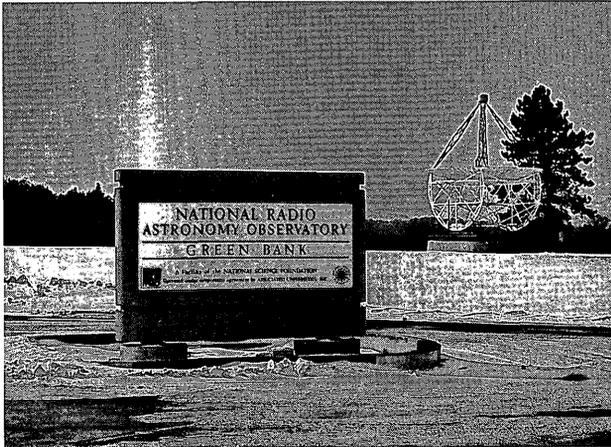




# THE POINT SOURCE

Volume 6, No. 2

Spring 2000



The picture above is the new entrance sign recently installed at the NRAO-GB facility. The sign was designed in Green Bank and warmly greets all travelers on the main highway. The old guard shack was removed to make way for this addition.

Photo by M. Holstine

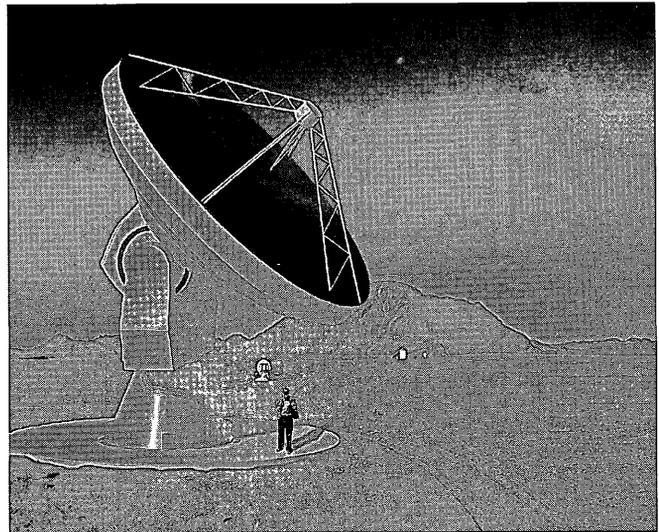
## ALMA Moves Closer to Construction

The ALMA project continues to accelerate toward the start of construction in 2002. A number of important milestones have been reached over the past few months that move us closer to this major goal. First, United States and European teams have held a series of technical meetings to agree on a specific scope for the project as well as to choose among alternative design approaches. Second, a detailed cost analysis, based on this project scope, has been completed and submitted to the funding agencies in both Europe and the U.S. Finally, the ALMA Science Advisory Committee has strongly endorsed this baseline project as meeting the challenging science goals originally set forth for ALMA. These actions set the stage for the funding of construction for the ALMA project to be included in the NSF Fiscal Year 2002 budget request.

Much work remains prior to the start of construction. The most visible will be the erection of two ALMA prototype antennas at the VLA site, set for completion at the end of 2001. These two antennas represent different designs by two contractors intended to satisfy identical performance specifications. Testing in the months following their com-

pletion will provide comparative performance information that will help choose the best design to replicate for the 64 antennas needed for ALMA. The complex specialized hardware required for these tests is currently under construction in Charlottesville, Socorro, and Tucson.

by Marc Rafal



ALMA prototype antenna engineering concept: Vertex Antenna Systems, LLC

## VLA 20th Anniversary Celebration

The 20th VLA anniversary was celebrated on May 24, 2000. A coordinated effort of many divisions made it all possible. Numerous employees worked hard on details for the event to be a success. Guests included Gas and Galaxy Evolution Conference attendees, scientists, retired and active employees, VLA site neighbors (ranchers), local dignitaries, and others who work closely with the VLA.

For the celebration, the Business Division assisted with the formal invitation production and mailing. They chartered four additional buses for transportation of employees and visitors between Socorro and the VLA and acquired tables and chairs from New Mexico Tech. The Engineering Services Division made seating arrangements for more than 350 people in the Antenna Assembly Building. Approximately 400 guests were hosted at the VLA site. A tasty BBQ meal was prepared by a Socorro caterer who

(continued page 2)



*Even the normally shy antelope came out for the VLA celebration and entertained the spectators upon arrival at the VLA site.*

*Photo by R. Norville*

reported that guests were served in under 13 minutes and that a total of 450 plates were served (some of us went for seconds).

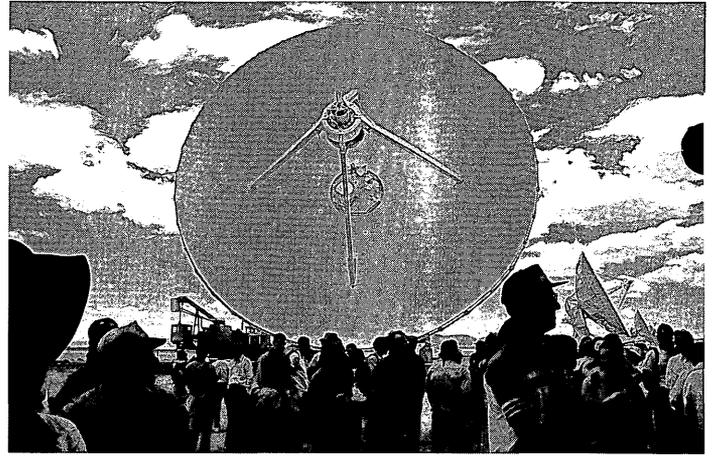
The Scientific Services staff served as tour guides while experts from the Engineering Services Division, Electronics Division, and Array Operations Division manned displays which described various major components of the VLA. The stage and sound system were loaned to NRAO by Socorro High School. The Engineering Services staff han-



*Rob Long and Leon Abeyta are pictured answering questions for one of the numerous groups on the guided tour.*

*Photo by K. Gatlin*

dled traffic control. New information pamphlets describing the proposed Expanded VLA Project arrived just in time, only hours before the event began. The New Mexico Employee Recreation Association (NMPRA) set up a table to sell their many commemorative items to guests. A new 20th Anniversary shirt sold briskly. (These attractive shirts may still be purchased via email to [nmpraplus@aoc.nrao.edu](mailto:nmpraplus@aoc.nrao.edu)). At the end of the event, everyone was rounded up, loaded on to the buses, and returned to Magdalena and Socorro. Special "sweeper" vans



*Photo by R. Norville*

ensured that no one was left behind. The VLA staff had the site cleaned up and back to normal operations the very next day. The 20<sup>th</sup> Anniversary VLA site celebration was organized by a committee chaired by Terry Romero.

*by Lew Serna, Terry Romero, & Skip Lagoyda*



*VLA celebration organizing committee members from left to right, Joan Wrobel, Jim Ulvestad, Dave Finley, Patty Lindsey, Pat Lewis, Terry Romero, Clint Janes, Skip Lagoyda, and Lew Serna*

*Photo by R. Norville*

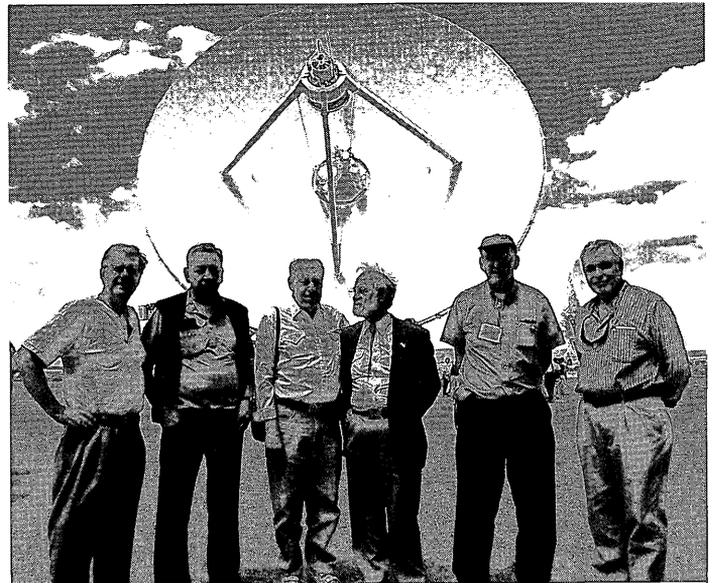
## **NRAO/NMT Conference on Gas and Galaxy Evolution**

NRAO and New Mexico Tech are co-sponsors

Over 180 astronomers converged on Socorro in late May for the conference on Gas and Galaxy Evolution, co-sponsored by NRAO and NMT in celebration of the VLA's 20th anniversary. The meeting kicked off with a Saturday afternoon reception at Macey Center; despite a gang of rowdy geese who laid claim to the nearby pond, everyone seemed to have a good time. The main part of the conference, held in NMT's Workman Center, lasted three and a half days, and featured over 70 talks and 80 posters. The conference was notable for attracting both theorists and



NRAO's John Hibbard, Michael Rupen and Jacquelin van Gorkom (Cornell) collaborated on the well attended Gas & Galaxy Conference. Photo by R. Norville



Two original members of the VLA start-up Jack Lancaster and Ron Ekers (center) are pictured with Paul Vanden Bout, Jack Campbell (left), Miller Goss and Dick Sramek (right).

Photo by K. Gatlin



Paul Vanden Bout and Miller Goss chatting with a few of the approximately 400 gathered celebrants. Photo by K. Gatlin

observers, from a wide variety of fields, with about half the participants being young graduate students and postdocs.

The increasing inclusiveness of the field was seen in the number of professional women present, about a third of the total, as well as the many countries represented (19!). Topics ranged from numerical simulations of galaxy formation, to optical and ultraviolet studies of the Lyman-alpha forest (absorption lines due to neutral gas seen against distant quasars), to the unexpected and peculiar gas distributions seen around galaxies in many VLA images. The "Weirdo Wall" realized a long-time dream of staff scientist John Hibbard (CV) to collect a large number of these images in one place. One of the most famous of these galaxies, M81, was featured on the beautiful t-shirts designed by Jansky Postdocs Tracy Clarke and Marc Verheijen, based on VLA data from staff scientist Min Su Yun. They were so popular, we're thinking of re-ordering them—send email to [tclarke@nrao.edu](mailto:tclarke@nrao.edu) or [mrupen@nrao.edu](mailto:mrupen@nrao.edu) if you'd like one!

There were a number of social events associated with the conference, including a nature hike — even astronomers can't work *all* the time! Much to the surprise of hike leader Gustaaf van Moorsel, the Monday 5:30 a.m. hike to the Bosque del Apache (a wildlife refuge, well-known for its fall bird migration) attracted some 40 participants. The Tuesday session was notable for the poster awards, which included a chile rijstra (a cluster of hanging chile peppers) for the hottest new result (Chris Mihos), and for the evening discussion session on high-velocity clouds. The conference concluded on Wednesday with a rousing summary by Linda Sparke, followed by the VLA 20th Anniversary Celebration.

by Michael Rupen

## **U.S. National Academy of Sciences Elects Martha Haynes in 2000**

Martha Haynes, a Trustee and former Interim President of Associated Universities Inc. was elected to membership in the U.S. National Academy of Sciences (NAS) in May of this year.

The NAS is widely recognized as the most prestigious of U.S. scientific societies. Its members represent essentially all fields of science such as mathematics, astronomy, physics, chemistry, physiology, anthropology, engineering sciences, etc. Only 60 new members are elected each year. Martha was elected last year to the American Academy of Arts and Sciences, an institution founded in 1780 by the then nation's leaders, including John Adams and John Hancock.

(continued page 4)

Martha has received this recognition for her many outstanding astronomical research activities. She, together with colleagues and students, was among the first to delineate superclusters and to recognize the effects of environment on galaxy properties and evolution. She produced the first extensive picture of galactic tidal interactions as traced by neutral hydrogen. She is a world leader in the study of galaxies by radio-spectroscopy techniques.

Martha has been affiliated with NRAO for close to a quarter of a century, initially as a summer student working with Dick Sramek. She did her thesis work at NRAO. Her degrees are from Wellesley College and Indiana University. Martha was site director for Green Bank in 1981-1983. She is currently a professor of astronomy at Cornell University.



Her husband, Riccardo Giovanelli, also a professor at Cornell, is known to many in the NRAO community. In 1989 he and Martha shared receipt of the Henry Draper Medal of the NAS for their work on the superclustering of galaxies. In 1997 the Italian government bestowed on Riccardo the honor and title of Cavaliere della Repubblica.

In her Charlottesville student days Martha was a founding member of the "Hvatum hill and dale" bicycling society. At Cornell she took to the water and was very active in sculling on Cayuga Lake. She continues her strong affiliation with NRAO in several capacities, including that of future user of the Green Bank Telescope.

*by Morton Roberts*

## The Science

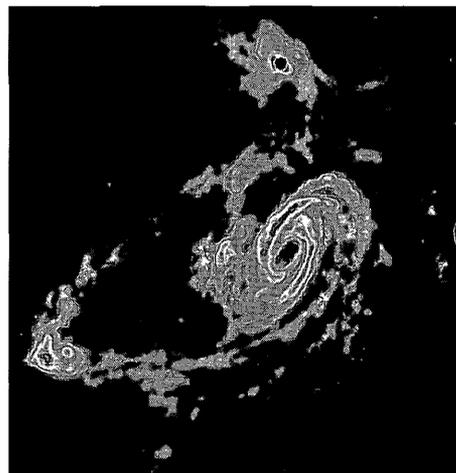
*Discussions from the Gas and Galaxy Evolution Conference*

One of the big puzzles in modern astronomy is how you take the primordial gas, which was originally roughly evenly distributed throughout the universe, and clump it together to make the stars and galaxies we see today. There are all sorts of different ways to tackle this problem. Some scientists create fake universes in their computers, turn on gravity and maybe a little gas cooling and star formation, and watch them evolve. They find that gas collects into thin filaments; the gas then flows down these filaments into dense clumps, the forebearers of galaxies and galaxy clusters. On the observational side, astronomers working with optical and ultraviolet telescopes use distant quasars as background sources, looking for absorption due to neutral hydrogen gas in front of the quasars. Each bit of gas absorbs a different wavelength of light; there are so many independent absorbers that very little continuum gets through, and the resulting spectrum looks like a bunch of spikes—giving the phenomenon its name, the Lyman-alpha forest. (Note: Lyman alpha is the name given to the highest-energy transition of atomic hydrogen.) The challenge for the theorists then is to associate the observed

absorption with the filaments seen in their simulations. The VLA contributes in several different ways; perhaps the most direct is by imaging the neutral hydrogen emission around known Lyman-alpha absorbers. The optical/UV folks can tell there is gas at such-and-such a velocity towards this quasar, but they can't tell how it's distributed (is it a sheet of material? a roundish blob? a thin filament?) and they can't see directly whether this gas is associated with nearby galaxies, or is it just sitting there by itself. Enter the VLA. By looking at the 21 cm line of neutral hydrogen, we can check for gas and galaxies over large areas around the quasar.

A bit closer to home, and on somewhat smaller scales, there's the question of how you make a galaxy. Were galaxies formed long ago, and now simply live on as isolated blobs of stars and gas? Or, are they continuously evolving and changing, even being born, down to the present? Do you make a galaxy by carefully adding little blobs of gas, or by throwing huge stellar systems together in violent mergers? Here again there is a wonderful interaction between computer simulations and observations, with the

VLA playing a very important and unique role. VLA observations of galaxies ranging from big spirals like M81, to big ellipticals like NGC 2865, to dwarf galaxies like IC 10, show very extensive gaseous streamers surrounding all these systems. Even apparently normal, "boring" galaxies show



*VLA observation of the neutral hydrogen gas in the M81 system.*

signs of past encounters; as many as two-thirds of a random sample show warps, asymmetric gas distributions, or gas rotating in different directions at different radii. Spurred by the data, theorists have developed simulations including both gravity and gas dynamics (shocks, gaseous heating and cooling, and crude star formation), which can match at least some of the observations.

There are, however, a number of outstanding questions. At a fundamental level, we don't understand gravitation on galactic or larger scales, and have to invoke the famous "dark matter" to match both clumping on large scales (remember those filaments that are supposed to make galaxies), and galaxy rotation curves on small scales. Unfortunately, the models which match the big stuff have severe problems with the small stuff, though it's still not clear whether those problems are disastrous or are simply telling us that life is more complicated than the current simple theories. Another outstanding problem is that of energy input. When you make galaxies, you also make stars,

some of which blow up (supernovae), and massive black holes, some of which give off impressive amounts of energy (as active galactic nuclei, or AGNs) and even more impressive relativistic jets. These energy inputs are clearly important, but we don't yet know how to handle them theoretically. For instance, recent VLA observations show that AGNs are not simple accelerators, spewing out jets at a constant rate and in a constant direction; instead the jets turn off and on sporadically, inflating huge bubbles in the surrounding intergalactic medium. Finally there is the problem of environment. Many, perhaps most, galaxies live next to one another, in groups and clusters. There is strong evidence from VLA and other radio observations that these galaxies interact, both with one another (cf. the mergers illustrated above), and with the hot X-ray-emitting gas which fills the space between the galaxies. This sort of interaction is again clearly important to galaxy evolution, at least in some cases; but we don't know exactly how it works, and how the affected galaxies respond. For instance, optical observations of intermediate-distance clusters showed that a significant fraction of the galaxies there had weird spectra, spectra which suggested recent but not current star formation. VLA and other radio observations have shown that in some clusters the gas is stripped away from galaxies near the central cores; the details of this process are just beginning to be understood.

One evening at the conference was devoted to discussing the nature of high-velocity clouds (HVCs). These are clouds of neutral hydrogen with no stellar counterparts, which move at much greater speeds than similar gas in the galactic plane. The prime question for extragalactic observers is: how far away are they? If they're nearby within, say, a few tens of kiloparsecs they are like the Magellanic Stream, relatively light clouds of gas bound to the Milky Way. If they're more distant, some have suggested up to a factor 100 times further out, they become truly huge, almost galaxy-size blobs of gas. Presuming the Milky Way and our local group to be fairly average, this would suggest that galaxy formation is pretty inefficient, leaving enormous amounts of pristine gas circling the stars, perhaps later to fall in and keep the galaxy shining with young stars for many billions of years. The evidence is diverse and complex, ranging from metallicity measurements, to Lyman-alpha absorption studies, to neutral hydrogen imaging. If there are lots of heavy elements in these clouds, they can't be primordial, and are more likely to be nearby; the existing metallicity measurements suggest lots of heavy metals, but the data are very preliminary, and also apply only to a few HVCs. The statistics of Lyman-alpha absorbers suggest that HVCs can't be too hefty, or we'd see many more (and more impressive) absorbers associated with random galaxies along the lines-of-sight to distant quasars. The neutral hydrogen data are confusing: imaging of the local HVCs has been interpreted to require huge masses, but most extragalactic observers say those are ruled out for distant galaxies, because they would have been seen by existing VLA surveys. The bottom line? More data are needed; together with a clearer

understanding of what is required and what is permitted by those that already exist. Maybe at the 30th anniversary party...

*by Michael Rupen*

## **Equal Employment Opportunity, Non-Discrimination and Harassment Statement**

### **Director's Statement**

The National Radio Astronomy Observatory is committed to a work environment in which all individuals are treated with respect and dignity. Each individual has the right to work in a professional atmosphere that promotes equal employment opportunities and prohibits discriminatory practices, including sexual harassment.

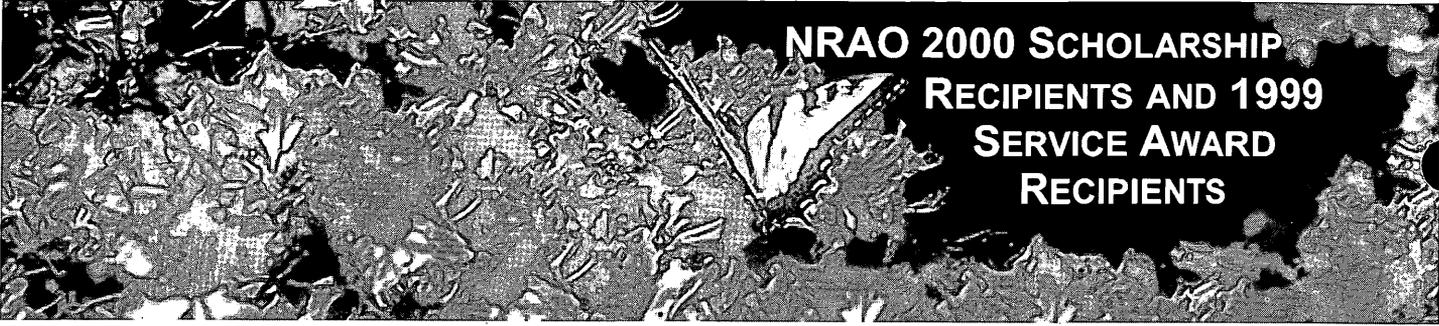
The Observatory will take affirmative action to ensure that applicants are employed, and that all employees are treated during employment, without regard to their race, color, religion, sex, sexual orientation, age, disability, marital status, citizenship, or any other characteristic protected by law. Further, the Observatory will take affirmative action to employ, advance in employment, and otherwise treat qualified handicapped individuals, qualified disabled veterans, and veterans of the Vietnam Era without discrimination based on their disability or veterans status in all employment practices. The Observatory will select the best qualified candidate to perform the duties of an available position and will give first consideration to present employees whenever practical.

The Observatory has developed a policy statement, training, and communications for the conveyance of its policies on affirmative action, non-discrimination, and harassment. Besides this posting, your Employee Handbook will provide general guidance on these matters. The complete policies are contained in the "Supervisors Manual," Sections 1 and 21; and are available for review in each of the Observatory libraries. Copies of the policies are available from the Observatory Personnel Offices, your supervisor, or any Ombuds representative.

The Observatory encourages the reporting of all perceived incidents of discrimination, harassment, or retaliation, regardless of the offender's identity or position. Individuals who believe that they have been the victim of such conduct should pursue their concerns through NRAO's formal or informal complaint procedures: with their immediate supervisor, any member of management, the Personnel Manager, or any Ombuds representative.

*Paul A. Vanden Bout, NRAO Director*

*(continued on page 6)*



**NRAO 2000 SCHOLARSHIP  
RECIPIENTS AND 1999  
SERVICE AWARD  
RECIPIENTS**

***2000 Scholarship Recipients***

As summer approaches and another school year for the children of NRAO employees comes to a close, we wish to honor several outstanding high school seniors. This year marks the 34<sup>th</sup> year of the AUI Trustee Scholarship program at NRAO. Each of this year's scholarship recipients will receive \$2,500 per year for up to four years of study at a college or university of his or her choice. For further information on the AUI Trustee Scholarship program, contact your Personnel Office.



**Phillip D. Grayson**

Phillip is a senior at Magdalena High School. He is a member of the Renaissance Academic Program. Phillip participates in various clubs including the Drama Club, the Supercomputer Club, and the Letterman Club. He is also a member of the Student Council and Who's Who Among American High School Students. Phillip serves as captain of the basketball team, was named to the All District team, and has been selected to play on the North/South All Star Team. He will be attending the University of South Carolina in Aiken, South Carolina.

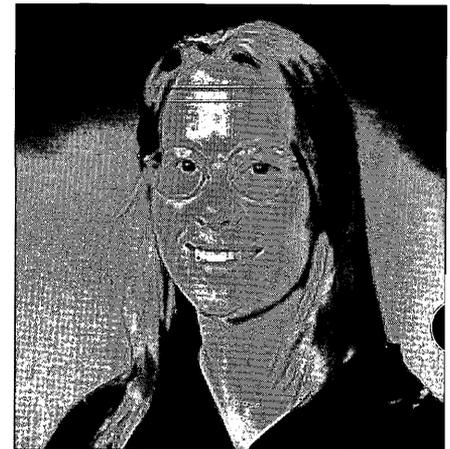
Phillip is the son of Steven and Colleen Grayson. Steve is a Technical Specialist in the Cryogenics Group at the VLA.



**Daniel A. Perley**

Daniel is a senior at Socorro High School. He is a member of the National Honor Society and the Renaissance Academic Program and is a finalist for a National Merit Scholarship. Daniel is involved with the Science Olympiad and is the vice-president of the Science Club. He is a recipient of the Bausch and Lomb Science Award. Daniel plans to major in Physics at Cornell University.

Daniel is the son of Margaret and Richard Perley of Socorro. Peggy is the Data Quality Coordinator in Array Operations and Rick is the Project Scientist for the VLA Expansion Project.



**Jessica Ryan**

Jessica will graduate this spring from Socorro High School. She is a member of the National Honor Society and the Renaissance Academic Program. She is the recipient of academic and scientific achievement awards from the University of New Mexico, New Mexico State University, and New Mexico Tech. She plays in the marching band, the concert band, and the jazz band. She plans to pursue a degree in Physics at New Mexico Tech.

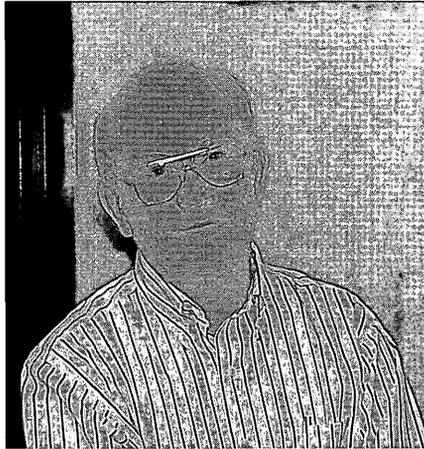
Jessica is the daughter of Kevin and Priscilla Ryan of Socorro. Kevin is a Scientific Programming Analyst in the Computing Division.

**1999 Service Award Recipients**

**30 Year Recipient**



**Robert L. Brown**  
Deputy Director, CV



**Mark A. Gordon**  
Scientist, TU

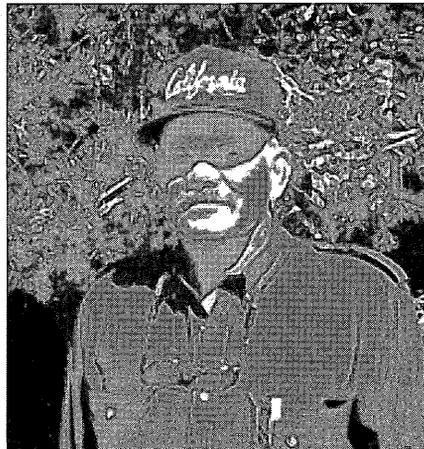


**Ronald L. Gordon**  
Sr. Telescope Mechanic, GB

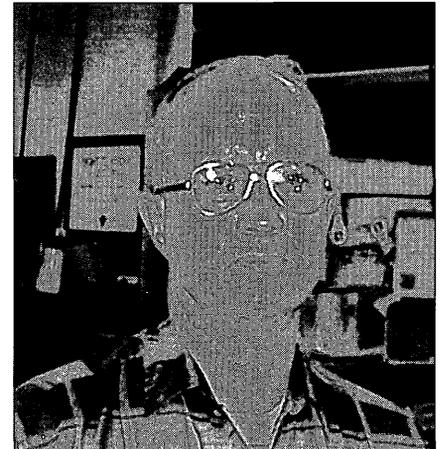
**20 Year Recipient**



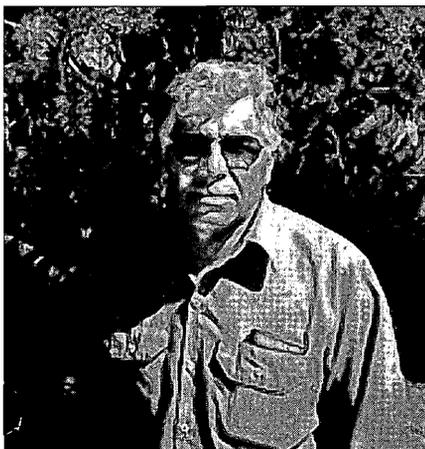
**Ellen Ary**  
Housekeeper, SO



**Steven G. Grayson**  
Technical Specialist, SO



**Ray H. Hanshaw, Jr.**  
Technical Specialist, GB



**Martín Lopez**  
Technical Specialist, SO



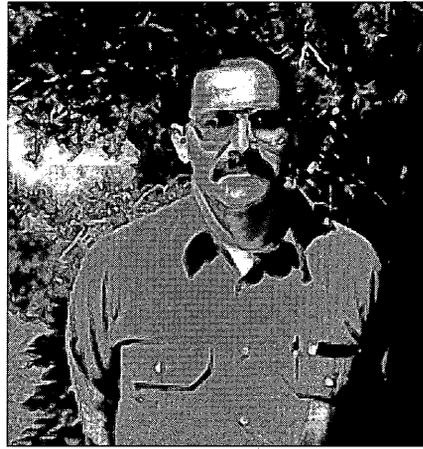
**George E. Martin**  
Sr. Systems Analyst, SO



**Roger D. Norrod**  
Electronics Engineer, GB



**Alison Patrick**  
Administrative Assistant, SO



**Melcolm L. Peralta**  
Sr. Telescope Mechanic, SO



**Margaret C. Perley**  
Data Quality Control, SO



**Robert C. Walker**  
Scientist, SO



**Carol J. Ziegler**  
Administrative Assistant, GB

*Photos were unavailable for the following 10 year recipients:*

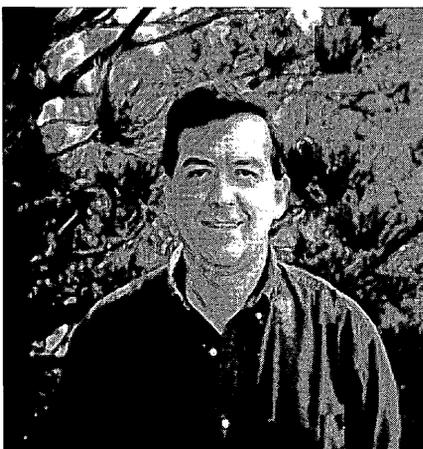
**Jeffrey Hagen**  
Sr. Scientific Prog. Analyst, TU

**Paul Hart**  
Telescope Operator, TU

**Mark A. Holdaway**  
Associate Scientist, TU

**Harry Stahl**  
Telescope Operator, TU

### 10 Year Recipient



**Christopher Flatters**  
Associate Scientist, So



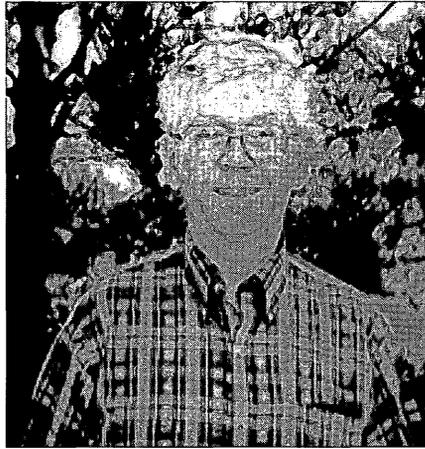
**David B. Gordon**  
Telescope Operator, GB



**James Ed Gray**  
Maintenance Electrician, SO



**Robert D. Hall**  
Assistant Director, CV



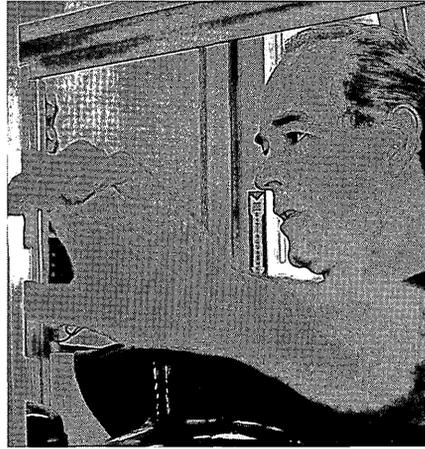
**Clinton C. Janes**  
Electronics Division Head, SO



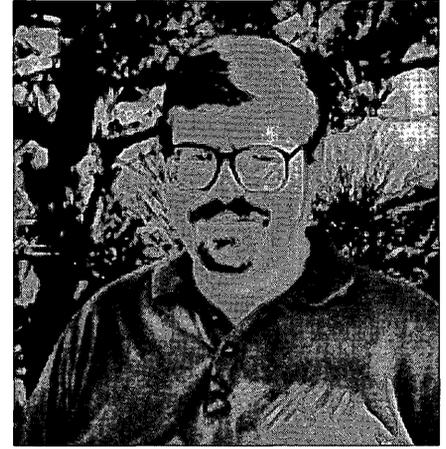
**Sue Ann Heatherly**  
Public Education Officer, GB



**Glen I. Langston**  
Associate Scientist, GB



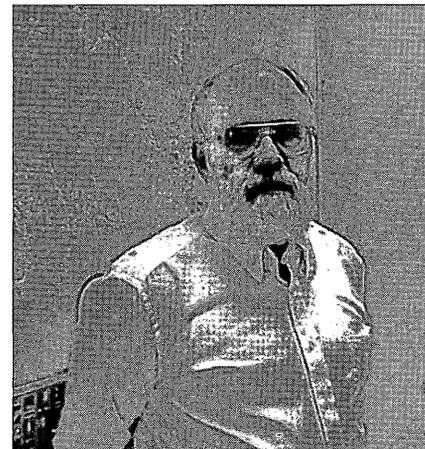
**Jack Meadows**  
Technical Specialist, TU



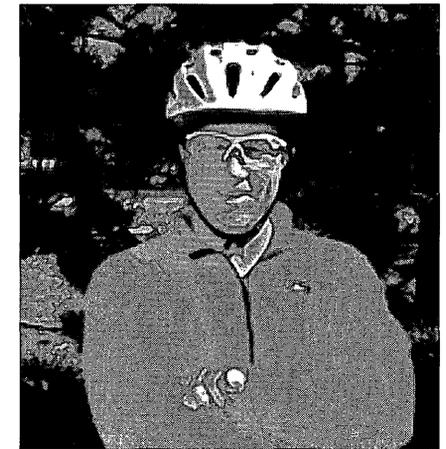
**Jim L. Ogle**  
Array Operator, SO



**Christine L. Plumley**  
Accounting Assistant, GB



**Dorsey L. Thacker**  
Electronics Engineer, CV



**Wesley K. Young**  
Sr. Sci. Prog. Analyst, SO

***Congratulations to All!***

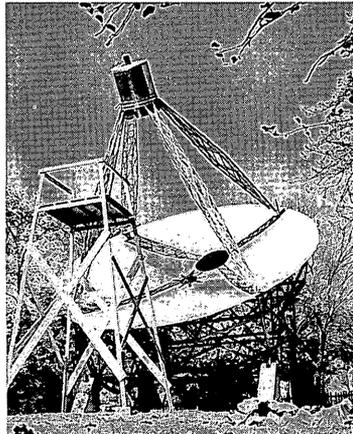
## The NRAO and "Contact": the Ham Radio Connection

First in a two-part series.

The movie "Contact," filmed at the VLA, starred Jodie Foster as astronomer Ellie Arroway. Early in the movie, the young Ellie was shown at her ham radio station calling "CQ, CQ. This is W9GFO calling." CQ is ham lingo for "calling anyone." Perhaps more interesting is the story behind the call letters used.

In Carl Sagan's book *Contact*, Ellie's calls were actually W9GFZ, but the director of the movie did not like the "Z" or "Zed" sound of the last letter in the call, so arbitrarily modified it, feeling W9GFO was more "pleasing." Also in Sagan's book, Ellie's activity with ham radio was using Morse code, not voice, as shown in the movie. According to the book, it was her early experience in "copying" Morse code that allowed Ellie, years later, to recognize the strange cadence of the radio astronomy signals to have a logical sequence, like Morse code. This clever approach used by Sagan explains why Ellie was able to identify the signals as having an intelligent origin when other astronomers hearing it could not. Unfortunately, this explanation for Ellie's success was lost in the movie version when the director felt it was better to show young Ellie talking into a microphone, rather than using a Morse code key.

Carl Sagan was not a ham. However, when developing Ellie's Morse code connection for the story, he contacted a friend of his who was a ham. And that ham radio friend was antenna pioneer Grote Reber. Grote is accredited with building the world's first dish antenna (in his back yard in Wheaton, Illinois) and was the first to make a contoured radio map of our galaxy just a few years after Jansky's famous discovery of "radio signals from space" in 1932. Dish antennas, of course, remain the dominant types used for radio astronomy (although it is doubtful that back then Grote ever pictured "his antenna" being built on the scale of the GBT!). As a tribute to Grote's help with the *Contact* story, and his contribution to astronomy, Sagan used Grote Reber's call, W9GFZ, as Ellie's call in *Contact*.



Reber antenna in his backyard in Wheaton, Illinois

W9GFO, the altered call sign used in the movie, has an interesting story as well. The AOC was contacted by a man trying to track down the origin of the W9GFO call in the movie, as that was his father's call sign. Though not a ham himself, you can imagine his amazement hearing his father's calls in the movie. Sadly, his father, Robert Wilson

of Salem, Indiana, had died only two weeks before "Contact" was released and never got to hear his calls on the big screen. He had held the call W9GFO since the 1930s. Those calls expired at the FCC in January 1999. They were immediately requested by, and awarded to, Richard Harmon in Seattle, Washington, simply because he wanted to hold the now famous calls used in the movie!



Grote Reber at receiver.

Grote Reber now lives in Tasmania. With his permission, W9GFZ was recently reassigned by the FCC to the NRAO Amateur Radio Club, thanks to the efforts of NRAO/NM Public Information Officer, Dave Finley, N1IRZ. This was done as a continuing tribute to Grote Reber's early work in radio astronomy. W9GFZ can be used by hams at any of the NRAO sites for special event operations.

The word on the street is that ham station W9GFZ will again be on the air during the dedication of the Green Bank Telescope (GBT) on August 25 through August 27. For more information on the event broadcasting and the National Radio Astronomy Observatory Amateur Radio Club, visit their web site at <http://www.aoc.nrao.edu/pr/w9gfz.html>.

Next: How early ham operators helped build the world's first radio astronomy observatories, and more on ham radio operators at the NRAO.

by Paul Harden

## Saving for College

The Section 529 way to save

One day not long ago, Monroe Petty, our Personnel Manager and I were discussing the virtues of children. Actually, he was consoling me. I have just begun my twelve year pilgrimage on the college tuition poverty line. That's right, three children! Of course Mom and Dad have high hopes that they will all go to college. Not long after that conversation, Monroe gave me a timely article he had clipped out of the financial section of the Washington Post. The topic? You guessed it, "Saving for College;" a very interesting piece about college savings plans known as "Section 529 Plans." The article was written by a prominent and well-respected financial columnist who is syndicated in many major newspapers. Here now are a few thoughts on the subject.

The savings plans are known by the IRS tax code Section 529 that Congress created in 1996. College savings plans

are state sponsored plans. This means that every state can create their own set of programs. This, as it turns out, is a bonanza for you and me. As more states develop 529 plans they get more competitive. Since their inception, some twenty-three states have adopted either a pre-paid college tuition plan, a college savings plan, or both. Several more states have plans to introduce their own versions this year. One beauty of these plans is that if your state does not have one, or the features are unattractive, you can enroll in a plan of another state. The Pre-Paid plan allows for an investment in a conservative account that is meant to keep pace with inflation controlled state-run college tuition rates. The College Savings Plan concept allows for greater investment potential by the parents or grandparents to choose the investment option best suited to their need.

The most conservative college savings plans may invest entirely in bonds, which are viewed to be very safe but produce a low return. Some plans offer a mix of bonds and stocks. The most aggressive plans will be built of stocks for high initial return and then convert to money-market instruments as college draws near. A very good web site to help you learn more about Section 529 plans is at <http://www.savingforcollege.com/>.

Here are a few of the advantages of the section 529 plans:

- You can make lump sum or monthly contributions
- Contributions are state tax free or tax deferred if used for college
- Funds may be used at any accredited school nationwide
- You can open more than one account for diversification
- You can join a plan in a state other than the one in which you reside
- The funds do not detract from a child's potential financial-aid awards

To view a website that will lead you to the state of your choice, I recommend that you visit the College Savings Plan Network site at <http://www.collegesavings.org/yourstate.htm>.

*by Roy Norville*

## **To Your Health**

### **You Don't Have To Be A Breast Cancer Victim**

It is not surprising that many of our lives have been affected by breast cancer. Almost three-quarters of the people living in the United States have a friend or relative who has struggled with the disease. Breast cancer is the most common form of cancer occurring in women of all ages. The statistics can be very frightening. For instance, it is estimated that 185,000 new cases of breast cancer will be diagnosed this year alone. In fact, every three minutes a

women is diagnosed with breast cancer, and 43,500 will die this year from this disease alone. A woman has a one in eight chance of being diagnosed with breast cancer at some point in her lifetime, and 80 percent of those with cancer will have no known risk factors.

With all of these negative statistics it is easy to wonder if there is any hope for beating breast cancer. In fact there is. Most women who are diagnosed today will survive. Currently there are approximately 2 million survivors in the U.S. How are more and more women winning the battle? Improvements in treatment and new medications are helping, but the simple answer is early detection. It may surprise you to know that with early detection, the five-year survival rate is 95 percent!

Many assume that because there is no history of breast cancer in their family, they are unlikely candidates for the disease, however as mentioned above, most of those diagnosed have no risk factors. This means that all women are at risk regardless of age, family history, and even lifestyle. Therefore, all women must be proactive beginning as early as age 20 with regular monthly self exams and an annual mammogram for women between ages 35-40. Mammography is important because it can reveal small lumps up to two years before they can even be felt. When the tumors are detected this early, the chances for survival increase dramatically. NRAO offers mammograms for female employees and dependents at no cost for the procedure and only a minimal lab interpretation fee, yet not enough take advantage of this service. This simple procedure can be the key to saving a life.

Another myth is that if you are male, you cannot develop breast cancer. Although it is rare for breast cancer to develop in males, the number of cases is on the rise. Unfortunately for males, the disease is not usually detected as early and they are more reluctant to seek treatment. Also, when they are diagnosed, there are really no support groups for men with breast cancer. For men there is a greater feeling of isolation with the disease. This lack of support is slowly changing; organizations such as Race for the Cure are beginning to provide support for afflicted men.

There are some lifestyle changes that can be made to reduce the risk for both men and women. For example, it has been shown that four or more hours of exercise a week can reduce the risk of breast cancer. Exercise strengthens the immune system as well as the body. High fat diets can increase the risk of cancer; therefore it is important to eat nutritious, low-fat meals. Alcohol consumption can also be a risk factor.

One thing is clear: while breast cancer can be a deadly disease, many lives can be saved with a healthy lifestyle and a program of early detection. For more information on breast cancer and other forms, visit the American Cancer Society web site <http://www.cancer.org/>. Be good to yourself and live smart.

*by Lisa Ulrich*

## **Canterbury, Distinguished Alumni Award**

Dr. Peter Napier, Socorro, NM, was recently awarded the "1999 Distinguished Alumni Award" from the University of Canterbury, Christchurch, New Zealand. Peter received his Ph.D. in Electrical Engineering as well as his Bachelor's from Canterbury. The handcrafted medallion is given to a select group of alumni annually in recognition of their career achievements. The University of Canterbury, founded in 1873, is located in Christchurch, the largest city on New Zealand's South Island, on the coastal edge of the Canterbury Plains.



### **Personnel Changes**

*3/1/200 thru 5/31/200*

#### **Promotions**

Charles Beverage to Management Information Systems Manager, GB  
Jody Bolyard to Safety & Environmental Protection Manager, GB  
Timothy Cornwell to Associate Director of Data Management, SO  
Patricia Lindsey to Administrative Aide, SO  
George Moellenbrock to Assistant Scientist, SO

#### **New Employees**

##### **Charlottesville**

Lisa Ulrich, Personnel Assistant  
Helen Sim, Public Outreach & Education Officer

##### **Green Bank**

Melanie Blackburn, Research Assistant  
Joshua Bonner, Summer Tour Guide  
Susan Roy, Summer Tour Guide  
Andrew Sharp, Summer Tour Guide  
Emily Mercer, Research Assistant  
Vincent Urick, Research Assistant

##### **Socorro**

Steven Ball, Research Assistant  
Kathryn Becker, Research Assistant  
Ian Hoffman, Research Assistant  
Richard Mellon, Research Assistant  
Stacy Teng, Research Assistant

##### **Tucson**

Andrea Vaccari, Electronics Engineer

### **Departures**

#### **Charlottesville**

Franz Bauer  
Billie Jo Mattox

#### **Socorro**

Daniel Edmans  
**Tucson**  
Thomas Folkers  
Ricardo Martinez  
Diane Miller

#### **Retirees**

#### **Charlottesville**

Dylon Dillon, 27 years

#### **Socorro**

Alison Patrick, 21 years

### **Summer Students**

#### **Charlottesville**

Adrienne Gauthier  
Caylin Mendelowitz  
Jeremiah Murphy  
Dimitri Veras

#### **Green Bank**

Melanie Blackburn  
Charles Fulton  
Emily Mercer  
Sara Petty-Powell  
Gabriel Prochter  
Christine Rebinski  
Vincent Urick  
Scott Zastoupil

#### **Socorro**

Steven Ball  
Kathryn Becker  
Edo Berger  
Melanie Clarke  
Ian Hoffman  
Richard Mellon  
Emmanuel Momjian  
Nathaniel Murphy  
Therese Ostrowski  
Stacy Teng  
Timothy Woodruff  
Bevin Zauderer  
Robert Zavala, Jr.

### **A Note from the Editor:**

Articles or ideas for the Point Source newsletter are welcomed. If you would like to submit an article, please contact the editor at phone (804) 296-0265 or by email to: [norvill@nrao.edu](mailto:norvill@nrao.edu).

Deadline for article submission for the upcoming Summer Issue is August 10, 2000.

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