

The O B S E R V E R

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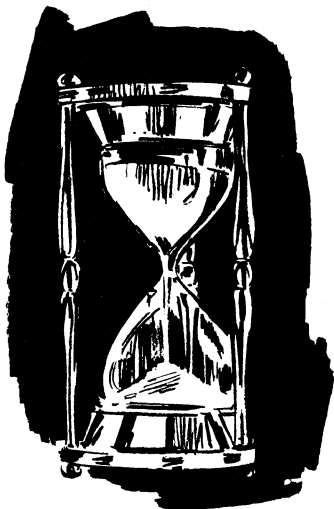
HOBO - A LEGEND IN HIS OWN TIME
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HOBO
A LEGEND IN HIS OWN TIME

Ken Kellermann

Astronomers, engineers, cooks, doctors - they come and they go. But one of the longest, continuous residents of the Observatory is Hobo. He was born on December 7, 1964, the son of Hobo I (a Norwegian Retriever who belonged to French Beverage) and Digy (a beagle owned by the Hungerbuhlers). He had four brothers and one sister. Hobo grew up with Doris and Arne Hungerbuhler and a cat. At various times he has lived with

roughly as the boundary of NRAO, and no competitors were accepted. As far as I know he never lost a fight, but there were a few bloody draws. Perhaps his most memorable battle was a three-way battle involving Hobo, Sam (a large, black canine of unknown mixed parentage), and Susie Dolan. Hobo lost a piece of his right ear, Susie nearly lost a finger when she tried to break it up, and both Hobo and Sam took weeks to recover from their bloody wounds. But since then Hobo and Sam have had a healthy respect for each other.



Digy lavishing attention on little Hobo

the families of Omar Bowyer, Buck Peery, John Payne, Bill Howard, and myself. On numerous occasions he has somehow managed to live and eat with two or three families simultaneously.

In his youth, Hobo was independent of the favors of man and managed to live off the local wildlife. He could outwit or outrun any rabbit, chipmunk, squirrel, mouse, beaver, and, alas, even a skunk (but only once!). I have seen him sit for hours over a rabbit hole, and usually acquire his prey as the result of a single powerful paw stroke. Other than to satisfy his need to eat, Hobo generally did not pick quarrels with smaller dogs or other lesser animals. But he had long ago staked out his territory, defined



Hobo engaging in his favorite pastime

Hobo has always been fond of walking, and will frequently join a group for a weekend hike. He got more than he bargained for one day last fall when he set out with Tom Cram toward Buffalo Ridge - and ended up in Monterey. Insofar as is known, the furthest Hobo has traveled from Green Bank is to Charlottesville, where he visited with John Payne for a weekend.

In recent months, Hobo has met a couple new friends - "Tramp" and "Bandit", who together with Hobo took up residence at NRAO. Unfortunately, Tramp had a bad habit of digging deep holes in the NRAO flower beds, and Hobo was quick to learn this trick. Tramp was subsequently invited to leave the

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Observatory.

During the winter months, Hobo spends a lot of time indoors. But when spring comes, we hope to see him again around the Jansky Lab, the cafeteria, the shops, or the telescopes.

HOMEOSTASIS

Richard Fleming

Homeostasis (hō-mē-ō-'stā-səs) is "the tendency of a system, especially the physiological system of higher animals, to maintain internal stability, owing to the coordinated response of its parts to any situation or stimulus tending to disturb its normal condition or function." This technical term describes the process which controls the temperature equilibrium within the human body.

Homeostasis can be thought of as the body's thermostat and it tries to maintain a relatively stable body temperature. This "thermostat" is almost entirely automatic. The body is kept warm by blood circulating throughout the head, trunk, and extremities. The blood vessels in the extremities can contract and dilate whereas the ones in the trunk, neck, and head cannot. When you get cold, your body will conserve as much heat as it can around your vital organs by constricting the blood vessels in your hands, arms, feet, and legs. Conversely, when you are warm, your blood vessels will dilate, or open up, and the increased blood flow will radiate the excess heat out through your extremities and finally through your skin. The body is assigning priority to the body's organs, which it needs more than extremities, to sustain life.

The head is the only part of the body where blood vessels do not contract to conserve heat since they must supply the brain to keep it functioning. The brain, therefore, has first priority, vital organs second, and extremities last. Because your head has no vaso-constricting mechanism to slow down the heat radiating blood supply, you will quickly

lose body heat from a bare head or neck. Studies have shown that 50 percent of the body's total heat production may be lost through an uncovered head at 40 °F. The old saying "when your feet are cold, put on a hat" is quite proper.

The internal burning (metabolism) of food or tissue takes place mainly in the liver and muscles. This burning takes place at a specific rate at rest, known as the basal metabolic rate, which can be elevated by fever, exposure to cold, eating, activity of organs and muscles, and by certain hormones such as adrenalin and thyroxin. In order to maintain a comfortable level of warmth, the body must produce heat at least as fast as it is lost to the environment.

In cold weather, if you wish to keep your hands and feet warm, you must insulate your head and torso properly. By conserving the heat generated by your torso you will force any excess to your skin surface and extremities where the blood vessels will then dilate permitting more blood flow and more warmth. No mitten or glove in the world will keep your hands warm if your trunk heat is insufficient.

The rule of thumb is that you can survive three weeks without food and three days or so without water, but without warmth you are lucky to last three hours. If you wish to keep warm while backpacking, walking out from your downed aircraft, walking to work, or just simply trying to put up with that house thermostat at 66 °F, it is wise to know the relationship between the wind, air temperature, metabolism, and other mechanisms which contribute to the loss of body heat. The effective temperature of the world around you is the combination of true air temperature, altitude, solar radiation (or radiation from other sources such as rocks heated during the daytime, campfires, etc.), and wind velocity.

Body heat is lost to the environment through the processes of conduction, convection, and radiation. The thermal conductivity of water is 240 times that of still air and a small amount of air movement over a surface increases the heat transfer by a factor of 5. The human body warms a thin layer of surround-

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ing air by conduction and radiation. However, if this thin layer is being removed by wind convection currents as rapidly as it is warmed up, a high rate of heat loss will result. This is described as the wind-chill effect and is most dramatic at low to medium wind speeds. Note in the chart that the wind-chill effect is greatest during the first 20 mph of wind speed over still air. The chart can be used by starting with the actual air temperature (thermometer reading) and across from the wind speed in the air temperature column find the effective air temperature with no wind. Example: an actual air temperature of +20 °F and a wind speed of 10 mph (both common in Green Bank), the chilling effect is the same as if the air temperature was -4 °F and there was no wind.

perature (98.6 °F). The temperature of the hands and feet can drop 40 to 50 °F below normal body temperature without lasting harm. But a relative drop in the temperature of the body core will kill you. A body core temperature drop of only 6 °F is more than enough.

Hypothermia occurs in stages. When the body temperature drops to 95 °F dexterity is reduced to the point where you cannot open a pocket knife or light a match. Shivering begins, followed by clumsiness, stumbling, falling, slow reaction, mental confusion, and difficulty in speaking. A serious event is loss of use of the hands which hampers efforts to set up shelter or light a fire. Below 90 °F, shivering stops and muscles become rigid, you become irrational and lapse into a coma. Death occurs below 78 °F, and may occur within two hours of the first symptoms.

EST. WIND SPEED MPH	ACTUAL THERMOMETER READING (F.)											
	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
	EQUIVALENT TEMPERATURE (F.)											
0	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
5	48	37	27	16	6	-5	-15	-26	-36	-47	-57	-68
10	40	28	16	-4	-9	-21	-33	-46	-58	-70	-83	-95
15	36	22	9	-5	-18	-36	-45	-58	-72	-85	-99	-112
20	32	18	4	-10	-25	-39	-53	-67	-82	-96	-110	-124
25	30	16	0	-15	-29	-44	-59	-74	-88	-104	-118	-133
30	28	13	-2	-18	-33	-48	-63	-79	-94	-109	-125	-140
35	27	11	-4	-20	-35	-49	-67	-82	-98	-113	-129	-145
40	26	10	-6	-21	-37	-53	-69	-85	-100	-116	-132	-148
SAFE PROPERLY CLAD					DANGER FOR BARE FLESH				GREAT DANGER FOR BARE FLESH			

Parts of the body with a large surface-area-to-volume ratio such as the head, ears, hands, and feet should be adequately protected. There is the danger of frostbite to these parts and with continued exposure to body cooling conditions hypothermia may become a danger. These two conditions can happen together or separately. If the surroundings are below freezing frostbite may occur. Hypothermia, on the other hand, can occur at temperatures above freezing. Hypothermia refers to cooling of the entire body or the lowering of the body core tem-

Hypothermia is a danger even in mild temperatures, say between 30 °F and 50 °F. The majority of cases develop in this seemingly harmless range. Being wet and in the wind or without proper protection can lead to hypothermia. Hypothermia is deadly because it is so subtle. We have all shivered at some time, with no discernible harm, because shelter and warmth were nearby or we had plenty of energy reserves to produce heat for a long time. What one rarely remembers about hypothermia is its effect on the mind.

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Clothing is important primarily for the insulation it provides by creating a dead air space between your warm body and the air outside. There is no clothing that is effective in every situation. Duck down, best for stopping wind, is of no use when wet. The clear plastic covering that protects against rain is not, by itself, a good insulator against cold. Wool has the peculiar virtue of drying from within, keeping the body warm even when wet. It is wise to learn which clothes are merely bulk and which will keep you warm. Understanding the environment, its effect on you, and how the body reacts and tries to adjust will allow you to be more comfortable or even survive an emergency.

CENTRAL SHOPS

Since October, 1976, Central Shops has been working on several new projects. One of the most important, and one receiving much attention Observatory-wide, is the Maser System. Most parts for the Maser are made from electrolytic copper and brass, and have to be machined to very close tolerances. In this Maser work we have been fortunate to be able to use methods and experience developed at JPL.

Probably the second most important project Central Shops is working on is the Inductosyn for the 300-foot. About three hundred man hours of work will be involved in making this unit whose principal parts are made from 304 stainless steel. The Green Bank Engineering Division designed the Inductosyn.

Recently the shop finished a 9 cm Scaler Feed Horn whose feed measures 31 inches in diameter and was made in two sections from 5 and 6 inch thick aluminum plates. The work went along smoothly and only minor modifications were necessary. In order to meet the project deadline, we worked two shifts for two weeks and one weekend.

We anticipate additional work on the Maser system, and fabricating parts for a few more helium refrigerators and compressors will keep Central Shops busy in the future.

BOWLING

Dick Hiner

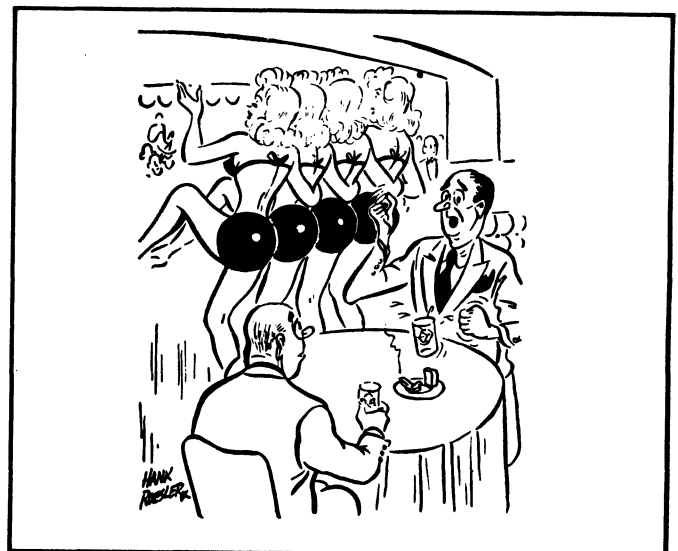
The first half of our league bowling schedule ends on January 4, 1977. Up to December 7 we won 26 and lost 30 games, placing us eighth in a 12 team league. By comparison, the first place team has won 34 and lost 22 games.

So far during the first half of the season, Wendell Monk (Central Shops) bowled the high series with a 527 on October 26, and is high for total pins.

First half members of the NRAO bowling team were Bruce McKean (Fiscal), Jim Gibb (Fiscal), Rufus Chappell (Cafeteria), Harold Crist (Telescope Operations), Dick Hiner (Telescope Operations), Larry Miller (Electronics), Howard Brown (Telescope Operations), Bob Vance (Computer), and Wendell Monk.

The second half of league play starts January 11, 1977. Team members for the second half will be Edward Burke (Telescope Operations), Don Hovatter (Fiscal), Albert Wu (Electronics), Larry Miller, Bill Vrable (Electronics), Bob Vance, and Russ Poling (Telescope Operations).

We need some new bowlers. If you are interested in bowling, contact any of the above.



"That reminds me — gotta bowl tonight."

THE 6/25 CM RECEIVER SYSTEM

Jim Coe

We have just completed our first observing session with the 6/25 cm receiver which was designed to provide the 300-foot with a receiver equivalent to the 140-foot Cassegrain 6 and 25 cm wavelengths system. Frequency bands received at 6 cm are from 4500 megahertz to 5100 megahertz and at 25 cm from 1000 megahertz to 1450 megahertz. In this article, I would like to describe how this receiver was developed and to show how many people were directly involved in its design and fabrication.

The design concept was established by Sandy Weinreb, Rick Fisher, Ken Kellermann, and Craig Moore. This concept included: (1) the 25 cm receiver was designed primarily for line observations and the 6 cm receiver was designed for continuum observations; (2) to save time and eliminate the need for warming and cooling the receiver the feeds would be changed from inside the front-end box with the receiver mounted on the 300-foot antenna; (3) a cooled diode transfer switch would be developed to provide two channel beam or polarization switching and cold load switching for the 6 cm receiver; (4) the 4.5 to 5.1 GHz paramps would be the same type as those used in the 140-foot Cassegrain system; (5) a new upconverter would be developed for the lower frequency range of 1.0 to 1.45 GHz; (6) a single beam orthogonal linearly polarized 25 cm feed, and a dual beam circular or linear 6 cm feed would be developed for the receiver system.

This receiver uses a closed-cycle helium refrigerator to keep the critical components cold so receiver noise is reduced which increases sensitivity. The refrigerator cools these components to 15 °K (absolute zero is 0 °K). However, there is a limit to the heat load the refrigerator can handle and still cool down to this temperature. Therefore, considerable care must be used in designing the vacuum chamber and the input and output lines so heat load on the refrigerator is minimized.

Since this was our group's first cooled receiver project, we were fortunate to be

able to obtain advice and help from other individuals at NRAO who had experience with cooled receivers.

Our first attempt at constructing a vacuum chamber or dewar was to utilize the dewar designed from aluminum channel for the Cassegrain system. The dewar leaked badly near the welds. When we attempted to reweld it other leaks appeared as if the metal was fractured near the welds. We designed and constructed another dewar of similar size from stainless steel. This dewar had a very low leak rate when tested.

Tony Miano did the detailed dewar design. Sidney Smith made the stress calculations for determining the minimum material thickness required. Ed Gardner machined the end plates, Dorman Williams rolled the cylindrical part from flat plate, and Basil Gum welded the parts together. Howard Brown and Dave Williams showed us how to clean and leak test the dewar.

The next step was to design and construct input and output lines which would provide adequate thermal isolation between the refrigerator and the dewar walls. This was necessary to prevent overloading the refrigerator cooling capacity. These lines were constructed of thin wall stainless steel tubing which resists heat flow about 10 times better than aluminum. The insides of these lines were gold plated to proper thickness for good electrical conductivity. Proper plating thickness is important because any excess gold plating adds appreciably to the heat flow through the lines.

When the input lines and the paramps were received they were installed in the dewar. Boyd Wright made the copper brackets to strap the paramps to the refrigerator cold station. He used a soft metal foil between the brackets and paramps to insure good thermal conduction to the cold station. Boyd also constructed the radiation shield which reduces the thermal radiation between the cold station and the dewar walls. Martin Barkley assembled the pump input lines and when some of these lines leaked they were re-designed on Martin's recommendation, and remade.

Then we were able to cool the system down with the paramps mounted. It cooled down from room temperature to 15 °K in about 3½

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hours. This was a milestone in the process of developing the receiver system. It made us think that some of the calculations of the thermal loads must have been right.

Unfortunately, we soon found out that the paramps, when cold, were very unstable. Intermittent bias connections and gain changes with vibration were occurring in all six of the paramp modules in the system. Warming up the dewar, retightening the screws holding the paramps together, and re-cooling solved this problem. After doing this, we found the paramps were more stable but improperly tuned. Bill Shank's remedy for the tuning problem was to mount one of the paramp modules in a test dewar built by George Behrens, cool it down and retune. The process of repair and tuning of the paramps required several months. Several of the paramp modules had to be disassembled and bias connections repaired. Two of the modules had to be returned to the manufacturer for varactor replacement.

Finally the paramps were working satisfactorily, and we proceeded to mount the 25 cm upconverters using brackets made by Boyd Wright. The input lines for the upconverters were late in arriving - because the manufacturer lost the order. We didn't know this until I checked with the manufacturer when the lines didn't arrive on schedule. When they did arrive we found that they had not been sealed as specified. So we sealed the lines with epoxy. A leak detector check showed the epoxy seal was OK, however one of these lines developed a leak later on.

Of the two upconverters, one worked very well, but the other one seemed to have extra loss. After warming the system back up (which takes about a day) and removing the upconverter, we found the input line connection had to be resoldered. When we cooled the system down again the upconverters worked fine. The upconverters had to be tuned very carefully to optimize the noise temperature over the frequency band. Tuning and measuring noise temperature took several weeks.

In the meantime, George Behrens had been going through a design and development process with the diode transfer switch. After several trial designs, George produced a switch with minimum insertion loss and ex-

tremely flat frequency response. The case on this switch required precise machining which was done by our shop. Detailed drawings for the case and the stripline printed circuit boards were made by Tony Miano.

After mounting the switch in the dewar, we cooled the system down. The only unexpected thing we found with the switch was that the diodes, when cold, took a long time to turn on. We could, however, run the switch at 50 Hz without much degradation in noise temperature due to diode turn on time.

We had to measure the increase in noise temperature due to the switch. At 6 cm there was about 10 to 13 degrees increase. The switch didn't add any significant noise temperature at 25 cm.

We ran a stability test on the system and found it worked fairly well. After another warm-up cool-down cycle we had a failure in the other upconverter - it had a crack in the ceramic substrate so we sent it back to the manufacturer. When the upconverter was returned, a final bench test showed the dewar system worked and we went ahead and installed the dewar in the front-end box.

The front-end box had to be longer and stronger than the standard box to support the 200 pound dewar and enable us to change the feeds from inside the box. Omar Bowyer adapted his design for the 9 cm receiver system to our requirements. Dorman Williams' crew (Winston Cottrell in particular) assembled the box and determined the dewar would fit.

Jim Oliver wired up the input cables to the box and made the heater coolers and fans work. He also assembled the control rack. Gary Homer, our co-op student, designed some of the control cards for this system and built most of them; Tony Miano made the drawings required for printed circuit cards and front panels; Doreen Morris etched the printed circuit boards; and Wendell Monk engraved the control panels.

After Bill Shank finished wiring the control cards to the dewar and installed the oscillators and amplifiers external to the dewar, and Jim Oliver and Gary Homer finished the control rack, we were finally ready for the first test of the whole 6/25 cm receiver

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system. Surprisingly most everything worked. Thanks to the care Bill and Jim had taken in putting it all together we had almost no wiring errors.

George Behrens designed the two 6 cm feeds for the receiver. The 25 cm feed was built by an outside vendor to George's specifications. The 6 cm feeds were fabricated in our shop and tested by Bill Kuhlken. Martin Barkley and Marvin Wimer worked on the waveguides used to connect the feeds to the dewar.

We tested the receiver in the indoor/outdoor range behind the lab. The noise temperatures were measured with the feeds pointed up at the sky. The stability of the receiver was tested as the box was rotated around. The 25 cm system showed a noise temperature increase much greater than anticipated. When we looked at the receiver output spectrum, we found interference at a number of places in the band. Part of this interference came from the two upconverter pump oscillators. This problem was cured when Bill Shank designed and the shop fabricated two RFI tight boxes for the offending oscillators.

The next step was a scheduled test on the 300-foot. Jim Oliver assembled the special cables needed to interface with the standard receivers and local oscillator system at the 300-foot. Herb Hanes and Ron and Don Gordon installed the receiver. Bob Viers helped us get it hooked up and running. Rick Fisher determined the focus, beamwidth, and efficiency of all three feeds. Herb Hanes and Dorman Williams had helped lay out a feed box which would hold the spare feed parts and could be lifted to the focal point. This made it possible for Jim Oliver and Ron and Don Gordon to change the feeds in a couple of hours. Rick looked at the spectrum of the 25 cm receiver very carefully to determine if any spurious signals were present. None were detected. During the run the dewar vacuum deteriorated. We thought the 6 cm waveguide windows were leaking so we replaced them when the receiver was brought down.

We were still having vacuum problems when we installed the receiver for the first observations at 25 cm. After pumping on the dewar, it lasted for about a week before the

vacuum got so poor the receiver started to warm up. By the time we were nearing the end of the 25 cm observations, Jim Oliver and I were climbing to the focal point and pumping on the dewar every other day. We still could not find the leak in the dewar. When we brought the receiver down and hooked the leak detector up to it, Bill Shank found an intermittent leak in one of the upconverter input lines. After we sealed the leak, the vacuum held very nicely through the 6 cm observing run.

The 6 cm observing run went well. The receiver sensitivity was very close to the theoretical sensitivity, but we did have intermittent instabilities in one of the channels. A few spurious signals showed up on the 25 cm receiver system during the observing run but we hope to eliminate these by adding some filters to some of the oscillator outputs. Overall, the performance of the receiver was pretty good.

Besides the people already mentioned, I received helpful advice from Bill Brundage, Chuck Brockway, and Ray Hallman on the design and testing of the receiver. Help also came from the Green Bank Graphic Arts department and the plating shop at Charlottesville.

My main point in this article is to show that considerable effort from many people is required to produce a new receiver system. Without the contributions from these people, the development of this receiver would not have been possible.

CREF UNIT VALUES - 1976

January	\$40.31
February	39.76
March	40.75
April	40.10
May	39.69
June	41.60
July	41.21
August	40.94
September	41.59
October	40.62

FIRST ANNUAL VLAPRA PICNIC

THE CHOW



THE FUN AND GAMES



There were many small-fry and adult games to occupy the afternoon. In addition to those portrayed in the following pictures there were also distance games such as football throw and rolling pin toss, kiddies piggyback race, three-legged races, balloon races, and even an egg throw.



"Actually, girls, don't let it get out...but the cafeteria food is better." Rosalina's Danny, Doris Gill, Rosalina Aruji, Don Swann, and (lower right corner) Emily Mathieu.



Sprinting on the second leg (women handled first leg) of the "let's get our heads wet" competition finds John Liebenrood in the lead followed by Robert Froelich, Michael Keyes, and in the back stretch, Jon Spargo.



The women were game, too! In the foreground is Lynette Napier and Dora Spargo.

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Aha - there is that Ken Sowinsky again. Do believe he only helped so he could get all kinds of exposures.



"Really, Jack, I wish you hadn't taken so many onions!" Left to right: Barry Blaisdell's father, Marlene Blaisdell, Jack and Phyllis Lancaster.



"And who told you there was a crap game going on over here?" Cynthia Baca, Bill Dumke, Steve Maas, Dan Baca on chair, and Robert Froelich with back to camera.



Indicative of the full family participation is this grouping of the Phil Dooley family to the left and the Joe Ortiz family to the right.



"No, Thurman, you patty-cake this way!" Marjorie and Thurman Derryberry in background, Myra Guin holding little April.



Here we find Les Temple leading the sneakers away from this group. We have it on the best authority it was due to one-too-many of Spargo's jokes.

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POCAHONTAS COUNTY IN THE CONFEDERACY

Tom Dunbrack

This article is being written primarily because the Editor-in-Chief of this chronicle has difficulty getting "nice to know-but not-need to know" contributions.

Now that y'all have seen "Gone With The Wind" on television and how those bad old "yankees" and "carpetbaggers" took advantage of us easy-going, fun loving people of the southern persuasion, I thought I would let you know how Pocahontas County, of which this "Stronomy Plant" sits on, fits into these outer fringes of the Confederacy.

Pocahontas became a county in March, 1821 by an act of the Virginia Legislature in Richmond. It was formed of land detached from Bath, Pendleton and Randolph Counties. There were to be two counties formed at this time--Pocahontas and Allegheny. Thomas Mann Randolph was the Governor of Virginia at this time and the fact that he was a descendant of the Indian Princess Pocahontas probably influenced his decision in naming the county.

The area that "Embraced the Crown of the Alleghenies" was to be called Allegheny and the area to the southeast was to be called Pocahontas. But due to a clerical oversight in Richmond the names were interchanged. Yes, government employees made mistakes in 1821 just as they do in 1976.

On March 5 and 6, 1822, all the county officials were appointed and sworn into office at Huntersville. The 127th Regiment of the State Militia was organized and was to be provided for by the county.

Edray was chosen as the permanent county seat by an appointed committee, but there was such a loud protest from people living near the head of the Greenbrier River that Huntersville was finally chosen as the permanent site.

The population of this area in 1800 was 153 persons but by the year 1860 it had increased to 3,958, due mostly to the long winter nights and the heavy influx of "Pilgrims" leaving the congestion of the cities.

In April, 1861, when Virginia adopted the ordinance of secession and joined the Confederacy, most of the counties west of the

Alleghenies met in Clarksburg to decide what course they should take. After several meetings and conventions which led up to the constitutional convention in Wheeling on November 26, 1861, a constitution was formed and ratified on May 3, 1862 by the qualified voters of 48 of the old Virginia counties. This was the birth of the new state of which Pocahontas County did not participate in any way, but was included into. Probably the biggest factor for the inclusion of Pocahontas County into the new state was its natural boundary formed by the ridge of the Allegheny Mountains.

By late July and early August, Pocahontas County was occupied by approximately 8,500 Confederate Troops under General Loring. Loring had his headquarters at Huntersville with men stationed on the Staunton-Parkersburg Turnpike at Bartow. There were also troops stationed on the Huttonsville-Marlington Turnpike at Valley Mountain, the area now known as Mace and Linwood.

In Pocahontas County - the scene of many a conflict, some of which are not recorded in history - two infantry companies and one cavalry company were formed in April, 1861.

One of the infantry companies was organized at Huntersville and included nearly 100 men, commanded at first by Captain D. A. Stoner and later by Captain J. W. Matthews. This company was to become "Company I" of the 25th Virginia Regiment.

The other infantry company, formed at Green Bank, was composed of 106 men under Captain James C. Arbogast and became "Company G" of the 31st Virginia Regiment.

A cavalry company of 75 men under Captain Andrew McNeel was formed but could not be supplied with arms so was disbanded. Of this company, about one-third joined the Bath Cavalry.

In the spring of 1862 Captain William L. McNeel organized a large company of cavalry, which went into the 19th Cavalry Regiment. Captain J. W. Marshall organized a cavalry company at Mingo of which about one-half were from Pocahontas County. These also went into the 19th Cavalry Regiment.

Colonel Imbodn raised a company chiefly in this county for the 62nd Virginia Regiment.

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Two hundred and fifty county militia were also mustered into the Confederate services, of which about 80 were used as local scouts and guides.

The official score sheet in the "Confederate Military History" shows Pocahontas County men as such:

14th Cavalry	-	20 Men
18th Cavalry	-	25 Men
19th Cavalry	-	125 Men
20th Cavalry	-	10 Men
21st Infantry	-	100 Men
31st Infantry	-	125 Men
62nd Infantry	-	60 Men
25th Infantry	-	Unknown
Other Commands	-	50 Men

It is fairly obvious from these figures that Pocahontas County had its heart in "DIXIE". Though later events show that the Confederate Troops did not fare too well in this area, Pocahontas County did have its place in the Confederacy.

There are many events and battles that took place in this area that are covered very well in such books as: Robert E. Lee's Cheat Mountain Campaign; West Virginia in the Civil War; The Virginia Volume of the Confederate Military History; The Maryland and West Virginia Volumes of the Confederate Military History.

If articles such as this are of interest and can justify the space in the *OBSERVER*, different events and battles may be covered at a later date.

NEW DOCTOR AT GREEN BANK CLINIC

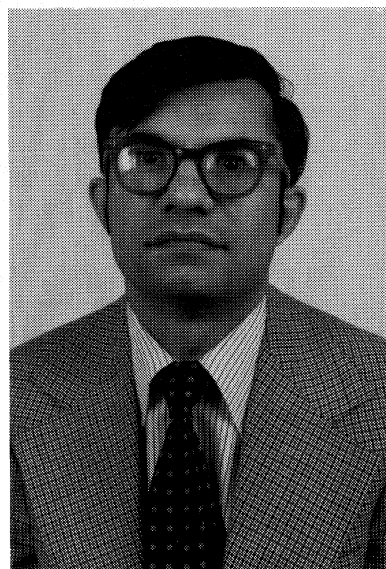
Bob Moore

Dr. Peter M. Tanna recently joined the staff of the Memorial General Hospital Association, Elkins, West Virginia, and effective October 15th became MGHA's resident physician at the Green Bank Clinic. MGHA operates the Clinic under an agreement with AUI/NRAO.

Dr. Tanna is a native of India and received his B.S. Degree in Chemistry from the

University of Bombay, in India, in 1960. Following his graduation he came to the United States and enrolled in Columbia University, where he served as a teaching assistant while working in the Masters Program. He received his Ph.D. in Bio-organic Chemistry from State University of New York, Buffalo, New York in 1966. He did post doctoral research in bio-chemistry at Rosewell Park Memorial Institute (one of the largest cancer institutes in the U.S.A.) from 1966 to 1967. He served as a Technical Assistant at Stevens Institute of Technology, Hoboken, New Jersey, from 1967 to 1968. Dr. Tanna worked as a research chemist from 1968 to 1971 at Kay-Fries Chemicals, Inc., New York.

Dr. Tanna served as clinical chemistry supervisor at Harlam Hospital in New York City from 1971 to 1972. In 1972 he entered Howard University College of Medicine, Washington, D.C., where he received his M.D. Degree in May 1975. He was elected to Alpha Omega Alpha national medical honor society. He served his medical internship at the Veterans Administration Hospital in Washington, D. C., from 1975 to 1976. He is also a member of Rho Chi Honor Society. He is a diplomat of the National Board of Medical Examiners.



*Dr. Peter M. Tanna -
New doctor at Green Bank Clinic*

Dr. Tanna, his wife, Vasant, and their
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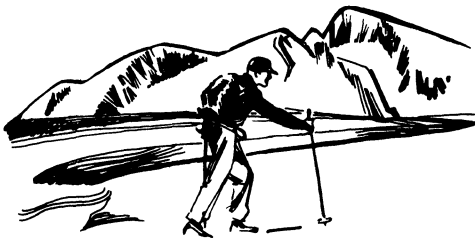
two children, Angelo 8, and Rupa 4, are re-siding in the "Wade House" in Green Bank. We bid them a warm welcome and extend our best wishes for a personally and professionally rewarding career in the Green Bank area.

V LAPRA

The Board of Directors has been as busy as little elves -- quite appropriately as their main concern has been the Christmas Party for the children planned for the afternoon of December 11.

The big event will take place in the conference room of the cafeteria at the site. Entertainment will be a puppet show, live from Albuquerque. And, it will be revealed that the huge gold building was indeed not the antenna construction area as many believed, but Santa's workshop -- as will be proven when Santa travels north from his workshop on the "Santa Claus Transporter Special". Where else in this whole wide world but on the Plains of San Augustin could such an event take place?

Employee comforts have also been uppermost in the plans of the Board as they have now provided candy, soft drink, and cigarette dispensing machines in the Technical Services Building, the Control Building, and the Cafeteria. Much appreciated, as the former walk to the Technical Services Building made one thirsty enough to gulp down the drink -- only to build up a thirst on the return trip through the drifting, shifting sand.



THE NEW LIBRARY AT GREEN BANK

Installment One of Two

Shep Sutton

In 1972 the West Virginia Library Commission (WVLC) began a construction program of thirteen small libraries throughout the state. Locations were to be determined by need, community interest, demonstrated ability of local Library Board to properly maintain a library, a suitable property site provided by the local library, and other qualifying factors. No local tax-based money for construction was required, although some local funds would be necessary for operational expenses.

These new libraries, an innovative design appropriate for small towns, were called "Instant Libraries". They were called "Instant Libraries" because of the short construction time, which would be true if there were no delays.

The Board of Trustees of the Pocahontas County Free Library (Marlinton, Green Bank, Durbin, Hillsboro) began a campaign to qualify for, and secure, one of the new libraries for Marlinton. Then Mrs. Elizabeth McClintic donated a building and property. The WVLC

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then gave a grant of \$10,000 for carpeting and furniture. With a good library in Marlinton concentrated effort began to build a new library for Green Bank. The drive was spearheaded by Dr. Ed Fomalont, then Library Board Vice-Chairman/Treasurer, and Shep Sutton, Board Chairman.



*Up goes first roof beam
on October 13, 1976.*

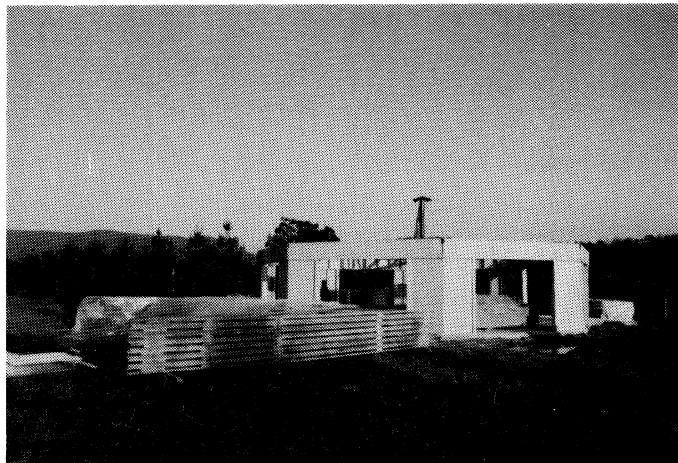
With varying degrees of help from what seems like everybody in creation the library is now almost completed. Negotiations have been carried out with the WVLC, HEW, NRAO, GSA, IRS, WV Surplus Property Office, Pocahontas County Court, Board of Education, State Road Commission, Benedum Foundation, Senator Byrd, Senator Randolph, and Jay Rockefeller.

In the spring of 1975 the obstacles confronting the Library Board seemed insurmountable. Then a funny thing happened. At one of Bill Howard's periodic get-togethers with all the employees, he mentioned that NRAO had been assisting the Library Board in obtaining a "mini-library" for Green Bank. He used the incorrect term "mini-library", rather than the proper term "Instant Library". He suggested it had been a failure. Well, an *instant* failure somehow does not sound too discreditable. But a *mini* failure. NEVER! Thus we were spurred on to renewed efforts.

Somehow the pieces started falling together. More money became available to offset spiraling costs. Help came from unexpected sources. We learned how to cut

through or jump over some of the endless red tape, a by-product when dealing with government agencies.

Following is a break down of cost in round figures with the source of funds. This is for construction, furniture, and books, but does not include driveway and parking



*Shell is half up on
October 14, 1976.*

lot, now in an advanced planning stage.

<u>ITEM</u>	<u>COST</u>	<u>SOURCE</u>
Prefab building	\$13,000	WVLC
Cost of erecting building, heating, lighting, plumbing, etc.	12,000	WVLC
	12,000	HEW
Architectural fee	1,450	WVLC
Well, pump, septic tank	2,500	Benedum Foundation
Furniture and carpeting	5,200	WVLC
Land deed (appraised value)	2,625	U. S. Government (formally NSF)
Book grant (supplements existing supply)	<u>3,000</u>	WVLC
TOTAL (to date)	\$51,775	

Without the assistance of Dr. Howard in securing the property the new library would not be almost a reality, at least not at this time. His help and advice have been most valuable. Sidney Smith and Buck Peery have given much needed assistance. Bob Moore and Richard Fleming have been very cooperative. Tony Miano prepared the artist's concept. Pistol Pete Tallman, in his capacity of

--continued, next page--

County Commissioner, and in his inconspicuous manner, has contributed greatly.

By the time the next *OBSERVER* goes to press, the library interior should be completed, carpet and furniture installed, and books in place. Also, dedication plans should be more firm and more information should be available. Jay Rockefeller has expressed a desire to make the dedication, and will do so if mutual scheduling permits.

At the time of this writing, completion has been delayed because of equipment delivery and weather conditions.

So.....more in the next issue of the *OBSERVER*.

Fruit Balls

*from the kitchen of
Ruth Anne Foe*

- 1 stick butter
- 1 lb. graham crackers
- 1 lb. candied pineapple
- 1 lb. candied cherries
- 1 lb. white raisins
- 1 lb. miniature marshmallows
- 3 lb. pecans or walnuts (chopped)
- 1 cup evaporated milk
- 2 packages coconut

Melt butter, marshmallows, and milk over low heat; stir constantly. Remove before mixture boils. Mix together finely chopped nuts, fruits, and crackers. Pour butter mixture over fruit mixture. Mix well, using powdered sugar to keep hands from feeling sticky while forming small balls. Roll balls in coconut. Let set on wax paper. Store in tightly closed containers.

I wish Bill Howard would have stayed
Until replacement could be made
With one as nice and clever!
"Which means, of course, forever."

—Sebastian

WHAT'S A BOSS?

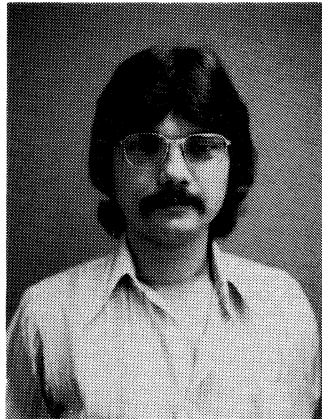
If he's soberfaced, he is a sourpuss.
If he's pleasant, he is too familiar.
If he's young, he doesn't know anything.
If he's old, he's an old stiff.
If he's a lodge member, his brothers expect favors.
If he drinks, he's a souse.
If he doesn't, he's a tightwad.
If he talks to everyone, he's a gossip.
If he doesn't, he's stuck up.
If he sticks to the rules, he's too particular.
If he doesn't, he's careless.
If he looks around, he's snooping.
If he doesn't, he's unobserving.
If he tries to settle all complaints, he must have the wisdom of Solomon.
He should have the patience of Job, the skin of a rhinoceros, the cunning of a fox, the courage of a lion, be blind as a bat, and silent as a sphinx.
All good ones are not in the cemeteries.

Did you know that there aren't as many people working as you may have thought? The population of this country is 160 million, but there are 62 million over the age of 60, leaving 98 million to do the work. People under 21 total 54 million, which leaves 44 million to do the work. Then there are 21 million employed by the government and that leaves 23 million to do the work. Ten million are in the armed forces, leaving 13 million to do the work. Deduct 12,800,000, the number in state and city offices, and that leaves 200,000 to do the work. There are 126,000 in hospitals, insane asylums and so forth, and that leaves 74,000 people to do the work. But 62,000 of those are tramps or others who will not work, so that leaves 12,000 to do the work. Now it may interest you to know that there are 11,998 people in jail, so that leaves just two people to do all the work. And that's you and me, Brother, and frankly, I'm tired of doing everything myself.

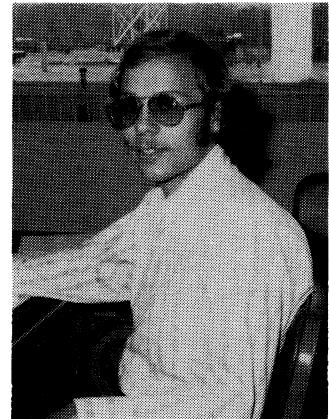
NEW EMPLOYEES



Debra E. Ervine
Accounting Clerk
Fiscal Division - GB



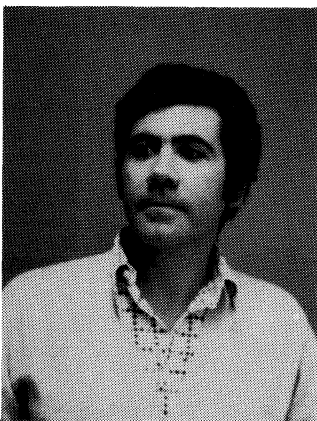
Harold F. Gardner, Jr.
Computer Operator
Computer Division - CV



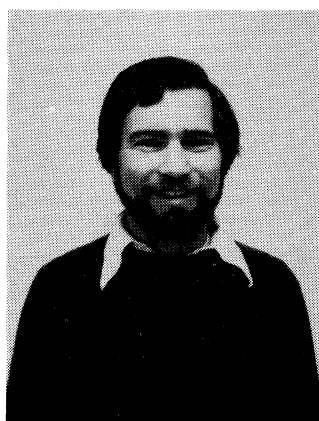
Richard J. Lacasse
Electronics Engineer
Electronics - GB



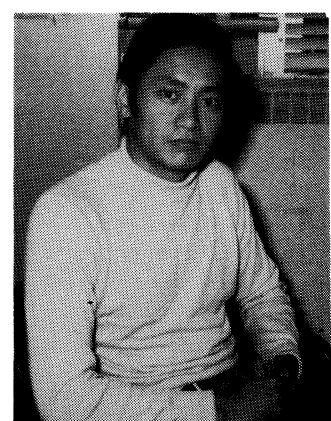
David W. Paul
Technician
VLA - CV



Hernan Quintana
Research Associate
Basic Research - CV



Ronald E. Silver
Technician
Electronics - Tucson



Albert K. Y. Wu
Electronics Engineer
Electronics - GB

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OTHER NEW EMPLOYEES - PHOTOS NOT AVAILABLE

Victor P. Anderson	Technician	VLA - New Mexico
Cecilia Aragon	Food Handler	VLA - New Mexico
Bruce D. Hillhouse	Maintenance Trainee	VLA - New Mexico
Amelia R. Lopez	Secretary	VLA - New Mexico

REHIRES

R. Carl Bignell	Mathematician	VLA - New Mexico
D. Dawn Reiche	Tracer	VLA - New Mexico

TRANSFERS

James L. Dolan	Electronics Engineer	VLA - New Mexico
Julian M. Hamed	Mechanical Engineer	Tucson

TERMINATIONS

Thomas M. Bania	Saundra M. Mason
Kathleen B. Clayton	Stephen A. Mayor
Robert A. Hamilton	Judith F. Moore
Irene M. Hernandez	Elsie E. Rivera
Alan Jewell	Richard G. Spencer
Jack S. Lambert	Armand C. Sperduti
Judith B. Martin	Edward M. Teyssier

* * * * *

RECREATION ASSOCIATION NEWS

Dwayne Schiebel

On November 16th, the annual meeting of the general membership was held. This meeting was attended by eleven people. The following people have been nominated to fill seven vacancies that will exist on the Board on January 1, 1977:

Richard Hiner
Wendell Monk
Dave Shaffer
Bruce McKean
Reginald Atkins
Winston Cottrell
Ray Hallman.

Since we only had seven nominations and no changes were recommended to the Constitution and By-Laws, it will not be necessary to hold an election this year.

Your Recreation Association Board of Directors has three activities scheduled for December. These are listed below:

December 12th - Children's Christmas Party
December 18th - Teen Christmas Dance
December 31st - New Year's Dance.

These three activities will make a total of sixteen activities that were held this year.

Congratulations to the new Board members and Good Luck.

* * * * *

WHAT AM I DOING IN CHARLOTTESVILLE?

John Dickel

This next installment in my continuing saga of travels around NRAO is attributed to my attendance at the semi-annual User's Committee meeting in November. Those of you who live in Charlottesville may know of this as a justification for a good bash at some elegant restaurant and those from other sites have probably noticed a few people jaunting off to Charlottesville every 6 months, but what are the meetings for? Basically they provide a forum where the NRAO staff can get together a group of 2-3 dozen outside users of the widespread observatory facilities. By bringing us all together, NRAO can get a better idea of how to best serve the needs of the radio astronomical community and often feel a consensus on what direction to go. We make no formal decisions or recommendations but the observatory administration does listen to our comments. In some instances, just to insure us of NRAO's integrity, people have even been embarrassingly reminded of statements made at previous meetings.

The meeting generally begins with a presentation of the status and operation of the current telescopes and electronics including a lot of give and take on what is available, what's wrong with it, what improvements are planned or needed, etc. This discussion provides an easy way to keep up with developments all over NRAO, and, at least in my own case, usually results in new observing proposals using equipment which I was not aware of before. Suggestions for new equipment are always welcome; in the old days such comments usually resulted with Sandy Weinreb's crew building the item for you by the time of the next meeting but now that even NRAO has realized we are in a recession, we generally have several serious discussions of tradeoffs and what you are willing to give up to get what you want.

Various concerns of the observers are also expressed at the meetings, with various degrees of success. For example, at every meeting for the last 10 years, at least one continuum observer has commented that contin-

uum observations always seem to take second place behind line work both electronically and as far as support for data analysis. Since I do both, I only make such a statement every other meeting.

The afternoon session is generally devoted to discussion of the new instruments being constructed or planned. This year, of course, we heard about the VLA and 25-meter telescope as well as some discussion of VLBs. It appears that there will soon be more antennas than people at the VLA site, but it's good to hear about the progress on that long awaited instrument. Planning for the 25-meter telescope continues to go on although apparently Bill Howard's future colleagues still can't guarantee when we'll get it.

The formal meeting ended with an epilogue contributed by Mike Hollis although he claims the author is anonymous (see the last page of the newest editions of the 36-foot manual).

As well as the meeting itself there are several fringe benefits for the attendees. Many of us managed to arrive early enough the night before to take in the Jansky Lecture, which this year was given by E. M. Purcell, the man who first detected the 21-cm line in space together with H. I. Ewen. A good audience of Charlottesville residents was present so NRAO really did not need to import an audience (that sort of thing is usually done to sell a candidate the week before an election - not after) but Professor Purcell's presentation on spinning objects was a welcome bonus to those of us who made it. My colleague, Professor Snyder, received another exciting bonus associated with the lecture, namely a nice expensive tour of all the towing establishments in Charlottesville while looking for his lost car. It seems that when he left U. Va. the place fell apart and put up a "tow away zone" where he used to park (and still does). Cheer up, Lew, they would probably charge even more for a motorcycle.

The trip is also an excellent opportunity to spend at least one night and often part of another day reducing data. I spent several hours this trip trying to rescue some data which had been lost on a telescope tape during a recent observing trip, and also starting to

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compare our Cas A synthesis (see the March *OBSERVER*) with Dave Hogg's earlier work. We have now accomplished step one which was to find an original 1969 tape and ascertain that it still has his name on it! Maybe by the next meeting we'll be able to actually read it.

One final aspect of the meeting is that whenever you get about 50 radio astronomers together in one room, add a few drinks, and several charming wives, you're bound to have a good time and also hatch lots of wild schemes. Perhaps by the next meeting we'll begin to see the results of the schemes hatched up last night by Heiles and Palmer together.

WHAT'S A MASER

Craig R. Moore

What's a maser? I've been asked this question many times since becoming involved with NRAO's newest receiver component. Let me try to answer that question in a few paragraphs. First, the word "MASER" is an acronym for Microwave Amplification by Stimulated Emission of Radiation. Second, masers can be either amplifiers or oscillators. In fact, NRAO has had a hydrogen maser oscillator for several years which is used as a frequency standard. We will limit the remainder of the discussion to maser amplifiers, which are commonly just called "masers" (as opposed to maser oscillators which are usually referred to as maser frequency standards).

Now that you know that, what's a maser? Basically it is an amplifier which makes signals stronger (we say it has gain) without adding very much noise of its own to the signal. Thus, it is a low noise amplifier. In fact, masers are the lowest noise microwave amplifiers in practical use, that is, they are not just laboratory curiosities (although some are).

The operation of a maser depends on the properties of certain materials under certain conditions which are described by the theories of quantum mechanics. The material used in

our maser is ruby, which is sapphire with a little bit of chromium added. A single uniform crystal is required for proper operation, and so man-made ruby is used. The electrons within the ruby crystal are arranged in energy levels and bound to the atoms in the crystal. The electrons and energy levels are analogous to a bunch of ping-pong balls on a set of stairs. It takes a specific amount of energy to move a ball up from one step to the next. Similarly, the same amount of energy is given up when a ball drops back to the lower step again. This is known as a quanta of energy.

When at room temperature, the ping-pong balls (electrons) are jumping up and down between steps in random fashion due to the thermal energy within the crystal. In fact, temperature is merely a measure of this thermal energy. If we cool the ruby crystal to the point where the thermal motion almost stops, then the ping-pong balls stay put on their respective steps. Now if we arrange to have one step have more than its share of ping-pong balls and a lower one to have less we have what is known as an inverted population. We do this by pumping the ruby; that is, adding a specific quanta of energy to raise electrons from one level to a higher one. Since the quanta of energy involved for ruby is equal to that of a microwave signal of a specific frequency, we can pump the ruby by adding a microwave signal.

Now that we have an inverted population, if some of the ping-pong balls (electrons) drop off the overpopulated step to the next lower one, they will give up a quanta of energy (which is equal to a microwave signal). If an incoming signal knocks some of them off, then the resulting energy output at that frequency is larger than that of the incoming signal and we have achieved gain.

In order for this to happen the crystal must be very cold (to reduce the thermal motion) and a magnetic field must be applied (in order to build the stairs). The strength of the magnetic field determines the spacing between the steps (energy levels) and thus the frequency of operation.

For those of you who have stayed with me this far, you now know something of quantum mechanics and also how a maser works. Of

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course, the energy levels are really determined by the way in which the electrons spin with respect to the external magnetic field and the interaction between electrons and the pump and signal frequencies is through an exchange of photons. But we'll leave the fine points to the physicists.

I mentioned earlier that masers are the lowest noise microwave amplifiers in practical use. In fact, they are the important element in the most sensitive microwave receivers in the world, which are used by NASA to communicate with satellites in deep space and make radar maps of the planets. If masers are so great, why hasn't NRAO had them before now? Well, we did have a maser back in 1963. This maser operated at 6 cm (4995 MHz) wavelength and amplified signals over a 25 MHz wide band. It was cooled by immersing the maser in liquid helium, which boils at approximately 452° below zero Fahrenheit. The helium dewar had to be filled every 24 hours. One day an ice plug caused pressure to build up and the resulting explosion destroyed the maser. After that NRAO concentrated on parametric amplifiers which could be cooled with a mechanical refrigerator, since they didn't need to operate at quite as low a temperature. Paramps also had more bandwidth and could be tuned over a wider frequency, both essential to modern radio astronomy.

In the meantime NASA stayed with masers and developed a closed-cycle helium refrigerator which allowed a maser to be kept cold for up to a year without attention. Just recently Bob Clauss of the Jet Propulsion Laboratory invented a maser design which allows wide tuning range and bandwidth comparable to paramps, yet preserves the low noise properties of a maser. The new NRAO maser is the first unit he has built with this design, and offers exciting new possibilities for radio astronomy. The closed cycle refrigerator makes the effort quite practical as well. I'm sure you will be hearing about masers at NRAO for many years to come.

WHERE IS HELL?

Is Socorro, New Mexico sitting over hell itself? Could be, according to what geologists reported at a recent Denver meeting. According to evidence reported there, micro-earthquake investigations show that 18 kilometers below Socorro is a chamber of molten rock 1000 kilometers in area.

Only the molten body's southeastern margin has been clearly detected. From beneath the Socorro Mountain the magma body's upper surface dips sharply to the east and west to depths of at least 20 kilometers. Geologists further suggest uplift in the Socorro area may have been caused by expansion of the magma body.

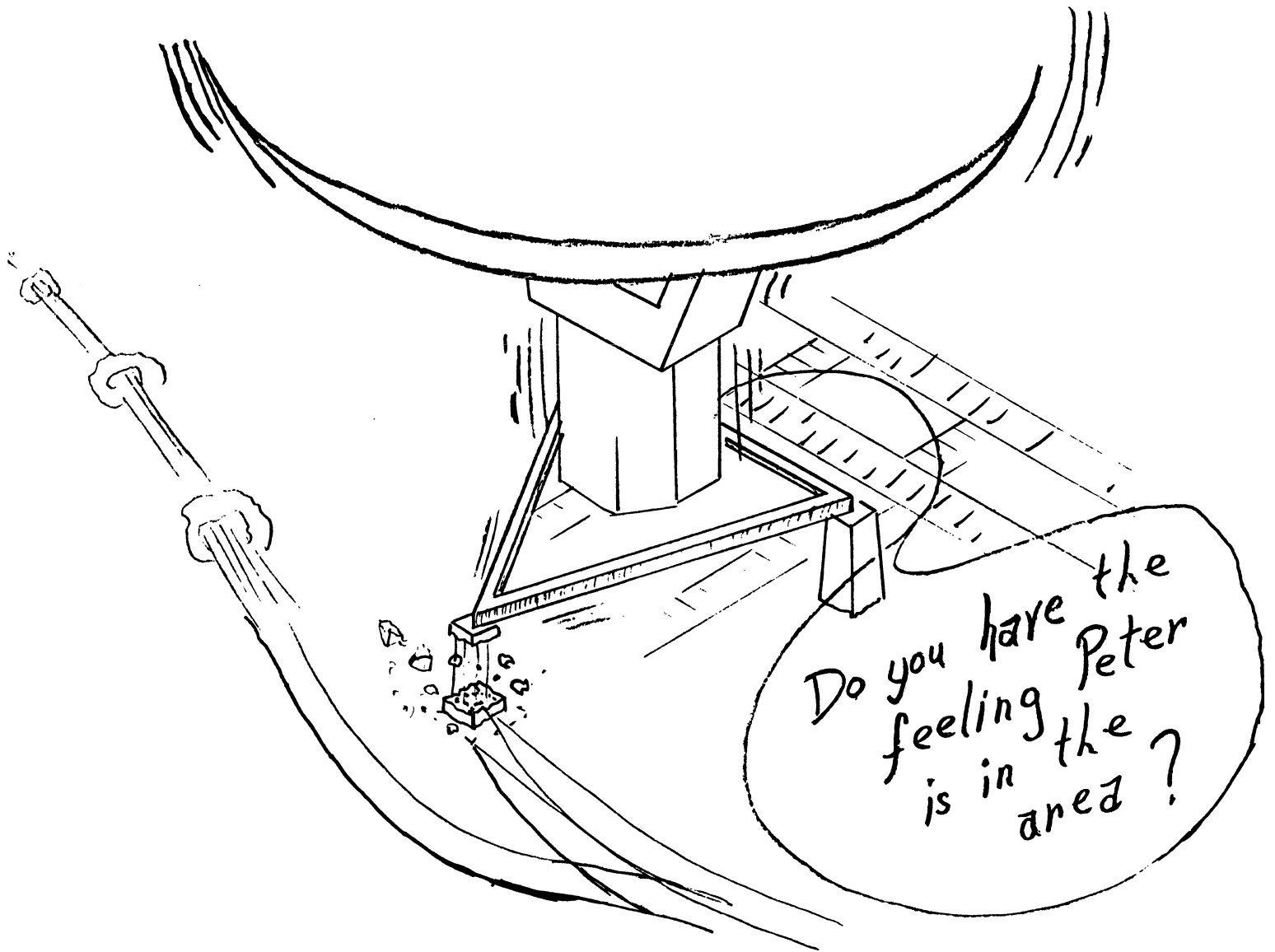
New evidence suggests a small shallow magma body about 12 miles southwest of Socorro and possibly several more small bodies at depths of less than 10 kilometers.

These chambers of molten rock have several implications: they are potential sources of geothermal heat; they might eventually become a full-fledged volcano; and their intense heat may be important in concentrating minerals. That's what scientists say. Some of us less scientific types see only one implication: they mean some of our NRAO friends won't have to go very far to reach their final resting places.

CARTOON FROM VLA LAND

This issue's cartoon was prompted by a meeting between Peter Napier and a cinder block wall. This wall, located in front of the Socorro office, once was vertical - until Peter knocked it over with a newly leased company pickup. It's how he moved it that produced the wonderment. He toppled the wall without cracking the wall or putting a mar on the vehicle. That's the background, the cartoon follows.

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INTERSTELLAR MOLECULE UPDATE

In the October, 1975 issue of the *OBSERVER*, we listed the interstellar molecules discovered through October, 1975. On 16 November 1976, Barry Turner sent an update to that list. Here are the four molecules you need to add:

YEAR	MOLECULE OR ATOM	SYMBOL	WAVELENGTH	RADIO TELESCOPE	
				LOCATION	SIZE
1976	Formyl Radical	HCO	3.5 mm	NRAO	36-ft
1976	Cyanodiacetylene	HC ₅ N	3.0 cm	Algonquin	150-ft
1976	Acetylene	C ₂ H ₂	Infrared	KPNO	4-m
1976	Cyanoethynyl Radical	C ₃ N	3.4 mm	NRAO	36-ft

* * * * *

1977 NRAO HOLIDAY CALENDAR

Friday	31 December (1976)	For New Year's Day (Saturday)
Monday	21 February	For Washington's Birthday
Friday	8 April	Holiday*
Monday	30 May	For Memorial Day
Monday	4 July	Independence Day
Tuesday	5 July	Holiday*
Monday	5 September	Labor Day
Monday	24 October	For Veteran's Day
Thursday	24 November	Thanksgiving Day
Friday	25 November	Holiday
Friday	23 December	½ Holiday
Monday	26 December	For Christmas Day (Sunday)

* Additional Holiday

* * * * *



THE PAPER CHASE
Part I

Sarah Martin

Do you ever get the feeling that the books and journals in your office are conspiring to smother you? Do you have the uncomfortable queasiness brought on by the knowledge that one substantial sonic boom could send an avalanche of ApJ cascading down on your head? You know you should dispose of some of those ancient journals, but after laying out the money for them, you suffer a certain reluctance to simply trash them. Besides, you know that the moment you dispose of that January, 1901 issue of the Journal of the Royal Astronomical Society of Canada you'll have a pressing need to look at it and it's such a long walk to the library. Still, the thought of the inevitable crash and crush when the weight limit of your shelves is reached is in the back of your mind....



DRAWING BY LOEBERT OSBORN

Well, once again, your friendly neighborhood library is willing to solve your problem for you and insure the protection of your pointed little head from the painful result

of toppling scholarly scribblings. Every six months or so, we distribute a duplicate exchange list to around 30 other astronomy libraries. We offer duplicates of journals and exchanges that we have accumulated by gift or accident to these libraries in exchange for their duplicates that we need to fill holes that have crept into our collections. In the past, our duplicates have aided the collections in such diverse places as the Fernbank Science Center in Atlanta, the Uniwersytet Jagielloński in Poland, and the Instituto Astronomico e Geofisico in Brasil.

The needs of the libraries with whom we communicate are not limited to astronomy materials. The Southern California Chapter of the Special Libraries Association has an active duplicate exchange program in which we participate. There are 56 contributing libraries whose duplicates are offered annually to around 600 libraries. Collections in almost every conceivable type of organization are represented, from Cal Tech and the City of Hope to Hughes Aircraft and the U. S. Navy. Their needs vary from the AIAA Journal to the Zhurnal Tekhnicheskoi Fiziki. Just think, the AJ you get rid of today could be read next week in San Jose. By donating your no longer needed journals to the library, you can be winning us friends all around the world and greatly needed issues for our library. We ask only that you let us know what you'd like to dispose of before bringing it to the library. A sudden gift of everyone's excess journals could put the librarians' heads in jeopardy and we certainly wouldn't want to do that.

Note also that we can only use journals and not popular magazines. These latter, however, are accepted by most public libraries. The Jefferson-Madison regional library in Charlottesville accepts magazines throughout the year for their semi-annual sales. Magazines should be taken to Gordon Avenue branch and books and long runs should go to the McIntire Branch. If you have a lot of material, they even have a pick up service available.

Finally, at least in Charlottesville, there's even a place to recycle your news-

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papers. The Cub Scouts and Boy Scouts take them on the first Saturday of each month at the East Coast Oil Corp. at 1600 Seminole Trail. In addition, the National Guard has two recycling points open 24 hours a day -- behind the Army Reserve Armory on Cherry Avenue and behind Gus' Steak House at 2304 Ivy Road.

So -- you really have no excuse for wallowing in that sea of printed matter. Recycle, either through you library or the National Guard. The pointed head you save could be your own.

THE POST-PROPHECY ELECTION

Lee Rickard

Ask a psychic about past predictions that came true, and you're bound to get a long, detailed list. Assassinations, elections, Jackie Kennedy's remarriage, and other disasters - you name it, they called it. But try to dig a little deeper, below the shifting sands of hype to the bedrock of truth (as Eric Sevareid would say), and you'll find the going gets hard. It isn't easy to get citations for the original predictions, in black and white and irrevocably dated. After all, it is important, when saying sooths, to retain a certain ambiguity.

Recognizing this, I have become fascinated by the case of Jeane Dixon. She is a fortune teller in the classic mold - at least, she uses a crystal ball. She is internationally famous, edits a nationally syndicated astrology column, is consistently sought out by interviewers from the supermarket press, and her biography (A Gift of Prophecy, by Ruth Montgomery) has sold in excess of 3 million copies. You would think that a psychic of such renown would be sensibly true to the traditions of Delphic obscurity. But no, Ms. Dixon insists on prophesying the near future in gaudy tabloids with dates on them. She is protected from the inquiring debunker only by the reluctance of libraries to keep bound copies of the National Enquirer, and by the nearly nonexistent memory of her public.

As an example of the sort of trouble to which this indiscreet scrying can lead, consider Ms. Dixon's most famous prediction: the assassination of President John Kennedy. Although usually referred to in this unambiguous way, the published prophecy was somewhat broader in content. In the May 13, 1956 issue of Parade magazine, she said that the 1960 election "will be dominated by labor and won by a Democrat. But he will be assassinated or die in office, though not necessarily in his first term." Well, it's still impressive. But consider this: from 1900 to 1956, there had been 14 elections, 7 won by Democrats. So by 20th-century history, the odds were 50-50 that the new president would be a Democrat. Furthermore, of the 10 presidents that had served in that period, 3 died in office and a fourth suffered a severe stroke that led to his death right after leaving office. In addition, Eisenhower had just the previous year come close to dying from a coronary thrombosis. The grim fact is that, at the time of Dixon's prediction, the 20th-century odds were at least 30-70 that a president would die in office. And as for labor dominating the 1960 election - it didn't. So, having the facts tends to take the edge off one's admiration.

Still, these are matters of hindsight, and a more favoring reviewer would cast them in a more favorable fashion. The problem is well known: the only fair test would be to keep a file of all published premonitions, matched against each day's newspaper; but maintaining a batting average for every check-out counter crystal gazer becomes tedious and expensive, even for a most dogged debunker. It is fortunate, then, that we have a Jeane Dixon to kick around. Her high profile makes it easy to keep tabs on her published appearances, and her great reputation guarantees that she will be no insignificant test case. With this in mind (applying my own brand of foresight), I collected her predictions for the 1976 elections. The results have been most enlightening.

In the July 6, 1976 issue of The Star, she predicted (1) that Jimmy Carter would win the Democratic nomination. That's certainly starting out on a good note but, since the

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prediction came only a few weeks before the convention and after the event had also been predicted by Time magazine, I was loathe to consider this a triumph. I charitably gave her $+\frac{1}{2}$ point. She also predicted (2) that some party members would not accept Carter and would work against him. This could conceivably be stretched to refer to Eugene McCarthy, although his independent candidacy was already active in July. Call it another $+\frac{1}{2}$, but note that pundits are now saying that one of the more interesting election results was the way Carter, the outsider, was able to collect together the previously straying Democratic factions. In addition, Dixon guessed (3) that Carter would choose "a simple citizen" for his running mate, and (4) that he would be hurt by his vice-presidential selection. He didn't, and he wasn't; count it -2.

Of the more distant Republican Convention, she foresaw (5) Reagan winning, with (6) Rockefeller making a sudden strong bid to retain his position as vice-president. Another -2. Furthermore, she said (7) that both conventions would "blow up in scandal" over the buying of delegate votes, with many committed delegates swinging their votes away from their legal commitments. Call it -1. She also predicted (8) two more assassination attempts on Ford, in July and October (both with guns), plus extraneous pre-election attempts on the lives of Carter and Reagan, and an attempt by the Soviet Union to manipulate the outcome of the election via bribery. I counted this -1 for the assassination attempts, and ignored the conveniently secret Soviet plan.

Ms. Dixon couldn't call the election in July; she said that people were still trying to decide between Carter and Reagan. (She was probably confused by the fact that people were really trying to decide between Carter and Ford.) But in the September 14 Star, she finally tuned in on the public sentiment. It was (9) Ford, all the way. She repeated this firm choice in the issue of The Star published on November 2. I only scored it -1. Furthermore, she predicted (10) that the Congressional elections would yield the largest turnover in history, and (11) that the Wayne Hays scandal would hurt the Democrats

as much as Watergate hurt the Republicans. In 1974, the net Republican losses were 5 Senate seats and 45 House seats. In 1976, as given by the November 4 New York Times, the net Democrat losses were zero Senate seats and -3 House seats. The total number of changes in the House, including all party turnovers, deaths, resignations, etc., was 65 seats - nowhere near a record. (In the 76th Congress, for example, the net seat change for the Republicans was 75.) Ms. Dixon netted -2.

In other related events, Ms. Dixon saw (12) that Henry Kissinger would quit over a disagreement with Ford, (13) that two of Ford's cabinet members would defy him over matters of policy, and (14) that Bella Abzug would win the Democratic nomination for senator from New York, but lose the election. I counted Kissinger a -1 (didn't everyone this year?), and Ford's cabinet a -1 (unless you consider the Butz joke a matter of policy). The New York senator's seat was difficult to score. If you interpret the prediction as "Abzug will win the nomination but the Republican will win the election", then it's a -2; if you interpret it as "Abzug will not return to the Congress", it's a +1. I took the average: $-\frac{1}{2}$.

And now for the grand total. Out of 14 predicted events or collections of events, Jeane Dixon scored $11\frac{1}{2}$ wrong and 1 right. We have a word for that down south: execrable. But, lest you be depressed by the sight of Ms. Dixon's career in ruins and turn away from all future precognitions, I myself shall do a little prognosticating: (1) The facts listed above will have little impact beyond my immediate family. (2) Jeane Dixon will add to her list of triumphs the predictions that Carter would be nominated and that Abzug would not return to Congress. And (3) I will never make as much money doing science as Jeane Dixon will doing divinations. Anyone care to keep score?

So then, what do we have to not look forward to? Well, in the September 14 issue of The Star, Jeanne Dixon predicts that a UFO will land some time before August 1977 and will begin communications with the people of Earth.

Too bad.

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WHAT'S COOKING?

Smacks

*from the kitchen of
Dorothea Oref*

- Cream: 2/3 cup shortening (part margerine can be used)
- Add: 2/3 cup brown sugar
4 egg yolks
1 teaspoon salt
- Add: 3 cups flour (mix with your hands, since it is a stiff dough)
- Spread and press onto ungreased jelly roll pan (17" x 11").
- Beat: 4 egg whites until thick
- Fold in: 2 cups brown sugar
2 cups chopped dates
2 cups chopped nuts

Spread mixture over pastry in pan. Bake in 350° oven for 25-30 minutes, or until lightly browned on top. When partially cooled, cut into squares.

Venetian Torte

*from the kitchen of
Janet Warner*

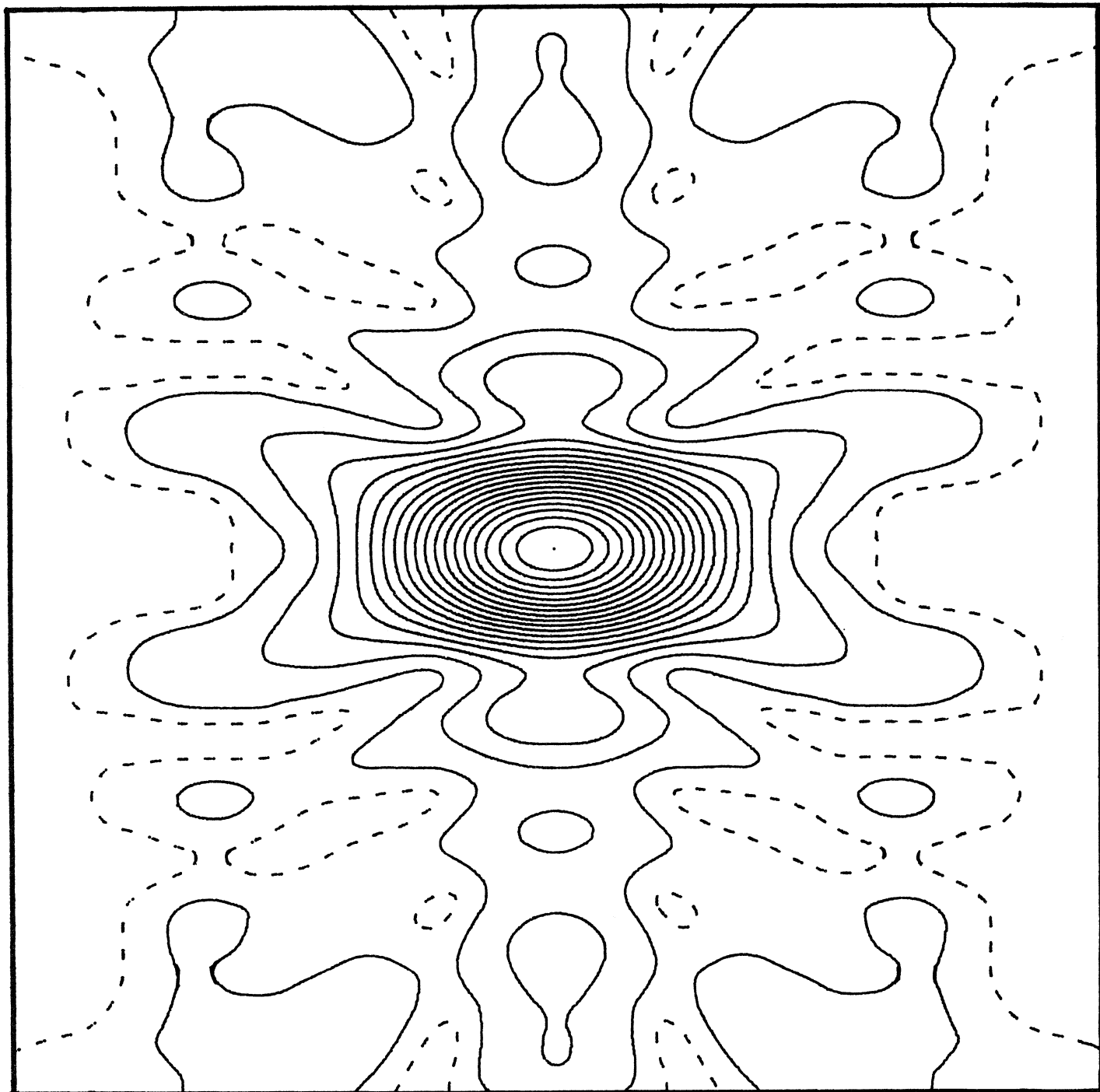
- 1 3 oz. pkg. Lime flavored gelatin
1 3 oz. pkg. Raspberry flavored gelatin
3 cups boiling water
3 cups miniature marshmallows
1 cup drained crushed pineapple
1 cup heavy cream, whipped
12 ladyfingers, split, cut in half
- Dissolve each pkg. of gelatin separately in 1 1/4 cups boiling water. Pour into 8 inch square pans. Chill until firm. Cut into cubes. Combine the miniature marshmallows, pineapple, and both pans of cubed gelatin. Mix lightly. Fold in whipped cream. Pour into a 13" x 9" pan lined with the ladyfingers. Chill several hours.

Orange Slice Cake

*from the kitchen of
Nancy Cassell*

- Sift together: 3 1/2 cups flour
1/2 teaspoon salt
- Combine: 1 lb. orange slice candy (cut up)
1 pkg. (8 oz.) pitted dates (chopped)
2 cups chopped walnuts
1 can (3 1/4 oz.) flaked coconut
- Add: 1/2 cup flour mixture. Mix well.
- Work with a spoon until light: 1 cup butter or margerine
- Gradually add: 2 cups sugar. Beat well.
- Add one at a time: 4 eggs. Beat well after each addition.
- Combine: 1 teaspoon soda
1/2 cup buttermilk
- Add alternately with flour mixture. Blend well after each addition.
- Add: candy mixture. Mix well.
- Turn into a large tube pan which has been greased and floured. Bake in a slow oven (300° F) for 1 hour and 45 minutes. Remove from oven.
- Combine: 1 cup orange juice
2 cups sifted Confectioner's sugar
- Mix well. Pour over hot cake. Cool, then let stand in refrigerator overnight before removing from pan.





SEASON'S GREETINGS

FROM OUR INTERFEROMETER TO YOURS

FOURIER TRANSFORM OF A CHRISTMAS TREE
(CONTOUR LEVELS: 5%, DASHED CONTOUR 2.5%)