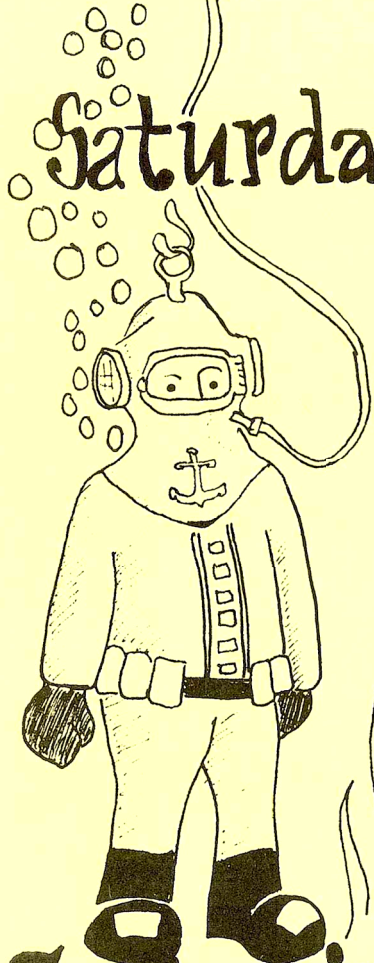


1981

# VLA PICNIC

Saturday, May 16<sup>th</sup>

at Sedillo Park



Swimming



Food..



# Games

and... the joy  
of playing  
with your children!

the OBSERVER july 1981

THE COVER

...is a "variation" on a poster done by Paul Harden to advertise the VLA's summer picnic in May. The artwork and ideas were too good to pass up. Read about the picnic on pages 8, 9, 10 and 11.

\* \* \* \* \*

The *OBSERVER* is a quarterly publication of the National Radio Astronomy Observatory. Articles and comments should be sent to, P. O. Box 2, Green Bank, West Virginia 24944.

\* \* \* \* \*

A special thanks to all the people who contributed articles and who helped with the *OBSERVER*.

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*NOTE OF THANKS*

*To all of you, who were so kind and helpful in our time of loss of my son, Bart and my brother.*

*Thanks again,*

*Dotty M. McLaughlin  
and family*

ASTRONOMY IN THE NETHERLANDS

*Wim Brouw*

The Netherlands (Holland is only part of the country, and people from other parts of the country hate to be called "Hollanders" as much as Americans dislike being called "Texans") is a small country with about six per cent of the population of America and including the surface water has about ten per cent of the land area of the state of New Mexico. Consequently, it has a population density of about 1100 people per square mile. It has a very stable climate, the only uncertainty being when summer will fall: on Easter, in May, or maybe even during the summer holidays. Neither the population density nor the weather makes it an obvious candidate for any large astronomical observing facility. Still, since the early years of the twentieth century, Dutch astronomy has prospered, and is of international standard. Dutch astronomers rank, according to the Minister of Science at the dedication of the recent extension of the Westerbork telescope, amidst tulips, cheese and beer as one of the better known export products of The Netherlands. To support this view, I must confess that at the VLA site I speak more Dutch than at one of the astronomical institutes in The Netherlands.

I see mainly four reasons for the evolution of Dutch astronomy under these adverse conditions: (1) on the scientific side there has always been the in-depth interpretations of observations, mostly done by others, with painstaking evaluation of the observational errors, to obtain a better insight in the "why" of the universe; (2) the initiation and execution of extensive survey-type observational programs with detailed care for completeness and calibration (Kapteyn, de Sitter, Hertzsprung, Oort and many others are well known representatives of

these ideas); (3) good cooperation between the different astronomical institutes without having the necessary competitive spirit; and (4) support of a government knowing the limitations but also the possibilities in pure science for a country with limited resources.

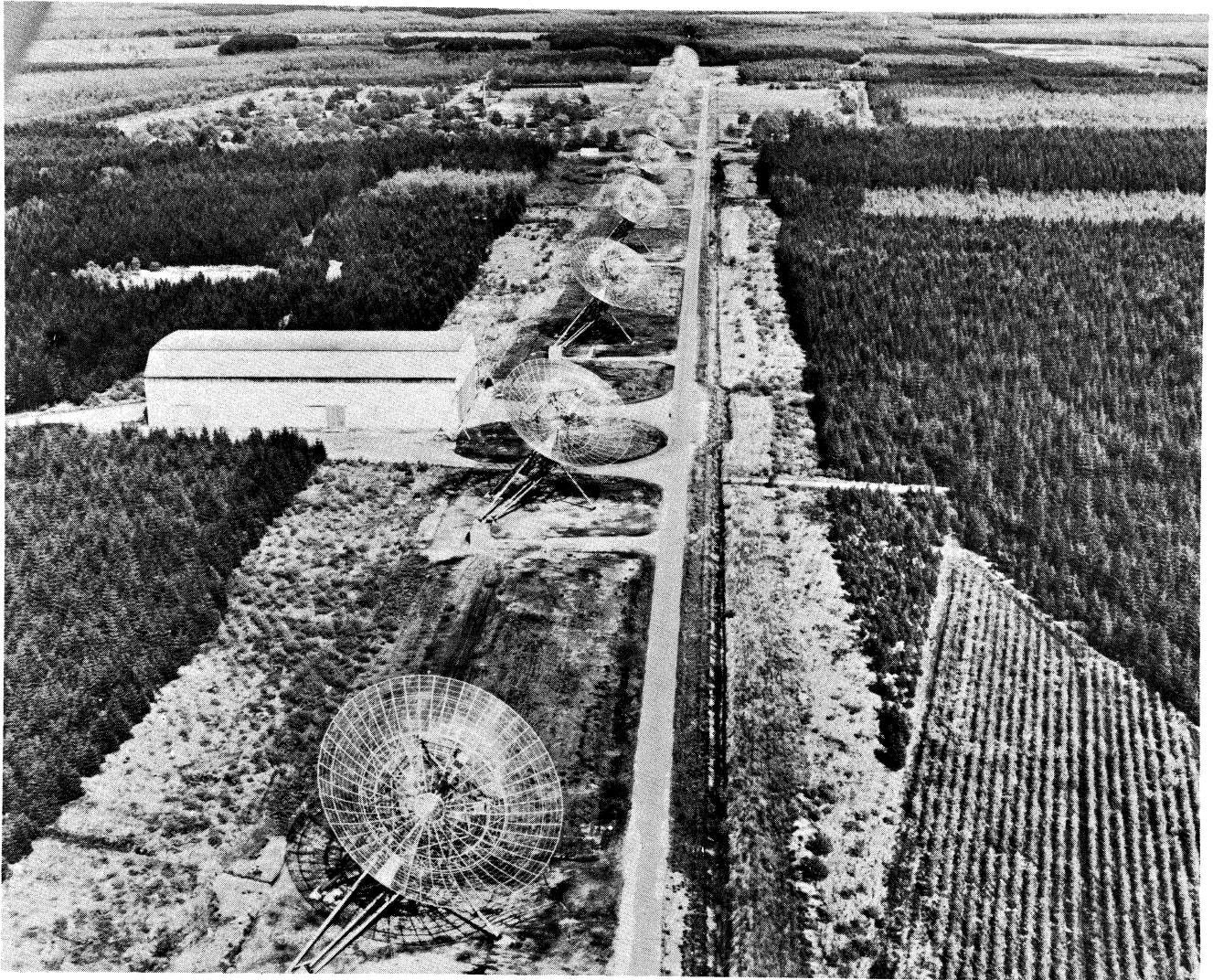
Astronomical research is concentrated at the universities in Amsterdam (mainly theoretical research in cosmology, stellar atmospheres, accretion disks, etc., Leiden and Groningen mainly galactic and extragalactic research, interstellar matter, and Utrecht mainly star research high-energy astrophysics) and was the first half of this century limited to the type of astronomy outlined above.

In the last decennia new observational techniques, independent of climate appeared, and Dutch astronomers saw the possibilities they offered. However, no university could afford to build instruments by itself, and The Netherlands Federation for Radio Astronomy was founded in 1949 to build, maintain and run radio astronomical facilities for the use of university astronomers. Contrary to what happened in other countries, astronomers only formed the Board of NFRA, engineers developed and built the instruments.

Development of radio astronomy was rapid after an initially long lead-time. In 1944, van de Hulst made his prediction about the HI-line. It took eight years before it was observed in the U.S.A., Australia, and The Netherlands. The Dutch observations used a 7.5-meter Wurzburg antenna, a war relic from the German coastal radar defense. This instrument was used to produce the well-known map of the spiral structure of our galaxy. Two Wurzburg antennas are still in use in Dwingeloo observing the sun with milli-second fine resolution with a spectrometer.

The 25-meter Dwingeloo telescope was built during this period (at its dedication, 25 years ago last month, it was

*--continued, next page--*



*The Westerbork synthesis telescope. Twelve 25-meter dishes are arranged along a 1.6-kilometer-long line in an east-west direction. Ten are fixed in position and two are movable along a rail track 330 meters long.*

the largest fully steerable antenna in the world), and produced, to name a few, the W-list of radio sources, detected the 3 kpc arm, high-velocity clouds, polarization of the galactic background, etc. At the moment it is in full use for VLBI, extensive surveys of HI and OH, and incidental purposes like measuring total hydrogen contents of

galaxies, or trying to detect disintegrating micro-black holes.

In the early sixties plans were made to build a large cross-type radio telescope. Since the cost was expected to be too high, the Benelux (Belgium, The Netherlands and Luxemburg) Cross Project was started. In 1966, it became clear that

*--continued, next page--*

international cooperation is not always easy, and it became a Dutch project. In 1970, the Westerbork telescope was dedicated. A good overview of the production of the first ten years can be found in an article by Allen and others in a Liber Amicorum for Jan Hendrick Oort at this eightieth birthday last year (Oort and the Universe, Reidel). Early highlights were the continuum spiral arms in M51, the anomalous arms in NGC 6258, arms in M101, and polarization studies of head-tail galaxies.

Space astronomy was another area for inter-university cooperation. The International Geophysical Year triggered the birth of the Commission for Geophysics and Space Research (GROC). Although the name suggests differently, less than two per cent of its budget is spent on geophysics (laser ranging), the remainder is used for astronomy. It started with rocket flights, and evolved in the participation in many satellite experiments (COS-B, IUE, HXIS, etc.), and the successful flight of the ANS (Astronomical Netherlands Satellite) well known for its detection of x-rays from globular clusters. At the moment the second Dutch developed satellite (with a 50 per cent participation of the U.S.A. and five per cent British) IRAS (Infrared Astronomical Satellite) is nearing its completion.

In addition, The Netherlands is a partner in the European Southern Agency (ESA) and the European Southern Observatory (ESO), which operates telescopes in Chile.

As noted earlier, astronomical research is concentrated at the universities. The above astronomical resources are used by a total of 64 tenured scientific staff and 52 post-graduate and post-doctoral appointees, supported by 60 technical and administrative staff. In addition the NFRA employs 103 people, of which six are half time research astronomers. The

GROC has a total staff of about 120, of which about ten per cent spend some time on astronomical research.

Financing of all astronomy is done by the Ministry of Science. Universities in The Netherlands are all government institutes. The NFRA is financed by ZWO, the Dutch equivalent of NSF, which also provides grants for post-graduate and post-doctoral positions at the universities. GROC is financed directly by the Science Department.

The amounts involved are:

Universities	- M\$	6.4/year
NFRA		5.2
ZWO - Grant		1.0
GROC		6.6
ESO		1.6
ESA (not counting 12.5 M\$ paid as contribution to non- scientific progress)		6.1

This amounts to about 2\$ per year per inhabitant.

The Netherlands is a small country. No other observatory is ever more than 3.5 hours away by train (twice per hour), hence cooperation is a theoretical possibility, and luckily, a practical fact. Although the universities are fully independent, a National Committee for Astronomy with representatives of the Universities, NFRA and GROC, screens all individual applications before they are passed on to ZWO or the government; and develops long-term policies. Although this body has no official power, full adherence to its "guidelines" is given.

The university departments are organized in a democratic way. Decision power rests with an elected body. The Chairmanship rotates between the full professors.

The NFRA has a board of trustees, consisting of representatives of the observatories and some external experts. (Physicists from university and business laboratories). They are ultimately

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responsible, and decide, mainly on the long-term policy. The day-to-day responsibility rests with the five division heads, one of which acts as a "director", on a rotating basis.

No scientific research stays healthy if there are no plans to develop new avenues. Although the economic situation of The Netherlands is not better than anywhere else, there are some plans that have a high probability of being executed.

In space research the IRAS satellite will fly early 1983. In addition many cooperative efforts are being pursued. Among others, the Hipparchos satellite, (ESA, astrometry) and an ESA x-ray satellite.

The Westerbork telescope will be equipped with a 327 MHz receiver, and an extension of the line receiver to 40,000 channels. This receiver will also be able to do real-time VLBI correlations for eight simultaneous stations. At the moment some ESA countries are designing a teleconferencing satellite (LSAT), which is expected to fly in 1985. It seems reasonably sure that a wide-band VLBI transponder will be added to this satellite; in which case Westerbork will probably be the ground station for real-time correlation of the European VLBI network.

Astronomers in The Netherlands, mostly the radio astronomers, have for years felt the need for optical facilities in the Northern Hemisphere. Many astronomers have been using facilities elsewhere, mostly in the U.S.A., but a more permanent basis of observational possibilities was looked for. Great Britain is building an extensive optical observatory on La Palma, one of the Canary Islands, which will have a 4-meter, 2-meter and several smaller telescopes, and a 15-meter millimeter telescope. Any day a protocol will be signed between ZWO and the British SRC to make this venture

a fully cooperative effort (on an 80 per cent - 20 per cent basis) between the two countries. Talks are underway to include the UKIRT telescope on Hawaii in the deal as well, and one staff member there is already paid by the Dutch.

It seems that with the possibilities provided in this way, Dutch astronomy will have the opportunity to stay at the forefront of astronomy in the next decade. It is up to the astronomers to use the available resources.

\* \* \* \* \*

NATIONAL YOUTH SCIENCE CAMP
-----------------------------

(NYSC)

On July 15, the NYSC, located at the Pocahontas County 4-H Camp near Thornwood, will visit the Green Bank site for a three hour tour beginning at 9:00 a.m. In addition NRAO will provide two scientists to speak at the camp before their July 15 tour. This will be the nineteenth group of campers to visit Green Bank.

Originated in 1963 as a part of West Virginia's Centennial celebration, the National Youth Science Camp (NYSC) is a remarkable all-expense paid three-week learning experience. The NYSC annually honors the top science-oriented students to graduate from high school in each state. The Governor of the State of West Virginia requests the governors of every state to select these two individuals. Selection procedures vary from state to state. In West Virginia, each high school principal nominates a senior student from his school. These nominees are then judged by a committee of scientists and educators appointed by the Governor. In several states selections are made through the Junior Academy of Science, State Science Fairs, or Science and Humanities Symposiums.

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Criteria for selection include high grades and accomplishments in the sciences, a demonstrated interest in new and unusual subjects, abundant leadership potential and a professed intention to enter into one of the scientific fields.

#### OBJECTIVES OF THE NYSC

- \* To give the highest reward and honor to two most promising science-oriented high school seniors from each state.
- \* To expand their interests through a broad range of lectures from outstanding researchers and educators.
- \* To improve their communication skills through the presentation of seminars on personal research topics.
- \* To demonstrate the applications of research with visits to area industrial and scientific sites.
- \* To allow them the benefits of a close personal association with other young scientists.
- \* To complement their technical abilities with cultural exposure from local historians, musicians, and artisans.
- \* To assure balanced participation of mind and body through a complete recreational and outdoors program.
- \* To place this scientific and cultural community in a rustic setting so the experience may be appreciated free of urban distractions.

\* \* \* \* \*



TO YOUR HEALTH!

#### ABOUT CAFFEINE

*Reprinted from Brookhaven Bulletin  
Vol 35 - No. 16, April 24, 1981*



Large doses of caffeine can cause restlessness, irritability, sleeplessness, and nervousness. For some, even a small amount of caffeine, especially at bedtime, can cause problems such as the inability to fall asleep, or wakefulness in the middle of the night or early morning and being unable to return to sleep. In addition, caffeine can cause cardiac symptoms such as a fast heart rate, palpitations, and a "fluttery" feeling in the chest. There is also some recent evidence that caffeine may adversely affect the unborn fetus.

For most people, withdrawal from caffeine, or reducing caffeine intake, can be done quite easily and with no ill effects. For others, especially those who are accustomed to consuming large quantities of caffeine (usually exceeding 500-600 mg/day or 5-8 cups of coffee), abrupt withdrawal may cause a phenomenon called the Caffeine Withdrawal Headache. Such a headache usually begins approximately 18 hours after the most recent intake of caffeine. It usually starts with a feeling of fullness

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in the head and rapidly progresses to a painful throbbing headache peaking 3-6 hours after onset. Sometimes this pain lasts 1-3 days and is often attributed to tension. Symptomatic relief from the headache may be obtained from a non-narcotic pain reliever alone (aspirin or tylenol), or in combination with an analgesic containing caffeine such as excedrin or anacin. Cutting down on caffeine consumption over a period of a few days might help to prevent the formation of the headache.

An average cup of instant coffee contains approximately 60-65 mg of caffeine, while percolated coffee ranges from 97 to 125 mg/cup. Tea contains an average of 20-60 mg of caffeine per cup depending on the length of brewing time and the brand of tea. In addition there is caffeine in cola drinks, cocoa and chocolate. A young child who drinks 12 ounces of cola, Dr. Pepper, or Mountain Dew has a caffeine intake comparable to that of an adult who drinks 4 cups of coffee, since caffeine dosage is related to body size and weight. Following is a partial list of the caffeine content of some common beverages and medications that contain caffeine.

Caffeine Sources	Content mg/serving
Coffee beverages:	
brewed ground	85/cup (range 85-200)
percolated	110/cup (range 97-125)
dripolated	146/cup (range 137-153)
instant	60-65/cup
instant (decaffeinated)	3/cup
Tea beverages:	
(bagged and loose brewed five minutes)	40/cup (range 20-60)
Cocoa, hot chocolate beverages	
	13/cup (range 6-42)
Cola beverages, Mountain Dew,	
Sunkist Orange Soda	47/12 oz. (range 30-70)

#### Drugs

Aspirin compound-phenacetin	
caffeine	32/pill
Bromo Seltzer	32/pill
Cope, Midol, etc.	32/pill
Fiorinal	40/pill
Excedrin, Anacin	60/pill
Pre-Mens	66/pill
No-Doz, Vivarin	100-200/pill
Dristan, Sinarest	30/pill

--Caroline Kramer, R.N.

\* \* \* \* \*

#### GREEN BANK TELESCOPE SCHEDULING BACKLOG

According to Rick Fisher by the beginning of June, 1981, enough proposals have been received to fill the 140-foot schedule through about August, 1982, including VLBI network time but not including extensive calibration or telescope downtime for modifications. The 300-foot could be scheduled through about May, 1982.

\* \* \* \* \*

#### VLA SUMMER PICNIC

*Jon Spargo*

In spite of an ominous weather forecast, Saturday, May 16, turned out to be an absolutely ideal day for a picnic and that's just what most VLA'ers did!

Now if May seems like an odd time for a summer picnic, you must remember that we desert folk find the 80° May temperatures a whole lot more pleasant than 100° August days. With that in mind the VLA Recreation Association made arrangements for the use of Socorro's spacious Sedillo Park including olympic pool. In addition to a wide variety of games and activities a great steak lunch was provided complete with

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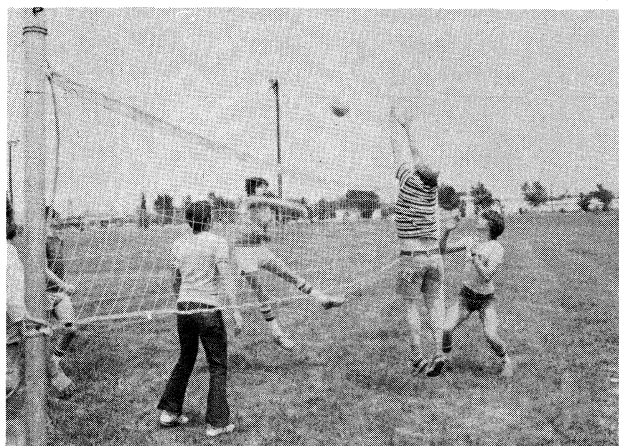
beans and green chili! The photos and captions below and on the next pages tell the rest of the story. Needless to say our summer picnic in May was a huge success and we fully intend to have a repeat performance next year!



*As Andy Strong, Kerry Clark and Phillip Hicks look on, Wayne Koski demonstrates the proper reaction to an overdose of green chili!*



*The Datil bunch came for lunch! Dorothy Larkin (oops, she's from Socorro), Sandy Richards and Alex, Allison and Jay Patrick and Russel Richards.*



*After a busy day of dropping bits, Spike Randolph gets it again! This time at the hands of Adam Van Horn.*

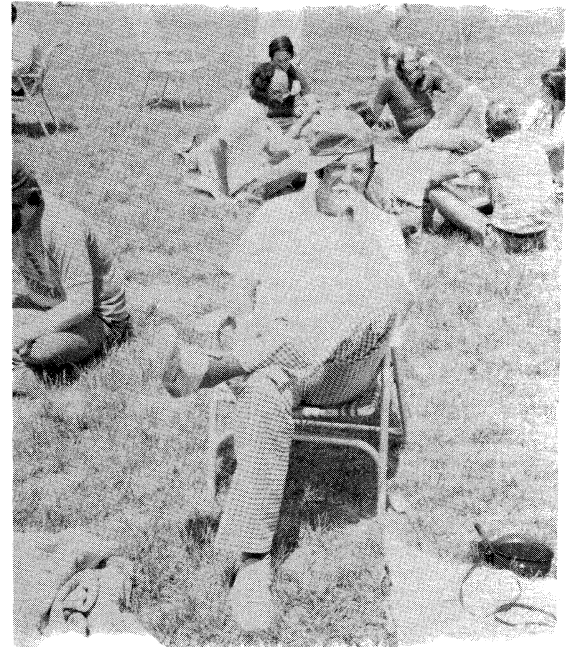


*del Giudice obviously didn't bum that one and the Boss (Ron Ekers) looks happy!*

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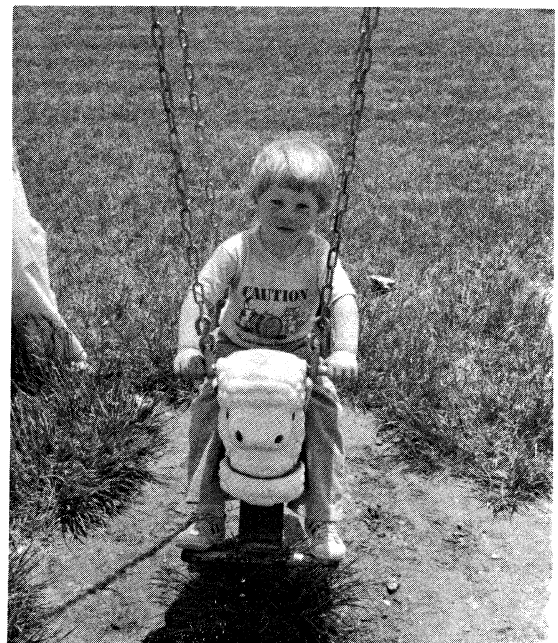
*Doesn't Betty Clark look great!*



*Every picnic has to have a ham!*



*Bill Randolph finally gets satisfaction by watching someone else (Bill Clark) miss a spike!*

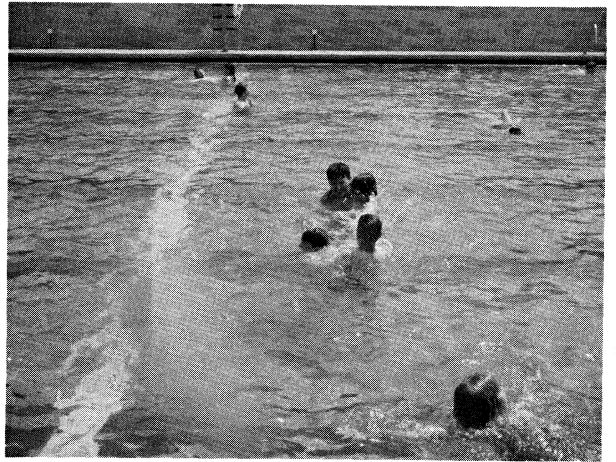


*In this country we start-em young. Future rodeo star Alex Richards begins basic training.*

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*Bob Burns and Bob Duquet are told to go play with the bigger kids!*



*What's a pool without kids!*

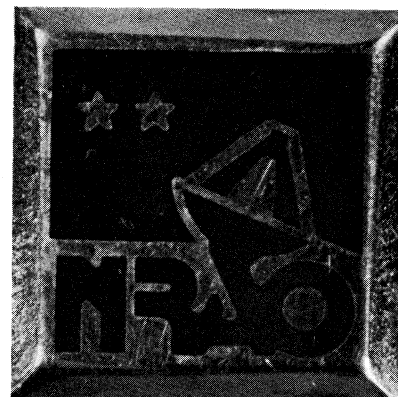


*Watched by Steve Troy, Ramon Molina, Peggy Perley and Ken Sowinski, Eva Rigby (Recreation Association president) explains to astronomer Bob Newell the proper procedure for ordering a steak. Bob, an ex-Navy carrier pilot, remembers his training and takes notes.*



*Kudos, for a job well done. Part of the Rec. Association crew who made it all possible. Frank Bacon, Eva Jean Rigby, Sheila Reasner, Bill del Giudice, Rick Hagen, Emory Egler and Jess Landers. Not in the picture, Esther Vigil, chairperson for all games and prizes who did a great job, and Paul Harden, who did all the art work.*





*Jane Chestnut*

Neil Horner, employed by the National Radio Astronomy Observatory since April 1961, retired May 15, 1981. Neil began work with the Observatory as a laborer, was transferred to guard, but Neil requested to be transferred back to a laborer, to quote Neil, "nights were made for love and sleep and he was getting behind with both", working as a guard. The transfer was granted. Since that time, he has worked in the paint shop, and at the time of his retirement was a plumber's helper.

A retirement party was held for Neil May 15th. He was presented his 20 year certificate and also, the new 20 year pin. Neil received some very nice gifts from his friends. We wish Neil the best of luck in his retirement years.

GREEN BANK SYMPOSIUM



*From left to right: R. McCray, B. T. Lynds, J. A. Nousek, L. H. Aller, J. Crovisier, J. M. Cordes, K. Prendergast, B. D. Savage, Y. Terzian, J. R. Jokipii, V. Icke, J. N. Bregman, J. Higdon, F. J. Lockman, R. A. Chevalier, T. Bania, J. M. Dickey, J. H. von Gorkom, G. Heiligman, R. J. Reynolds, D. McCammon, E. E. Salpeter, S. Federman, L. Spitzer, R. C. Bohlin, M. Kutner, D. M. Elmegreen, L. M. Hobbs, B. G. Elmegreen, E. B. Jenkins, F. W. Stecker, B. J. Rickett, B. E. Turner, J. P. Ostriker, L. Blitz, W. T. Sanders, P. C. Myers, C. Heiles, L. L. Cowie, W. D. Watson, R. L. Brown.*

*by*

*John Dickey*

May 10-13 a workshop was held at Green Bank titled "The Phases of the Interstellar Medium". Because of the number of rooms available the attendance was limited to forty people. Scientists from a broad range of disciplines participated, with one or two people representing entire fields such as optical, ultraviolet, x-ray or radio spectroscopy. Several theorists also attended; they helped form a synthesis of

the observational material. The general conclusion of the conference was that there is a lot we still don't know about the interstellar medium, though some questions appear more tractable than others. For the NRAO staff it was a good chance to make new friends in other parts of the spectrum.

Since most of the participants were not radio astronomers, coming to Green

*--continued, next page--*

Bank was a special occasion. Some had never been to the observatory, for others it was the first time in fifteen or twenty years. Most people were surprised how long it took to get to Green Bank. But once they got there most people found the observatory a pretty good place to hold a workshop. The lack of distractions helped people get more deeply involved in the subject than at some meetings; and the fairly intimate room and board arrangements helped give unity to the group. A lot of credit for the success of the conference should go to the people of the Green Bank administrative services division, particularly the residence hall-cafeteria staff, who produced excellent meals and worked hard to make sure everyone was comfortable, and also to Carol Ziegler, Wally Oref, Becky Warner, Tony Miano, Bob Moore, Janet Warner, and Berdeen O'Brien, who took on a lot of extra work helping out.

\* \* \* \* \*

1980-81 AUI TRUSTEE SCHOLARSHIP

On May 20, 1981, Morton Roberts, director of NRAO, announced the following NRAO winners of the 1980-81 AUI Trustee Scholarship Competition.

Thomas Hjellming

Mr. Hjellming is graduating from Socorro High School in Socorro, New Mexico. He has been a member of the National Honor Society the past three years and was chosen as a Boy's State Delegate his junior year. He is a four-year member of the German Club and the NOVA Club and has competed in the National Math Contest every year since his freshman year.

Thomas will attend Arizona State University this fall where he will study engineering. He is the son of Dr. and Mrs. Robert M. Hjellming of Socorro.

Dr. Hjellming is a Scientist at the VLA.

Laura S. Howell

Miss Howell is a senior at Pocahontas County High School in Dunmore, West Virginia. She is a member of the National Honor Society and the Honors Program. She served as class president in her freshman and sophomore years. She is active in Band, Cheerleading, and serves as secretary for the 4-H Club. She is included in Who's Who Among American High School Students and the Society of Distinguished Names and Faces. Miss Howell is the School Newspaper Editor and was a State Finalist in News-writing and Editorial Writing.

Laura plans to enter West Virginia University where she will major in Pre-nursing. She is the daughter of Mr. and Mrs. Leonard Howell of Green Bank. Mr. Howell is Chief Telescope Operator at the Interferometer.

David A. Mathieu

Mr. Mathieu is a senior at Socorro High School in Socorro, New Mexico. He has been a Student Council Representative for four years and served as Vice President his junior year. He was also a Boy's State Delegate his junior year. Mr. Mathieu is active in track, basketball and football. He received All District and All State honors in football during his senior year.

David plans to enroll at New Mexico State University this fall where he will pursue an engineering degree. His parents are Mr. and Mrs. David L. Mathieu of Socorro. His mother, Emily, is a Senior Accounting Clerk at the VLA.

\* \* \* \* \*



THE 1981 NRAO SUMMER STUDENT PROGRAM
--------------------------------------

*Galen Gisler*

Despite budgetary constraints, and the fact that we were unable to make any alternate appointments to the program this year, the 1981 NRAO Summer Student Program is only slightly smaller than in previous years. Seventeen bright young minds will swell our ranks this summer, ten of them in Charlottesville, six at the VLA, and one in Green Bank. They are fourth year undergraduates, or first and second year graduate students, and they come to us from universities all over the United States.

The program of activities for the summer students is loosely organized. Each student is assigned to one or two staff members, who supervise him/her in a project of mutual interest. In some cases the student helps the advisor with a large project which has been years in the making, in others the advisor suggests a small, self-contained project which the student can undertake with minimal supervision. In either case, the student is allowed full use of the NRAO facilities and is encouraged to consult with other members of the NRAO staff. In addition, in Charlottesville and at the VLA, there is a full program of lectures throughout the summer given by various members of the staff, and covering many important topics in radio astronomy and astronomy in general. At the end of the summer the students are asked to give short talks summarizing the results of their summer research at a summer student symposium. In many cases, this symposium is the first such experience for the student, and it can give him/her valuable self-confidence for future scientific talks which he/she will have to give.

Another feature of the program, begun last year for the Charlottesville and

Green Bank students, is an allocation of a small amount of observing time on one of the NRAO telescopes for the students as a group. This observing time is scheduled in the latter half of the summer, to allow the students time to decide what to do with it, while leaving enough time afterwards for the data reduction to be done. The students are themselves responsible for choosing the project, carrying out the observations, reducing the data, and preparing the results for publication. They will, of course, have access to the advice and opinions of staff members at any stage in the endeavor. Last summer (1980) the students used their twenty hours on the 140-foot telescope to get 21-cm line profiles of dwarf galaxies, and measure rotational velocities and masses of the galaxies.

The summer students in Charlottesville and Green Bank also participate in public relations for the Observatory, by spending a week each in Green Bank assisting with the public tours. They give short talks to the tourists who flock to Green Bank every summer, and demonstrate how a radio telescope works by using a two-foot dish to "observe" a small radio transmitter hidden in the ceiling of the public auditorium.

There are social aspects to the program also, beginning with the summer students' picnic (for students and advisors and families) held this year in Green Bank on Saturday, June 27th. The picnic is an important ice-breaker for the students, who will afterwards be working together with each other and with the staff as friends and colleagues. Last year's Charlottesville students also participated in numerous other social activities, either spontaneously organized by the students themselves or by others at NRAO with student encouragement and participation. These included excursions to points of interest outside Charlottesville (e.g., the Smithsonian Institution in D.C., the King's Dominion amusement park, hiking or camping

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in the Shenandoah National Park, white water rafting in West Virginia, major league baseball games in Baltimore and Philadelphia), volleyball, softball, and bicycling, and dinner parties at each other's homes and apartments (last summer we had at least one such party each week for the last six weeks of the program!).

The summer student program is a long-established feature of NRAO's service to the American scientific community. Since the early 1960's the program has exposed young men and women to radio astronomy at an early stage in their careers, giving them the opportunity to have direct experience with the NRAO telescopes, receivers, and data handling equipment. This experience makes them better equipped to use these facilities as visiting graduate students and professional astronomers in the future. Similar summer programs exist at the Arecibo Observatory, Sacramento Peak Observatory, and Kitt Peak National Observatory. The NRAO program is the largest of these, in terms of numbers of students. National laboratories in other branches of science have sponsored similar programs for many years.

The success of the summer student programs at the national observatories as a vehicle for recruiting fresh talent into astronomy is measured by the fact that a substantial fraction of the present staff at the national observatories is made up of alumni of these programs. Even more alumni now have posts in the academic community and are frequent users of our facilities.

Not all of the alumni of summer student programs go into astronomy as a career, of course. Many go into other branches of science, in the academic world, in industry, or in government. We hope that these alumni carry with them a solid appreciation of the national observatories and their significance

to the scientific community as a whole. Perhaps the most important function of the NRAO summer student program is to ensure that the NRAO will have influential friends 25 or 30 years from now.

The newest wrinkle on the summer student programs at the national observatories is a program introduced at Kitt Peak last summer, in addition to their regular summer student program. Called the NAHB program, its aim is to educate young Native Americans, Hispanics, and Blacks in fundamental science, and to recruit them into scientific careers. These minorities are much more drastically under-represented in basic science than in other professional fields. Of all the national laboratories, Kitt Peak is the first to institute such a program, and its backers hope that it will be imitated elsewhere, with the intended result that greater numbers of Blacks, Hispanics, and Native Americans will opt for scientific careers. The NAHB program recruits younger students than the regular summer student programs do, aiming mostly for second and third year undergraduates. Kitt Peak's experience with it was very favorable last summer, with nine eager and ambitious Black and Hispanic students participating. Mark Gordon of our Tucson site participated directly in the KPNO - NAHB program by supervising one of the students. One of the 1980 NAHB students has been accepted to the regular summer student program for 1981 at the Arecibo Observatory. The 1981 NAHB program, under the direction of B. T. Lynds, will have eight new students.

\* \* \* \* \*





CHARLOTTESVILLE SUMMER STUDENTS

*Jackie Thomas*



*From left to right, top row: Jim Knoke, Chong-An Chang, Dave Wolpert, Tony Davidov, Roy Nakatsuka, Reinhard Skuppin, Debe Crocker. In front: Paul Coleman, Deanne Tucker, Jim Lewis, Elizabeth Sturgis, Carol Bornmann*

Everyone knows summertime at NRAO means new faces and new friends with the arrival of the summer students. This year in Charlottesville, we have a very "worldly" group to say the least. From Colorado to China to Germany to right here in Virginia. Just to give you an idea, here are the names and a little information about each of our summer students:

Jim Knoke, from Somerville, New Jersey. He is a student at Haverford College and is majoring in physics. Jim is working with Fred Schwab.

Chong-An Chang, from Mainland China, was a student at Peking University and will begin at the University of Pittsburgh where he will major in physics. He is working with Bob Brown.

Dave Wolpert, from Boston, Massachusetts is a student at Princeton and is majoring in physics. Dave is working with Ed Fomalont.

Tony Davidov is from Boras, Sweden and is a student at Chalmers University of Technology. He is working at our electronics lab with Sandy Weinreb in some projects on the Apple Computer.

Roy Nakatsuka is from right here in Virginia and is a student at UVA. He is majoring in astronomy and is working with Alan Tubbs.

Steve Ratcliff, from Ballston Lake, New York, will be a student at Princeton and will major in astronomy. He is working with Dave Burstein.

Reinhard Skuppin, from Saulgau, West Germany, is a student at University of Tubingen and is majoring in astronomy. Reinhard is working with John Dickey.

Debe Crocker, originally from Needham, Massachusetts is a student here at University of Virginia. Her major is astronomy and she is working with Barry Turner.

Paul Coleman is from Kailua, Hawaii. He is a student at the University of Pittsburgh and a physics major. Paul is working with Jim Condon.

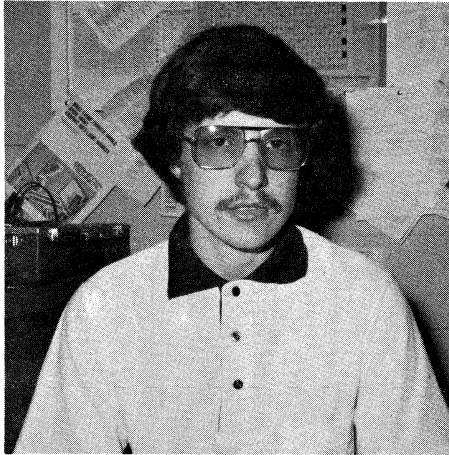
Deanne Tucker is from Denver, Colorado. She is a student at Stanford University and her major is physics. Deanne is working with none other than the summer student co-ordinator, Galen Gisler.

Jim Lewis is from the neighboring city of Fairfax, Virginia and a student right here at UVA. He is majoring in physics and astronomy. Jim is working under Jay Lockman.

Elizabeth Sturgis is from Coatesville, Pennsylvania and a grad student at the University of Michigan. She is majoring in astronomy and working with John Benson and Jeff Puschell.

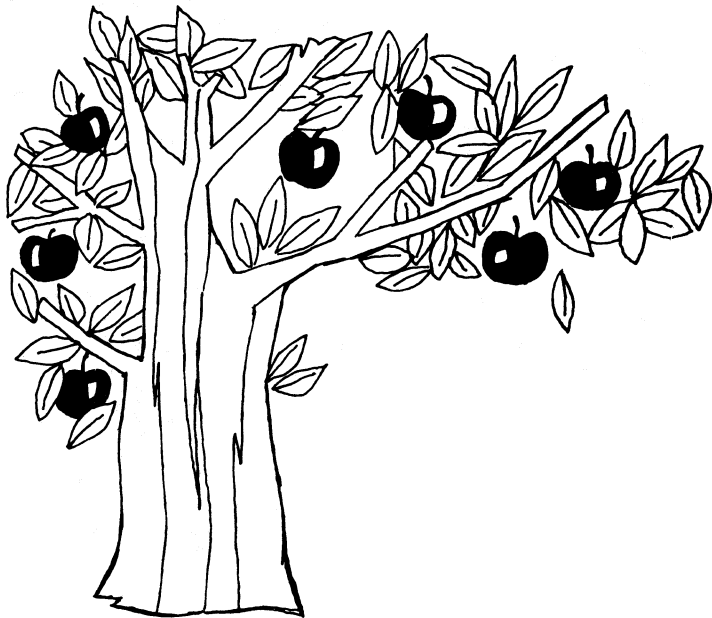
Carol Bornmann, from St. Charles, Missouri, is a student at the University of Missouri at Rolla and is majoring in computer science. She is working with who else but Bill Meredith.

## GREEN BANK SUMMER STUDENT



*Richard Bradley*

Richard is an electrical engineering major at Carnegie Mellon University in Carnegie, Pennsylvania, where he makes his home. He is working under the supervision of Roger Norrod.



## VLA SUMMER STUDENTS

Michael Andrews attends Iowa State University at Ames, Iowa. He is a physics major and will be working with John Basart this summer.

Robert Calvert is originally from Berkeley, California. He attends Reed College in Portland, Oregon, where he majors in physics. He'll be working with Bob Burns.

Michael Fitzsimmons will be working with Dick Sramek this summer. He hails from Austin, Texas, and attends Reed College in Portland. His major is physics.

Kenneth Mighell majors in astronomy, physics at the University of Washington in Seattle. He is working with Ron Ekers.

Thomas Cwik (not shown) attends the University of Illinois where he majors in electrical engineering. He makes his home in Urbana, Illinois. He is working under Peter Napier.

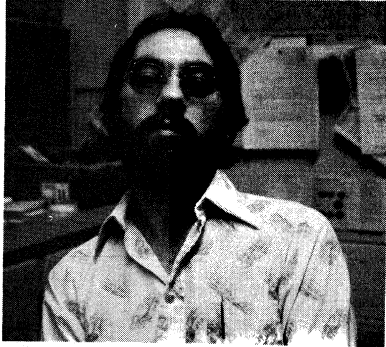
Michael Lesser (not shown) lives in Los Angeles and attends UCLA. His major is astronomy. He is also working under Ron Ekers.



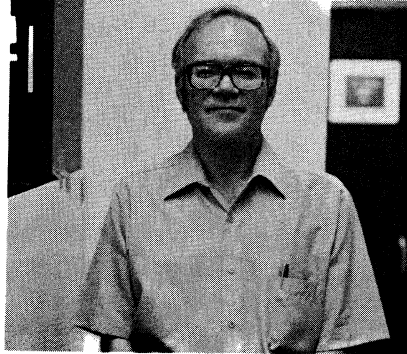
*From left to right:  
Michael Fitzsimmons, Michael Andrews,  
Kenneth Mighell, Robert Calvert*

PERSONNEL UPDATE

New Employees



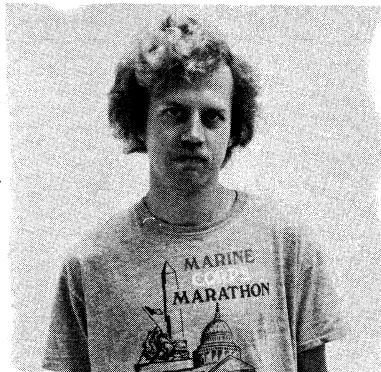
Wesley A. Sizemore  
Technical Specialist  
Telescope Operations - GB



Donald C. Wells, III  
Systems Scientist  
Computer Division - CV



Manuel Sierra  
Visiting Electronics Engineer  
Central Lab - CV



James S. Ulvestad  
Research Associate  
Basic Research - CV

Other New Employees  
(Photos Not Available)

Ronald W. Lowe  
Scientific Programmer I  
Computer Division - NM

Dennis W. Polyard  
Intermediate Technician  
Electronics - NM

Craig L. Sarazin  
Visiting Associate Scientist  
Basic Research - CV

Mary F. Holmes  
Draftsman II  
Antenna Division - NM

Rehires



Raymond P. Escoffier  
Electronics Engineer I  
Central Lab - CV

Christopher P. O'Dea  
Jr. Research Associate  
Student Support - NM

Terry S. White  
Technical Specialist  
Tucson Operations

Susan E. Delap  
Technical Specialist  
Telescope Operations - GB

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PERSONNEL UPDATE

(Continued)

Terminations

Daryl L. Grant  
Christopher J. Salter  
Larry Crouch  
Linda L. Staley

David Emary  
Stephen Gottesman  
Dan L. Fenstermacher

Retirements

John H. Lancaster

Neil Horner

Return From Leave of Absence

Kenneth I. Kellermann

Steven R. Spangler

Temporary Part-time Employees

Anita Sue Oliver  
Tour Receptionist  
Scientific Services - GB

Beth A. Liptak  
Lifeguard  
Plant Maintenance - GB

Mary J. Baca  
Housekeeper/Food Handler  
Administrative Services - NM

Steven W. Gillispie  
Equipment Caretaker  
Plant Maintenance - GB

Rosalie Slaven  
Housekeeper/Food Handler  
Administrative Services - GB

William A. Shank  
Laborer  
Plant Maintenance - GB

Barry C. Williams  
Lifeguard  
Plant Maintenance - GB

Gregory A. Brubaker  
Painters Helper  
Plant Maintenance - GB



HOW TO WIN FRIENDS AND INFLUENCE  
THE NEIGHBORHOOD

*Bette del Giudice*

Eight years ago in Green Bank, Bette decided after twenty-five years of procrastinating she now had the ideal place to keep honey bees. Bill and the rest of the family were against this idea but humored Bette. Support, delivery and even the initial financing for two hives of bees came from Carol and Howard Mullenax of Durbin.

The bees arrived with the Mullenax couple in the dark of the night while city visitors were at the del Giudice house. The guests thought that country living finally had taken its toll on poor Bette and that she finally went over the edge. Bill did finally offer to help set up.

Frantic trips to Marlinton were made for bee veils, etc. An evening beekeeping course was taken at Green Bank school by most of the del Giudice family. Bill got so intrigued by the character of the honeybee that he converted and became an apiarist. Insanity is catching.

After three years of freezes, starve-outs, swarmings and wax moths the del Giudices finally gleaned twenty pounds of honey per hive at the amazing cost of \$22.00 a pound. Bill accepted a transfer to Socorro so the bees had to be sold.

Once settled in Socorro Bette and Bill studied local newspapers for ads about honeybees. Two active hives of bees were located, inspected and purchased. The big fellow who delivered them by himself at 3:00 a.m. caused all sorts of wonderment to the dogs and people of the neighborhood at that hour. Bette and Bill became very popular and came to the attention of much of the neighborhood.

Eventually the two hives became four with the purchase from Sears of two queens and two packages of bees all of the Italian persuasion. Arrival day at the Sears order store made Bette very, very popular. The people at Sears frantically phoned Bette, who was teaching at Zimmerly School, to come quickly that her bees were loose in the store. They really weren't. A few stow-aways attached themselves to the outside of the packages. People get so excited.

Now with four hives in full residence, Bette and the neighbors were straining each other's patience. Gene Spaulding came to the rescue and invited the bees, he loves to be near, to come and live at his place in San Antonio, New Mexico. The bees dearly love all that alfalfa and Gene in return. Under his dotting attention the wax moths and skunks hardly make a difference. The first full season of bee management in New Mexico produced 100 pounds of honey per hive for Bette and Bill. The cost is more like \$1.50 per pound.

Gene has become so devoted to the bees that he was constantly scouting out swarms and cleverly ensconced colonies up and down the Rio Grande valley. One of the latest was in Luis Lopez under a small solid building. Bill, Bette and daughter Maria crawled under the building to smoke the bees and collect old honeycomb, brood comb, queen and worker bees. Bette received, sorted and packed. The whole neighborhood, at a discreet distance, turned out to watch this Sunday entertainment. About forty pounds of honey was saved and then given to the building owner and the bees were triumphantly brought back to Socorro after just a few hours work. Three days later the bees decided that they didn't like life in town and flew off into the sunset. (Normally bees swarm before noon.) The hive that they vacated was mothballed and moved out of the way near to the garage.

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Four days later Bette had a small group of teacher friends for a picnic in the yard. Just before guests arrived, Bette and Maria noted a football-sized swarm of bees in the yard next door. Bette and Maria decided to box the swarm as soon as the guests left.

The guests arrived, including Nancy Gibbins, the school principal, who is deathly allergic to bee stings. Nancy is a former beekeeper. She was totally unbothered, and she advised each new comer of the swarm, its habits, etc. The group nervously sat down at the picnic table and started to eat. In ten minutes the sky was dotted with bees coming their way.

Bees everywhere. Right overhead and coming down. They came down fifteen feet from the picnic table and walked right over the moth balls and on into the stored beehive. It's true. There were five terrified witnesses.

This added another hive to the inventory. New hives don't produce an appreciable amount of surplus honey. The four established hives produced 800 pounds of surplus honey in 1980. The honey is now costing about 50¢ a pound.

The bee madness seems to be inherited by the female offspring. Maria and Anni both are beekeepers. Maria has made plans to keep her own beehives much to the chagrin of a certain young man that hangs around the del Giudice household.

\* \* \* \* \*

SENECA LAKE REOPENS

After an absence of nearly three years, Seneca State Forest Dam and Lake have been replaced by the Department of Natural Resources, division of parks and recreation. The reconstructed dam was designed by Brackenrich & Associates, Inc., Lewisburg, West Virginia, and built

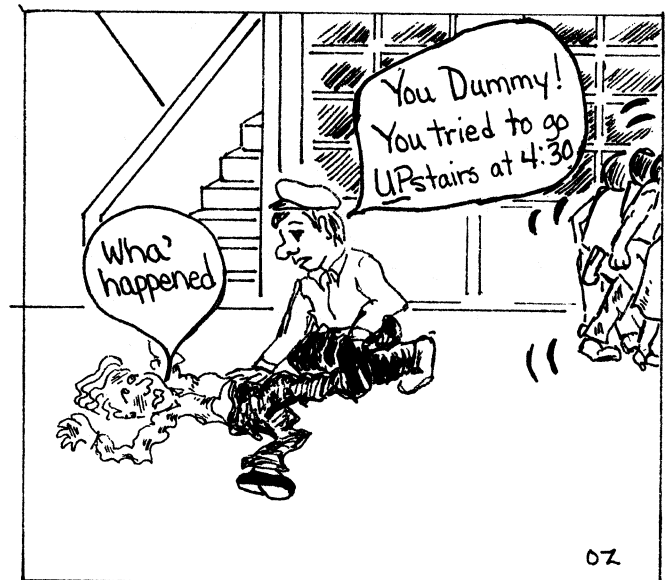
by the Triple H Construction Company of Beverly, West Virginia, at a cost of just over \$147,000.

Due to winter water and ice damage, the original dam was breached in March of 1978, and a series of culverts replaced the dam to create a roadway for access to several of the Seneca State Forest cabins. However, vigorous public sentiment was instrumental in prompting the decision to replace the dam.

Seneca Lake is stocked with trout bi-weekly through the spring by the Department of Natural Resources, division of wildlife. Largemouth bass were also stocked in the spring with a stocking of bluegill and a fall stocking of trout to follow. Division of wildlife fish biologist, Bernie Dowler, describes Seneca Lake as a high elevation, warm water lake where fair to good bass and bluegill fishing can be expected.

Seneca, the second largest state forest with a total acreage of 11,684, offers guest accommodations of seven rustic cabins and ten tent or trailer campsites. Recreational possibilities include boating, fishing, hunting in season, picnicking, playgrounds and hiking trails.

\* \* \* \* \*



RETIREMENT DINNER FOR JACK LANCASTER

*Eva Jean Rigby*



*Phyllis and Jack Lancaster*



*Morton Roberts and Jack Lancaster*



*Everyone enjoys the cocktail hour*



*Emory Egler, Ron Ekers, Jess Sanders,  
Eva Jean Rigby*

Jack Lancaster was honored by friends and fellow employees at a retirement party on March 28, 1981. The party was held at the National Guard Armory in Socorro. The VLA Recreation Association sponsored the band and the no-host bar. The accompanying photographs, taken by John Basart bear witness to the success of the send-off for Jack. The decorations

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were contributed by Charlene Temple.

Jack hails from Bellport, New York, a once small fishing village on the Great South Bay and before coming to NRAO in 1972, to build the VLA, Jack had worked eighteen years for AUI at Brookhaven National Laboratory. Under Jack's leadership, as assistant director and project manager, the VLA was dedicated on October 10, 1980.

Jack and Phyllis' love for the sea was made apparent to their New Mexico friends when they purchased a sail boat and set out for two years of sailing the Eastern Inland Coastal Waterways and the Carribbean.

Retirement? Sailing is hard work but, as always, Jack and Phyllis are doing what they enjoy the most -- living life to the fullest.

\* \* \* \* \*

CONFERENCE ROOMS

*Wally Oref*

NRAO Green Bank now has three conference rooms for group meetings. The smallest seats 8-10, the intermediate 16-20, and the largest, located in the auditorium, will comfortably seat 40-45.

All three conference rooms are air conditioned, have teleconference systems, and good acoustics. The largest two can be equipped with standard audio visual equipment.

The auditorium conference room is not available from mid-June through Labor Day when it is being used daily as the tour center. Scheduling of the smallest and largest conference rooms should be made with Wally Oref and the intermediate with Rich Lacasse.

\* \* \* \* \*

1980-1981 BOWLING SEASON

*Richard Hiner*

The Green Bank bowling team has completed the 1980-81 bowling season. A record of 65 wins and 79 losses gave us 9th place in the Tuesday night league at the Elkins Recreation Center. In the first half of the season (eighteen weeks) we posted a 36-36 record, and finished the second half with a 29-43 record.

The following employees bowled this past season: Everett Arbogast, Howard Brown, Harold Crist, Marc Damashek, Richard Hiner, Jim Lyons, Wendell Monk, Roger Norrod, Russell Poling, Sidney Smith, and Bob Vance.

There are two halves in a bowling season, the first half is from September 1 to December 29, 1981, and the second half is from January 5 to May 4, 1982. We need some new bowlers that would like to bowl a full or half of a season. You can contact any of the above bowlers and they will give you the details about the bowling season.

\* \* \* \* \*

ITALY THEIR ITALY

*C. J. Salter*

Strange, things just aren't right with Milan Train Station. Too many trains, not enough people and -- something is missing? I take my seat in a (surprisingly) empty compartment and then the first flash of recognition. Railwaymen, that's what's missing. Not a grey uniform in sight where normally porters are falling over each other to carry bags you are quite determined to carry yourself. In a not-too-controlled panic my eyes scour the platforms and then I see him; two hundred and fifty pounds of Ferrovia Statale employee with an object in

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life. He takes a pace forward, stops, looks, bends and? And he picks up a discarded plastic coffee cup. He weighs it on his hand, he holds it up to eye-level, he admires its grace, examines its form, considers its subtlety and with exquisite care replaces it on the ground the wrong way up. Suddenly, with unexpected agility, two hundred and fifty pounds of grey-clad power launch themselves skywards. I don't doubt that as the doomed receptacle vanishes into pure energy there is a minute pop (or is it a tiny scream?); I can't possibly hear it physically, but as a catalyst to understanding it might well be a fifty megaton explosion. STRIKE! A comfortable feeling wells over me and I settle back contentedly into my state-subsidized luxury. I shake my head knowing all will be well again in a couple of hours and reflect how rusty my Italology has become. Ah, Italy - their Italy.

There is an obvious answer for everything in this country; it's just seeing it that isn't always so easy. Things seem so comfortably normal and then the unexpected hits you between the eyes! Take an example. If you want a new suit you go to the tailor's, right? For meat you go to the butcher's; for vegetables, the greengrover, O.K.? So where do you go to buy salt, postage stamps and bus tickets? The tobacconists, of course. Get the idea? What do you

mean confusing! Let's take an easier example then -- car number plates. Each city issues plates with its own identification letters. MI is Milan, BO is Bologna, VE is Venice. Dead simple, eh? So where's RO then? "Rovigo", you reply correctly, "Whoever could have thought it might be Rome?" So you are getting the idea!

It's much the same in politics, the other Italian blood sport (we'll meet the other, other national blood sport in a bit). Italy has about ten political parties, but let's concentrate for now on the two biggest. Largest of all, and the forever government (don't let a new prime minister every three months fool you!), are the Christian Democrats, the party of the Church. Next biggest are the Communists. Implacably opposed, you suggest? Sorry, wrong again? Only two years ago they were indulging in the most affectionate of embraces immortalized by the delightful title of "The Historic Compromise".

An aspect of the Italian life-style which I suspect a passing American would find strange is what I have come to call "the Great Italian Agrophobia". As an Italian becomes more prosperous he doesn't dream of buying land, moving to the countryside and entering the smoky city only for the essential business of earning his daily bread. He will move to tinier and tinier apartments, nearer and nearer to the center of town, until finally achieving the ideal of one room on the fifteenth floor above the main street. Stage two of the game is then to surround himself with as many relatives as possible. The ultimately successful man has his mother-in-law in the next apartment, his own parents on the fourteenth floor, son on the thirteenth, uncle, brother-in-law, aunt and third cousin on the twelfth, etc.

Driving in an Italian city is an experience no masochist should miss. The standard transport here is the Fiat 500, best described as one quarter of a Ford

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Pinto. I suspect that on first encountering a Fiat 500, an American would try to put it on, rather than get into it. With vehicles of this size, Italian roads do not have lanes, you just pack as many cars in line abreast as you can. Traffic lights take on the aspect of a Formula 1 Grand Prix start line, while the 30 mph speed limit is universally accepted as marking the minimum speed permitted! The average Italian is a magnificent driver so long as he is pitting his wits against his own kind. He can become confused, deranged and even homicidal when confronted by a jibbering foreigner who is wondering what he did that was terrible enough that he should be sentenced to drive in this apparent chaos.

All of which brings me in a natural way to the other, other national blood sport -- pedestrian hunting. I know of no other country where a motorist would rather die than stop for a pedestrian crossing. Open season reigns all year long on the foot-bound unfortunates. Clearly it is far too easy for a pedestrian-seeking race to run a pedestrian down, but to clip his heels with your tires or remove her shopping basket with your fender, that takes real skill. Pedestrians, of course, expect such treatment but when they catch the rare motorist with weak nerves are quite capable of retaliating by lingering in front of his car to discuss their neighbor's operation or yesterday's soccer results. The whip hand, however, is always with the motorist and I can dip into my own experiences for a typical example. Once, as a very new driver here, I did the unheard-of and stopped at a crossing where a pedestrian was cowering. She looked at me amazed. I waved her across. One foot was already on the crossing when a look of doubt replaced amazement. She stopped, she stepped back, she looked hard at me, I smiled. Horror crossed her

face as she stared imminent extinction in the teeth. Bombs would not have moved her from the slender sanctuary of the pavement. A wiser man, I drove on.

How then would I classify the Italian experience? Perhaps an impossible question to answer simply. Delightful? Frustrating? Refreshing? Impossible? All sum it up equally well and equally badly. This is a country where you can develop ulcers very, very quickly, but at least you can expect to feed them well! What could one say of Italy in just a few words? The only thing that comes to mind is "Italia? E la lono Italia!"

\* \* \* \* \*

#### BAKED LASAGNE

*Carol Ziegler*

2 - 6oz. cans tom. paste	2 cups water
1 - 8oz. can tom. sauce	½ tsp. pepper
1 small onion (chopped)	1 tsp. salt
1 small can mushrooms	2 tsp. oregano
1# box lasagne noodles	1# ground beef
2 tsp. minced garlic	2 eggs
½# ground pork (optional)	
1 - 8oz. pkg. shredded mozzarella	
1# ricotta or large curd cottage cheese	
½ cup grated parmesan	

Brown beef, pork, mushrooms, onion in a pan. Drain. Add garlic, oregano, water, tomato paste, tomato sauce, salt and pepper. Simmer at least 30 minutes. Cook noodles according to directions, set aside. Beat eggs. Add the ricotta or cottage cheese to eggs. In a 9 x 13 x 2 pan, layer the ingredients. Start with a layer of noodles, cheese and egg mixture, meat sauce, mozzarella. A layer of meat sauce should be on top. Sprinkle with parmesan. Bake for 35-45 minutes at 350°

*These proportions suit my family's bland tastes. For spicier lasagne, add a little more oregano, garlic (use fresh) and onion.*

## WHAT'S COOKING?

SPINACH BALLS*Nina Damashek*

2 pkgs. chopped frozen spinach or  
1-2 pkgs. fresh  
2½ cups Pepperidge Farm Herb Stuffing,  
or other breadcrumbs with herbs  
1 large onion (chopped)  
4 eggs, beaten  
¾ cup butter, melted  
½ tsp. salt  
½ cup grated parmesan cheese  
pepper and garlic to taste

Thaw spinach and drain. Mix with other ingredients. Chill. Roll into one inch balls. Place on cookie sheet. Freeze. Store in plastic bag. Bake from the freezer for 17 to 20 minutes at 375°.

MUSTARD SAUCE*Nina Damashek*

1/3 to 1/2 cup dry mustard  
1/2 cup white vinegar  
1/2 cup sugar  
1 egg yolk

Combine mustard and vinegar in small bowl. Cover and let stand at room temperature over night. Combine with rest of ingredients in sauce pan. Simmer until slightly thickened. Cover and store in refrigerator (will last up to one month). Serve at room temperature.

\* \* \* \* \*

BUTTER PECAN SHORTBREAD*Carol Ziegler*

1 cup butter  
½ cup packed light brown sugar  
2¼ cup flour  
½ cup finely chopped pecans

Beat butter until soft, add brown sugar gradually. Beat until fluffy. Add flour gradually. Mix in pecans. Chill dough until it is easy to handle. On lightly floured surface, pat and roll dough into 14" x 10" rectangle approximatel ¼" thick. Cut into 24 squares. Divide each into four triangles. Bake 18-20 minutes at 300°. Decorate with icing if desired.

Icing

2 T. butter  
¼ tsp. vanilla  
1 cup confectioners sugar  
milk (about 1 T.)  
coloring if desired

\* \* \* \* \*

