish at zenity, r.m.s. surface error should not exceed 0.002 inch, and at 15 degree elevation, should not deviate by the same amount from the best fit parabola. this is a very severe requirement, and in order to meet it, rohr plans to mill the entire dish as one intergal unit from fitted, shaped and welded sections of 3/8 inch aluminum plate.

at this writing, the project, under dr. john findlay, is proceeding according to schedule. most of the foundation and site preparation is well under way and contracts for power, water and road work have been let. the completion target date has been set for mid-august.

letter to the editor

dear sir:

i would like to express my thanks and the thanks of the american cancer society to the employees of the observatory who have helped to make up the \$442 which we have collected in the green bank-arbovale area.

contributions are still being accepted, so if anyone who is interested has not had a chance to give, the following people are soliciting contributions:

mrs. allen sheets
 mrs. james galford
 mrs. vere barkley
 mrs. hurbert rexrode
 mrs. neil horner
 mr. jamie sheets

the pocahontas unit accomplished the following in their fight against cancer for the year 1964:

1. provided rubber sheeting, old used sheets, hospital shirts, dressings, pads, and misc. loan closet supplies for cancer patients.
2. furnished disposable colotomy bags for two patients.
3. provided transportation for four patients for check ups and treatments.
4. furnished drugs and medications for three patients.
5. distributed educational material through public education programs.
6. replied to inquiries.
7. cancer chairman and two volunteers attended cancer crusade meeting in lewisburg, w. va.

8. sponsored the annual crusade that raised \$1,700.

signed - jamie sheets

140-ft telescope news by howard lambert

most comments on my last article in the observer about the tree climbing squirrel hunter were, "what are you, some kind of nut?" yes i am - and don't you forget it.

correspondence with peter good reveals that he is getting settled and is "working hard" at bnl. i suppose you can believe him. he worked hard here - when he worked. he reads the observer so i know he'll appreciate the reference to him. keep up the good work pete. he also advises that he has finally ordered a new mustang convertible. hope you like it fine and enjoy those top down cruises on long island.

pete commented about all lower case letters being used in the last observer as others have. the only question was that we have never been taught to use small letters in proper names, beginnings of sentences, etc.

lambert has dropped a few pounds - haven't you noticed. part of it fell away when the blisters on his hands healed after spending about two weeks worth of evenings digging a ditch and putting drain tile around one end of his house. complaints, complaints - sore back, blisters, bla, bla, bla. it wasn't that he had never done hard labor - it's just been quite a while. now he's painting his house and he complains about that.

.... continued on next page....

troy henderson, jamie sheets, bill kuhlken and bill vrable and the rest of the motor driven bike crew are happy cyclists. just ask them to smile - you can see the bug stains on their teeth, the mark of a happy cyclist. you can't tell about bicycle riders though. they don't travel fast enough for the bugs to make a lasting impression.

dick grabe is feeling ok after his hernia operation and returned to work on may 24th after about a 4 week stay in the hospital for the knifing and subsequent recuperation.

excess steel at the 140-ft was sold to the raleigh junk co of charleston, w. va., and their crew has been busy over the past two or three weeks cutting up and moving out the scrap. gene crist note: now you can take a photo of the 140' without all that _ _ _ _ stuff getting in the picture.

fish stories are few at the 140'. everyone is too busy to go, or if they do have time, they must be tired of continual fish stories so they don't bring the subject up. speaking of fish - s. s. greenwood bought dave smith's old 4-wheel drive pickup so he can pull the big ones from the river down by his maryland home. we may have written this before, if we have forgive us. anyway, here it is: mr. greenwood says he won't fool with a fish that you can't stand on and remove the scales with a hoe.

do you know why the hen only went halfway across the road? she laid it on the line - that's why. that's what i've done - laid it on the line, and now i say so long till next issue.

300-ft word by dave van horn

nothing much new here at the electric ear. on with 100-channel auto-correlator. had 21 cm standard receiver up too, but cooling both front ends with existing equipment presented seemingly insurmountable problems. so until additional cooling can be added we're left with a fun program.

no new babies, new cars, or deer kills. must be living right (or wrong). Bob Viers, as usual, has had a relative in the hospital the past week or two. He'll be the cause of us losing our group insurance contract yet.

we had an astronomer program an observation here two weeks ago at 21 degrees south. was going to try it except it probably would have led to someone trying to get one in at 3 hrs. east.

from the interferometer by tony distasio

this month our interferometer has been applied to a statistical survey of a large number of celestial objects in order to determine which of them have very small apparent diameters, and which have large enough apparent diameters to be studied with the techniques of aperture synthesis. the objects comprising this group will be studied again in more detail using long tracks with the interferometer to determine their exact positions.

in the case of the objects having sufficiently large apparent diameters, some information can also be obtained about their structure when they are examined again with our interferometer. this information will be supplied to optical astronomers who will then be able to make a more complete analysis of the nature of these objects.

.... continued on next page....

we welcome john weaver and tom carpenter, our new operators at the 85's, and we are happy to have harold crist back again for the summer. we were sorry to lose bill hunter to the 140-ft, but we hope that he will find his new responsibilities interesting and enjoyable.

lately, one could find weary operators at the trailer with their ears close to the receiver's radio output speakers, trying to understand the voices which have been heard frequently on the night shift. but, alas, it seems that the broadcasts which are somehow getting into the receiver's i.f. system are usually in spanish which makes them more irritating to listen to. some of the music that has also been heard is a little easier to take.

lab gab by 孫大偉

almost every night one can find people at work in the lab. since the seven year's construction of the 140-ft telescope is in its final stage the push seems to be on the millimeter lab, low noise lab, and digital lab to finish their shares of responsibility.

millimeter lab -

for past few weeks the millimeter lab has been trying to put the 6 cm multiple channel receiver together. here is an example of what happened during a particular week. to start off, the frequency multiplier was not functioning. after a new one was made and installed in the receiver, it was found that there was no cable connecting the klystron and the klystron power supply. later part of the day, a cable was found and placed in the system. the gain of the klystron was found to be too low and the noise figure was too high. a new klystron replaced the old one the third day. alignments were made on the klystron. that afternoon the switch driver stopped working. the next day

the switch driver was repaired. then the digital output system quit. it took almost the rest of the day to fix the system. of course the analogue record could not disappoint the other parts of the receiver by not joining them. on the fifth day, the recorder stopped operating. hope the millimeter will have some better luck in the future.

digital group -

the digital group completed and installed an automatic magnetic tape digital output system in the 140-ft telescope. operational amplifiers are used instead of r-c circuits to give a "perfect" integration. also featured in the new system is a 400 step per second magnetic tape recorder instead of 200 step per second type that previously have been used in the digital output systems.

a solar marker (est) system was installed. the system puts marker on analogue records such that not only can minutes, seconds, and hours be read from the record but also the day, month and year can be read from the chart.

the old lunar occultation digital output unit was modified for dr. erickson's use on the 300-ft telescope.

also the digital lab assembled a digital output unit for 6 cm, multichannel receiver.

low noise lab -

since the first of may, the low noise lab has been preparing the front end for the lunar occultation on 140-ft telescope on may 23. the three individual receivers (234 mhz, 356 mhz, and 405 mhz) were built in one single unit. this was the first observation ever made on the 140-ft.

..... continued on next page.

every so often you will see an image flying by in the lab. please do not worry. it is not an emergency or the man from nrao. it is just mr. shalloway. once he is on the move, he does not mess around with the 5 mph speed limit in the lab. we wonder what is his time for quarter mile run?

back ends -

we would like to welcome carl wooddell back from his stay in the hospital. after diagnosing his physical the doctor decided to give carl a "tune-up", which is why you didn't see him around much for a while. better change oil every 2000 from now on, carl.

fix-it shop -

the synthesizers keep rolling in along with oscilloscopes, john flukes, and you name it.

clair stephens and ken anderson are having a few differences over a certain softball game. it seems that there was a little interference run by a player on ken's team. if anyone has a rule book please call.

aui trustees scholarship

this year for the first time aui has offered a four-year scholarship to dependents of permanent observatory employees. the scholarships are awarded on the basis of past academic achievement and a test which all applicants must take.

the winners for 1965 are david hamed, son of tony hamed of engineering, and mike rose, son of bearyl mclaughlin of the works area. mike plans to start at marshall university this fall and david at west virginia university.

the scholarships will be offered again next year, so parents with college-age offspring might do well to check into them. the possibility of a \$900/year scholarship should be worth anyone's while.



findlay leaving nrao

after nine years in the mountains of west virginia, dr. john w. findlay is leaving for the mountains of puerto rico. it was announced by cornell university on march 7 that dr. findlay would become the new director of the arecibo ionospheric observatory effective september 1, 1965. the facility for which arecibo is most noted is its 1000 foot fixed dish which is the largest dish-type radio telescope in the world.

dr. findlay is not leaving nrao for good, but will only be on a leave of absence for one year - the term of his directorship. afterwards he will go to charlottesville where his family will have been staying, to join the rest of our scientific staff. it would seem that it pains the good doctor a bit to leave our scenic wonderland as he does no plan to depart from green bank until august 31 - one day before he is due at arecibo. at least he will recognize the familiar faces of a few erstwhile employees of nrao in his new job in the persons of yervant terzian, ellen gundermann, and occasionally dr. frank drake.

the three main areas of research now being explored at arecibo are 1) ionospheric study by radar backscatter. 2) lunar and planetary radar and 3) radio astronomy. dr. findlay is not sure in which areas he will work at this time, but one thing he is sure of: "i plan to improve my golf game - the place is lousy with golf courses."

welcome, doc

the observer wishes to extend its hand of friendship (that's not the one you use to get your wallet out) to dr. sam p. davidson, who is starting a "permanent" practice in the former office of dr. barry smith.

dr. davidson arrived in green bank around may 5, and is now living with his wife and three children (two sons aged 16 and 7 and a 5 year old daughter) in the "basement" of the clinic where dr. martin used to live.

after earning his m.d. degree at the university of tennessee medical school, dr. davidson served his internship at knoxville general hospital. he served with the u. s. army medical corps during world war ii in the states and the european theatre and has had general practices in boomer and falls view, w. va.; amigo, w. va.; and gate city, va. his experience is mainly in general medicine and obstetrics, which should be of interest to the mothers of the community.

we hope dr. davidson will find green bank as much to his liking as do those who live here now.

what time is it?

or, a day in the life of an n. r. a. o. telescope operator: he gets up at 7:00 a. m. (dst), washes, eats, and is on the job by 6:45 a. m. (est). he looks at his observing program and sees that the next source will be coming up at 6:15 a. m. (lst). at that rate he could finish one of those jobs that was needed yesterday.

by the time that source is "through" it is 10:30 a. m. (lst), which is really 11:00 a. m. (est) which in actuality is 12:00 a. m. (dst). time to eat after only 2 3/4 hours of work?

anyway, when the wall clock says 3:00 p. m. (est), his program is finished because it's 2:30 p. m. (lst) which is really 4:00 p. m. (dst). thoroughly confused, our boy stumbles out the door and drives off into the sunset ... or is it sunrise?

dear orlo,

last week when i walked into the lab to go to work i saw a two-wheeled motor-driven contraption parked outside the door with "omar" written on the side of it. what kind of a high school whoopee would ride something like that to work?

signed:
dilbert dirtynex

dear dilbert,

scoff not. that "contraption" was a new japanese f. a. s. the fastest motorcycle in the world except for the american slo-ped which holds the record at 732.69 mph.

orlo.

dear orlo,

grass-tex is to grass as soft coal is to a pillow.

signed:
roy rawknee

dear roy,

sounds like an asphalt to me.

orlo.

continued next page --

dear orlo,

the other day my boss, h. , gave me the tough but challenging assignment of building a receiver to monitor heaven. what frequency do those boys operate on up there?

signed:
james blob
secret agent 006.9

dear james,

i've been trying to get in contact with that place for years, but the closest i've come has been oral roberts on my television receiver. good luck.

orlo.

dear orlo,

what are you finks trying to prove by not using any capital letters in the observer? i was really embarrassed to have to show that piece of illiteracy to my friends.

signed:
pece doff

dear mr. doff,

if you think that was embarrassing, you should have seen it if the editor had tried to use capitals.

orlo.

dear orlo,

where did you ever get a crazy name like orlo?

signed:
bill smith

dear bill,

people who live in glass houses shouldn't throw stones.

orlo.

dear orlo,

yesterday when the garbage collector came around he accidentally picked up by sweatblood fm tuner which i have been working on for two years. what shall i do?

signed:
fubar jones

dear fubar,

keep quiet and maybe he won't notice it.

orlo.

information on public tours of the national radio astronomy observatory

scheduled tours of the national radio astronomy observatory will be offered to the public from june 9, 1965 through august 15, 1965. tours will be given at 11:00 a.m., 1:30 p.m., and 3:30 p.m. (daylight saving time), wednesday through sunday. no tours will be given on monday and tuesday.

tours will begin from the green bank high school. each tour will include a short movie or lecture on radio astronomy and visits to the principle operating radio telescopes. there is no charge for these tours.

observatory wives tea

the regular monthly meeting of the observatory wives is cancelled for the month of june. the meeting will be held at the regular time in july.

summer students

the observer welcomes the following summer students to n. r. a. o. :

graduates:

<u>name</u>	<u>school</u>	<u>major*</u>	<u>year</u>	<u>hometown</u>	<u>employed</u>
john m. comella	cornell	p, a	2	detroit	basic research
robert r. davies	u. wisconsin	a	2	pueblo, colo.	basic research
michael dewey	u. michigan	a	1	syosset, n. y.	basic research
philip heckman	u. chicago	p	1	kokomo, ind.	basic research
norman johnson	u. michigan	a	2	franklin, mich.	basic research (tucson)
amar maheshwari	u. chicago	p	1	portblair, india	basic research
theodore schoenbeck	ohio state	e	3	columbus, ohio	electronics
rebecca gordon	u. michigan	a	3	southport, conn.	basic research
kurtiss gordon	u. michigan	a	2	new york	basic research

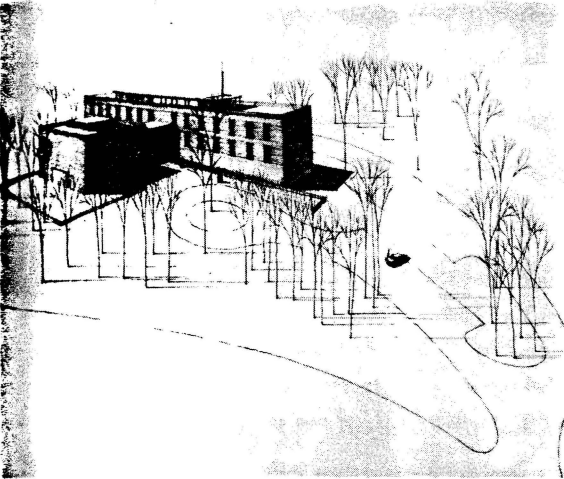
undergraduates:

richard l. branham	georgetown	a	4	arlington, va.	basic research
jerome l. cross	carnegie	e	4	pittsburgh, pa.	electronics
hermann flaschka	georgia tech	m	4	decatur, ga.	basic research
nancy h. remage	wellesley	a	3	newark, dela.	basic research
leon m. morrison	u. florida	e	4	gainesville, fla.	electronics
katherine moyd	cornell	a	4	yonkers, n. y.	basic research
anita petelinek	notre dame c.	p	4	cleveland	basic research
james a. steppe	n. c. state	e	4	raleigh, n. c.	electronics
david w. stowe	u. wisconsin	p	3	milwaukee, wisc.	basic research
andrew tanenbaum	mit	p	4	white plains, n. y.	basic research
m. f. thorpe	u. manchester	p	3	newcastle-upon-tyne	basic research
david klein	carnegie	p	2	pittsburgh	computer group
virginia fagerlin	u. north carolina	p	4	fort lauderdale	computer group

* p is physics, a is astronomy, e is electrical engineering and m is math.

preview: charlottesville

rising out of the ground only a mile and a quarter from the rotunda on the university of virginia grounds is a red and white, "jeffersonian influence", brick building.



Artist's Conception of New Lab

the building was designed by tippetts, abbett, mc carthy, and stratton, engineers and architects from new york, to house some five labs and a number of offices of our own n. r. a. o. construction is being carried out by r. e. lee and sons, charlottesville.

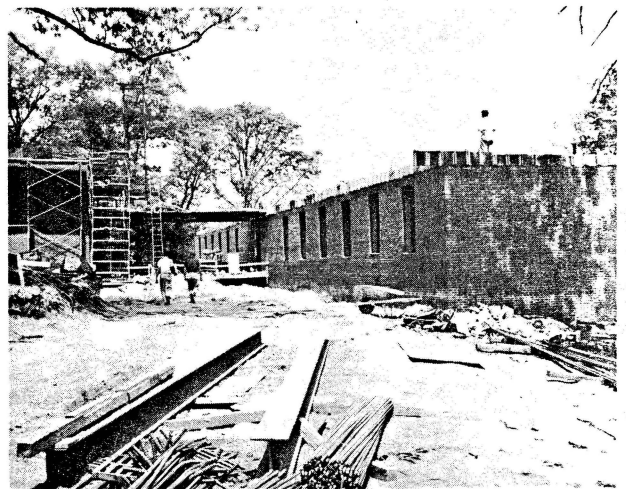
the plans for the building were approved by the fine arts commission of virginia, and after almost six months, construction is right on schedule. according to the contract, the building will be ready for occupancy the first of december, 1965.

although the main portion of the building will not be as large as the green bank lab building, it will have three floors, the top two of which will be connected to a smaller building section in front by a plate glass enclosed connecting link. the smaller portion of the building will

house a library and a 112 seat auditorium, while the larger will have the offices and labs, a drafting room, a computer room, a darkroom, a shop, and for those who now make the daily trek to walt's place, a canteen for coffee breaks.

on the third floor will be the scientific offices, a conference room, and the library. the second floor will be devoted to electronics labs and associated offices and the auditorium. everything else will be on the first floor of the main building except for the added attraction of a "walk on" roof for antenna experiments.

charlottesville is only 115 miles from our scenic wonderland here in the heart of pocahontas county; so if you get the itch for first-hand info, why not drive down and see for yourself?



Similar View Taken on May 5, 1965

the curse of alberich
or
the origin of teutonic astronomy

(editor's note: this was found unsigned in my mailbox.)

translator's note: this manuscript was discovered recently under the ruins of an early german university. it was written in an odd mixture of old english and early low german; the rhyme scheme was quantitative except for the crude a-b-a-c-d endings. quantitative verse, a legacy of the greeks, is almost unknown in early english works and, in fact, is almost unknown in modern english. at the risk of a rather crude syllabic meter the translation attempts to keep the quantitative sense.

the dating is quite uncertain---the basic scene is ca. 600 ad, but the reference to the new world is disruptive and the heros' names quite post-wagnerian.

of the dreadful curse of alberich, rained on a stalward race
which, after a hundred generations, holds fast within their souls
of the gold bedecked treasure, set forth for all to face
and the blood drenched web of the norns which winds this weary fate---
this then is the tale to be told.

sigi, son of odin, was a mighty king of the hunns
it was he who fathered the volsungs and, in turn, a mighty race.
the rhine-gold¹ was first seized by alberich the nieblung;
from him wotan and loge by guile did steal the horde,
and alberich did curse them thus:

"beware! mighty wotan and all who line your bars---²
the gold with the ill-begotten ring¹ shall lure all your sons
along the paths of the world - chasing the light of the stars³.
always your sons and daughters shall be torn from the hearts of their friends
to wander across the earth.

wotan was of cautious mind and gave the gold to fafner
who carried it south unto the banks of a great river
where he placed it in the depths of a cave in the hills of the winding neckar.
then he took the form of a dragon to await the foretold coming
of he who would inherit the curse.

time brings always changes some for better or worse.
the hunns soon gave way to the people, those who had suffered so long,
people known as germans, those to inherit the curse.
mightiest of the germans was sigfried who learned of the gold awaiting
on the banks of the attractive neckar.

continued --

sigfried found the dragon and with the sword of the god¹
 enjoined a prolonged battle which raged throughout the days;
 throughout the land of the huns and over the forest they trod
 until at last fafner tired and there was slaughter great and grim.
 but ere he died he prophesied:

"sigfried, great is the treasure thou today hast won,
 but greater yet is the curse upon this bitter gold.
 your sons shall rail your might as the cloak of the wanderer they don
 to walk the ways of the world following the path of the sun --
 this then is the treasure won. "

now sigfried lost the treasure and brought the fall of the gods¹,
 but his sons rose up again to walk the paths of the world.
 the will of the niebelung held and they would forsake their sod --
 off to the east they went to war on the lowly russ,
 and south to topple byzantium,

in the north they overcame their masters⁴, to the west they spread their curse.
 aye, to the people of the lowlands they lent their weary fate--
 the penchant to roam the earth, the desire to search the universe--⁵
 the need to destroy old roots and then destroy the new
 because of that curse by the neckar.

time passed again and this fate is with them today
 to the fabled new world they came chasing the gold and the stars;
 they came to make new homes, but soon they wandered away⁶
 chasing the stars once again, destined to wander afar
 and make lonely the least of their friends.

this then is the curse of alberich the niebelung.

-
1. the reader should be familiar with teutonic lore.
 2. teutonic astronomers are often well known drinkers. possibly
 this is a reference to this fact.
 3. the main theme---an obvious reference to early german astronomy.
 4. sweden was at one time t-h-e power in northern europe.
 5. the dutch are also well known for their early astronomical efforts.
 6. from the manuscript it is impossible to tell whether the tense of
 this line should be past, present, or future. perhaps all three are
 implied.
-

reloading

the nraora now has sufficient equipment to reload most of the popular calibers. the following full length re-sizing dies are on hand:

- 1) 308 win. 6) 30 carbine
- 2) 243 win. 7) 30-30 win.
- 3) 222 rem. 8) 300 savage
- 4) 257 roberts 9) 35 rem.
- 5) 244-6 mm rem. 10) 270 win.

the corresponding bullet seating dies are also available. powder, primers, and bullets can be purchased by seeing paul devlin.

the green bank rifle and pistol club meets the first tuesday of every month at 7:30 pm. anybody interested in learning how to reload center fire cartridges is invited to attend the meeting or contact one of the members. savings of up to 75% are possible when reloading old shells. reloading is not dangerous if proper precautions are taken.

ceramic workshop

the regular wednesday night ceramic workshop will be closed for the summer. the last regular session will be june 30th. anyone wishing to finish any items already started should do so.

for sale

mobile home, nashua, 2 bedroom -- \$2,500 -- excellent condition.

dick grabe
extension 347
phone 456-4783

house for rent

1 mile from frost, w. va., on road to virginia -- 6 rooms, bath and basement. will rent partially furnished, if desired.

contact
mrs. dale mc carty
phone 799-4924

movies for june

june 7 -- "serengeti shall not die"

an academy award winning documentary. a panorama of life in the african jungle.

june 21 -- "white wilderness"

a walt disney true life adventure from the mysterious, frost-bitten regions of the arctic.

june 28 -- "sergeant york", starring gary cooper, walter brennan and joan leslie

the story of a brave conscientious man who shuns a hero's reward to return to his beloved tennessee home.

library starts fund drive

on july 1, 1965, the green bank public library will have finished its second year of service to the community. this week appeal letters will be mailed to members, former contributors, and interested people in order to raise the money for operating the library for the coming year.

during the past two years the money for running the library has come primarily from private donors. approximately 72 people from upper pocahontas county gave last year, many contributing \$1 a month or more.

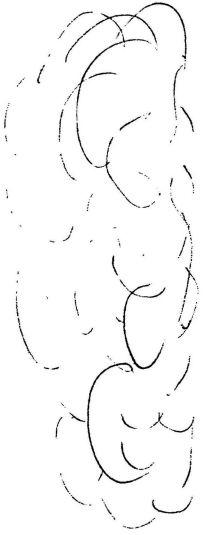
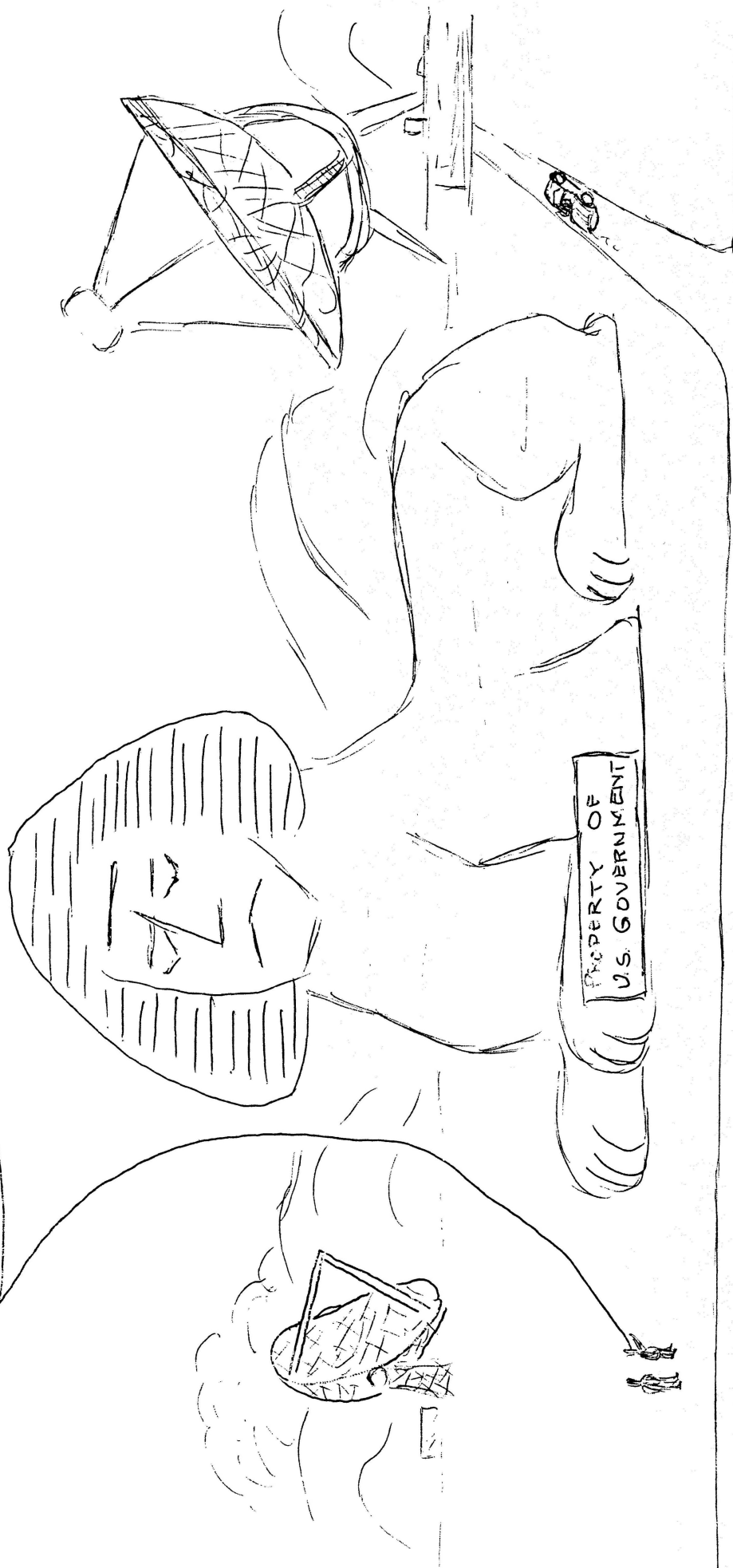
the green bank public library occupies a small house next door to mouser's store in green bank, and is open tuesdays 3-5 p.m., 7-8:30 p.m. and thursdays 7-8:30 p.m.

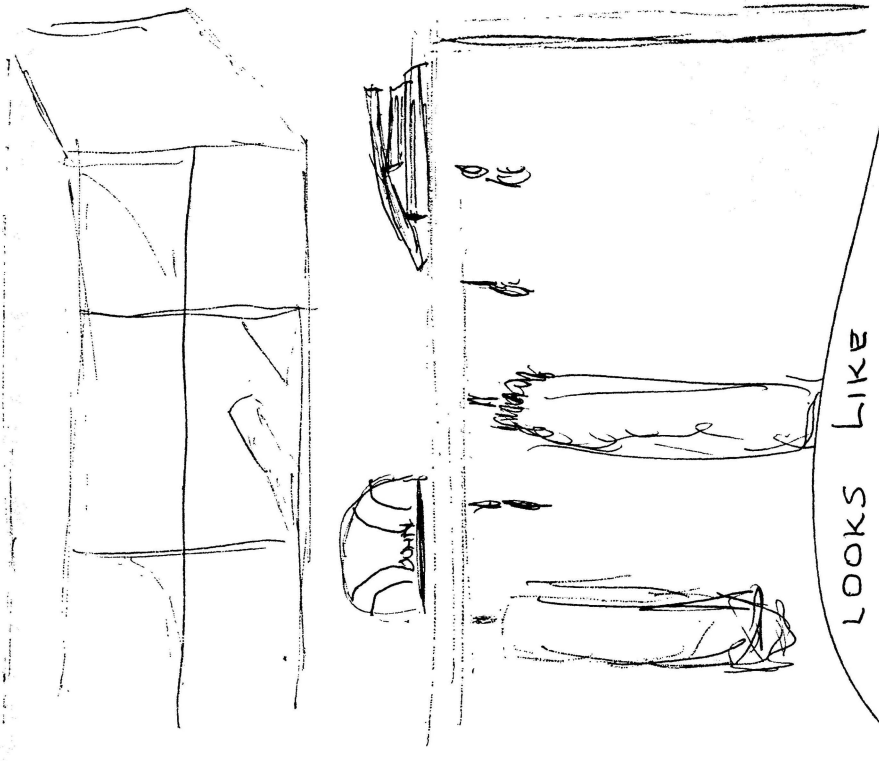
during the year the volunteer staff of the library processed and shelved 300 books which were donated to the library. they have also made a card catalog. at the present time the library collection includes books on permanent loan from the west virginia library commission, and many books which are now owned by the library. every three months the staff returns 75 books to the library commission in exchange for 75 new books. in addition the library also orders books which have been specially requested by individuals.

the library now has 177 members and its circulation of 2210 books is greater than last year's by 700 books.

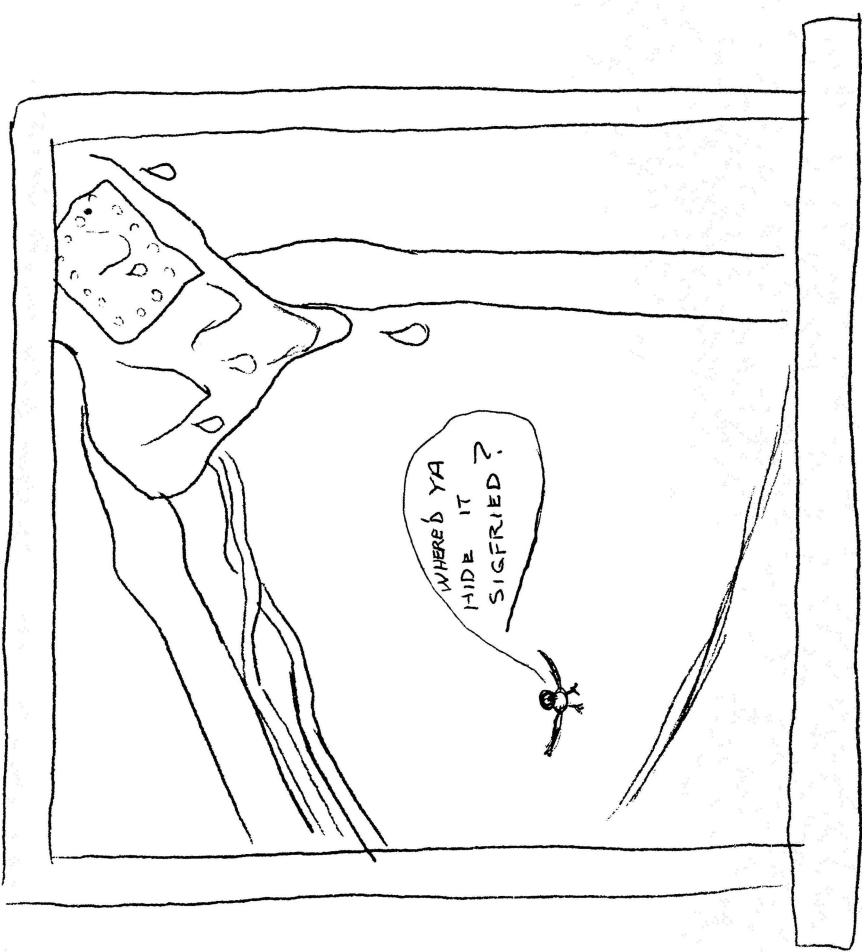
until the present time the green bank public library has been organized and run by an informal group of volunteers. recently mrs. edmund gardner, miss peggy smith, rev. denver lively, and mr. john plunkett have been asked to serve as a preliminary committee which will become a more formal board of trustees for the library. it is planned that the board of trustees will take over the responsibility for the annual fund raising campaign, and setting the general policy for the library. the routine work will continue to be done by a group of volunteers.

WELL, THAT'S WHAT
WE GET FOR PUTTING
STUDENTS INTO THE
ENGINEERING SECTION!

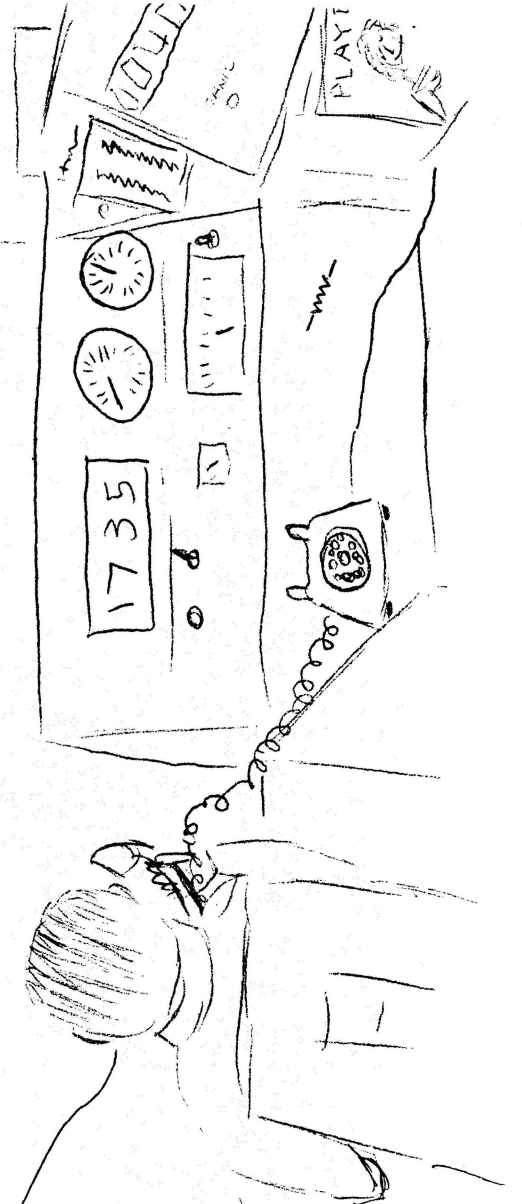




LOOKS LIKE
A BIT OF A COOLING
PROBLEM.,.,.

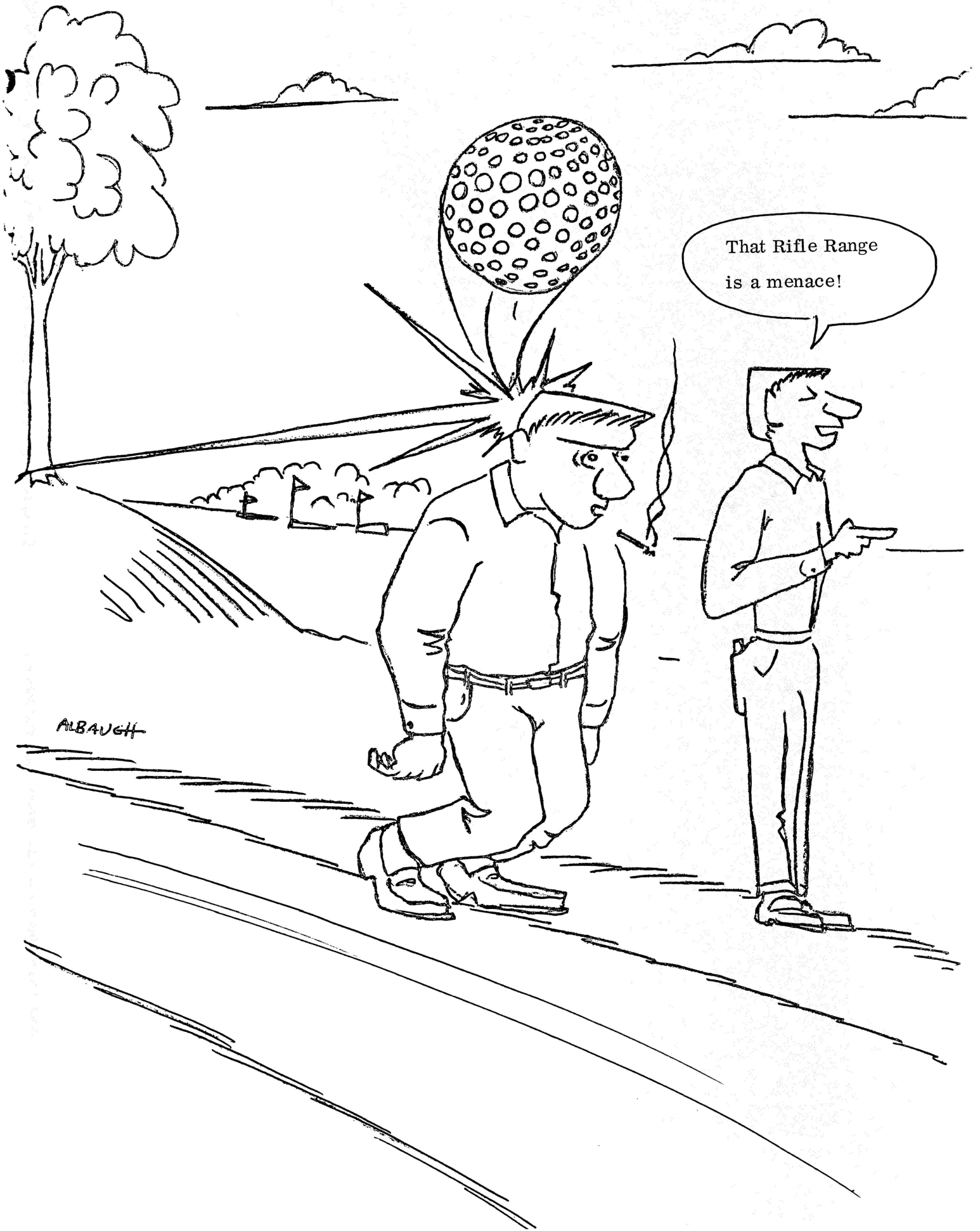


WHERE'S YA
HIDE IT
SIGFRIED?



1735

PLAY



That Rifle Range
is a menace!

ALBAUGH