

## Narath Sees Opportunity to Strengthen Bell-Sandia Ties

The road between AT&T and Sandia has traditionally been one-way. Many talented managers have left what we remember as the "Bell System" and have come to Sandia, sometimes for short assignments, sometimes for the remainder of their careers. But for the first time, an executive has traveled in the opposite direction — today Al Narath (10) is on the AT&T Bell Labs payroll.

Al's decision to accept the job offer was quick but not easy. Sol Buchsbaum, executive vice-president at Bell Labs, called him less than a month ago and described Bell's opening — vice president of government systems. "It took me an hour to decide," says Al. "After so many years of people from Western Electric [now AT&T Technologies] and Bell Labs coming to Sandia and helping this organization, I simply felt that the first Sandian given an opportunity to take a management role at AT&T could not turn it down."

Al's new job is to manage the R&D effort that supports Bell Labs' and AT&T Technologies' corporate commitment to seek increases in government business, a significant reversal of earlier policy. It's a major task; sales to the government have been increasing by some 20 percent a year.

In the recent past, Bell Labs provided the R&D effort supporting the manufacturing, sales, and marketing managed by AT&T Technologies' Federal Systems Division (under Warren Corgan, who served briefly as Sandia's comptroller) through a vice-presidency responsible for technology and for government (that is, military) systems. The latter has now been split off, forming a new vice-presidency that Al will head up. Most of the systems engineering and some of the development will be done in

*(Continued on Page Four)*



AL NARATH (10) is now Vice-President of Government Systems at Bell Labs.

 **LAB NEWS**  
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### Product of Basic Research

## New Technique Improves Photovoltaic Efficiency of Polycrystalline Silicon

Tenacity is one of the traits of a top scientist. Carl Seager of Electronic and Transport Phenomena in Solids Division 1132 has a tenacious grip on the idea that the commercial future of photovoltaic devices lies in the use of pulled (extruded) or chemically vapor deposited polycrystalline silicon.

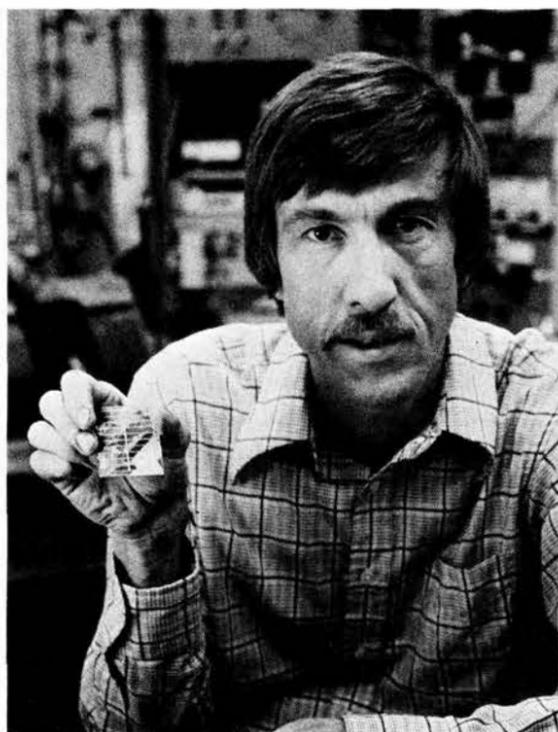
Backing up that idea is a long-sought but only recently perfected technique developed by Sandia researchers. Called "hydrogen passivation," it alters the electronic states of the grain boundaries natural to polycrystalline silicon. As such, it's the key step in improving photovoltaic performance of the material to the point that it challenges the performance of single crystal silicon, which contains no grain boundaries.

In hydrogen passivation, hydrogen ions are diffused into the polycrystalline silicon's surface and near-surface defects (located primarily at the grain boundaries

that define the material's crystal lattice structure). The process passivates, or negates the effects of, dangling bonds of silicon atoms created by the mismatch in orientation among the crystals. These dangling bonds are capable of reducing the current that would otherwise flow unimpeded across the silicon cell.

In laboratory experiments, numerous solar cells made from hydrogen-passivated polycrystalline silicon achieved more than 14 percent efficiency in converting solar energy into electrical energy, a figure comparable to the performance of commercial single crystal silicon cells. This represents about a 20 percent improvement for these large-grain (millimeters to tens of millimeters between grain boundaries) polycrystalline cells. Even more dramatic improvements in cell efficiency have been observed in finer grained (boundary separation measured in microns) materials, but

*(Continued on Page Four)*



CARL SEAGER (1132) displays an example of a polycrystalline silicon solar cell. Note that the light reflection differs on the surface of the various crystals in the material. Sandia has developed a new technique, hydrogen passivation, that improves the photovoltaic performance of this class of relatively inexpensive solar cells.

# Antojitos

**Danger: Irate Scientist** When Sandia recently broke another record for factoring large numbers--71 digits--by using the Cray X-MP computer at Los Alamos, a carefully worded joint press release went to the local media. That evening one TV newscaster dutifully, and erroneously, reported that it was Los Alamos that had broken Sandia's earlier record. Easygoing Jim Davis (1641) caught the newscast from Durango where he and factoring team colleague Diane Holdridge had addressed a group at Fort Lewis College. Thinking to set the story straight, he called the newscaster and tried to explain that, yes, the factoring record had been broken at Los Alamos--but no, not by Los Alamos. So what happens in the 10 p.m. news? The newscaster simply reports that "an irate scientist" from Sandia had called him "and the fight goes on." The incident would be simply amusing--Jim Davis, of all people, as an irate scientist--if it didn't point up the fact that news reporters too often favor confrontation over accuracy: a factoring record gets broken, ho-hum; an imaginary fight between Los Alamos and Sandia, now that's news! (The print media are hardly exempt. The Sandia-Los Alamos press release noted that Cray's Tony Warnock had assisted in the record-breaking factoring feat; one paper took it upon itself to tell the world that Tony had left Cray Research and joined Los Alamos.) Yes, I know, we're not perfect at the LAB NEWS either--but I think we try harder to be.

\* \* \*

**Truly Tri-Lingual** David Judd (2625) drives a '70 Corvette. But you couldn't prove it's a Vette at all by reading its labels--he's had all the identifying insignia taken off. On the rear the new letters read "TRECE TOV," and the license plate says "01101." TRECE means 13 in Spanish, TOV is Yiddish for "good," and 01101 is binary for 13. The car's name? Lucky 13, of course. ●BH

\* \* \*

You can fool some of the people all of the time and all of the people some of the time, and that's usually sufficient.

## THE SEVEN ITALYS



Italy is divided into seven population groups ranging from progressives to "archaics," according to a poll reported by Alvaro Ranzoni in the newsmagazine *Panorama* of Milan. Progressives, Ranzoni writes, average thirty-two years of age and live in northern and central Italian cities. They are "heirs of 1968" in politics and drug use, and eat a lots of snacks. Archaics -- average age sixty-- are relics from another time, close to the peasant world of yore. They eat pasta and regional dishes, build up savings, and, though uninterested in politics, vote Christian Democratic out of a sense of duty. In between come the emerging professionals, the modern consumers, the puritans, and the conservatives. The "Cipputos" -- named after a cartoon serial about a frustrated worker -- average forty-four years of age and are rigid, authoritarian, and afraid of unemployment and automation. They lead "lives divided between work and the corner bar," and vote Communist.

— Donald R. Shanor in *World Press Review*

## LAB NEWS

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## Events Calendar

March 30, April 6, 13 — Neil Simon's "The Odd Couple," March 31, April 7, 14 — Moliere's "Tartuffe," 8 p.m., The Best Little Warehouse in N.M., 4201 Ellison NE, reservations, 883-8958.

March 31 — NM Symphony Orchestra Fiesta Concert, conducted by Carmen Dragon, 8:15 p.m., Kiva Auditorium, Convention Center.

April 1 — Lecture, "The Spanish Borderlands," and "The Spanish Presidial Military," Joe Sanchez, historian with the National Forest Service; 2 p.m., auditorium, Albuquerque Museum.

April 1 — Classic Magic by Michael Anthony — April Fool's Day show of magic, juggling, fire-eating, and mime; 3 p.m., KiMo.

April 1-June 17 — The Western Federation of Watercolor Societies Ninth Annual Exhibition, Albuquerque Museum.

April 2 — Travel/Adventure film, "Belgium," 7:30 p.m., Popejoy.

April 6 — "World Saxophone Quartet," 8 p.m., KiMo.

April 6-7 — Southwest Ballet, "Spring Ballad 1984," 8:15 p.m., \*2:15 p.m., Popejoy.

April 7 — Lisa Gilkyson in Concert," 8 p.m., KiMo.

April 9 — Cultural Series Event, "The Pump Boys and the Dinettes," a mixture of country pop and musical theater, 8:15 p.m., Popejoy.

## Supervisory



CLYDE LAYNE to supervisor of Systems Research Division 8228, effective March 16.

Clyde joined Sandia Livermore in 1980 after 11 years with LLNL, first holding the responsibility for the large centralized lasers at the Combustion Research Facility. Last November he transferred into 8228 and worked on analysis of strategic defensive systems.

He has an AB degree in physics from Princeton University, plus master's and PhD degrees in applied science from UC Davis.

Clyde and his wife Celeste have two preschool children and are in the process of building a new home in Livermore. His hobbies include hiking, racquetball, and wood-working.

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GABE GUTIERREZ to supervisor of Property Management Division 8262, effective March 16.

Gabe came to Sandia in 1960 to work in communications for the engineering support organization. In 1965 he was promoted to section supervisor in Communications, Drawing Reproduction and Micrographics. Then in 1981 he moved to the Security Division, handling various staff functions.

He earned an AA degree in business at Chabot College and a bachelor's in business administration from the University of San Francisco.

Gabe and his wife Julia reside in Livermore and have three sons and a daughter at home. Gabe's outside interests include photography, travel, fishing, and church activities.

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BILL WILSON to manager of the Computation Department 8230, effective March 16.

He started at Sandia Livermore in January 1969, first working in solid state physics research. In 1974 he was named supervisor of the Theoretical Division. During the past 10 years he has worked in helium and hydrogen research and photo-electron transport. Bill was recognized by the DGE in 1983 for sustained outstanding research in the annual Materials Science Research nationwide competition. He was one of four Sandians so honored.

His education includes a bachelor's in mathematics, a master's and PhD in physics, all from the City University of New York.

Bill has five children, three grown and two, ages 4 and 5, residing at home in Livermore with him and his wife Helle. He is active in the American Physical Society, is an avid runner, and enjoys skiing.

## Appointments



BOB DOUGHERTY to manager of the Engineering Support Department 8270, effective March 16.

He began at Sandia Livermore in 1958, first working in preliminary design of weapon projects. He became a section supervisor in that area in 1958, then moved to the W58 project. Following that he spent a year in systems studies before transferring to Albuquerque in 1965 as supervisor of the Preliminary Design Division. In 1969 he took the supervisor's post in neutron generator development.

Ten years later Bob transferred to the weapons system organization, then was loaned to the Office of Military Applications, spending two years at Germantown, Md. He returned to Albuquerque in 1982 as supervisor of the W85 Test and Project Division.

He earned a BS and MS in ME from the University of Idaho where he also taught two years before coming to Sandia.

Bob and his wife Margaret, an elementary school teacher, will be moving to the Livermore area later this spring. They have two grown children, a son in graduate school at Iowa State and a daughter who lives in Albuquerque.

His hobbies are backpacking, woodworking, photography, and home computers.



TECHNICAL BRIEFINGS for new staff members and those recently reclassified at Sandia Livermore were conducted over a three day period in early March. Providing overviews the first day were President George Dacey who talked on "Where We Are Going," Tom Cook (20; shown here) talking on "Historical Perspectives," and Dick Claassen (8000) whose subject was "Sandia in the Eighties." Also taking part from Albuquerque were Gene Reed (2000) talking on components and Roger Hagengruber (300) whose topic was "New Directions for Sandia." This was the first such comprehensive briefing since 1982.



## SANDIA LIVERMORE NEWS

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MARCH 30, 1984

### Scientific Collaboration

## 'Co-Authoring' a Route to Wider Awareness of Sandia Capabilities

Sandia's name is becoming familiar to scholars around the country and around the world. That's because our scientists often collaborate with their peers from the outside world to produce technical papers and reports for the benefit of other researchers in government, universities, and private industry.

Some of the co-authored papers produced in 1983 at Sandia Livermore resulted when outside researchers visited the Labs, others came through national and international symposiums, and still others grew out of joint projects undertaken through government contracts with other institutions or companies. Last year scientists from West Germany, Israel, and Canada as well as the US worked with Sandians to write some of the scores of technical papers and reports that Sandia published.

A cooperative paper with a West German professor came as the result of a meeting in 1979 when Bill Ashurst (8363) delivered a talk in London. There he met a professor of general mechanics from the University of Aachen, Norbert Peters, who was interested in the same subject area. Later Bill gave a seminar at Aachen on turbulent reacting flow in combustion research. As a result of these contacts Norbert came to Sandia last fall for a six-week research project in the Combustion Research Facility. Out of their joint efforts, Bill and co-worker Alan Kerstein (also 8363) produced a paper titled "Calculated Scalar Dissipation in Two-Dimensional Flows" with Norbert and one of his Aachen graduate students.

Another report last year was co-authored by Steve Margolis (8231) and Gregory Sivashinsky, a professor of mathematics at Tel Aviv University. They had first met at an international symposium five years ago. Then last year the Israeli professor became a visiting faculty member at UC Berkeley, and the two had occasion to work on some research together. From this collaborative effort came the paper "Flame Propagation in Vertical Channels: Bifurcation to Bimodal Cellular Flames." Also last year Steve co-authored a paper with a Northwestern University faculty member, Bernard Matkowsky, whom he had met previously at a technical meeting. This paper was titled "Non Linear Stability in Bifurcation in the Transition from Laminar to Turbulent Flame Propagation."

A third international cooperative effort occurred while a McGill University faculty member from Montreal was at Sandia Albuquerque as a consultant to a hydrogen safe-

ty program for the NRC. He also came to Livermore to give a talk on detonations. This Canadian, John Lee, was co-author with Pamela Barr, Bill Ashurst (both 8363), and Joe Grear (8231) on a paper titled "Turbulent Flame Acceleration — Mechanisms and Computer Modeling." Pam first presented the paper at Cambridge University at a meeting sponsored by the American Nuclear Society and European Nuclear Society last August. She and Bill also visited Montreal to work with John on the report. They have consequently collaborated on a second paper with John and Calvin Chan of McGill on obstacle-generated flame acceleration, which is a comparison of experimental and numerical results in the same area.

Jim Wang (8361) has been working with the Tennessee Valley Authority on a number of research projects, and a report on "Real-Time Total Mass Analysis of Particulates in the Stack of an Industrial Power Plant" resulted from part of that work. It was co-authored by Ben Kee, Dennis Linkins, and Dick Lynch of the TVA in Chattanooga, Tenn.

A professor of aerospace engineering at the University of Michigan, James Driscoll, came to Sandia on a sabbatical for five months to use the combustion facility for his experiments. As a result of his visit Bob Schefer and Bob Dibble (both 8351) co-authored a report with him on "Mass Fluxes Measured in a Turbulent Nonpremixed Flame."

Another combustion facility visitor, Stanford University mechanical engineering department faculty member Craig "Tom" Bowman, spent a six-month sabbatical studying the effect of pressure on soot formation in diffusion flames. From that study came the report "Measurements of the Structure of Sooting Laminar Diffusion Flames at Variable Pressures" co-authored by Bill Flower (8351).

Also working in combustion research from Lawrence Berkeley Laboratory is Nancy Brown, a physical chemist. She and Jim Miller (8353) have produced a paper for publication in the *Journal of Chemical Physics* called "Collisional Energy Transfer in the Low Pressure Limit Unimolecular Dissociation of HO<sub>2</sub>."

Metallurgy professor Darrell Smith of the Michigan Technological University spent a six-month sabbatical at Sandia working in porous media in the metallurgy group. Brad Meyer (8124) and Darrell produced a report titled "Flow Through Porous Media — Comparison of Consolidated and Unconsolidated Materials" as a result of their research.

## Narath Moves To AT&T

Al's group. Some will be done in other parts of Bell Labs — it operates with a system of matrix management after which Sandia's is modeled.

Al's group is working in such areas as underwater sound detection, a large program that AT&T has pursued for many years and that is continuing to attract a good deal of attention from Washington. Now AT&T is also considering greater involvement in C<sup>3</sup>I (command, control, communication, and intelligence) and in modern battle management in general. "We plan to work toward integrating communications with intelligence information," says Al. "Given the vast amount of data processing necessary to pull it all together, it's an immensely complex job. Imagine the staggering task of doing C<sup>3</sup>I for a ballistic missile defense system — vast amounts of data to be processed in seconds; missiles to be fired, guided ... We won't lack for challenges. Hopefully, my experience at Sandia has given me the kind of background necessary to help meet them."

It's also true that being a member of AT&T's management during this unsettled time poses its own set of challenges. "What we're seeing unfold is a unique chapter in American business," notes Al. "Never before has a major US enterprise dissected itself and then had to reconstitute as we're now seeing AT&T do. It's a very exciting time to go back there. Inevitably there will be changes within AT&T as it turns itself from a regulated monopoly into a competitive organization facing the open market (except, of course, for AT&T Communications, formerly Long Lines, which is still regulated).

"At the same time, my going back East is an opportunity to strengthen the relationship between AT&T and Sandia. If you look into the future, you have to ask yourself, 'Will AT&T continue to be willing to manage Sandia — no fee, no profit, some aggravation, and all?' I feel strongly that it would be very unfortunate — certainly for Sandia, probably for the United States — if that relationship, which has endured for so many years, were to be broken. As AT&T faces new challenges, among them new growth in an area in which Sandia has real familiarity, I see an opportunity for a Sandian to make a contribution. It's an obvious match, an opportunity that can't be turned down. And I hope and expect I won't be the last Sandian to join AT&T in similar circumstances."

Although it didn't take Al long to decide to accept Bell Labs' offer, it wasn't easy. "I'll miss the mountains and the open spaces. I've been a Westerner for a long time. But we — my wife Barbara, our almost first grade son and almost seventh grade daughter — are determined to adjust to the East. It will be an exciting experience for all of us, both professionally and otherwise.

"Pulling up roots after 25 years here is

## 'I'm Delighted' — Buchsbaum

LAB NEWS asked Sol Buchsbaum, Bell Labs' executive vice-president of customer systems and Al's new boss, to comment on the move: "Al will be heading up all of Bell Lab's R&D in support of our work for the federal government. It's a big task, and one that's growing rapidly, so he'll have his hands full in managing a diverse program of activities. But I'm confident that his extraordinary skills will allow him to step right in and take over an important function here. After all, he knows Washington intimately, and the work he'll be managing will not be new to him.

"On the personal level, I'm delighted that Al is joining Bell Labs, and so are other members of the Council here. I gained a high respect for his abilities when he was a director under me when I was vice-president of research at Sandia in 1968-71. I'm most pleased at the opportunity to hire him."

## 'Tremendous Vote of Confidence' — Dacey

"First of all, I think it's a tremendous vote of confidence in Sandia, a clear recognition on Bell Labs' part that our management is capable of accepting new challenges, opportunities, responsibilities. I also see Al's move as indicative of closer, better interactions between Sandia and Bell Labs than in the past.

"And finally, I of course want to recognize Al's tremendous contributions to Sandia and to wish him well in his new career with Bell Labs. We're losing a talented manager, but — who knows? — as my own career demonstrates, people do sometimes return."

George Dacey  
Sandia President

very difficult. And my roots do go deep — not just into the gravelly soil of New Mexico but into this organization. I have strong emotional ties to Sandia, and they will not be attenuated quickly.

"But, at the same time, when I decided to go East, I made a commitment to do my best on the job to be done there. That's what I'm focusing on, not on returning here someday. "Of course the future is inherently unpredictable."

## Polycrystalline Silicon

the end results are still substantially below those of large-grained cells.

And the new technique is a lot cheaper than growing single crystal silicon. Polycrystalline silicon, whether pulled directly from the melt or deposited on a metal or glass substrate, is easy and inexpensive to manufacture.

Carl, Dave Ginley (1154), and later Don Sharp (1831) and Janda Panitz (1834) have spent several years studying and perfecting the hydrogen passivation process.

When Carl first started the investigation, no one had ever isolated the grain boundaries of polycrystalline silicon or described the current/voltage properties of these defects. Gordon Pike (1815) contributed the idea that the current/voltage properties of the grain boundaries could be used to predict the density of grain boundary defects: essentially, the lower the conductivity, the greater the density. Knowing this quantity allowed them to describe the photovoltaic performance and the electron/photon transport characteristics of polycrystalline silicon.

Then followed almost six years of thorough investigation of grain boundary defects in polycrystalline silicon. The study led to the perfection of new measurement techniques to determine the minute changes in voltage and resistance across grain boundaries and theoretical modeling efforts to understand the phenomena observed.

Carl has punctuated the years of lab experiments with a series of technical papers. Among them: "The Electronic Properties of Semiconductor Grain Boundaries"; "The Electrical Behavior of Grain Boundaries in Silicon"; "Fundamental Studies of Grain Boundary Passivation In Polycrystalline Silicon with Application to Improved Photovoltaic Devices" with Dave Ginley (1154); and most recently, "Hydrogen Passivation of Defects in Silicon Ribbon Grown by the Edge-Defined Film-Fed Growth Process" with Don Sharp (1831), Janda Panitz (1834), and J.I. Hanoka of Mobil Solar Energy Corporation.

Over the years the Sandia team has worked closely with commercial suppliers. They have provided the team with samples and have checked Sandia's results. One of them, taking direction from a published paper, has used the hydrogen passivation technique to fabricate prototypes of a commercial polycrystalline silicon cell that is testing at 14 percent efficiency. "This is just one indication of the possibilities ahead for commercial development of photovoltaic devices using our technique with polycrystalline silicon," Carl says. "Competition inevitably reduces prices — and a mass market reduces prices.

"We're still looking at polycrystalline silicon and answering a lot of questions from others — researchers as well as industrial types — interested in our work," Carl concludes. "There are a few more ideas we want to pursue that might improve even further the performance of solar cells."

We told you he had tenacity.



NEW SUPERVISORS — (back row, 1 to 4) Gil Weigand (1511), Ron Andreas (1620), and Garth Maxam (7554); (front row, 1 to 3) Don Rohr (7212), John Biffle (1523), and John Hart (3730).

## Supervisory Appointments

**GIL WEIGAND** to supervisor of Fluid Mechanics and Heat Transfer Division I 1511, effective March 16.

Gil joined the Lab's nuclear safety group in August 1979. Since then, his work has been related to calculations dealing with fluid mechanics and heat transfer and radionuclide transfer.

He received his BS in aeronautical engineering from California Polytechnic State University and his MS and PhD — both in ME — from Purdue. He is a member of ASME and the American Physical Society. Gil was recently elected chairman of the NM Radiation Technical Advisory Council; his membership on this science advisory board was a five-year gubernatorial appointment.

Gil enjoys photography, jogging, and woodworking. He and his wife Marilyn and their three-year-old daughter live in the SE heights.

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**RON ANDREAS** to manager of Exploratory Systems Department 1620, effective Feb. 17.

Ron joined the Labs in April 1963 as a member of the technical staff in advanced data systems. He later worked in the arming, fuzing and firing systems organization. Ron was promoted to supervisor of an exploratory system division in 1971. Since then, his work has been primarily with navigation, guidance, and control systems.

He received his BS and MS in EE from the University of Kansas. As a member of the Doctoral Study Program, Ron received his PhD in EE from UNM in 1970. He enjoys golf, softball, and woodworking. He and his wife Carolyn have three children at home. They live in the NE heights.

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**GARTH MAXAM** to supervisor of Electromagnetic Testing Division I 7554, effective Feb. 1.

Joining the Labs in 1975, Garth worked for four years in the electromagnetic analysis group; he was concerned with analyses of the susceptibility of nuclear weapons to electromagnetic sources such as lightning. For the past four years, Garth has worked on the development of an analytical capability to evaluate the

electromagnetic compatibility of weapons with their carrier aircraft.

Garth received his BS, MS, and PhD — all in EE — from Michigan State University. He enjoys woodworking, gardening, and racquet ball. Garth lives in Corrales.

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**DON ROHR** to supervisor of Weapon Manuals Division 7212, effective March 16.

Don has been with the manuals division since joining Sandia in March 1977. The group is responsible for the preparation of weapon maintenance manuals within the joint nuclear weapons publication system and works closely with the military and other national laboratories.

Don is a retired major in the Air Force; he served from 1955-76. He received his BS in engineering from the U.S. Naval Academy. He enjoys skiing, tennis, and youth soccer. Don and his wife Phyllis have four children. They live in NE Albuquerque.

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**JOHN BIFFLE** to supervisor of Applied Mechanics Division III 1523, effective March 1.

Since joining the Labs in October 1966, John has worked in the engineering analysis department. His primary task has been the development and procurement of finite element computer software in addition to performing structural analyses.

John received a BS in ME from Texas Tech, an MS in ME from the University of Washington (Seattle), and his PhD in engineering mechanics from the University of Texas. John was a member of Sandia's Doctoral Study Program. He is a member of ASME. He enjoys trout fishing, golf, youth soccer, and playing the bass viol. John and his wife Phyllis have a 10-year-old son. They live in NE Albuquerque.

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**JOHN HART** to manager of Purchasing Planning and Services Department 3730, effective March 16.

John joined Sandia in April 1951 in the production department. He was a production scheduler and coordinator for about seven years before transferring to technical writing. A couple of years later, John became an administrative assistant in the electrical components directorate. John moved into Purchasing about 20 years ago



GARY JONES (6223)



EARL CUMMINGS (3612)

and has served as buyer for a number of organizations. He was promoted to supervisor of a purchasing division in 1977; most recently he headed Purchasing Division A 3711.

John received a BS in health and physics education and his BBA from UNM. He enjoys golf and skiing. He and his wife Ann have three grown sons. They live in SE Albuquerque.

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**GARY JONES** to supervisor of Photovoltaic Systems Development Division 6233, effective March 16.

Joining Sandia in March 1970, Gary worked in the space nuclear power program and then joined the group working on the Radioisotopic Thermoelectric Generator (RTG) and was primarily concerned with materials work for the heat source. For the past seven years, Gary has worked in photovoltaics.

He received a BS in physics from the University of Dayton and a PhD in metallurgy from Iowa State University. He is a member of the American Society for Metals and the American Solar Energy Society. Gary enjoys photography, music, and collecting Indian art. He has one daughter; he and his wife Carol live in Cedar Crest.

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**EARL CUMMINGS** to supervisor of Plant Facility Operations Division 3612, effective March 1.

Before coming to the Labs in June 1978, Earl worked 25 years in the heating/air conditioning control industry; he worked for Honeywell and was a consultant to Sandia for 10 years. Earl worked in the operations engineering group until November 1980 when he was promoted to section supervisor in the division he now supervises.

Earl attended the University of Utah. He served in the Air Force in Korea from 1949-52. His hobby is racing his 32-foot sailboat; he has raced in the Bahamas, on the Pacific coast, and at many inland lakes in the Southwest. He and his wife Carol have four children and three grandchildren. They live in NE Albuquerque.

*Q. I am retiring soon and would like to purchase a large photo of the Labs, such as the LAB NEWS sold some time ago. Is there any way to make the photos available again? I am very happy about my association with Sandia and would like to have the photo as a memento.*

*A. I am pleased that you would like to remember your years at Sandia with an aerial photo. I've asked the principals in the South 14 Village Project (operated from the LAB NEWS office) whether they would be willing to have large color prints made from a soon-to-be available negative and then to sell those prints to benefit the project. The answer was yes. See the Take Note item in this issue.*

H.M. Willis — 3100

*Q. The call-in order desk has been a great improvement and is saving much unnecessary paperwork and time for the staff when requesting General Stores material.*

*However, when the wrong material is delivered, nothing but frustration ensues. The recipient of the erroneous material must now initiate a Credit Slip and then try to find someone to return the wrong material to after calling Org. 3742 to report the receipt of erroneous material.*

*It would seem more appropriate that Org. 3742 correct its own errors, whenever they occur, by delivering the correct material (as a result of the one phone call complaint) and collecting the erroneous material. If paperwork is necessary to correct their error, should not they be the ones to generate it?*

*A. You are quite right that 3742 should correct its own errors by delivering the correct material, picking up the erroneous material, and preparing whatever paperwork is necessary. General Stores will do this if you will make a notation of the situation on the original copy of the Packing List in red ink and return it to them. General Stores employees will then deliver the correct material and pick up the material sent in error. Because of a shortage of vehicles, this may not be as prompt as we would both like, but it will be done. This can be accomplished quicker if the item is small enough to go in an envelope along with the Packing List and be returned through the mail.*

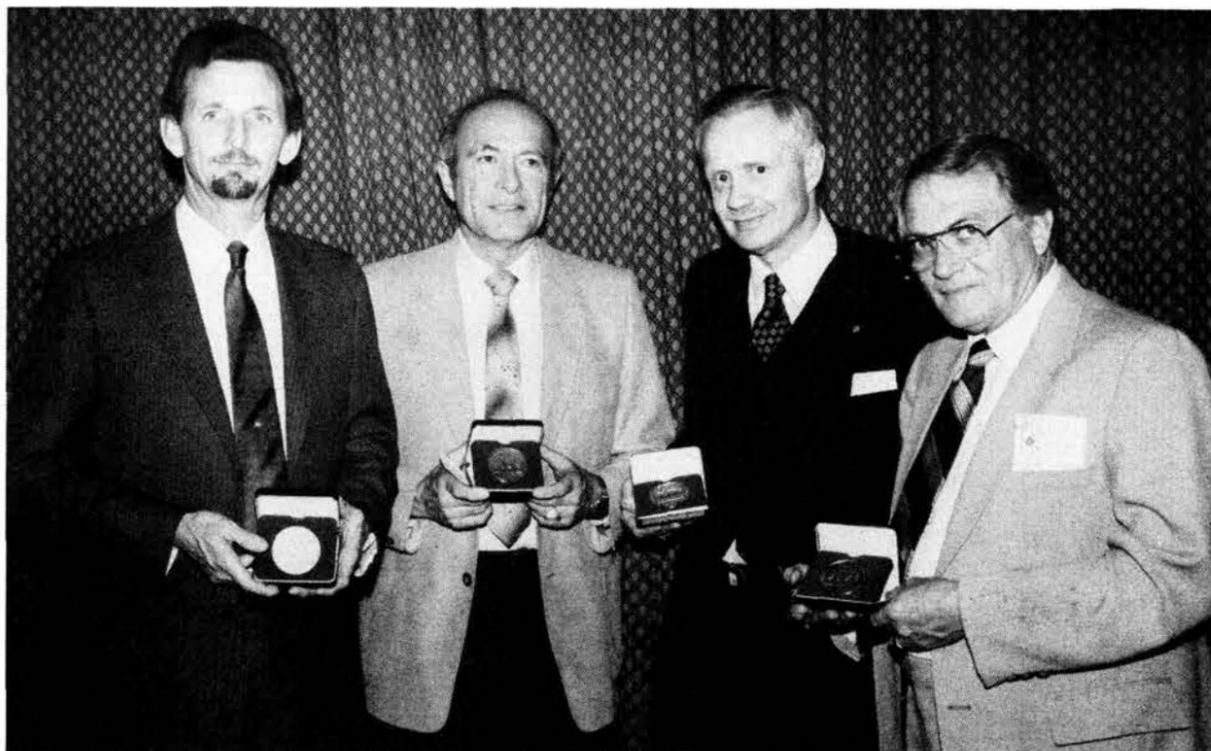
R.R. Russell — 3700

*Q. Kirtland Federal Credit Union and the Credit Union at Pantex offer credit cards with no annual fees. When will the Sandia Laboratory Credit Union have credit cards for its members without an annual fee?*

*A. The SLFCU Board of Directors is currently studying the pros and cons of implementing a credit card program. The study is projected for completion in April 1984. Based on the study, the Board will determine whether it is feasible for the Credit Union to offer such a program.*

*If a credit card program is offered, it may or may not have annual fees. The program will have to be established on the basis that is most beneficial for the membership as well as the Credit Union.*

C.L. Turner, SLFCU General Manager



"CENTENNIAL MEDALS" were presented by the local section of IEEE (Institute of Electrical and Electronics Engineers) to five members, including three Sandians and one retired Sandian. The awards commemorate 100 years of existence of IEEE and its predecessor organizations (the Institute of Radio Engineers and the American Institute of Electrical Engineers; the latter was founded in 1884) and were given to those who have performed outstanding service for the section. From left: Bob Gregory (2100), Jerry Hood (2150), Roy Colclaser (former professor of EE at UNM and now with Signetics), and Cecil Land (1112). Award recipient Gene Newlin (ret.) was out of town when the ceremony was held.

*Q. The driving and parking habits of some Sandians are abominable: Type 1: Employee had a paperback placed on the steering wheel and took every opportunity to read it, not only while stopped, but also as she was driving south on Wyoming. Some drivers drive with one hand while holding a cup of coffee in the other hand (Safety violation?) Type 2: Many employees drive DOE vehicles and park inside or outside of Gate 1 (west of Bldg. 803 or in adjacent 2nd shift parking) and then walk to the Credit Union or are driven by and let out near the C.U. (Use of Gov. vehicles?) Type 3: A certain cabal of singles consistently park their cars in the designated Car Pool parking area. I feel these cretins could easily wreak havoc on anyone's body if they were accosted about their negligent and nefarious misuse of parking privileges. (Violation of posted signs?)*

*What can be done about these selfish mavericks who feel their entertainment, happiness, and personal pleasures must be fulfilled at the expense of others? (I know! Legislation cannot assure character, honesty, or integrity. It takes backbone!)*

*A. The driving habits of a small number of our employees at times leave something to be desired. However, Sandia Security is not authorized to do anything about it when it occurs on the streets and roadways of KAFB — that's the job of the KAFB Security Police.*

*The Laboratories' policy regarding parking in and around Sandia Tech areas is detailed in SLI 1904. Sandia Security is responsible for enforcing this policy. However, manpower limitations do not allow Security to patrol the Labs' parking areas continuously. Of necessity, Security must rely in part upon public-spirited employees like yourself to report improper and unsafe parking practices for corrective action. When you observe someone who fails to comply with the Laboratories established parking procedures, call Security at 4-3155 and they will take the appropriate action.*

C.L. Brumfield — 3400

*Q. President Dacey's overview in the Institutional Plan FY 1984-1989 mentioned some of the problems in competing for the top 10 percent of the nation's engineering and science graduates. For years Sandia has recruited the top 10 percent of the students and has contributed little or nothing in return to the many universities that have provided the present Sandia staff.*

*Perhaps Sandia should consider becoming a matching gift company (match all employee gifts to their universities or schools) like most DOE weapon complex companies, Western Electric, Bell Laboratories, and AT&T.*

*A. Thank you for your interest in Sandia's responsibilities toward universities that "supply" the Laboratories with top engineering and science graduates. It is true that Sandia does not participate in an employee gift matching program. DOE budgetary constraints severely limit the kind and amount of voluntary contributions Sandia can make since we are 100 percent government funded. (You will note that this same rule is apparently followed by other National Labs since none of them are listed in the brochure you sent.)*

*Although Sandia does not participate in an employee matching grand program, we do support a number of universities through research contracts and grants, faculty sabbatical summer hires, Adjunct-Professors, equipment loans, and matching grants for university departments enrolling Sandians from our Doctoral Support, One-Year-on-Campus, and Special Masters Programs. In addition, there are always a number of collaborative research projects going on in a wide variety of fields ranging from combustion research to nuclear engineering and medicine. We believe that these activities constitute a sizable effort and are consistent with the Laboratories' commitment to supporting those institutions that provide the Laboratories with staff and conduct research and programs relevant to the work of the Laboratories.*

J.R. Garcia — 3500

## Take Note

Some Sandian out there deserves a thank you. He's the one who used his First Aid training to stop the severe bleeding that followed a fall by Marguerite Lewis on March 13 near Base Headquarters. She knows that he's a Sandian and he drives a small beige or yellow pickup — and that he was the only person among the several passers-by who came to her rescue as she lay injured on the sidewalk. Whoever you are, thanks!

\*\*\*

An account has been established in the Credit Union to accept donations for the son, daughter-in-law, and granddaughter of Ilene Mathes (153). The family was severely burned and their home demolished by an explosion on March 10. Blood donors are also sought; contribute at the Bloodmobile at Medical on Tuesday.

\*\*\*

Southern Appalachian folklorist and musician Mike Seeger (brother of Pete) will stage a concert and call a square dance on April 7 at the Heights Community Center (823 Buena Vista SE) at 7:30 p.m. Admission is \$4 in advance or \$5 at the door. The event is sponsored by the NM Folk Music Society. More info from David Strip (6415) on 255-7230.

\*\*\*

The American Lung Association of New Mexico is sponsoring a six-week "Freedom From Smoking" clinic 7-9 p.m. on Tuesdays, beginning April 3. Enrollment for the clinic is limited, and preregistration is required. For more information, contact the Lung Association at 216 Truman NE or call 265-0732.

\*\*\*

The South Highway 14 Project has a new aerial photograph of Tech Area I that is a suitable gift for retiring employees. The 16 x 20 color photo has space at the bottom for the signatures and well wishes of the employee's friends. It is mounted on press-board, ready for hanging as is or for framing. The photo sells for \$20 and is available in the LAB NEWS office, Bldg. 814.

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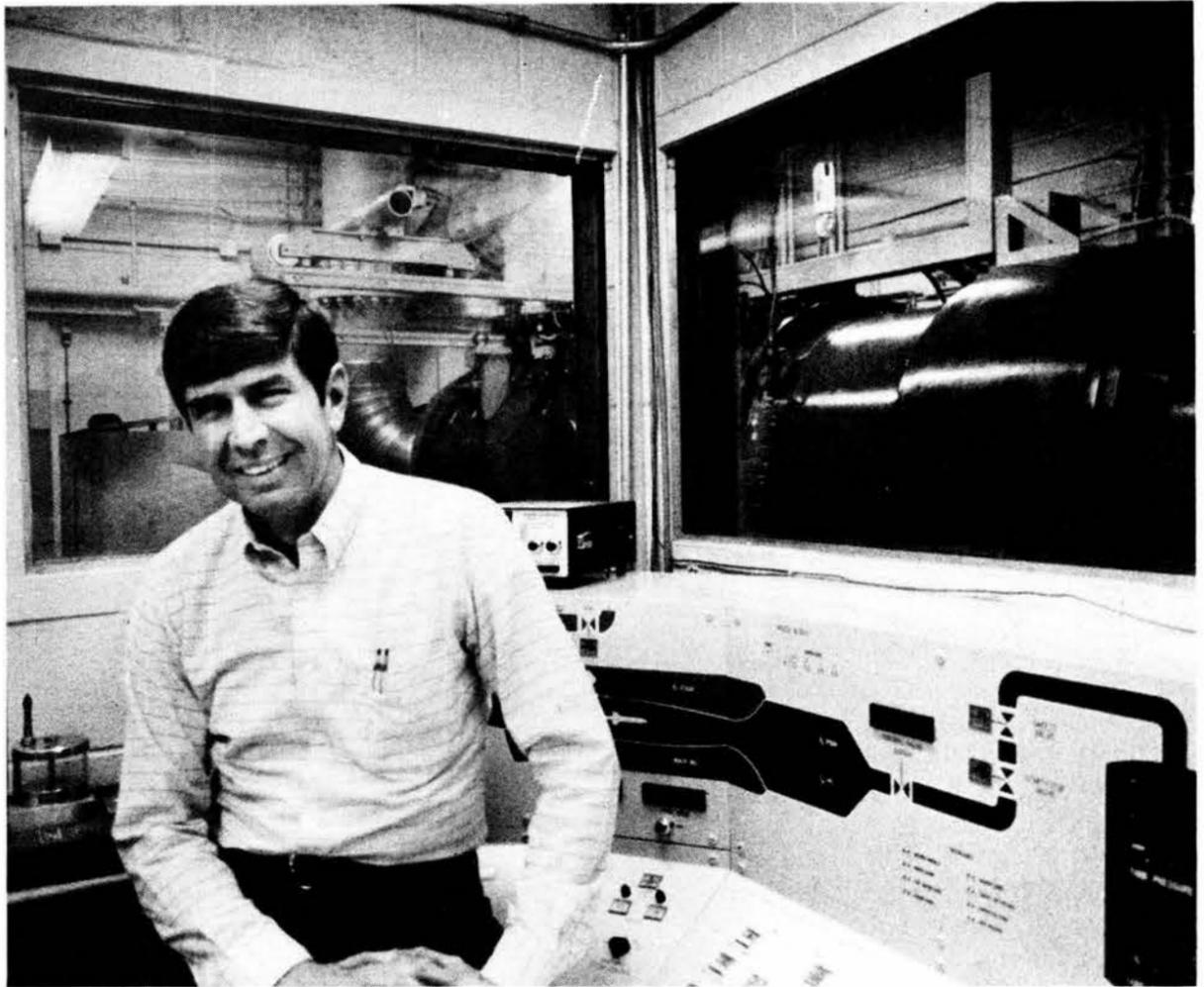
KAFB's Security Police Investigations office has the following items found on base: lady's gold diamond ring found near Texas and "F" Street, lady's gold diamond ring found in the East Gym, and lady's gold wristwatch found in the hospital parking lot. To claim property or for more information, call 4-5421.

\*\*\*

Retiring this month and not shown in LAB NEWS photos are Ben Bright (3425), Leonard Baker (3423), Doyle Earnest (3613), Frank Gurule (3741), Henry Pacheco (3618), Alexander Trujillo (3421), and Larry Williams (7471).

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Albuquerque Little Theatre's production of "Arsenic and Old Lace" opens tonight and runs through April 15, every night except Monday. Curtain goes up at 8 p.m. For reservations, call 242-4750.



DON McBRIDE, supervisor of Experimental Aerodynamics Division 1634, was recently elected president of the Supersonic Tunnel Association, an international organization of 41 government, university, and industry wind tunnel R&D groups representing 11 free world countries. The STA is unique in that its work is not published or referenced so that researchers are free to discuss problems as well as successes; as such, the STA fosters a free interchange of ideas at the operational level. The next meeting will be in Goettingen, West Germany, at the DFVLR research facilities; the meeting will be followed by a visit to wind tunnel facilities at Cologne, then a tour of those in the Netherlands, Belgium, France, and England. The STA was founded in 1954; Sandia joined in 1955. Since then, four Sandians — Alan Pope, Randy Maydew, Carl Peterson, and now Don — have served as president.



ASTRONAUT MARY CLEAVE spoke at an "Expanding Your Horizons" conference for young women (grades 8-12) recently. Sponsored by the NM Network for Women in Science and Engineering, the conference was designed to increase the young women's interest in math and science and to foster awareness of career opportunities for women in these fields. Joining Cleave (left) for this photo were Hazlet Edmonds (3522), Ellen Cronin (6330), and Yolanda Padilla-Vigil (3511), all of whom helped plan the conference.

## Fun & Games

**Golf** — Sandians are eligible to join the KAFB Duffers who will face the Chamber of Commerce Hackers in the fifth annual tournament at the Tijeras Arroyo golf course on June 1. KAFB has won the event for the past three years. Entries are limited to 72 from each group; get entry forms at the TA Pro Shop, Que Pasa, or either of the open messes.

\*\*\*

**Pit Climbing** — How many times can you walk up and down the steps in UNM's Arena? Find out by joining the Pit Climb for

the Cure on May 5; it's sponsored by the Cystic Fibrosis Foundation, and the money raised — each entrant has a sponsor pledging so much per step or ascent/descent or something — goes toward research on a cure for the disease. Co-sponsors include Western Airlines, Aladdin Travel, Gatorade, and Academy Printing so the prizes for pledge money totals and other prizes awarded by drawing should be good ones. Grand prize is a trip to Disneyland. More info and sponsor sheets from the CF office on 255-7507.

# Beaming In — On Outer and Inner Space

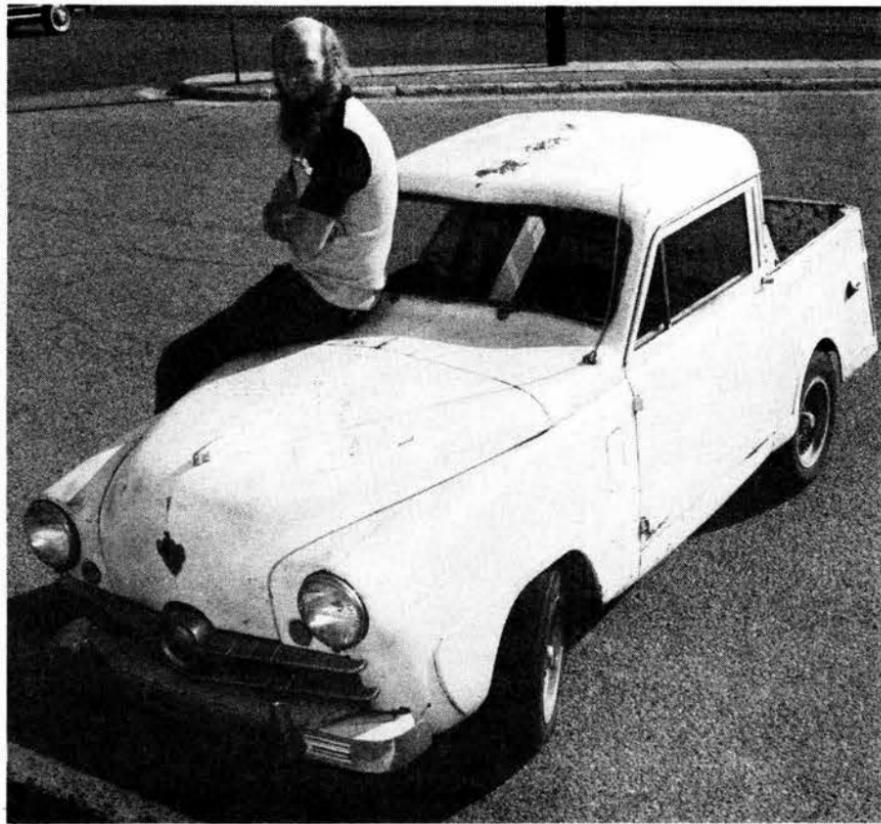
“Magnetically Confined Relativistic Beams in Astrophysics” was the dry title for a recent colloquium that dealt with some rather remarkable cosmic forces. Gregory Benford (Physics Dept., University of California Irvine) described how some distant galaxies eject immense jets of radiation that travel many times their own radii.

The intriguing feature of these jets is that they shoot out from the galactic nucleus in what seem to be self-confining magnetic fields. The jets of such “nonconventional galaxies” also leave trails of matter, much like the wake of a ship.

What could cause such a powerful emission of matter from a galactic center? Benford said that a black hole is the likely culprit. A massive black hole in the center of a galaxy would attract hydrogen clouds and gulp up entire stars. As this matter is drawn toward the black hole, it forms an accretion disk. The intense heat generated in the accretion disk would blow off some of the matter — from 10 to 20 percent — which would shoot out as a magnetically confined jet.

Such phenomena are not confined to distant galaxies. They also occur at smaller scales within our own Milky Way Galaxy. One example is the Crab Nebula, which has at its center a pulsar — a superdense star that is the collapsed remnant of a supernova explosion. This pulsar emits a jet two light years long.

Benford pointed out that the nature of these jets interests not only astronomers but also scientists who are working on the problems of propagating relativistic beams in the laboratory. Benford, incidentally, is the author of eight science fiction books



CROSLY PICKUP, vintage 1951, is the “main machine” of Dan Buller (1111). Dan usually rides his bicycle to work, but occasionally he drives this little pickup to handle shopping and errands. Dan has replaced the original engine with a Toyota 1600 cc mill that is usually good for about two weeks on a fill-up of the 5-gallon tank. Dan doesn't keep mileage records, but he drives across town several times a week to visit his girlfriend. Other than an extra leaf in the front springs and beefed-up brakes, the machine is original factory issue, even the gray paint. The pickup bed is about four feet square and two feet deep, handles about 500 pounds of cargo.

which may or may not have a bearing on his scientific hypotheses (his latest is *Across the Sea of Suns*).

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In another colloquium, Dr. J.D. Wicks of the UNM School of Medicine talked about nuclear magnetic resonance (NMR), an analytical technique now being used as a diagnostic tool to allow physicians to look inside the human body with a radiofrequency probe combined with a strong static magnetic field. The NMR technique provides high spatial resolution, comparable to computerized X-ray tomography (“CAT scanner”), and contrast resolution based not only on the distribution of specific nuclei but also on their chemical nature.

Wicks said that NMR is not a new technique — it's been used for decades as a tool for chemical analysis. It's only within the last seven or eight years, however, that the principle of NMR has been applied to imag-

ing the human body's interior.

(The name of the technique is running into some negative reaction among the press and public because it includes the word “nuclear,” Wicks pointed out. Therefore it is likely that NMR will become MRI — magnetic resonance imaging.)

The NMR is essentially a large superconducting magnet into which the patient is introduced. The opening is lined with radio frequency coils that perform the diagnosis. Wicks pointed out that NMR will not replace the CAT scanner, but will complement it.

NMR could have negative effects on some patients. For instance, the heating effects from the coils could be harmful to people with large metallic implants. However, the only documented instance of biological harm to date is when the large magnet picked up some loose metallic objects in the vicinity and caused them to strike a patient.



Frank Tufts (3660)



Marion Drago (1651)



Jim Avis (5122)



Dick Kidd (1652)



Brian Finley (7223)



Ralph Hamilton (3435)

## Retiring



Bob Parker (7553), George Corbell (3418), Woody Hunt (7658)

# MILEPOSTS

## LAB NEWS

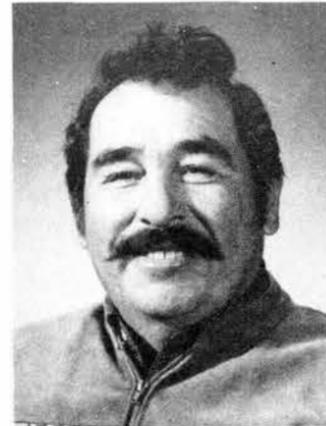
MARCH 1984



Yale Knox (3155) 35



Eleanor Owens (3700) 20



Willie Lucero (3613) 10



Bob Blewer (2147) 15



Joan Woodard (8454) 10



Gerald Hays (1128) 10



Ron Amaral (8162) 20



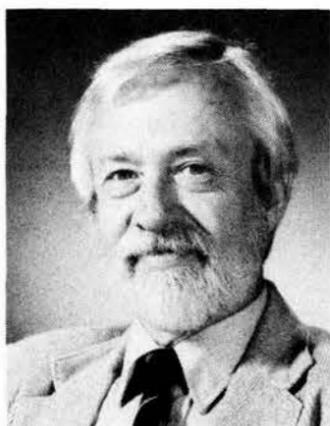
Chester Chavez (3418) 10



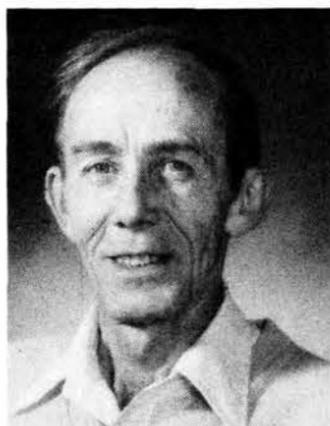
John Seuser (8414) 25



Bob Sheldahl (1633) 15



Paul Jones (7483) 25



Jack Smith (5152) 35



Catherine Marino (8414) 10



Jose Jojola (3613) 35



Gary Samlin (1244) 15



Mel Mefford (3463) 20



Dora Gunckel (6410) 15

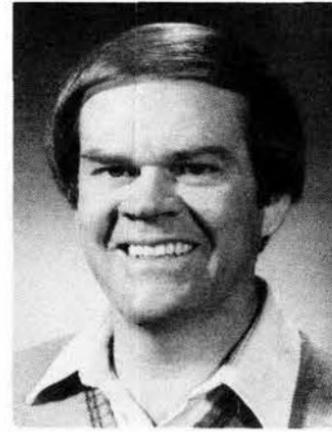
# MILEPOSTS

## LAB NEWS

MARCH 1984



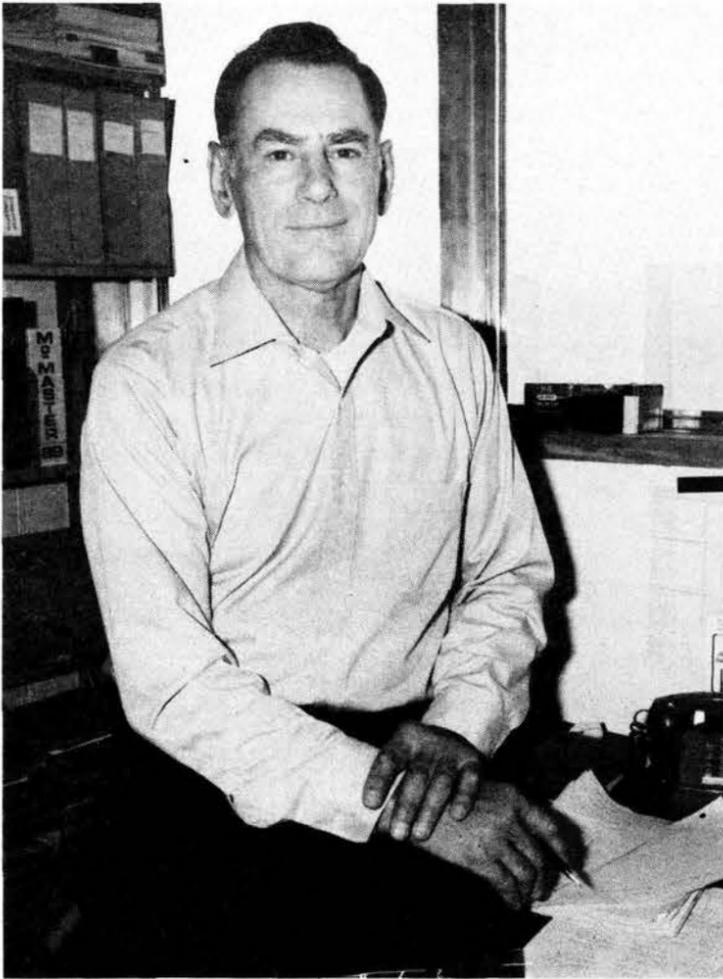
Wayne Chrisman (8347) 20



Ed Burgess (6221) 20



Frank Casner (7242) 25



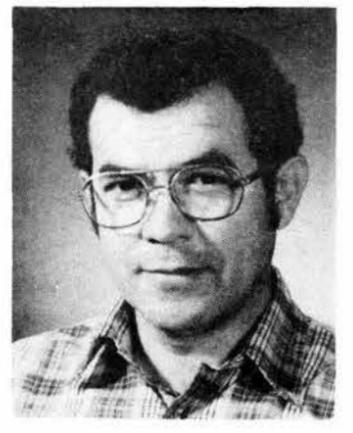
Vic Roh (5341) 30



Lorraine Stamer (8424) 20



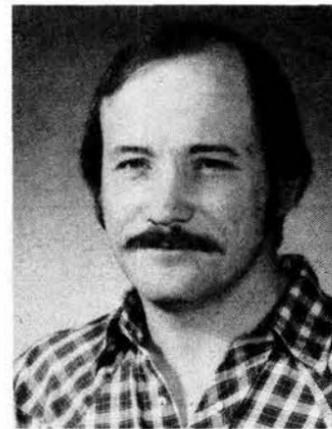
John Campbell (3423) 10



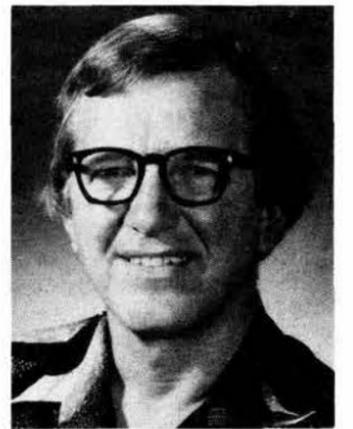
Eloy Cota (5245) 20



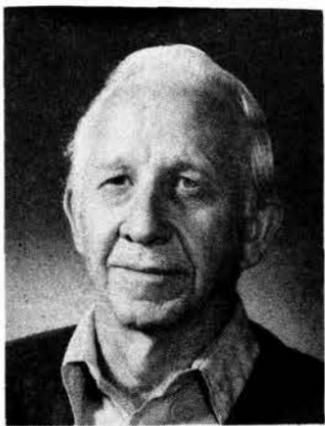
Gerald Stoker (7551) 20



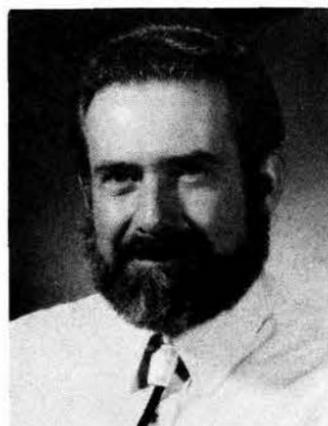
Bruce Whittet (6314) 10



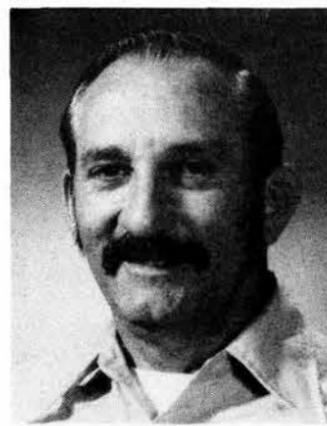
Don Jelinek (2344) 20



George Revels (7471) 30



Bob Workhoven (5249) 25



Lester Harris (5231) 25



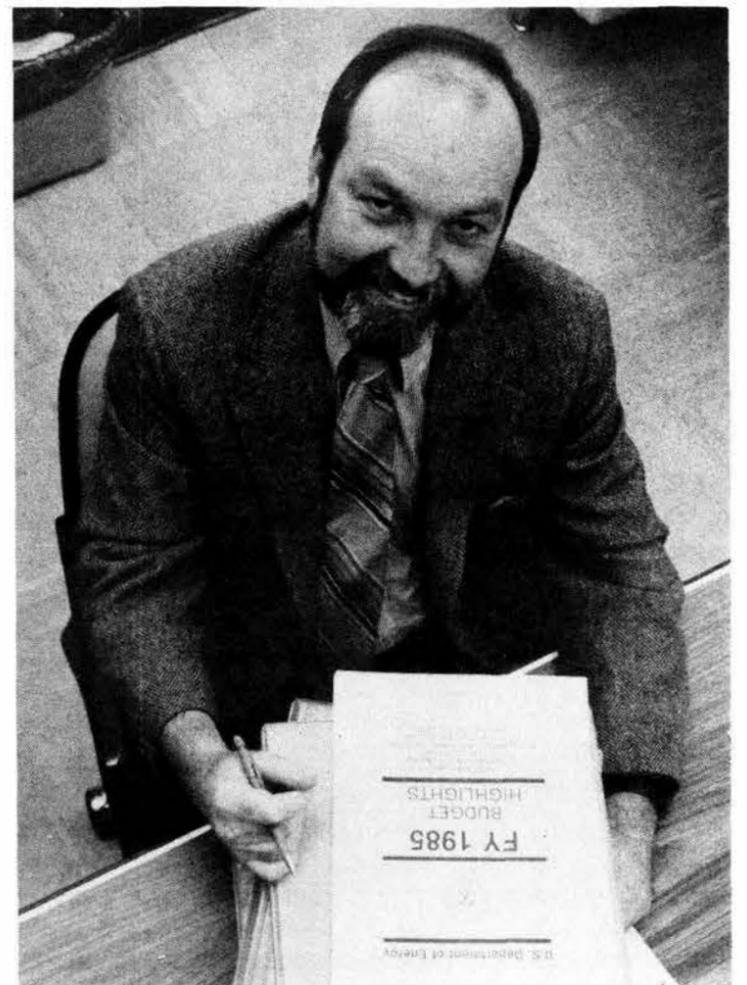
Sam Mancuso (3545) 30



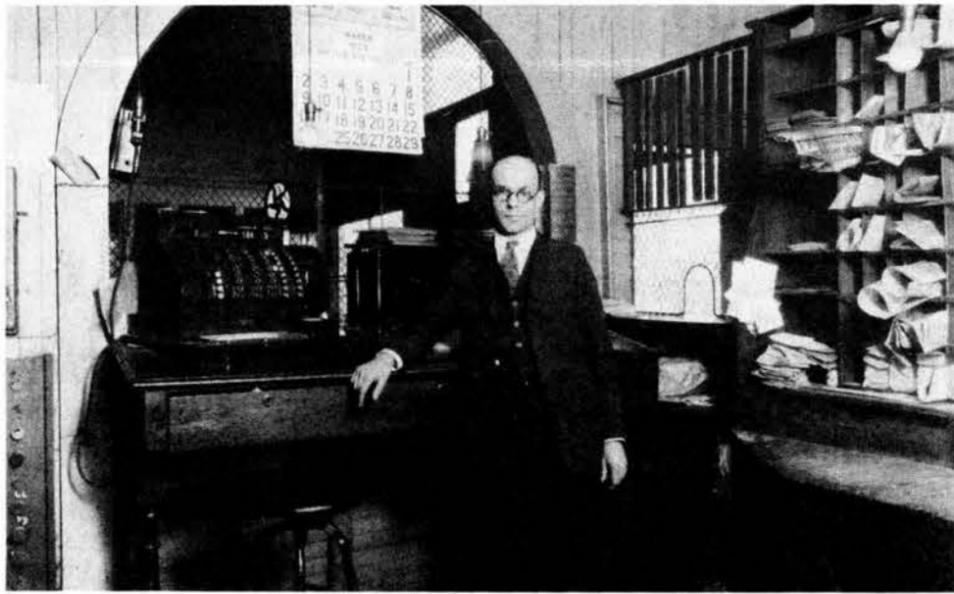
Betty Pimental (8336) 15



Roger Eaton (1511) 20



Jerry Wackerly (8423) 25



## My Favorite Old Photo

The date on the calendar is March 1930 in this office of the Consolidated Coal Mining Company in Acme, West Virginia. That's my father, Millard Knight, who was company bookkeeper at the time. He worked for Acme about 40 years, starting as a trap boy when he was a teenager. He took time off after service in WWI to attend business school. In those days, a miner was

paid 25 to 30 cents a ton for loading coal. The cash register numbers in the photo represent a transaction for employee number 184 who was paid \$5, probably a week's wages. I was born in Acme, but Dad didn't want me to be a coal miner. I'm glad my son Pat works at Sandia, in Division 2311.

— Bob Knight (7472)

UNCLASSIFIED ADVERTISEMENTS • UNCLASSIFIED ADVERTISEMENTS • UNCLASSIFIED ADVERTISEMENTS • UNCLASSIFIED ADVERTISEMENTS

**Deadline: Friday noon before week of publication unless changed by holiday. Mail to: Div. 3162.**

### RULES

1. Limit 20 words.
2. One ad per issue per category.
3. Submit in writing. No phone-ins.
4. Use home telephone numbers.
5. For active and retired Sandians and DOE employees.
6. No commercial ads, please.
7. No more than two insertions of same ad.
8. Include name and organization.
9. Housing listed here for sale is available for occupancy without regard to race, creed, color, or national origin.

### MISCELLANEOUS

- TWO Chihuahua puppies, AKC w/papers, females. Powell, 877-4939.
- MATCHING wedding rings: man's four .02C diamonds; lady's, four .01C diamonds; \$200, 1979 appraisal \$450. Sharp, 293-1824.
- QUEEN-size sleeper sofa, \$100; 3-5 piece place setting Lenox china, Weatherly pattern, \$75. Boling, 298-8141.
- MOVING SALE: household goods, antique tools, wheels, baby crib, oak desk, etc. March 30, 800 La Senda NW. Zickert, 898-3475.
- PEKINESE puppies, AKC reg., pedigree furnished. Anderson, 873-3945.
- DEC PDP11/03; VT103 terminal w/11/2 proc, 64KB mem., 4 serial parts, RX02 disk, \$4500. Jensen, 884-5318.
- LANE Coffee table & end table, walnut, \$150; chrome walking cane, \$15; dinette table, 36 x 60, \$35. Sanchez, 836-3060.
- POWER POLE, \$1.50/ft.; 1200-egg incubator for all sizes of eggs, \$350; ducks, \$7; used 3/8" plywood, painted, 4 x 12, \$4/sheet. Lackey, 898-6638.
- LADIES Lynx Tigress & Spalding golf clubs; 120" gold sofa & chair; Nelco port. machine; Hoover upright; gold carpet; tent & more. Crowder, 298-8885.
- CAMPER shell, short-wide-bed, lighted, 74" x 80" x 25 1/2" ht., \$180. Cordova, 268-6496 after 5.
- HERITAGE dining room suite, \$2500 OBO. Hezlep, 296-2962.
- CAMERA, Canon AE-1 program w/f. 4 lens, \$250; Canon 70-210 zoom lens, \$160; other Canon lenses available. Shepard, 881-1972.
- WATERBED, king size, w/6-dwr. pedestal bookcase headboard, \$300. Anderson, 292-1945.
- ELECTRIC train table, 4' x 8', \$25. Sherman, 292-3297.
- GARRET metal detectors: Master Hunter discriminatio TR/VLF Deepseeker ADS w/7" coil, \$250; Master Hunter BFO w/ 3, 5, 7, 12" coils, \$125. Snyder, 293-8124.
- TURQUOISE necklaces (3) appraised at \$225/ea.; will sell for half OBO; Sears exercise bicycle, \$40 OBO.

- Bauer, 842-1453 after 6.
- KENMORE wash machine; Magic Chef gas stove, dbl. ovens; book case & wall unit w/stereo speakers. Eiffert, 268-1854.
- BLACK naugahide couch, \$70; antique wagon wheels, \$35 ea. Peterson, 256-7514.
- SNOW tires: H78-15LT, fiberglass belted, \$30/pair. Beegle, 296-5300.
- ARABIAN horses, ready to breed or ride. Ellis, 869-3582.
- MAPLE twin bed, \$125; Simmons hide-a-bed, \$200; lg. swivel rocker, \$100; B/W console TV, \$25; golf clubs, bag, cart, \$75. DeLollis, 299-5384.
- WET SUIT, U.S. Divers, small, farmer john w/hood, boots, gloves, \$150; Meerscham pipe, intricate carvings, never used, \$150. Barnette, 292-5186.
- REFRIGERATOR, apt. size Coldspot, chocolate, Formica worktop, 5.9 cu. ft., 24w, 24d, 33.5h, \$75. Dalphin, 265-4029.
- FIREPLACE stove, \$125; roping saddle, 15 1/2" seat, \$400 Stone, 281-2819 after 5.
- GAS lawn mower, \$60. Jarrell, 293-9671.
- REDWOOD picnic table/bench unit, tubular aluminum frame w/solid redwood lumber, you haul away, \$25. Dean, 296-3264.
- TIRES: Michelin 225 x 15; used carpet, Scout II parts: bumpers, springs, transfer case; several used couches; dishes. Brooks, 299-1884.
- 8' fluorescent light fixtures w/tubes; Grundig stereo w/integral short & long wave radio, tape player. Prevender, 299-5253.
- RUGER .357 magnum cal., new model Blackhawk, w/holster, \$175. Hackard, 299-4333.
- 60-GAL. pickup aux. fuel tank, \$125. Harrison, 255-7978.
- LEE'S carpeting, 45 plus sq. yds. short shag, green. Randall, 821-0388 after 5.
- CHEST freezer, 20.3 cu. ft., 8 yrs. old, \$200. Ashworth, 281-9125.
- CAMPER, 8' slide-in, 1/4 cabover, GE refrig., furnace w/thermostat, pressure water, jacks, tie-downs, custom made '81, \$2650. Meyer, 296-9066.
- SKIS: Olin 830 175cm, \$300; 180cm, \$275; both w/Tyrolia 280D bindings, used 10 times. Garcia, 898-0685 after 5.
- TIRE w/4-hole rim, new, never used, SBR, w/w ER-78-14; tent, sleeps 10, used twice, new \$129, sell \$65; louvers, fit '77 Ford Mustang back window, \$49. Chavez, 831-9591.
- 14-YEAR-OLD grey mare, part Arabian, \$500; English saddle plus tack, \$150 w/horse. Brice, 345-4827.
- CAMERA, 35mm SLR, Olympus OM10 body w/50mm fl.8 Zuiko lens & new semi-hard case, \$130. Mogford, 898-1416.
- FREE to good home: two black Labs, age 7 & 2, both neutered. Davis, 281-1248.
- TRAVEL trailer, 20' Jayco, tandem wheels, AC, radio, TV antenna, spare, includes all necessary equipment: hitch, jacks, hoses, etc.,

- \$4750. Sublett, 884-4426.
- APT. size sofa, coffee table, 2 fans (one oscillates, other stationary). Beard-sley, 292-5910.
- RADAR warning receiver, Escort, 9 mos. old, cost \$240, sell for \$160. Erickson, 266-4218.
- HAMMOND organ, model M3, about 20 yrs. old, \$750. Ludwick, 296-6447.
- CRAFTSMAN 10" radial arm saw, stand, casters, & combination blade, \$290. Griffiee, 296-8129.
- SKI BOOTS, Moliter, men's size 8 or women's size 7. \$75; fp screen, 36 1/2" x 21 1/2", \$30. Bennett, 298-1142.
- SIZE 7-8 peach formal, worn once, \$25; Smith-Corona port. elec. type-writer, \$90; BSR-MacDonald turntable, \$30. Martinez, 299-5728.
- MEN'S left-handed golf clubs, Ram Accubars 3-9, PW, SW 1, 3, 4, 5 W, \$125. Russell, 298-8879.
- SLEEPING bag, Marmat Gore-Tex Penguin, all goosedown, -35° rating, 10" loft, used one season, retail \$515, sell for \$325. Shunny, 265-1620.

### TRANSPORTATION

- 1924 MODEL T Huckster, maple body, new wood wheels, \$6200. Hebron, 883-0738.
- '64 CORVETTE Stingray, black, rebuilt 327, 4-spd., \$6000. Toya, 833-4406, 898-0491.
- '80 RENAULT Le Car, 36K miles, radio, AC, \$2500. Wickett, 268-7804.
- '71 FORD pickup; '76 Honda 360CJ; Sony 6' big screen TV; '77 Jeep CJ7, '77 BMW 320i. Moss, 299-6573.
- '74 MONTE CARLO for parts. Griego, 877-6842.
- '83 HONDA 1100 motorcycle (V65 Magna), \$3695 includes a \$150 helmet. Ulibarri, 881-3551.
- HONDA XL1805 street/trail motorcycle. Fisher, 881-8072.
- '81 FORD Bronco, 351 V8, captain's chairs, instruments, cruise, radial tires, Hurricane wheels, loaded w/extras, 21K miles. Creel, 294-1650.
- KDX 175 Enduro motorcycle, \$900. Rutledge, 294-5644.
- '83 BMW R 100RT motorcycle, 11K miles, smoke silver, cycle found AM/FM radio, Bell M2 helmet, all \$5700. Hillman, 888-3565.
- '81 SUZUKI GS650E w/windshield mounted fairing, BO over \$1500. Prevender, 299-5253.
- '78 MERCURY Marquis 4-dr., 38K miles, some body damage, \$1300 as is, PS, PB, AC. McMurtry, 881-8053.
- '73 JAGUAR XKE 2+2, AT, 69K miles, dk. blue, below CPI avg. retail, \$11,500. Rutledge, 821-3048.
- '78 DATSUN 280Z, 5-spd., \$7K, consider small truck as partial trade. Zarick, 836-5703.
- '72 CHEV. Vega GT, steel sleeved engine, \$300. McFarland, 281-5346.
- '72 MGB convert., green w/white top, wire wheels, 4-spd., manual, luggage carrier, 70K miles, \$2500. Dean, 296-3264.

- '75 PORSCHE 911S Targa, 5-spd., 2.7 liter engine, will trade. Rees, 821-2256.
- '72 TOYOTA Corona Deluxe, 2-dr., 114K miles, \$850. Everhart, 266-3852.
- 20' CABIN cruiser boat/trailer, 150 HP inboard/outboard motor, \$2000. Dobias, 256-7476.
- '81 CHEVY custom van, 305 engine, AC, AT, special lighting, carpeted, 4 captain's chairs, cruise control, low miles, \$11,400. Arnold, 822-1307.
- '68 CHEVY Impala, 4-dr., V8, AT, AC, PS, needs valve job, \$450. Hoffman, 294-0543.
- '79 MERCURY Zephyr stn. wgn., 6-cyl., luxury Villager features w/AC, cartop carrier, rear defroster, \$3500. Schubeck, 821-3133.
- ALL-American soap box derby, official junior division racer, steel wheels, \$100. Wengert, 294-5373.
- '65 CHEVROLET stn. wgn., V8, stick shift w/OD, AC, \$750. Morrison, 877-7425.
- '70 CHEVELLE SS w/rebuilt 396 engine, AM-FM cassette, 4-spd., \$1500; drawing desk w/cabinet, \$30. Moyer, 881-3879.
- '74 DODGE club cab pickup, 3/4 ton, 4 x 4, AT, PS, PB. McCormick, 821-2092.
- '79 DODGE Omni 4-dr. hatchback, AT, PS, AC, AM-FM, 30,560 miles, 25 mpg city, \$3000 firm. Pendall, 265-3008.
- BOAT, 12' fiberglass, surrey top, oars & anchor, \$275; 7.5 hp outboard & fuel tank, \$300. Wagoner, 869-6791.
- '82 YAMAHA Heritage Special, 650 twin, 4400 miles, \$1295. Buttz, 292-4504.
- 1940 BUICK Special, straight 8 engine, \$2900 or trade for good running pickup. Chavez, 831-9591.
- '37 CHRYSLER Roadster, 75% restored, \$7K. Perryman, 281-3020.
- '81 HONDA 750c, windjammer & more, new tires, low mile, \$2100 OBO. Webb, 294-8341.
- '48 WILLEYS JEEP, CJ2A Ford V8, roll bar, skid plate, new battery, red, \$1200. Crompton, 299-5569.
- '75 TRIUMPH Trident, approx. 700 miles on rebuilt engine, needs paint, \$800. Minor, 296-5272.
- '77 OLDS Starfire 2-dr. hatchback, 4-spd., V6, AC, AM/FM/CB/8T, 22K miles, \$2500. Warpinski, 884-8791.
- '72 VEGA, 4-spd., \$380. McDonald, 298-0347.
- '80 VW Rabbit diesel, 4-dr., stereo, sun roof, \$3200 OBO. Erickson, 266-4218.
- '82 AUDI 4-dr. sedan, sun roof, 5 spd., std., FM-AM cassette, 20K miles, 34-36 mpg. Gonzales, 344-9832.
- '77 YAMAHA XS750-2D, shaft drive, luggage rack, Vetter Vindicator II fairing, w/fairing \$640, w/o \$490; Bell Magnum II helmet, \$40. Griffiee, 296-8129.
- '74 OPEL Manta, 4-cyl., 4-spd., 27 mpg, \$750. Prevender, 299-5253.
- '75 17' Ranger bass boat w/135 HP Chrysler, Wishbone trailer, accessories, \$4000; '82 Troy-Bilt rototiller, 6 hp bar-tread tires, \$750. Kilgore, 898-5111.
- '81 DATSUN 210, 2-dr., 5-spd. trans., 62K miles. Toya, 898-0491.

### REAL ESTATE

- 8% ASSUMABLE loan, 2-bdr. condo, \$48K, fp, pool, jacuzzi, tennis, security, washer, dryer in unit, down payment negotiable. Kulju, 881-5265.
- 1.3 ACRES El Pinar Estates, 14 miles off frontage road, wooded, electricity, phone, \$8K. Perryman, 281-3020.
- MOUNTAIN property, 2 lg. wooded lots on Frost Road west of Tumbleweed, view, solar orientation. Southwick, 281-3782.
- 5/8 ACRE mountain property in Sherwood Forest, Torrance County (approx. 50 miles from city), best offer over \$1500. O'Neil, 892-6754.
- 1 TO 10 acres, Belen area, \$69 down, \$6900/acre. Sanchez, 1-864-9297.
- MOBILE HOME, '78 Nashua 14 x 70, 2-bdr., 2 bath, 12 3/4% assumable loan. Jones, 281-1186.
- '81 MH, 14 x 70, 2-bdr., 2 bath, \$800 cash, assumable VA loan, 18 miles east of city, must be moved. Burek, 281-2206.
- 3-BDR., 2 bath house, 2000 sq. ft., beamed LR, wet bar, carpeted, trees, garden, in Valley mile N of I40, \$110K. Smith, 242-9576.
- NE, townhouse, 2-bdr., 1 1/4 bath, auto-dbl. garage, patio, heatalator fp, irrigated landscape, vaulted beamed ceiling, sky lights, more, \$4K down, 12.5%, assumable, mid 80s. Pierce, 883-2719.
- JUAN Tomas, 9 to 36 acres, 4 miles south of I40, 3 miles east of S14, trees, southern exposure, \$2300/acre. Baack, 296-2312.

### WANTED

- ROOMMATE for 3-bdr., 2 1/2 bath townhouse, storage, pool, tennis, Morris & Indian School, \$230/mo., utilities included. Dreike, 299-6670.
- ADJUSTABLE metal bed frame to fit either single or double bed. Mason, 281-3052.
- SUMMER faculty hire & wife need housing May 20-Aug. 24, furnished apt./house. Brammer, (303) 482-4645, Ft. Collins, Colo.
- WOMEN softball players to form team. Foster, 821-9226 after 5.
- USED playpen & sturdy highchair. McFadden, 293-7177.
- LASER sailboat. Fisher, 881-8072.
- CRIB, bassinet, other baby furniture. Barnette, 292-5186.
- USED Duplo/Lego children's plastic blocks. Hudson, 884-7621.
- WILSON Staff, pitching wedge, 1958 model, Dyna-powered, black dot. O'Bryant, 268-9049.
- TO RENT 16' utility trailer capable of carrying a 3600-lb. automobile for four days, in April. Rutledge, 821-3048.
- OBSOLETE Sandia-issue blue briefcase with Velcro fastener, not zipper. Hawkinson, 281-1281 after 6.

### WORK WANTED

- HOUSESITTING for summer months, can furnish references. Palmer, 299-4722.
- WELDING jobs for T-VI student, gas or electric. Yingst, 884-3812.

## Poor Boys Tonight; 'Pussycat' Tomorrow; Casino Night April 14

TONIGHT, one of the Club's favorite bands — The Isleta Poor Boys — returns to the ballroom to play the best of country western dance music from 8:30 until 12:30. Happy Hour prices are in effect from 4:30 until the music starts. The buffet tonight (served from 6:30 until 8:30) is a spectacular spread of barbecued beef ribs with accompanying goodies for \$8.75, or you can order from the Club's standard menu with prime rib and seafood entrees, even diet burgers — something for everyone. Next Friday, April 7, The Poor Boys return to the Club bandstand for more music making while prime rib is the buffet feature. Karen Edwards will instruct free western dance lessons from 7:30 until 8:30.

TOMORROW, the Club stage sees a live production of a modern comedy, "The Owl and the Pussycat" starring Gary Bearly and Karen Byers. The evening starts with cocktails at 6 followed by a steamboat round of beef buffet at 6:30 and the show at 8. Tickets are \$13 per person. Call for reservations (265-6791) right now. There will be a repeat performance next Wednesday, April 4.

VARIETY NIGHT on Saturday, April 7, features the classic Walt Disney animated film, *The Sword in the Stone*. This is a retelling of the King Arthur legend concentrating on Arthur's boyhood education with Merlin the magician. Super sandwiches are available at 5 p.m.; the movie starts at 6. Admission is free to members and families.

GOURMET DINING (Club 35) was inaugurated last month with an enthusiastic group demanding more of the outstanding wine, food, and service. Manager Mitch Griffin promises another superlative evening on Tuesday, April 10, starting with a wine taste and hors d'oeuvres at 5 and continuing through watercress soup, eggs Provençal, tournedos Wilshire, potato pancakes, and cherries Jubilee. The evening ends with coffee, an after-dinner drink and a great sigh of supreme satisfaction. The cost is \$35 per couple, and the first 35 couples to make reservations comprise the Club 35 this month.

ATTENTION PARENTS of youngsters of kids age six and under. The little ones are cordially invited (along with Mom and Pop) to the Club's annual Easter Egg Roll on Saturday morning, April 14, starting at 10 a.m. The Easter bunny will have been busy, busy, busy the night before hiding lots of eggs and a few gold ones worth big prizes to the lucky youngsters who find them. There will be egg roll contests (down the patio hill) for various age groups with more prizes to winners. Cartoons follow. Admission is free to members and families.

CASINO NIGHT, when the Club ballroom is transformed into Las Vegas on the

Rio Grande, is set for Saturday evening, April 14, with the doors opening at 6:30. Crap tables, blackjack tables, poker, chuckaluck, and a wheel of fortune will run full blast from 7:30 until 10:30 with door prizes awarded every hour. You trade \$1 (non-members pay \$2) for admission and a bundle of play money to wager on the games. Green chile, posole, and prime rib sandwiches will be available for those who need to take time out for sustenance. Elton Travis and the Westernaires will play for dancing from 8:30 until 12:30.

TRAVEL — A show and tell program on the New Orleans International Exposition is set for Monday, April 2, at 7 p.m. in the Club ballroom. The Club offers a package to New Orleans May 25-29 during the Fair for \$562. This is a chance for a preview with some pretty pictures accompanied by the latest word on New Orleans.

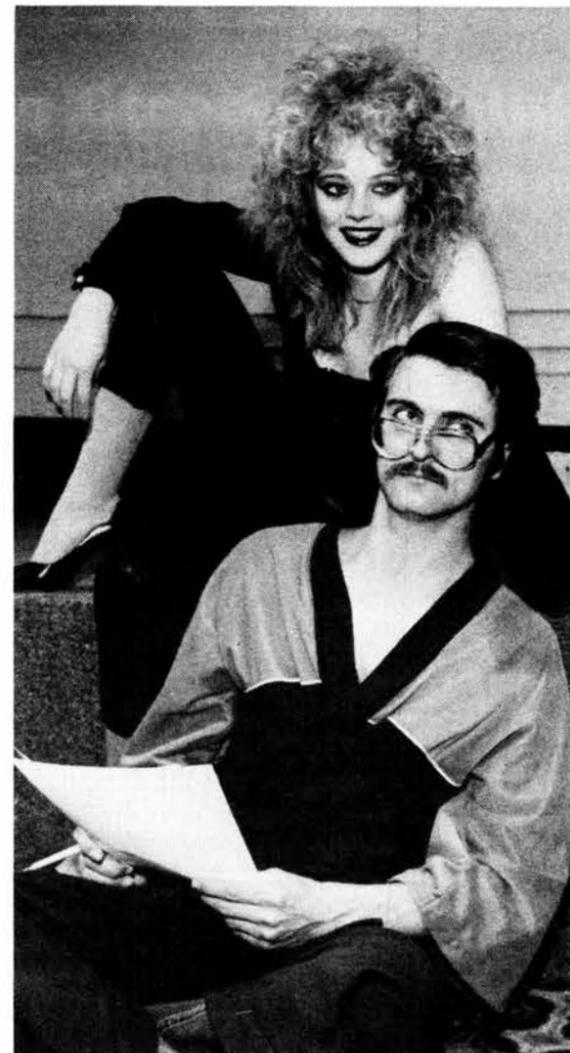
Other trips scheduled by the Club include Hawaii for a week on the beach in Honolulu May 12-19 starting at \$484. Many options are available.

Also, Charlie Clendenin (2611), travel director, has a Fiji/South Pacific nine-day Polynesian holiday trip for \$825 starting June 30. Call Charlie after work on 299-2071 for more information.

UPCOMING EVENTS worth noting now include a fantastic Mini-Luau on Thursday, April 19, with an national touring group called the Pearls of the Pacific booked to present an evening of grass skirt dancing, fire dancing, the hula, war chants, and general excitement. Thursday Evening Fresh Seafood fans will be happy to know that Manager Mitch is planning an exciting spread of Polynesian seafood for the occasion. An Easter Sunday Champagne brunch is planned for April 22. Mark your calendar.

POOL & PATIO season tickets go on sale at the Club on April 17 at 8 a.m. The best bargain in town last year is even better this year — prices have actually been reduced! Singles pay \$12, couples \$24, and families \$35. You'll want to buy your tickets as soon as possible if you want to avoid the stampedes on May 5 (swim lesson registration day) and Memorial Day weekend. Look for your April SERP Newsletter for a full spread on the Pool, Patio, & Tennis Program. In the meantime, call 4-8486 for information.

SWIM LESSON registration is May 5 from 9 to noon in the lobby and ballroom of the Club. The old pros who have been involved with the summer swim program will tell you to purchase your pool and patio season ticket before that date to avoid a long wait. The April SERP Newsletter will have all the pool, patio, and tennis information included so check it before calling 4-8486 for further information.



DINNER THEATRE NIGHT tomorrow features a production of "The Owl and the Pussycat" on the Coronado Club stage. Karen Byers and Gary Bearly, best known locally for their outstanding work with ACLOA, are the stars of the bedroom and bellylaugh comedy. The show is preceded with cocktails at 6 and a steamship round of roast beef buffet at 6:30. Tickets are \$13 per person. Call the Club office (265-6791) right now for reservations. If it's booked solid for Saturday, then try for Wednesday, April 4, when the performance repeats.

### Sympathy

To Ted Bryant (2561) on the death of his father March 2 in Caldwell, Idaho.

### Congratulations

Carla Perea (3426) and Joseph Minichello (3613) married in Albuquerque, March 9.



### VIA NEWS

Here is a volunteer opportunity for Sandia employees, retirees, and families. If you are interested, call Karen Shane (4-3268).

SICKLE CELL COUNCIL OF NEW MEXICO needs an electrician and a carpenter to construct a quiz board to be used during next month's Health Fair. Plans and materials will be furnished.