

High-Speed Impacts 'Frozen' in Three-Dimensional Holograms

Holograms have become widely familiar, but it's still a bit eerie to see a three-dimensional image floating in space and know it isn't "really" there. As intangible as holographic images seem, though, Sandia researchers have found them useful for recording detailed information about what happens during collisions at extremely high speeds — 10,000 mph or more.

In fact, the impacts recently imaged at Sandia are believed to be the highest-velocity collisions ever captured in this way.

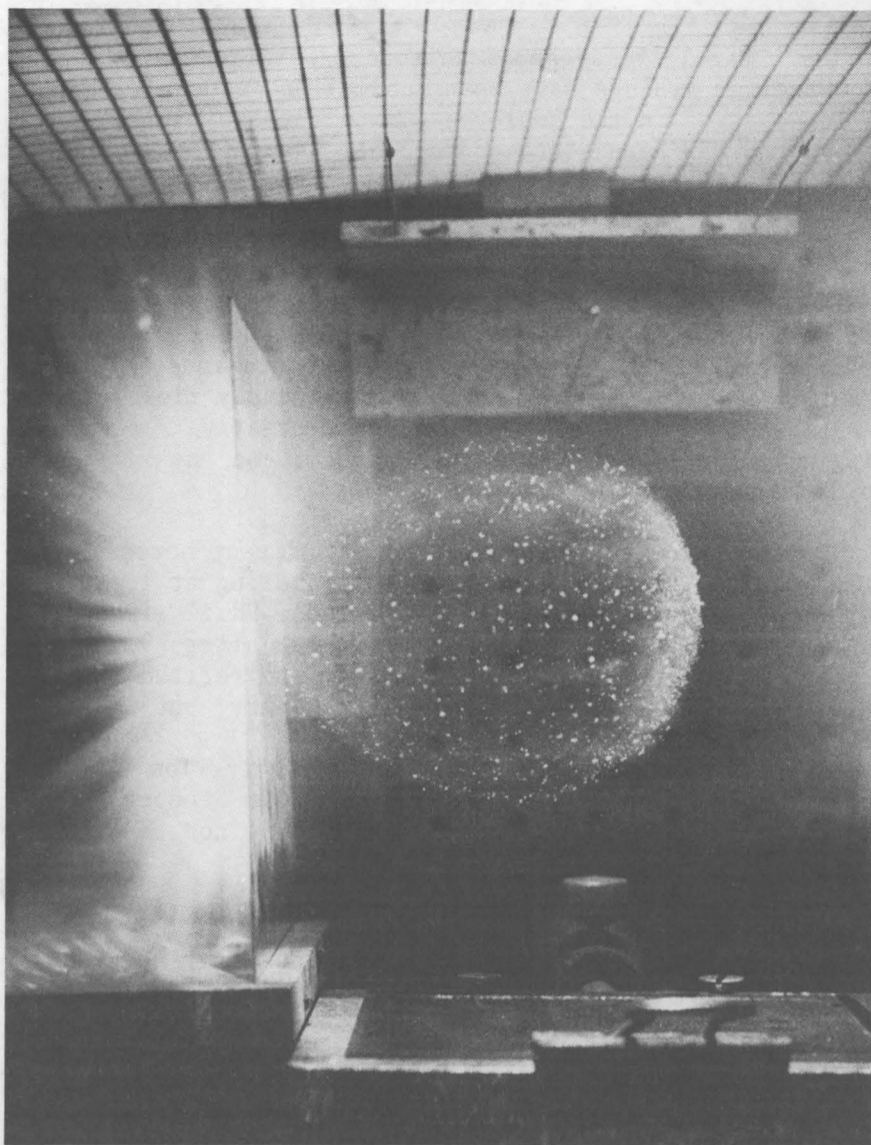
The holograms not only "freeze" the scene as a photo would, they also allow observers to view the subject — in this case, the three-dimensional pattern of impact debris — from different angles. Such holograms will help scientists and engineers

The holographic image has enough resolution and depth of field to show small fragments.

study the damage caused by hypervelocity impacts and the patterns of fragments that come from them. The resulting knowledge can be applied, as one instance, to space technology — the design of advanced orbital-debris shields, for example. Hypervelocity impacts are also useful in studying issues such as weapon safety and the effectiveness of projectiles.

Impact velocities in successful tests so far have reached 4.5 kilometers per second (2.8 miles per second, or more than 10,000 miles per hour). The velocity may soon be extended to 6 kps. A

(Continued on Page Four)



STEEL BALL strikes steel plate in this recent experiment. After passing through the 0.025-inch-thick (0.63 mm) plate, the quarter-inch (6.35 mm) ball and some of the plate material fragmented into the teardrop-shaped cloud of particles seen at the center of the photo. The bright area at left behind the plate is a flash caused by the impact. This photo was made with an ordinary camera looking down into the test chamber; the shutter was left open, and the pulse of laser light used to create the hologram also provided the light to "freeze" the fragments for the photo. A sheet of holographic film is at the bottom of the photo, and a reference grid that helps determine fragment locations is at the top. The hologram resulting from a test such as this is difficult to represent in two dimensions. (Photo by Scott Gosling)



LAB NEWS

VOL. 44, NO. 5 SANDIA NATIONAL LABORATORIES MARCH 6, 1992



FUTURE ENGINEERS? — During National Engineers Week, high school students from throughout New Mexico visited Sandia recently to get a glimpse of what goes on at a national lab. Here, some of the students acquire "hands-on" experience with the 29-foot centrifuge in Tech Area 3, which during operation might be whirling at 175 revolutions per minute. They learned that the centrifuge has been used for tests ranging from the earth to the heavens — from underground mine-subsidence modeling to aerospace vehicle testing. The students also viewed a rocket-sled shot and visited the National Solar Thermal Test Facility's Solar Tower.

(Photo by Randy Montoya)

Goal Is Continuous Improvement

Sandia Goes for AT&T Chairman's Quality Award

After the failure of a long-distance network for several hours in 1989, AT&T Chief Executive Officer Bob Allen decided he needed to do something dramatic to improve quality. At that time, he issued a statement saying he wanted AT&T quality to be the best in the world.

The way he decided to accomplish that goal was to have AT&T compete for the national Malcolm Baldrige Award, widely recognized by industry as one of the most prestigious quality markers in the world. To foster corporate-wide participation, he established an internal competition,

"It focuses on customers, on processes, on being world-class."

based on precisely the same criteria, called the AT&T Chairman's Quality Award (CQA).

As one of the 23 business units/divisions that make up AT&T, Sandia is now in the midst of preparing its first application for the CQA. In 1991, Sandia was one of only five business units that did not apply.

However, even though the process is based on the annual Malcolm Baldrige competition, the ultimate objective is not to win an award, notes Charles Tapp, Director of Quality Improvement 4300. The objective is to constantly improve quality and customer satisfaction in order to ensure corporate survival.

Good Business Sense

"There are three reasons for participating in the CQA," he says. "First, it makes business sense — it focuses on customers, on processes, on being world-class. Second, we need a metric to measure

(Continued on Page Five)

This & That

We're Changing, Too - Partly to accommodate some Labs-wide changes and partly to confuse ourselves (things have been running too smoothly lately), we've made a few changes in the Employee Communications Division. For one, Charles Shirley, LAB NEWS assistant editor, has been appointed to the new position of managing editor. As such, he's now responsible for making story and photo assignments, editing copy, and coordinating the layout. Either Charles or I (Larry Perrine) will be glad to talk with you about story ideas, but it might be more efficient if you would contact Charles first on 844-5199. (I haven't told Charles this part yet, but he's also expected to field any complaints.)

My revised duties are many, but the most notable are continued writing of this column, writing more feature stories, graciously fielding calls involving lavish praise, acting important, in-depth creative thinking, and attending vital conferences in Aspen, Hawaii, and the Caribbean (hey, I can dream, can't I?).

Family Matters - Several more Sandians have called or sent notes in recent weeks to say they are "20/20 Club" members - accumulating at least 20 years of service after a parent had done the same: Bonnie Vigil (1944) has 22 years of service; her mom, Adela Cook, retired in '85 after 29 years at the Labs. Mary Beth Brown of Albuquerque called to say she retired in '85 after working here 30 years and that her pop, Carthel Henry, put in 23 years before retiring in '78.

We also discovered another three-generation Sandia family. Tom Stueber (9216) has worked at the Labs since 1979. His dad, Jim Stueber, retired after 27 years of service earlier that year, and Tom's son, Kurt Stueber (1935), began working here last September.

Feedback on Feedback - We're a tad tardy in reporting this, but FY91 was the busiest year in the last 10 for the Feedback program. We processed 222 Feedback questions and suggestions in FY91, 53 more than in the preceding year and 100 more than in FY89.

Reiterating a few basics about the program: (1) You can submit questions without your name if you want, but include your name if you definitely want an answer because we publish in the LAB NEWS only those Feedbacks that are of broad interest; (2) We accept Feedback questions and suggestions by mail (Feedback Coordinator, Div. 3162) or by telefax (844-0645), but the telefax should be used only if you don't want to preserve your anonymity. Need more info about submitting a question or suggestion? Call Janet Carpenter (3162) on 844-7841.

Wild and Weird Spellings - Several issues back, I asked readers to submit any recent "creative" Sandia name and address botches. Not enough room to print 'em all, but here are some of the more entertaining ones, including a couple that I've had in the file for some time: Mark James (3551), upon checking out of his hotel after a conference, received a receipt showing him as an employee of Sandy Lab on Ubank Rd. in Albuquerque, Minnesota (MN). Rod Geer (3163) sent a newspaper clipping that mentioned San Dimas Laboratories in Livermore; the clipping was from a newspaper in a town only 60 miles or so from Livermore. Keith Miller (9145) got mail addressed to Sundig Nutrition Lab. Retiree Edward Ashland received something from the IRS addressed to Albug Vevgue. Jim Rice (1270) received a catalog mailed to Saudia Defional Laboratories. Neal Counts (9341) got a letter addressed to Sandia Nut Lubs. And an anonymous Sandian received junk mail addressed to Sandy Natural Lavatories. •LP

Mixes Humor with Law

DA Bob Schwartz Speaks at Sandia March 19



A funny thing happened to Bob Schwartz on his way to a career in the criminal justice system — he turned out to be part comedian and part lawyer, so he decided to mix the two and became a funny district attorney (DA).

Schwartz, elected as Bernalillo County DA in 1988, will speak at Sandia on Thursday, March 19, at noon in the Technology Transfer Center (Bldg. 825). His talk is titled "Criminal Justice in Bernalillo County." Seating is available on a first-come basis, and time has been allotted for audience questions following the presentation.

The colorful DA has developed a reputation as an aggressive prosecutor, but one with a well-developed sense of humor to provide some comic relief in an area that's all too often "too serious."

Schwartz has taken his comedic talents as far as a local comedy club, performing as a standup comic to help pay off campaign debts.

Even his resume reflects his sense of humor. In the professional experience category, it says: "1989 to present, Second Judicial District Attorney, chief law enforcement officer for Bernalillo County — 500,000 people, 1,000 police officers, too many criminals."

He received a BA degree from Villanova University and a law degree from Georgetown Law School. He has been with the Bernalillo County District Attorney's office since 1981.

Schwartz's talk is part of the Community Focus series coordinated by Community Relations Div. 3163. For more information, contact Al Stotts on 4-2282.

Welcome

Albuquerque — Albert Alvarado (3441), Martin Aragon (7811), Michelle Archuleta (21-1), Rosanne Asbury (21-1), Barbara Charrette (21-1), Richard Dramer (7815), Cecilia Garcia (21-1), Roy Gideon (7812), Jorge Jones (21-1), Ramon Manzanares (7812), Bernadette Montano (21-1), Clare Stanopiewicz (21-1), Howard Thomas (7814), Fred Webb (7818). *Other New Mexico* — Edwin Christilaw (7811), Linda Moore (21-1), Wallace Widerkehr (7814).

Elsewhere: *Colorado* — Scott Wilkinsin (3125).

Take Note

Outlook for the semiconductor industry and the impact of semiconductors on daily life are keynote topics for the 14th annual Ideas in Science & Electronics Exposition and Symposium (ISE '92) to be held at the Albuquerque Convention Center May 12-14. Keynote speaker Charles Thompson, senior vice president and director of world marketing for Motorola, Inc./Semiconductor Products Sector, will present a speech titled "2000, Here We Come!" ISE '92 technical program topics include environmental issues, environmentally conscious manufacturing, harmonization of digital product data standards, computer graphics, imaging and data fusion, medical/biomedical instrumentation, instrumentation and testing, communications, manufacturing and technology transfer, and special interest papers. Everything except the keynote lunch is free to registered attendees. Lunch tickets (\$20) are available from ISE (8100 Mountain Rd. NE, Suite 109), phone 262-1023.

The Muscular Dystrophy Association is looking for volunteer counselors to attend its annual New Mexico summer camp for children with neu-

romuscular diseases. This year's camp is being held at the New Mexico Institute of Mining and Technology in Socorro June 21-26. Each volunteer teams up with a camper from New Mexico or El Paso to enjoy camp activities together, including fishing, boating, swimming, basketball, dances, and more. Volunteers also learn to help campers overcome daily barriers to living with disabilities. Transportation from Albuquerque is provided. For more information, contact John German (3162) on 262-1721. For a volunteer application, call the MDA office on 828-1331. Applicants must be at least 16 years old.

The Albuquerque Chapter of Professional Secretaries International is sponsoring a professional growth seminar, "Strategies for Coping with the Rapidly Changing World of Work: Transcending Your Nervous Breakdown," on Friday, March 27, from 1 to 4:30 p.m. at the UNM Conference Center (1634 University Blvd. NE). Cost is \$39 (includes materials). For information and registration, call 892-6210. Registration deadline is March 20. The seminar is open to everyone (not just secretaries).

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Intrepid Underwater Adventurer**The Double Life of Bob Schmieder:
And You Thought He Was Only a Physicist**

Bob Schmieder (8347) leads a double life.

By day he is a respected physicist at Sandia. But on weekends and vacations, he sheds his street clothes and dons his diving gear to become an intrepid and well-known underwater explorer.

For a long time, Bob enjoyed sport diving as a hobby. But in 1977 he swallowed a diving bug that has remained with him ever since: That's when he learned about an unexplored underwater island named Cordell Bank about 20 miles due west of Pt. Reyes, Calif.

Upon encountering the fascinating biological community on the island in 1978, his life was forever changed. The island became a 14-year "obsession," in his own words, that has culminated in his newly published book, *Ecology of an Underwater Island*.

Moreover, his explorations up and down the Pacific coast have led to the discovery of many rare and even new species of flora and fauna. As a result of his extraordinary work in marine biology, he has had another underwater island near Monterey named for him, as well as two new species — a sponge and an alga.

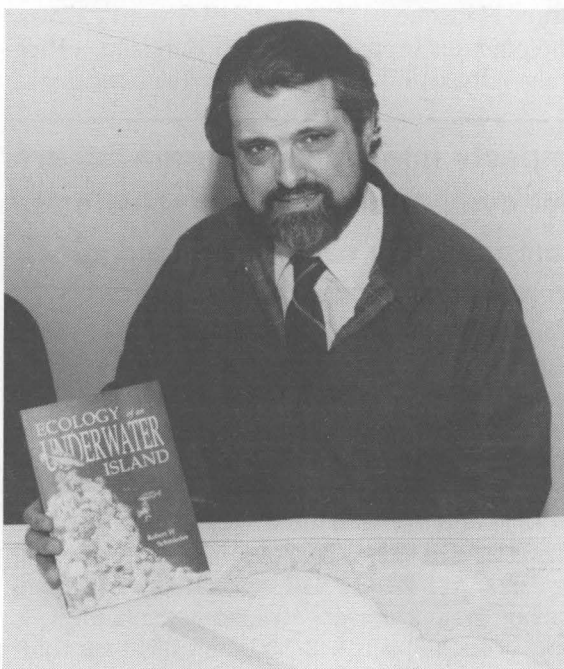
Thriving Underwater Community

Bob and a handful of other diving enthusiasts discovered Cordell Bank to be a thriving underwater biological community. It is extraordinarily lush

"This was a remote place in the ocean where no one had ever set foot. It was a thrill!"

due to several factors — the current, upwelling, clean water with no sediment, hard rock substrate, and shallowness that allows sunlight to penetrate and photosynthesize red algae, providing food for many organisms.

The bank was named after a 19th-century marine surveyor, Edward Cordell, who mapped it for the US Coast and Geodetic Survey in 1869. Shaped like a mountain plateau, the underwater bank rises from the ocean floor to just 240 feet below the surface. Some of the pinnacles reach even farther, stopping 118 feet below the surface.



SANDIA PHYSICIST and underwater explorer Bob Schmieder (8347) displays a copy of his new book next to an oceanic map of the Farallons region where Cordell Bank is located.

Bob notes that in previous oscillations during the Pleistocene Age, the ocean reached a low point (down about 360 feet). Wave action planed the surface of the island at what was then sea level.

On hundreds of dives since 1978, Bob and his colleagues have explored the island's topography and begun cataloging the marine life that inhabits its craggy peaks. Their findings have been carefully recorded by marine biologists.

As their adventures unfolded, Bob founded an organization known as Cordell Expeditions, a non-profit research group that fields expeditions to unexplored oceanic sites off the Pacific coast. He is primarily responsible for having Cordell Bank and 200 square miles of ocean around it declared a Marine Sanctuary by the federal government.

His book is a case study of the bank and its ecology. Sandwiched within its 144 pages are 55 illustrations, many of them color photos taken by Bob and others using underwater cameras. The book's cover is a watercolor rendering of Cordell

Bank by Bob's youngest son, Randy, a senior at UC Santa Cruz.

In the book, Bob notes that Randy's depiction has "captured the spirit and visual impression of a typical scene on the bottom at Cordell Bank, where cover is so dense that not a single spot of bare rock shows. The sponges, crabs, anemones, hydrocoral, hydroids, urchins, snails, worms, and fish shown on the cover are depicted as I saw them during my dives."

Bob Finds Many Places to Explore

Even though Cordell Bank has been an all-consuming attraction to him for more than a decade, Bob has broadened his avocation and found other interesting places to explore. In November 1990 he led a large scientific group to Roca Alijos off the coast of Baja California. This is a spot 200 miles offshore where an ancient volcano thrust some craggy rocks up from 12,000-foot depths to break the surface of the ocean.

The researchers took their boats to three unexplored pinnacles. They used rubber dinghies to land on barren outcroppings and explore the underwater features. They found birds, spiders, and flies, but no plants except for one green alga above the water.

"This was a remote place in the ocean where no one had ever set foot," says Bob. "It was a thrill, a complete mind blower! Four of us scaled the largest rock and found a plateau the size of a living room — the floor was covered with bird
(Continued on Page Six)

**Goods, Karfs Get
Award for Paper**

Steve Goods and Clarence Karfs (both 8314) have been named recipients of the Warren F. Savage Award by the American Welding Society for a paper published in *Welding Journal* in May 1991. Titled "Helium-Induced Weld Cracking in Low Heat Input GMA Weld Overlays," the article discusses the influence of entrapped helium on weldability, comparing two types of welding processes.

The award honors the paper that best represents innovative research resulting in a better understanding of the metallurgical principles related to welding. The award will be presented at the International Welding Exposition 73rd Annual Convention in Chicago March 25.

**SANDIA
LIVERMORE NEWS****Agreement Settles Livermore Labor Issues**

Employment issues raised in a 1991 Department of Labor (DOL) audit at Sandia, Livermore have been settled in an agreement signed by both parties on Feb. 26.

The agreement settles issues raised during a routine review of the Livermore site by DOL's Office of Federal Contract Compliance Programs (OFCCP), the agency responsible for monitoring government contractors' compliance with Affirmative Action requirements. Some issues relate to the Labs' technical compliance with Affirmative Action reporting regulations.

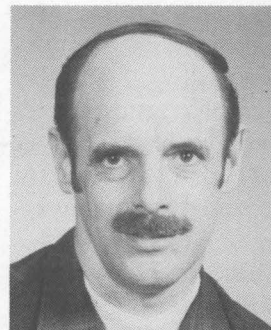
The agreement also accepts Sandia's proposal to hire three minority applicants to resolve OFCCP concerns about hiring practices in one job classification and to hire another minority applicant to resolve an individual complaint.

John Crawford, VP for Livermore Programs and Site Management 8000, says the Labs' management chartered employee teams to study the issues raised in the audit report immediately after it was received in February 1991 and to recommend actions.

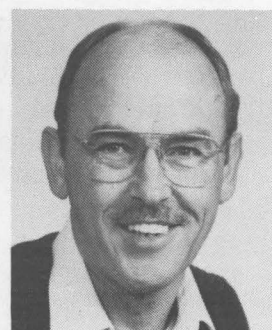
"The teams came back with some excellent recommendations and action plans, many of which are already being implemented," says John. "Sandia is dedicated to practicing the true spirit of equal employment opportunities and to fostering a work environment that is free from discrimination. We recognize the need for continuous improvement, and — with the involvement of our employees — will continue to identify and develop ways to improve Sandia's processes."

**Recent
Retirees**

Shirley Carson
1913 23



Don Swanson
5365 31



Elmer Smith
9332 31

(Continued from Page One)

3-D Holograms

key part of the technique is using a bright laser pulse lasting only a few billionths of a second to expose the holographic film (see "Laser Pulse Makes High-Speed Hologram Possible").

Checking Computer Predictions

Hypervelocity impacts can be simulated by computer — that's an important research area in which Sandia is a leader — but simulations have to be checked against experimental results. A major aim of the pulsed holography development (PHD) project, says project manager Jim Ang of Structural and Solid Mechanics Dept. 1430, is to validate three-dimensional computer simulations of high-speed impacts.

"Conventional imaging techniques — photography and flash X-rays, for example — are two-dimensional," says Jim. "A significant part of the information that a three-dimensional hydrocode

Computers simulate hypervelocity impacts, but simulations have to be checked against experiments.

predicts can't be checked against such 2-D images. Though it's fascinating just to view the holograms, their real utility will be for validating widely used 3-D codes." Besides recording a 3-D image, the new holographic technique offers enough resolution and depth of field to show very small fragments.

The PHD project team also includes deputy

leader Carl Konrad of Experimental Impact Physics Div. 1433; Dave Cox (1433), Randy Hickman, and Scott Gosling (both contractors) at the Shock Thermodynamics Applied Research (STAR) facility, where the impacts are carried out; Bruce Hansche (2752) and Bill Sweatt (2756), photometrics support; and Scott Hareland, a Rice University senior who worked on the optical sys-

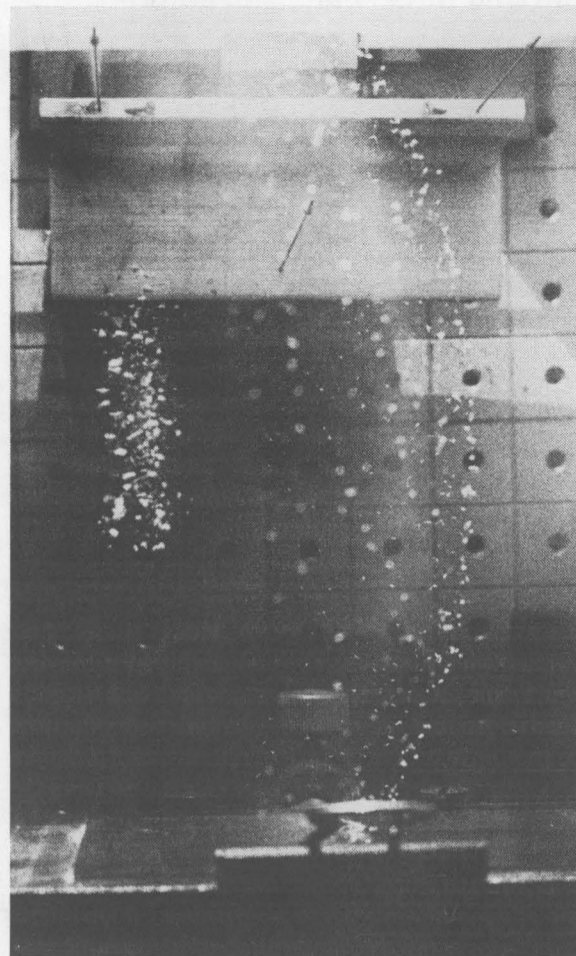
Impacts imaged in a Sandia lab are believed to be the highest-velocity collisions ever captured in holograms.

tem as a summer employee last year and is expected to return this summer.

PHD team members are working with the 3-D Computer Simulations team in Computational Physics Research and Development Div. 1431 and in Computational Physics and Mechanics Div. 1432 to determine the best way to use the holograms for validation. That may involve developing a quantitative data-reduction system for analyzing the holograms, visually comparing the holograms from actual impacts with holograms that are computer-generated from simulations, or both.

In one of the first successful experiments, a quarter-inch steel ball was fired through a 1.6-mm-thick (about 0.06 inch) sheet of acrylic plastic. The steel ball shattered into several hundred fragments. (See photo at right.)

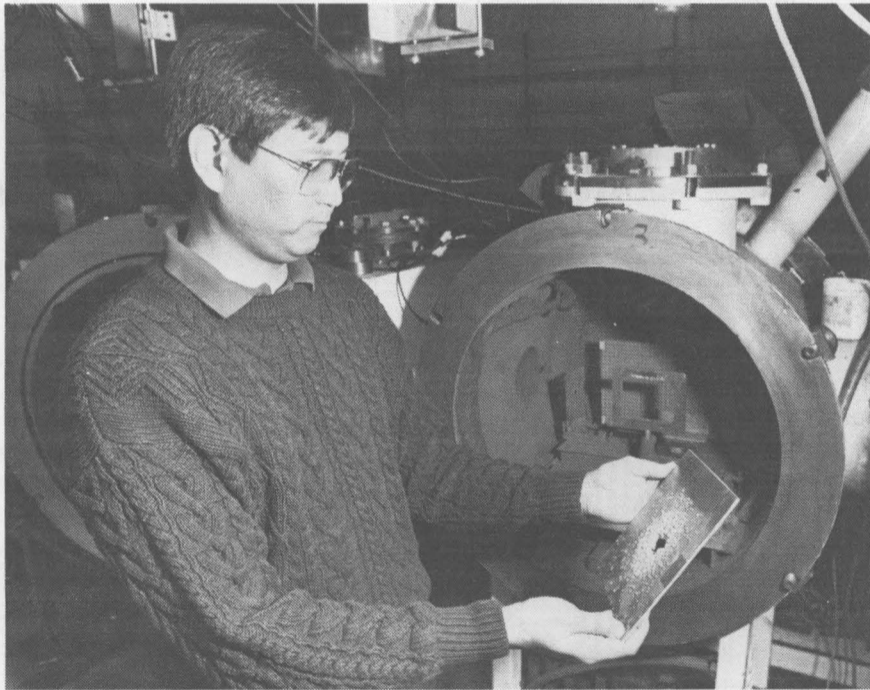
The experiments are carried out with a high-velocity gas gun at the STAR facility. The two-stage gun fires a piston to compress hydrogen gas, which launches a projectile into the test chamber. The gun and test chamber combined are about 45 feet long.



TWO WAVES of impact fragments are seen here, a curved group of acrylic plastic particles spread across the test chamber and a more compact group of fragments from a steel ball that struck an acrylic sheet (out of view at left).

The team is working to obtain holograms with both higher impact velocities and larger fields of view. They have extended their tests to different materials, such as small spheres (about 1/8 to 1/4 inch) of steel, aluminum, copper, or tungsten striking sheets or blocks of acrylic, stainless steel, aluminum, or copper. "Now that we've obtained our first pulsed holograms," says Jim, "we're beginning to build a library of holograms of various impact configurations and materials."

•KFrazier(3161)/CS



JIM ANG (1430A) inspects a "witness plate" that stopped the debris created by the steel-on-steel hypervelocity impact pictured on page one. He's standing by the test chamber (here opened for access), inside of which can be seen the reference grid and a rectangular frame used to hold holographic film.

Laser Pulse Makes High-Speed Hologram Possible

Sandia's Pulsed Holography Development project uses extremely short pulses of light — no more than 5 billionths of a second — from a very bright laser to obtain pulsed holograms of hypervelocity impacts. "What's unique here," says project leader Jim Ang (1430A), "are holographic images of much higher velocity impact events than previously achieved."

Conventional holography generally requires film to be exposed for about a second, or even longer. This usually restricts the method to stationary objects, though holograms of impacts up to 1 kilometer per second had been holographically imaged before the recent Sandia experiments. The 4.5 kilometer-per-second impacts successfully imaged at Sandia push that maximum upward by 450 percent.

To create a hologram of a hypervelocity impact, a pulse of coherent light from a laser is divided into two beams. One beam traverses the field of debris fragments before reaching a sheet of holographic film placed at one side of the test chamber. The second beam, a reference beam, travels directly to the film. The film records interference patterns from the two beams.

The holographic image is reconstructed by illuminating the developed film from the side with another laser. An observer sees a virtual image of the fragments seemingly floating in space behind the film and can view it from different angles. The Sandia test setup includes a reference grid (visible in the photos) that helps determine the relative location of fragments.

Take Note

Economic development and the Free Trade Agreement, ethics in state government, protecting the innocent and the accused in sexual harassment matters, and The Americans with Disabilities Act are the workshop topics in the Third Annual James B. Lewis Institute for Public Policy to be held Friday, March 20, in Albuquerque. Sponsored by the New Mexico chapter of the American Society for Public Administration and other state groups, the day-long institute will be held at the Albuquerque Convention Center. The registration fee, covering four workshops, a luncheon, and a reception is \$25 through March 16; individuals registering after that date will pay \$35. For additional information, call Vangie Samora on 277-2965.

Retiring and not shown in LAB NEWS photos: John Lloyd (5167).

Sympathy

To Tony Jojola (2473) and Judy Galvan (3703) on the death of his wife and her mother in Isleta Pueblo, Jan. 23.

To Fred Perea (7818) on the death of his mother-in-law in Albuquerque, Feb. 18.

To Alfred Foster (9123) on the death of his wife in Albuquerque, Feb. 19.

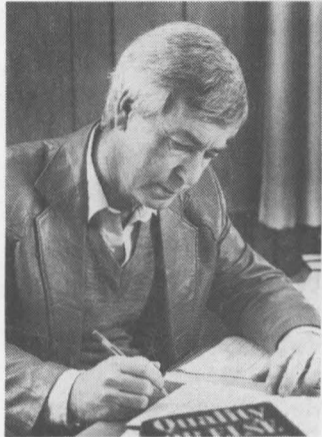


(Continued from Page One)

Quality Award

our progress as to whether we're getting better in our ability to satisfy our customers. Third, it's important to AT&T, and we want to be a valued and contributing member of the AT&T family."

The CQA focuses on three things. In the first place, it requires numerically measured positive trends of increasing customer satisfaction for a minimum of three years. This is determined



CHARLES TAPP (4300)

through surveys, telephone interviews, repeat business, and other interaction with customers.

"We as a lab are changing from where we had one captive customer," says Charles, "from where we were entitled to a certain amount of money per year, to a mode where there will not

be a single dollar coming into this company that doesn't come from people who believe they will get the best value for that dollar by giving it to us rather than by going somewhere else."

The second thing the CQA requires is proof that the increase in customer satisfaction isn't accidental — for example, it isn't because a company's competitors fell off the face of the Earth, but is the result of processes that an organization has identified, has control over, and is continuously improving.

World-Class Processes

Finally, the CQA requires a company to show that its processes are world-class.

For example, when Xerox's Business Products and Systems Group in Rochester, N.Y., won the Malcolm Baldrige Award in 1989, the company determined that one of its most critical processes was the ability to take and fill orders accurately. After studying companies throughout the world, company analysts decided that L.L. Bean, the catalog order company, was the world's best. Xerox then benchmarked its process against that of L.L. Bean to win the award.

"If we wish to be a national laboratory, what

Long Way to Go, But Off to a Good Start

Although it takes at least three years of continuous improvement to win honors in the AT&T Chairman's Quality Award (CQA) competition, Labs managers believe Sandia is off to a pretty good start.

Executive Vice President Orval Jones (20), who is in charge of Customer Satisfaction, by far the largest category in the overall rating (worth 300 points out of 1,000), predicts that Sandia's application will become its most powerful tool for continuous improvement.

"As my team and I have engaged in assembling and writing Section 7 of Sandia's application," says Orval, "we've all become excited and enthusiastic about what a powerful tool the preparation process is in evaluating our overall performance and identifying deficiencies. The sections of the CQA application cover every aspect of our work and provide an overarching integration and evaluation for everything we do."

Goal Is Continuous Improvement

After Sandia's application for the CQA has been evaluated, the author of each category will make recommendations for improvement, notes Roger Hagenruber, Vice President for Defense Programs 5000. Roger is writing the leadership part of the application.

"I'm writing it to try to put the best face on Sandia. That is what is expected in this process. However, another outcome of it is you become aware of all the things you didn't say, all the things you wish you could have said — what was missing." Those are the things that will become part of his recommen-

dation for improvement.

Continuous improvement, not winning an award, is the ultimate goal, he adds.

Some of the questions asked in the area of leadership are: Does the chief executive officer show leadership in setting the standards and goals for quality and continued improvement? Do senior managers of the Labs get involved? Do they have a process in place that ensures that they talk about improving? Does Sandia show leadership in the community?

"There's no doubt that Al Narath has personally put quality at the top," says Roger. "He has established and chairs a Quality Council that meets regularly. He has appointed a Quality Director and a directorate that works with Sandia and with outside organizations. Sandia has helped train suppliers and DOE people; that, too, is an indication of leadership. In ES&H, we work with the city and state to establish standards of performance and to be a good neighbor."

Sandia still needs to improve its self-appraisal processes, notes Roger, and to continue pursuing some new initiatives, such as customer involvement and focus at the annual Sandia leadership conference.

"I don't believe that initially we'll get the marks we want in leadership, but we've made a lot of good starts and we'll get some credit for our effort. Our many years of nuclear weapon quality processes will also get good marks. I think we're off to a pretty good start and have identified lots of opportunities for additional leadership initiative and improvement."

standard is acceptable for this laboratory other than world class?" asks Charles.

Sandia is now in the process of internally scoring its first companywide application for the Chairman's Quality Award. The process is confidential, and it will ultimately be up to President Al Narath to decide how to communicate the outcome to employees.

Following the internal scoring, a formal application will be submitted to AT&T June 1, says Charles. Examiners who do the scoring have been specially trained by AT&T. Both Charles and Paul Longmire (5407), formerly Manager of Corporate Quality Department 4310, have been certified as

well, and have participated in scoring applications from other AT&T business units.

The application addresses seven categories, each of which is the responsibility of one of Sandia's vice presidents. The seven categories and the individuals who are primarily responsible for the application for each are: Leadership — Roger Hagenruber (5000); Information and Analysis — Paul Stanford (100); Strategic Quality Planning — Dan Hartley (6000); Human Resource Utilization — Lee Bray (30); Quality Assurance of Products & Services — Paul Robinson (4000); Quality Results — Gerry Yonas (9000); and Customer Satisfaction — Orval Jones (20). ●LD

Purchasing Is First to Adopt the Baldrige Approach

One organization at Sandia, Albuquerque has already undergone a self-assessment under the Malcolm Baldrige National Quality Award criteria — Purchasing & Materials Management 3700, headed by Director Bob Zaeh. (Sandia's Livermore facility is now also using the process for continuous improvement.)

Certified examiners from AT&T considered the directorate's score of 304 out of a possible 1,000 as "favorable for a first-time applicant."

The process got under way in 1990, when Bob asked for volunteers to head each of the seven categories in the application, explains Quality Coordinator Leon Sikora (3746). Called "champions," these category leaders formed subcommittees to prepare the application, which was submitted to AT&T last May.

The process forced Purchasing to evaluate itself as an independent service company rather than as a function within a business, adds Leon. The three areas now targeted for improvement as a result of the assessment are data analysis, procurement cycle time reduction, and personnel development.

Data analysis is management based on fact, on actual measurements of performance. "The

Baldrige criteria require comparisons between yourself and your competitors and the development of metrics for measuring improvement," notes Leon.

Cycle time reduction is improved efficiency, or the length of time it takes to complete a service. "For us, that means constantly reducing the time it takes to process procurements, or the time from receiving a purchase requisition to placing a contract to completing a contract," says Leon.

Important to Measure Improvement

In this area, Purchasing has reduced purchase requisition processing time in half, from four days to two days. Another positive result is that by reducing paperwork and approval channels, the directorate has been able to cut in half the time it takes to process a portion of the contract closeout procedure after the work covered by a contract is completed, from one month to two weeks. This results in quicker return of leftover funds to line organizations.

Personnel development includes such things as training programs, rewards and recognition programs, and team and committee work.

This is also an area where Directorate 3700

has already achieved some impressive results, he adds. Employee involvement on teams and committees has increased 69 percent over the last three years.

A number of quality teams within Purchasing are now applying Process Quality Management & Improvement (PQMI) techniques to improve internal and external customer satisfaction and operating efficiency, says Leon. One of the things the directorate hopes to accomplish is to develop a more accurate means of measuring the quality performance of suppliers.

Some of the things Purchasing received high marks for include publishing an operating strategies handbook that outlines the directorate's mission and the responsibilities of employees and managers; publishing an informative customer newsletter every two months about purchasing services and quality improvement activities; maintaining an active Quality Council; having a full-time directorate quality consultant (that's Leon); and having an internal quarterly customer service award.

By 1993, when the next self-assessment is scheduled, employees in Purchasing hope to improve their score by 50 percent.

Give Team Members Your Suggestions

Union Representatives and Managers Will Jointly Revise Performance Appraisal System

Between now and June, represented employees in Albuquerque will have an opportunity to help revise their performance review system, say project leaders Terri Giron-Gordon and Mark James (both 3551).

Representatives of management and the three unions at Sandia will work together on the Performance Appraisal Project.

Union employees make up about one-fifth of Sandia's workforce. Various focus groups have indicated that managers and employees aren't satisfied with the existing performance appraisal system. Sandia agreed to put together a team to design a new system based on input from union and management representatives as well as comparisons with the practices of other companies.

Team members will design a new system by June and implement it by December, after managers and employees are trained in using it, says Mark.

Jay Sanchez (3560) says he is excited about this joint labor-management project that is long overdue and views it as an opportunity to apply

quality principles to a process that impacts every represented employee. Dick Shepardson (3550), who manages the performance appraisal function at Sandia, endorses the concept that employees should have a voice in a system that affects them.

Several Concerns Cited

Among the concerns cited by the design team are perceptions that the existing performance evaluation system is too subjective; that it does not reflect desired corporate values like teamwork or risk-taking; that it does not gauge or foster employee development; that it can be demotivating. Moreover, all union employees are judged by the same eight general criteria, defined somewhat differently, even though those criteria may not always apply to each individual's job.

Another key area of concern is a policy that imposes a limit on the number of people who are eligible to receive excellent or very good ratings.

"We think more than 5 percent of our people merited an excellent rating last year," says Harold Garcia (3435), a security supervisor on one of the

teams, "but we were limited to that percentage."

Bill McLendon (3141), president of the Office & Professional Employees International Union (OPEIU) Local 251, says he would like to consider having the evaluation system linked to Individual Performance Awards — cash awards given on the basis of performance.

"We hope that what will come out of this is a performance evaluation system that will evaluate employee performance fairly," he says.

Employees and managers are invited to provide input into the process by contacting team members with their suggestions, says Terri.

Team members representing the International Guards Union of America include union members Carol Bonney, Lorri Kaiser, and J.L. Torres, and management members Harold Garcia, Shane Murray, and Mike Benavidez (all 3435).

Representing the Metal Trades Council are union members Paul Gabaldon (2471), Dave Leyva (2482), and Joe Perez (3423), and management members Jerry Gallegos (7813), Gary Graham (2482), and Reynold Tamashiro (2411).

Representing the Office & Professional Employees International Union are union members Tim Ashby (7844), Bill McLendon (3141), and Mary Ann Mitchell-Carr (3128), and management members Jerry Esch (3150), David Palmer (3727), and Wayne Potter (152). ●LD

TEAMWORK — Mary Ann Mitchell-Carr (left, 3128) and Lorri Kaiser (3435) exchange ideas for improving performance evaluations of represented employees. Members of the Performance Appraisal Project team will design a new system by June and implement it by December, after managers and employees are trained in using it.



(Continued from Page Three)

Double Life

droppings and crushed rock. Underwater, our team collected samples of marine life, plants, and animals, which are now being examined to determine what rare and even new species exist there."

What about that other underwater island that has been named Schmiieder Bank? Bob and others found it on a map and went there several times from 1987 to 1989, exploring its features as no one had before. It is very similar in physical characteristics to Cordell Bank, but lies three miles offshore from St. Sur, which is 25 miles south of Monterey.

They collected considerable amounts of marine life. As a result of Bob's continued work, a scientist for the National Oceanic and Atmospheric Administration and two others proposed the name, which was then approved by the US Board of Geographic Names. Bob has also been honored by marine biologists by having a new species of sponge, *Erylus schmiiederi*, and a new species of alga, *Codium schmiiederi*, named after him.

All this only whets Bob's appetite for more adventure. Future plans include exploring a series of small islands off the southern tip of Baja California known as Revilla Ggedos, and a submerged bank farther south off Clipperton Island call Shimada Bank.

To assist in these endeavors, his group has acquired a diesel-powered, 42-foot converted fishing boat called the Cordell Explorer that they use for many of their trips. They also lead groups of Berkeley schoolchildren on day trips to the Farallon Islands, and provide charters for special projects, such as a documentary on elephant seals near the Farallons that aired a few days ago on public television.

Copies of the paperback edition of Bob's book about Cordell Bank are available in the Sandia, Livermore Library or from Bob. All profits from the sale of the book go to Cordell Expeditions for marine research. He has also written a biography of Edward Cordell that is scheduled to be published later this year. ●BLS

Sandia News Briefs

Radar and Avionics Systems Could Benefit from Sandia Development

Researchers in the Labs' Hybrid Microcircuit Div. 2411 have developed new methods for making high-performance microwave circuits on a soft, flexible substrate — techniques that could prove valuable for synthetic aperture radar (SAR) systems, avionics electronics, and other systems that need large, high-precision hybrid circuits. Developed primarily for special SAR applications, the techniques are used to make circuits that are up to three times larger than normal hybrid circuits to accommodate more functions than are found in other SAR systems.

Project engineer David Norwood (2411) says the new methods have allowed Sandia researchers to pattern and etch circuit conductors with 1/4-mil tolerances and line widths as narrow as 2 mils (a mil is a thousandth of an inch). Features can be machined into the soft substrate with 1-mil accuracies.

SAR is commonly used for reconnaissance and remote sensing. An SAR system produces higher resolution images of objects than standard radar in either daylight or darkness and in all types of weather.

Sandia Computer Code Helping Wind Turbine Operators

A computer code that predicts the useful lifetimes of wind turbine components has been developed by Sandians in Wind Energy Research Div. 6225. The code, called LIFE2, can also be used to develop inspection intervals for turbine components, says Herb Sutherland, who along with Larry Schluter wrote the latest version of the code. The original code was written by Herb, Tom Ashwill, and Kathy Naassan. All authors except Naassan (a UNM student at the time) are members of Division 6225.

The improved version has been issued to about 10 US firms for evaluation. The code is used during design analysis to forecast a turbine's lifetime for both engineering and marketing purposes, and again once the turbine is installed to verify that the design analysis was accurate.

Sandia has prime responsibility for DOE's Vertical Axis Wind Turbine (VAWT) program and operates the VAWT Test Bed near Amarillo, Tex.

Send potential Sandia News Briefs to Editor, Div. 3162.



Fun & Games

Golf — The Sandia Golf Association will hold a membership drive/golf tournament open to all Sandia employees at Los Altos Golf Course on Saturday, March 21. The last tee time is at noon. There will be no tournament fees for this event. Green fees are \$11.05; carts are optional. Format is a four-person scramble. Form your own team or sign up as individuals to be placed on a team. No official handicaps are required. All prizes will be awarded through a draw. Contact Mike Winder at the Coronado Club on 4-8486 to sign up. All entries are due by noon on March 12.

Bowling — SANDOE Bowling Association December Bowlers-of-the-Month: Scratch — Ron Husa (2314), 635; and Margaret Tibbetts, 627; Handicap — Dick Radtke, 628 and 706; and Rena Yellowrobe (6423), 543 and 663. January Bowlers-of-the-Month: Scratch — Jerry Long (ret.), 574; and Cheryll Barton, 668; Handicap — Fred Gunckel (2543), 572 and 608; and Mildred Smith (2831), 606 and 711.

Winners of the Five-Person Team No-Tap Tournament held Jan. 18 and 19 at Fiesta Lanes were Pat (DOE) and Dominic Bellino, Dorothy Castro (DOE), Diana Dobias (6301), and Dee Schumpert (DOE) with a 3511 team series. Second place went to Glenn Folkins (ret.), Tom Lutz (6428), Ernie Montoya (2411), and Tony (2412) and Linda Montoya with a 3454 team series.

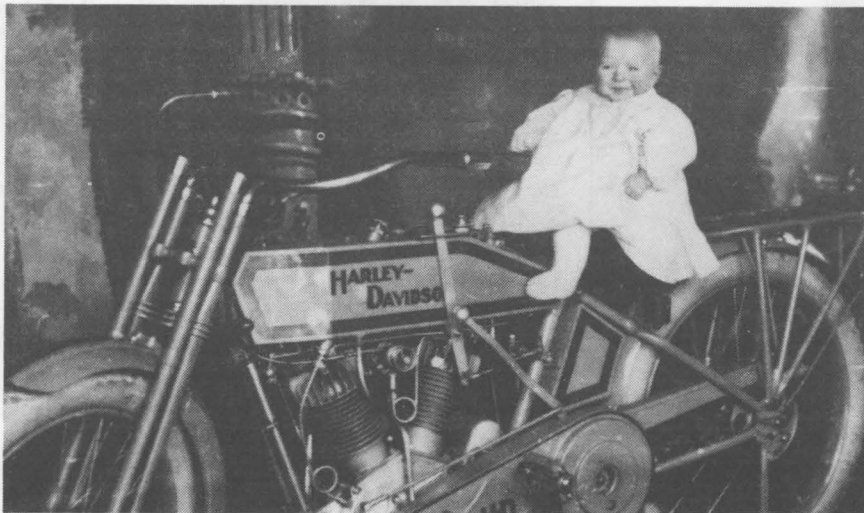
Winners of the Four-Game Mixer Tournament held Feb. 1 and 2 at Holiday Bowl were Ernie and Ella Haralson with a 1502 combined series. Second-place winners were Steve Garcia and Steve Perez with a 1480 series.

The Association sends special congratulations to Ron van Theemsche (2851), who rolled a sanctioned "300" game (714 series) in the Sandia Major League at Fiesta Lanes on Feb. 11.

Walking — The Super Cities Walk will take place across the country on Sunday, April 5, to raise money for the fight against multiple sclerosis. The 15-kilometer Albuquerque route begins at 9 a.m. (check-in is at 8) at UNM's Johnson Field and goes through the campus past Historical Register buildings to Old Town, Tingley Beach, and the Rio Grande Zoo. Everyone raising \$50 or more will win a T-shirt plus other prizes. The grand prize is a trip for two on TWA to any domestic destination, including San Juan and Hawaii. For more information, contact the Multiple Sclerosis Society on 842-6767. Brochures containing registration and pledge forms are available in the LAB NEWS Office in Bldg. 814.

New Baby, New Bike

Retiree Harley Davidson Moody Was Born to Ride . . . for a While



FAVORITE OLD PHOTO — Harley Davidson Moody perches on his father's new 1915 Harley-Davidson. As Harley's name indicates, his father was a motorcycle enthusiast — until a close call on a crowded road caused him to give up riding.

Editor's Note: The photo above came to us as a "favorite old photo" submission, but the contributor had so many good anecdotes we hesitated to reduce his story to a mere photo caption. Here are his words, paraphrased in some places:

I have photos of my father and mother riding motorcycles, but the one I treasure most is this photo of me on top of my father's new 1915 Harley-Davidson. That's because my birth certificate reads "Harley Davidson Moody, born Sept. 23, 1914; father, motorcycle repair man."

My father began modifying (non-factory customizing) Harley-Davidsons long before the bob-jobs and choppers of the 1950s. When I was very young, he built a Harley-Davidson sleigh for winter riding. It had lugs on the rear wheel for digging into the snow and ice, wide runners in place of the front and sidecar wheels, and controls that extended into the covered sidecar where the driver sat. You can imagine that machine coming at you with no one sitting on the cycle's seat. It caused a bit of concern in the little town of Glenco, Minn.

Harley-Powered Handcar

Another of his modifications was a railroad handcar powered by a Harley-Davidson engine. This worked well and was a lot of fun until the railroad company asked my father to stay off the tracks, even on Sunday when the trains weren't running.

When I was five, my father moved us from Glenco to Riverside, Calif. Shortly after, the whole family toured California on a motorcycle. My oldest brother rode in the seat behind Dad; my mother, my other brother, and I all rode in an extra-wide sidecar. Near Signal Hill, Long Beach,

we got caught in heavy traffic and came so close to an accident my father's leather legging was torn. That night, my father made a proclamation: "We no longer ride motorcycles." He sold his Harley-Davidson dealership and repair shop and went to work as a printing compositor.

I rode motorcycles some in the 1930s and '40s. In the '60s I got a chance to ride mopeds on a Sandia field test assignment in Bermuda, where the speed limit is 25 mph and the cars are small and few. But I never loved motorcycling the way my father did. Like him, I decided it was safer not to ride.

— Harley Davidson Moody, retiree

Take Note

The Cystic Fibrosis Foundation will sponsor its annual Pit Climb fund-raiser at the UNM Pit on Saturday, March 21. Participants raise money by securing pledges for the number of laps run around the Pit or the number of times they climb the Pit stairs. Substantial progress has been made in recent years toward a cure for cystic fibrosis. For more information, contact Tim Wheeler (6321) on 5-9540.

Sandia Laboratory Federal Credit Union is offering a series of free seminars about tax preparation at Credit Union Center (Juan Tabo & Comanche), first floor meeting room. "Basic Tax Concepts" will be presented Saturday, March 7, from 10 a.m. to noon. "Complex Tax Returns" will be Monday, March 9, from 6:30 to 8:30 p.m. and Saturday, March 21, from 10 a.m. to noon. Call 293-0500, ext. 303, for reservations.



THEY ONLY LOOK NEW — Sandia's electric vehicles got new paint jobs recently to replace old paint and to improve their visibility. Dick Bassett, who has been monitoring and documenting the fleet's performance for eight years, is seen here with the vehicles. (Dick is retired from the Labs, but is now a consultant to Div. 2525.) Before, the vehicles were painted various colors, and it was not obvious that the vehicles were part of a Sandia fleet, he says. In addition, new electronic controllers were installed recently that make the vehicles silent, responsive, and

more efficient, says Dick. The 11 modified Ford Escorts — white with the words "electric" painted in blue — are driven by various Labs organizations as utility vehicles. Most of them were obtained in 1981 as part of a feasibility study. More advanced electric vehicles are being developed now, but the modified Escorts continue to be useful for short trips around the Labs. The vehicles, which have a range of 30 to 40 miles and top speeds of 65 mph, have totaled 100,000 miles during the last eight years.

feed **back**

Q: Recently a high-level AT&T executive spoke to Sandians in the Technology Transfer Center about the need for culture change in the workplace in order to survive. One interesting point he made was that the commitment to culture change by upper management must be visible to the staff for it to occur throughout an organization. He said he intended to accomplish that by eliminating larger management offices and placing his leaders among the staff. This enhances the leader-vs.-manager image and provides for simplified relocation of middle managers without the delay caused by searching for a new executive office. It also means promotions will not have the negative impact of taking space from staff activities. Why can't we embrace this innovative culture change message?

A: This is one of many issues that will be addressed by the Sandia Management Council in due course in connection with the ongoing restructure activities. I would be interested in knowing how AT&T proposes doing this and what levels of management will be affected. Please drop me a line.

Al Narath (1)

Q: On the subject of Sandia's future, John Crawford (8000) admits our weapons budget will be cut substantially. When asked recently if this implied a reduction in the work force, he answered with an emphatic, "No, why should it?" It seems to me that if far fewer weapons are being developed at Sandia, our budget (particularly FY93) will reflect this, and without a miraculous surge in money from other sources, we can't afford to maintain our current size.

If I'm correct, why is Mr. Crawford denying the possibility? Does he not realize that sudden, unannounced layoffs can be devastating to one's private life? At other large companies, such as Boeing, when budget cuts are imminent, notices are published indicating that layoffs are possible. These notices are followed by private consultation with one's supervisor to discuss future options. My understanding of the layoffs Sandia experienced in the 1970s was that management denied the possibility right up to the layoffs. Since Sandia takes great pride in its employees, I believe we deserve to be treated like professionals rather than blindsided. Some realistic statement must be made soon.

A: Your question is asked often and is difficult to answer, so I always try to be very careful how I respond. I believe what I have said in past responses to your question is that yes, we expect a downward trend to continue in the weapons R&D budget and we are working very hard to increase our funding in other areas. We do not know what the net result will be for FY93 and beyond, but we will continue to make every effort to fully support our staff. No layoffs are planned at present, but there are no guarantees in such a rapidly changing world. I apologize if I gave an unsatisfactory response to your question when you asked it; I hope this written response more clearly states what I know and don't know.

John Crawford (8000)

Q: I have been informed that motorcycles are prohibited inside all Sandia technical areas, including Tech Area 3. I would like to know the reason for this policy, in light of the fact that motorcycles seem to be the only vehicles that are prohibited. Personal cars, government vehicles, large trucks, heavy equipment, forklifts, four-wheeled all-terrain vehicles (ATVs), and bicycles are allowed. As full face helmets are required for motorcyclists but not for bicyclists or ATV operators, it would seem that motorcycle operation is safer than either of the other two.

Because of this policy, I am required to park

Got a Question or Suggestion?

Employees who have suggestions for improvements at Sandia or who need quick answers to Feedback questions are encouraged to telefax their suggestions/questions to the Employee Communications Div. 3162 at 844-0645. For additional information about how the system works, call Janet Carpenter (3162) on 844-7841. She can also provide printed Feedback forms if you cannot locate one where they are stocked in common areas throughout the Labs.

my motorcycle outside the gate and walk about a mile to my office. If I walk on the road, I am a safety hazard to vehicles and they are a safety hazard to me. If I walk on the dirt beside the road, uneven surfaces are a safety hazard. If I drive a car or truck, I can park directly outside my office, eliminating 30 minutes to an hour of walking time. Can this policy be amended? If not, can sidewalks be constructed or electric carts provided?

A: Until your inquiry, the subject of motorcycle access to Area 3 had never been addressed. We contacted the Sandia Traffic Safety Committee, which decided Feb. 4 to allow motorcycles in Tech Area 3 under the following conditions: Motorcycles may be used only for personal transportation between the main entrance gate and the individual's work location; they may not be used for other transportation.

In addition, operators of vehicles on Sandia-controlled property must comply with all state laws as well as any more stringent requirements imposed by Kirtland Air Force Base or Sandia.

Examples of special requirements for motorcyclists include: All motorcycle operators must wear an approved safety helmet that meets the standards of the Snell Memorial Foundation, American Standards Institute, or Department of Transportation; all motorcycle operators must wear impact-resistant goggles or full-face shields; all motorcycle operators must wear shoes or boots, together with full leg covering; passengers are prohibited; packages must be secured in such a manner as not to interfere with safe operation of the vehicle; parking is approved in designated areas only; smoking is prohibited while riding on motorcycles; handlebars may not be higher than 15 inches above the level of the seat; the motorcycle must be able to make a 90-degree turn in less than 14 feet; and motorcycles must have two rear-view mirrors, one on each handlebar.

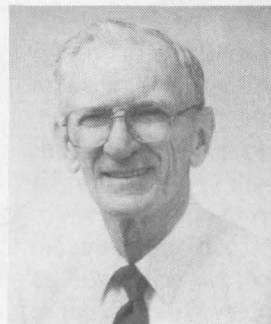
Jim Martin (3400)

Q: Work with the base to install traffic signals at intersections along O Street and Eubank Boulevard south of Tech Area 1 that would function during rush hour. Try to reduce the morning traffic backup. The base should be able to use some of the excess street lamps replaced during recent upgrades.

A: Kirtland recently replaced several signal lights with newer systems, but it was not cost-effective to install any of the old lights at other locations. The units have been scrapped or saved for parts. However, planned O Street improvements include signal lights at major intersections, such as the one at 14th Street. These improvements should reduce the morning and evening rush hour backup on O Street between the Eubank gate and 9th Street. Facilities Directorate 7800 will continue to work with Kirtland on site improvements that include road designs and traffic signals at appropriate intersections.

Jim Jacobs (7800)

Recent Retirees



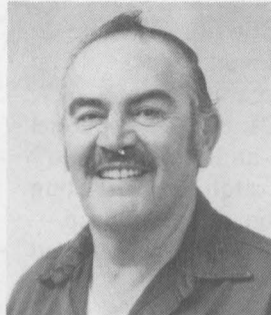
Chuck Kyger
9213

35



Jennie Scales
2851

15



Esquipula Narvaez
3425

26



Pete Hernandez
2722

38



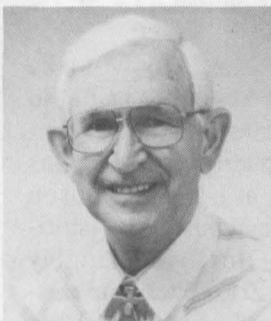
Stan Yager
2715

27



Charles Stillwell
6224

38



Bruce Ercole
5143

35



Palmer Landis
2855

35

Take Note

The YWCA 11th annual Easter Egg Hunt will be held Saturday, April 18, at the YWCA Piñon Canyon Center in Tijeras to raise scholarship money for summer day camp for families who cannot afford to send their children to camp. Festivities include the egg hunt, entertainment, face painting, clowns, and more. Four hunts will be held, the first beginning at 10:30 a.m. Children of all ages may participate (young and small children are given a head start). Parking will be available at Roosevelt and A. Montoya schools in Tijeras, and shuttle bus service to the Center will be available continuously beginning at 10 a.m. Cost is \$1 per person (adults and children). Call the YWCA on 822-9922 for more information.

Congratulations

To Christine and Dennis (2485) Clingan, a daughter, Kasey Danielle, Dec. 29.

To Loretta and Michael (2485) Saavedra, a daughter, Ashley Marie, Jan. 27.

To Sheryl Hingorani (6601) and Randy Watkins (6611), married in Albuquerque, Feb. 21.



Sandia News Briefs

Sandia Helps State Help Small Businesses

Thanks to a new program coordinated by the State of New Mexico, small businesses can now get the help they need for solving technology-related problems. The program, called the State Technology Assistance Resource System (STARS), refers small businesses in need of technology assistance to technical organizations such as Sandia.

"We want to help New Mexico businesses become more competitive by providing the most appropriate, cost-effective assistance possible," says Marsha Oldakowski of the state's Technology Enterprise Division. "We don't want to provide high-tech solutions for low-tech problems." The program will draw resources from a nationwide commercial data base of more than 1,000 technical experts and vendors.

Sandia is participating in the program along with several other educational, government, and corporate organizations in New Mexico. Mark Allen of Technology Transfer Applications Div. 4212 says STARS will help make Sandia's Technology-Based Regional Economic Development (TRED) program — an existing program aimed at providing Labs technical assistance to small- and medium-sized businesses — more accessible.

Researchers Study Effectiveness of Desert Landfill Capping

Research by Carol Stein of Geochemistry Div. 6233 and David McTigue of Computational Fluid Dynamics Div. 1511 has confirmed the effectiveness of capping hazardous waste landfills to prevent downward leaching of contaminants, even in desert-like environments.

Researchers had initially been concerned that in arid environments, dry soil underneath a landfill cap might act as a sponge, drawing water into the landfill from adjacent, wetter soils and allowing hazardous, water-soluble materials to leach into groundwater supplies. In wetter climates, they say, smaller differences in moisture content between adjacent soils would likely minimize such lateral movement of soil moisture.

The Sandia experiments, conducted over a 1-1/2-year period, show that liquid water in the upper few meters of soil probably moves very slowly in dry conditions, while water vapor moves more quickly. The researchers conclude that capping landfills probably prevents most contaminants from leaching downward, but that water vapor movement warrants further study. "For the most part, what we've found is reassuring," says David. "However, vapor movement could be a problem under some conditions."

Harrison and Harvey Earn Compensation Certifications

Carol Harrison of Facilities Org. 7800 and Margaret Harvey of Compensation Planning Div. 3552 recently earned the designation of Certified Compensation Professional (CCP) from the American Compensation Association (ACA).

The ACA is a non-profit organization of professionals who design, implement, or manage employee compensation and benefits programs. To earn the CCP designations, Carol and Margaret passed a battery of written exams. Three other Sandians are also CCPs: Ed Hathaway (8522), Ami Peterson (3552), and John Ledwith (4302).

The ACA has approximately 14,000 members in the United States and Canada.

Sandians Help Mooooove Solar Technology to the Ranch

Sandia's Solar Thermal Design Assistance Center and Technology-Based Regional Economic Development (TRED) program are teaming with New Mexico cattle ranchers and a solar company to solve a common winter ranching problem — frozen livestock water troughs.

TRED program manager Mark Allen (4212) says the groups, together with the New Mexico State University (NMSU) Cooperative Extension Service, are testing various solar energy systems that could keep the troughs from freezing. On many ranches, electric heaters are not feasible because the watering holes are located far from power lines and do not warrant costly hookups, and some ranchers must drive long distances to break the ice so livestock can get water. Several systems are being tested by a Wagon Mound rancher to determine which works best. One of the systems was designed by Earl Rush (6215). John Anderson (6217) is lead engineer for the field tests.

A report will be published by NMSU and made available to other ranchers, and AAA Solar Service and Supply plans to market a system that will incorporate features proven to work well in the tests.

"The beauty of the program is that the groups involved leverage their resources and achieve something that none could achieve on its own," says Dave Menicucci (6217), Solar Thermal Design Assistance Center manager.

Send potential Sandia News Briefs to Editor, Div. 3162.

Local United Way Monitors National Controversy

Recent reports about the resignation of the national president of the United Way of America, following news accounts of his high salary and lavish life style, have become cause for concern among local United Way agencies, including the United Way of Greater Albuquerque.

The publicity could hurt donations, if donors don't understand that the national organization is a separate corporation with no direct control over local United Ways, says Melodie Owen Eyster (140), chair of Sandia's 1992 Employee Contribution Plan (ECP) campaign that will be held later this year. Through the 1991 ECP campaign, Sandians in Albuquerque pledged more than \$1.5 million to local health and human services organizations. That represents more than 20 percent of the local United Way's total pledge.

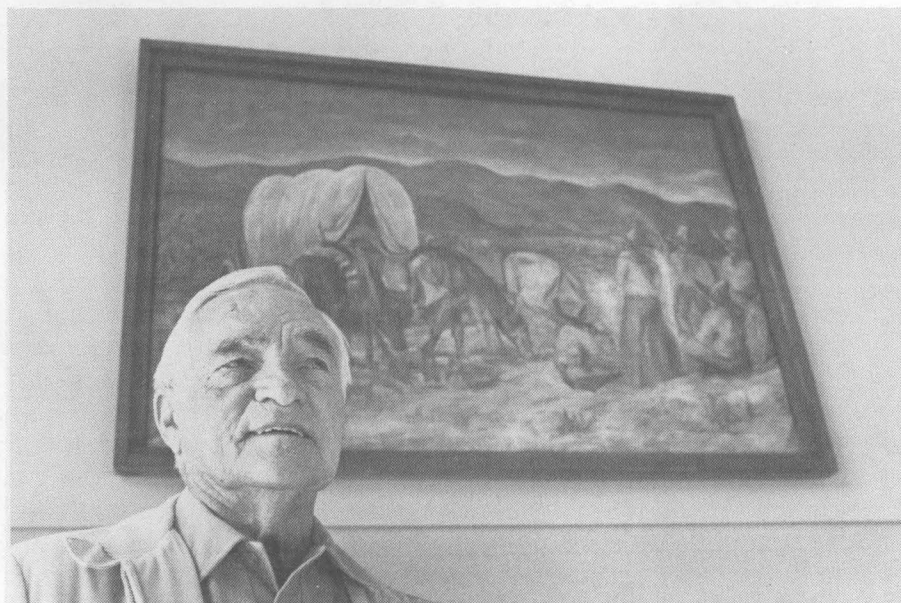
Last year, Albuquerque's United Way gave \$60,000 in support of United Way of America's \$29 million budget. In exchange, the local organization got marketing and materials support, personnel training, and association with other valuable national programs. This association, through a program called Gifts in Kind, resulted in distribution of more than \$200,000 in gifts to non-profit organizations in New Mexico during 1991.

Albuquerque's United Way will give 88 percent of the \$7.43 million it expects to raise this year to local programs, which help people living in the three-county Albuquerque area. The 12-percent administrative costs at Albuquerque's United Way compare with a 25-percent maximum for administrative costs suggested nationally.

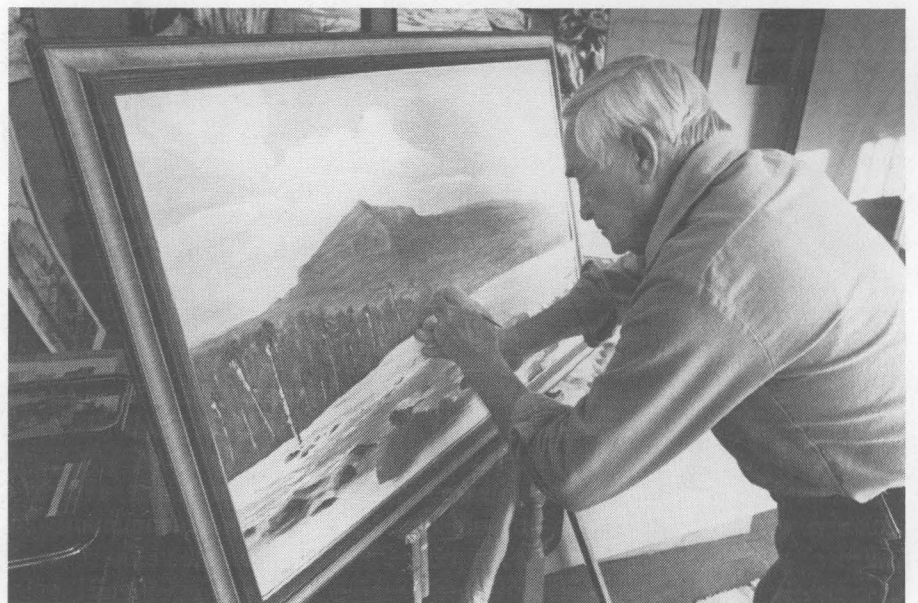
The local organization is watching the national situation closely as an independent investigation of allegations proceeds. Results, expected by April 6, will provide the local board with some basis for decisions about future relations with the national group. ●

Retiree Deaths

Robert Patton (84)	Jan. 2
James Williams (74)	Jan. 7
Joseph Gonzales (66)	Jan. 9
Walter Scott (80)	Jan. 9
Clara Kopp (79)	Jan. 16
Wallace Hansen (71)	Jan. 17
Charles Champe (68)	Jan. 19
Marjorie Ready (84)	Jan. 22
John Cantwell (53)	Jan. 24
Harry Aiken (81)	Jan. 25
Charles Rettinger (88)	Jan. 26



QUALITY CONTROL AND ARTWORK — George Shelton retired from Sandia's Quality Control organization in 1970, but says he's still using quality control principles for restoring artwork. Seen above, George is standing in front of one of the four Carl Van Hassler paintings that he recently restored. The paintings are on



loan to the Albuquerque Convention Center. In the other photo, George spruces up one of his own paintings. He's been restoring artwork since he was 15 years old. George is also known for painting landscapes using only catsup and mustard, a concept he developed and demonstrates to elementary school students.

MILEPOSTS

LAB NEWS

March 1992



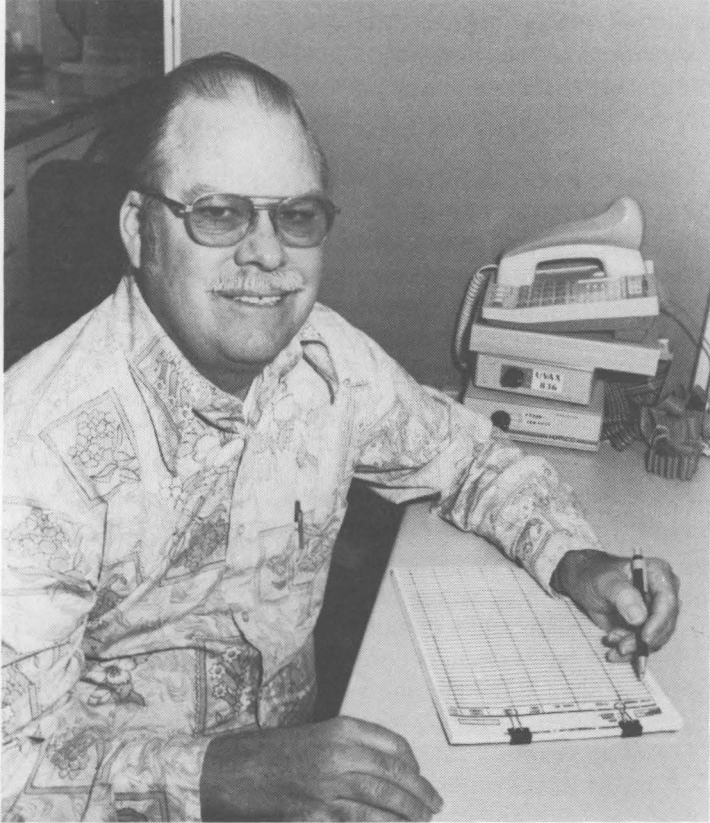
Lyle Davis
2818 35



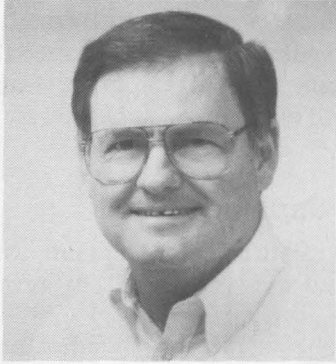
James Clemons
2712 40



Paul Pierce
2335 25



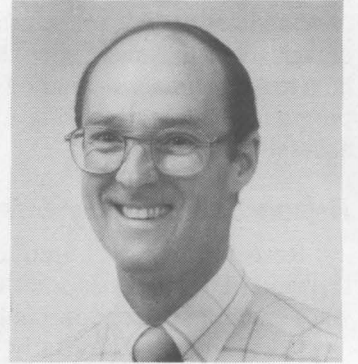
Don Odell
2486 40



Ben Duggins
2733 25



Russell Acton
2737 35



Thomas Mayer
9567 20



Robert Anderson
2858 35



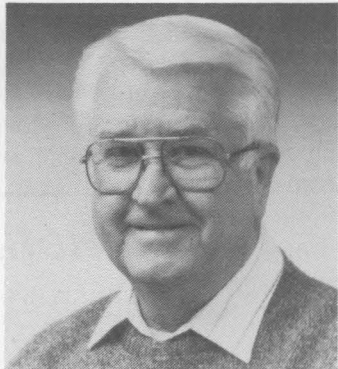
Frederick Yost
1830 20



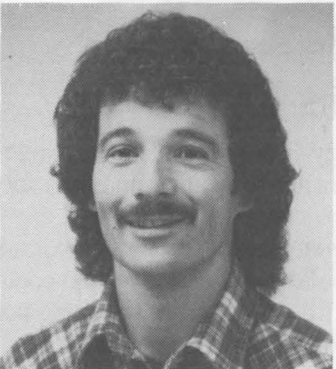
Mary Gallegos
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John Loukota
2412 25



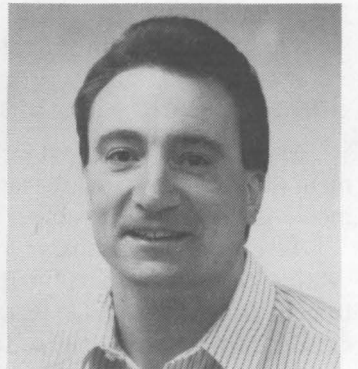
Matt Roach
5027 35



Michael Pacheco
7813 15



Gary Peterson
2335 25



Richard Cernosek
1315 15



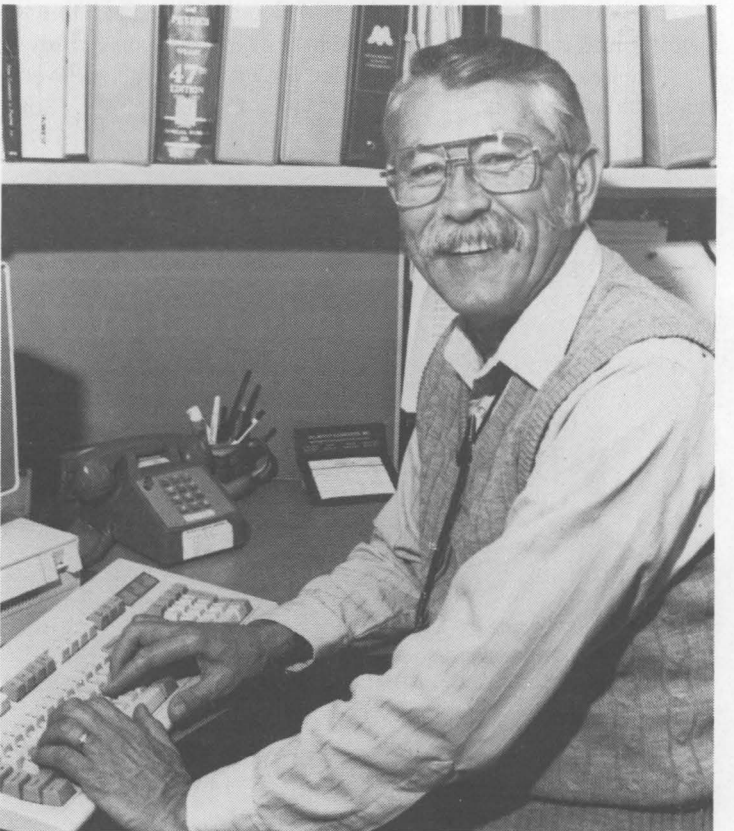
Paul Beeson
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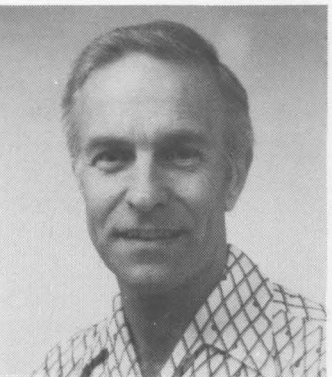
Cynthia Williams
152 15



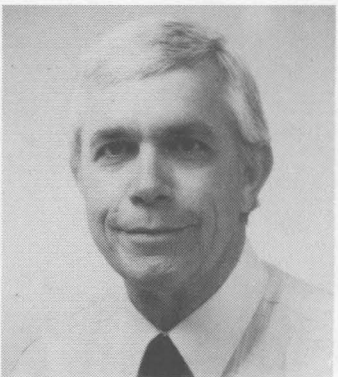
Duane Benton
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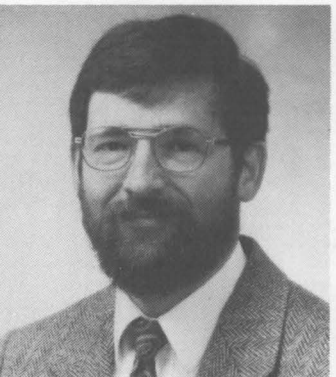
Frank Garcia
4343 30



Paul Stang
9533 30



Billy Stanton
5115 30



Jerry Knorovsky
1831 15

UNCLASSIFIED ADVERTISEMENTS • UNCLASSIFIED ADVERTISEMENTS • UNCLASSIFIED ADVERTISEMENTS • UNCLASSIFIED ADVERTISEMENTS

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

Ad Rules

1. Limit 20 words, including last name and home phone.
2. Include organization and full name with each ad submission.
3. Submit each ad in writing. No phone-ins.
4. Use 8 1/2 by 11-inch paper.
5. Use separate sheet for each ad category.
6. Type or print ads legibly; use only accepted abbreviations.
7. One ad per category per issue.
8. No more than two insertions of same "for sale" or "wanted" item.
9. No "For Rent" ads except for employees on temporary assignment.
10. No commercial ads.
11. For active and retired Sandians and DOE employees.
12. Housing listed for sale is available for occupancy without regard to race, creed, color, or national origin.
13. "Work Wanted" ads limited to student-aged children of employees.

MISCELLANEOUS

ELECTRIC DRILL, 1/2-in., heavy-duty, w/some wood & metal drill bits, very good condition, \$25. Freyermuth, 299-2053.

JEWELRY SALESMAN'S CASE, 18" x 9.5" x 16.5", 7 trays, \$20; antique folding tea cart, oak, \$65. Gregory, 344-1436.

BAR STOOLS, swivel, almond metal w/oak accents, beige padded seats & backs, counter height, 4 at \$69 ea. Kolb, 271-1775.

SKI EQUIPMENT, downhill & cross-country, Dynastar N9K 175, Trak Glide 205 & 210, Solomon bindings, SX62 boots. Torres, 265-6516.

CHROME MAGS, 14-in., Keystone Classics, look new, great for restored classic car, \$160; w/new tires, \$220. Fink, 294-3678.

FENDER GUITAR & AMP, great condition, \$500. Marquez, 898-3827.

DOWN VEST, Hunter Mountain, beige/navy w/red accent, zip-up pockets, size med., gift, never worn, cost \$100, asking \$25. Schkade, 292-5126.

CHESAPEAKE BAY RETRIEVERS, ready March 7. Romero, 897-2690.

LABRADOR-MIX PUPPIES, 7 wks. old; also, 8-mo.-old Labrador female, free to good home. Hesch, 892-2119.

NATURAL MINK JACKET, med., appraised at \$1,950, will sell for \$1,200. Freshour, 256-9168 after 6 p.m.

HEAVY WOOD DESK, 34" x 60", see John at 605 San Mateo NE, \$50 cash, you move. Rea, 296-4620.

IBM-COMPATIBLE 20MB DRIVE + SW, \$300; Apple II+ printer/monitor/SW, \$250; wide printer, \$75; Houston plotter, \$75. Shuster, 857-9544.

HEATHKIT H8 COMPUTER, H17 disk drive, H19 terminal, free; Zenith ZTX-11 terminal, monitor, modem, \$20. Jorgenson, 271-0077.

COCKER SPANIEL, black, spayed female, 5 yrs. old, needs home. Rex, 344-6552.

TWO CRIBS, Jenny Lind style, w/mattresses, \$80/ea. Funkhouser, 296-0036.

WATERBED MATTRESS, Hibernation Series, ultra-firm king-size, in original box, \$50; mountain bike fork, switchblade, excellent condition, \$85 OBO. Mayer, 294-3368.

TIRES & RIMS, P195/75 R14, good condition, \$30 for 2 tires & rims, \$50 for 4. Carlson, 897-1850.

GOLDEN RETRIEVER PUPPIES, 10 wks. old, \$100; irrigation pump, 3.5-hp, rebuilt Briggs & Stratton. Salazar, 877-7311.

CUSTOM DRAPERIES, sheers & rods included, 84" x 126" (sliding glass door), & 86" x 48" (window), gold, excellent condition. Nevada, 293-2651.

BAR STOOLS, 30-in., contemporary style, white metal, white cloth seat & back rest, \$250/pr. new, asking \$125/pr. Downs, 898-6641.

PING EYE-2 WOODS, 1-3-5, nearly new 210; Wilson X-31 woods, 1-3-4-5, jumbo grips, \$50; PGA irons, 3-PW, SW, near new, \$175; Ginty, \$30; more. Stang, 256-7793.

REAR WINDOW LOUVERS for '82-'90 Camaro or Firebird, \$40 OBO. Lesperance, 298-5203.

FORD TRACTOR, 601 diesel w/front-end loader, 35-hp, in excellent condition. Vigil, 1-384-2691 after 6:30 p.m.

AKC LONGHAIR MINIATURE DACHSHUNDS, perfect housepets, great personalities, good w/children, various colors, see mother & father, \$250-\$300. Ferrell, 888-3023.

KEMP INDUSTRIAL CHIPPER-SHREDDER, PTO driven, 3-point hitch carry, cost \$1,650 new, sell for \$1,100 OBO. McDowell, 298-0439.

WEDDING BANDS, 14Kt gold, man's wide band, size 8-1/2; woman's narrow band, size 6-1/2, w/small diamonds, \$200. Unstead, 881-1384.

MULTISYNC NEC MONITOR, 20-in., \$1,099; 40-Meg. hard drive, \$40; oak vanity, \$299; offroad R/C cars & controllers, \$399. Luther, 293-4462.

ROWING MACHINE, Precor model 618e, w/electronics, like new, \$125 OBO. Holloway, 296-6354.

TWO-PIECE CONTEMPORARY SOFA, gold, very good condition, \$450. Lucas, 268-6108.

GERMAN SHEPHERD PUPPIES, AKC-registered, purebred, beautiful markings, 6 females, 4 males, shots, \$175/ea. Callahan, 764-8708 or 243-2491.

RUNNING BOARDS, set, MM-100 Master Step, bright finish, 91-in. long, w/hardware, splash guards, \$70. Mead, 299-4868.

CROSS-COUNTRY SKIS, no-wax, 205cm, size 41 boots (3-pin), 140cm poles, \$70 pkg. or sell separately. Lorence, 275-3586.

BEN FRANKLIN STOVE, good condition, \$60. Marquez, 836-5153.

STUDIO COUCH, converts into double bed, 72-in. long, \$150. Case, 293-5466.

CAMPER, Tilt'n Hiltin, 8-ft. cabover, elect./propane refrigerator, stove/heater, 3-burner w/oven, propane light, 4 jacks, \$950. Holton, 831-4831.

BELL STAR II MOTORCYCLE HELMET, size 7-1/4, little used, \$50 OBO; dinette set, table, 2 leaves, 6 chairs, you haul, \$40. Dreike, 299-6670.

TWO BELLY-DANCING COSTUMES, both for \$25. Hines, 821-8592.

ASAHI PENTAX CAMERA, w/50mm lens, Vivitar 28-85mm lens, auto-extender, filters, & flash, make offer. Alderson, 293-5112.

VCR, 4-head, hi-fi, remote, programmable, used for 6 mos., originally \$600, sell for \$350; brand new Toyota AM/FM car stereo, \$100. Kern, 822-0535.

NEW RIM W/TIRE, fits '87 Ford Tempo + others, value \$63+, sell for \$50 OBO; moving boxes, small to dishpacs & wardrobes, 50¢ to \$6. Omstead, 823-2096.

DINING ROOM SET: Italian provincial w/gold leaf, includes 6 chairs, 2 leaves, pads, glass top, \$875. Cooper, 299-4454.

EXECUTIVE DESK, wood w/glass top, 40" x 75", \$350. Benton, 877-2473.

FIREBIRD WHEEL, very good condition, \$150; deluxe propane barbecue grill, only 2 yrs. old, \$125. Roach, 296-0432.

MATERNITY CLOTHES, size 8-10. Sullivan, 298-4880.

NAVAJO RUG, new, 30" x 46", black, gray, white, maroon, \$400. Trembl, 265-3507.

DRESSER, highboy, night table, pecan finish, French provincial style, \$450. Peterson, 266-9524.

WHIRLPOOL HEAVY-DUTY DRYER, \$50; Minolta X370 camera, w/flash, 2 lenses, \$175. Lewin, 898-2303.

HOTPOINT FROST-FREE REFRIGERATOR, almond, 15 cu. ft., good condition, \$100; Sunbeam gas grill, w/o gas tank, \$15. Burstein, 821-6688.

ROUND-TRIP AIRLINE TICKET, New Orleans, April 8-11, \$150. Burns, 281-3922.

UMBRELLA STROLLER, \$5; other infant & toddler things. Hudson, 884-7621.

THREE 15-IN. HUBCAPS for Chev. Corsica, \$15/ea. Orand, 275-2255.

IBM PC JR., 64KB, w/PC compact printer, DOS 2.10 manuals, Basic manual, Zenith monochrome monitor, 2 keyboards, assorted educational games, \$200 OBO. Chavez, 881-2711.

MOVING SALE: large microwave, \$100; captain-style bunk beds w/matching chest of drawers, \$250; both in like-new condition. Sikora, 891-7862.

ROUND-TRIP AIRLINE TICKET, Las Vegas, non-stop, America West, March 17-19, male, \$90. Roberts, 864-3529.

GENUINE NAVAJO RUGS (2), Teec Nos Pos style, superb condition; 4' x 5', \$1,500; 2' x 3', \$500; prices are reduced and very reasonable. Nez, 898-2028.

PET CARRIER, Kennel Cab, w/2 feeding dishes, med. size, \$20. Anastasio, 821-4245.

KING-SIZE WATERBED, complete, \$100; heavy-duty Maytag washer, \$100; china, 20-piece settings, serving pieces, \$400. Hingorani, 265-5625.

CARD TABLE, 4 chairs, excellent condition, \$60; new fondue set, \$10; pasta cutter & racks, \$20; car bike rack, \$15. Anderson, 897-2772.

SAGE GRAPHITE III 586 RPL 4-section travel rod, w/sock & tube, \$245; Ensoniq EPS sampler/sequencer, w/4x expander & stand, \$1,400. Nichols, 281-0801.

REAR WINDOW for '86 Nissan truck, \$40 OBO; set of 4 rims for same truck, \$40 OBO. Howard, 839-9203.

BUMPER POOL TABLE, professional, solid oak, w/game top, excellent condition, \$300; 3-in. Tri-chlor tablets, wrapped, \$2/lb. Henderson, 884-8309.

DROP-LEAF DINING ROOM TABLE, Duncan Phyfe, mahogany, w/2 expansion leaves, \$200. Vandetti, 299-2318.

MOPAR DISTRIBUTOR, dual point, all wires & coil, very good condition, \$50. Baney, 294-8970.

DRAFTING TABLE, \$65; kneeling chair, \$35; Coleman ice chest, \$40; all in great shape. Barclay, 291-1301 weekends.

KASTLE SKIS, 205cm, CMP Grand Prix, Gertsch 6D bindings, \$25. Everts, 822-1767.

FROST-FREE REFRIGERATOR, white, \$100, 15-cu.-ft. upright freezer, white, \$100. Record, 892-2381 after 5:30 p.m.

EXTENSION LADDER, 20-ft.; fertilizer spreader; power lawn edger; hide-a-bed couch; AM/FM record player stereo; freezer boxes; canning jars. Mills, 299-2130.

DYNA-GYM EXERCISE EQUIPMENT, excellent condition, \$75 OBO; Rival electric food slicer, Model 1030V, in box, used twice, \$60 OBO. Dixon, 298-5617.

FOUR TRUCK TIRES, 7:50X16LT, in fairly good condition, excellent as spare tires, asking \$12/all. Chavez, 243-9530 or 842-6374 after 6 p.m.

CARTOP CARRIER, molded plastic, \$50; formals, some long, some short, mostly size 8. Kaye, 293-0499.

DOUBLE-BASKET CHROME RIMS, good condition, \$200; dash cover & bra for '80 Mustang, \$25 dash, \$50 bra. Chavez, 842-6374.

JUST-MARRIED SALE: dining table, chairs, & leaves, \$400; microwave, \$100; wood rocker, \$75; many other items. Watkins, 265-5625.

RECIPROCATING SAW, B&D, professional, variable speed, w/case, \$85; pair coaxial 16 ohm English Soundcraftsmen 12-in. speakers, \$70. Minnear, 281-0946.

CASSETTE TAPE DECK, like new, records great, \$75; exercise bike, \$50; zoom lens, 80-200mm, \$40; all OBO. Mesibov, 898-3725.

NIKON 35MM CAMERA, w/owner's manual, \$125. Wrons, 275-0856.

APPLE IIe COMPUTER with miscellaneous software and Epson printer. Torres, 828-1679.

TRANSPORTATION

MAN'S 12-SPD. FUJI "CLUB," w/extras, excellent condition, large frame, \$100; Schwinn "Speedworks II" trainer, magnetic resistance, \$50. Keefe, 898-3805.

GIRL'S KENT BICYCLE, 18-in., white/pink, w/training wheels, excellent, \$50. Foster, 299-2778.

'74 VOLKSWAGEN 411 (square-back type), AT, good condition, 100K miles, \$700. Williams, 296-9082.

'83 WINNEBAGO LESHARO MOTORHOME, Class A, 20-ft., new tires, 22-mpg, 30K miles, \$9,500 OBO. Babcock, 299-3121, leave message & phone number.

'64 CHEV. LWB, 6-cyl., 3-spd., AC, dual tanks, excellent condition, \$1,900. Scott, 294-8627.

'90 LINCOLN CONTINENTAL, white w/burgundy leather interior, fully loaded, 22K miles, \$16,900. Freshour, 256-9168 after 6 p.m.

SEA KING ALUMINUM V-BOTTOM BOAT, w/15-hp Evinrude motor, trailer, tank, bass seats, much more, \$1,350 OBO. Hollingsworth, 869-2579.

'86 FORD F250, AC, PS, PB, 4-spd., 460, 61K miles, 10,000-lb. Reeves hitch, AM/FM cassette, new tires. Casaus, 867-5785.

'74 PORSCHE 911, white, red interior, 5-spd., AC, Blaupunkt, \$7,900. Meeks, 292-5915.

'82 SUBARU GL, tilt, cruise, AM/FM cassette, immaculate interior, needs a little outside work, \$1,250 OBO. West, 292-5083.

REPOS: '89 Toyota pickup, 4-WD, 5-spd., V-6, AM/FM stereo tape deck, AC, 57K miles, bids accepted until Tuesday, March 10; '89 fifth wheel, 38' long x 8' wide, w/queen-size bed, sofa bed, expandable living room, bids accepted until Tuesday, March 17; we reserve the right to refuse all bids; subject to prior sale. Sandia Lab FCU, 293-0500, ext. 344, ask for Pat.

BMX BIKE, 20-in., Roger DeCoster, \$50. Mayer, 294-3368.

'87 PLYMOUTH GRAND CARAVAN LE, 37K miles, in excellent condition, loaded w/options, always garaged, \$9,550 firm. West, 292-2271.

'85 FORD THUNDERBIRD, 43K miles, fully equipped, excellent condition, \$5,000 OBO. Woodall, 296-2391.

'84 PLYMOUTH HORIZON TOURISMO, 4-dr., very good condition, new tires, 2.2 engine, 5-spd., \$1,550 OBO. Marquez, 836-5153.

WOMAN'S 10-SPD. SCHWINN BIKE, low mileage, brake cables & tires recently replaced, 21-in. frame height, \$40. Dreike, 299-6670.

REYNOLD'S 12-SPD. RACING BICYCLE, w/matching cycling shoes, excellent condition, may be sold separately. Sliaty, 268-3832.

FUJI TOURING SERIES IV BICYCLE, 64cm frame, front & rear racks, 40-spoke rear wheel, 18-spd., index shifting, \$150. Schafer, 296-0017.

SAILBOATS: AMF Sunfish, almost new, \$950; AMF Force 5, new, \$1,495; AMF Zuma, never used, \$1,395. Ahr, 821-6905.

10-SPD. BIKE, \$75. Lewin, 898-2303.

'85 FORD LTD, PS, PB, AT, AM/FM, cruise, excellent condition. Jimenez, 296-9256.

'83 BUICK PARK AVENUE, 4-dr., white, plush velour seats, all power, locking-type wire wheel covers, \$3,200. Solanos, 298-4523.

'89 TOYOTA COROLLA SPORTS COUPE, 33K miles, 36K warranty, 5-spd., twin cam, cruise, sunroof, PS, PS, PW, PL, alloy rims, \$9,100 OBO. Avila, 883-5642.

'89 FORD TAURUS LX, 3.8-liter engine, AT, AC, PS, 4-dr., AM/FM cassette, new tires, digital dash, comb locks, \$7,950. Stang, 299-8688.

'89 FORD MUSTANG LX, 4.3-liter engine, AT, AC, PS, PB, PW, PL, AM/FM stereo cassette, \$5,000. Biskis, 275-2382.

'81 PLYMOUTH RELIANT STATION WAGON, AT, AC, 2.6L Mitsubishi 4-cyl., 90K miles, \$1,325 OBO. Key, 298-7988.

'80 HONDA CSX 500 DELUXE, 30K miles, looks & runs great, \$1,000. Kaye, 293-0499.

'77 VOLKSWAGEN BEETLE, mechanically sound, needs paint & minor body work; '87 Bass Tracker boat, 50-hp Mariner, trolling motor, fish locator. Neel, 821-4258.

10-SPD. BICYCLE, Schwinn lightweight Super Sport, 22-in. frame, 27-in. tires, little used, \$75. Bear, 881-7128.

'84 CAMARO BERLINETTA, new engine, clutch, starter, battery, 105K miles, \$3,000 OBO. Neau, 345-9345.

REAL ESTATE

2-BDR. CONDO in Angel Fire, furnished, \$63,500. Burd, 1-527-4873 or 892-2117.

3-BDR. HOME, by owner, 1,800 sq. ft., 1-1/2 baths, extra-large master bedroom & family room, 1206 Lester NE, \$79,900. Pena, 898-2388 or 265-6791.

3-BDR. MOBILE HOME, gorgeous 1991 model, great condition, 2 baths, low down payment, take over payments. Smallwood, 296-2931.

3-BDR. HOME, Bernalillo, enclosed pool in redwood, jacuzzi, PR, sunken den & backyard, wet bar, double garage, \$90,000. Guttke, 867-9133.

LARGE RESIDENTIAL LOT, 100-ft. frontage, south facing, overlooks Four Hills, all utilities, \$50,000 OBO. Abbin, 296-7678.

VIEW LOT, NE, fully developed, more than 5,000 sq. ft., \$29,500; 3-bdr. home, NE, 2-story, 2 full baths, La Cueva & Dennis Chavez school district, \$128,000 range. Chavez, 828-2106, evenings.

2-BDR. HOME, excellent condition, 1 bath, separate utility room, covered porch, 6-ft. wall, 1 garage, \$59,750. Callahan, 831-5607 or 243-2491.

3-BDR. HOME, NE, 1,800 sq. ft., 1-3/4 baths, new carpet, linoleum, & appliances, large landscaped yard w/elevated view deck, east of Tramway near Lomas. Roach, 296-0432.

3-BDR. HOME, 1-3/4 baths, 1,500 sq. ft., 2-car garage, 900 Hope Pl. NE, Copper & Tramway, \$95,000. Graham, 298-9454.

1/4-ACRE LOT, custom area, NW Albuquerque, \$30,000. Mazze, 299-4568.

HILLCREST MOBILE HOME, 1974, 14' x 70', huge lot, near Base, package valued at \$10,600, asking \$8,600. Grahek, 292-5829.

UPGRADED ADOBE HOME, Belen, excellent, w/8% assumable non-qualifying loan, solar, new fence, cooler, wall heater, patio, \$41,000. Roberts, 864-3529.

4-BDR. TOWNHOUSE, adobe accents, fireplace, assumable 8% loan, excellent condition, \$58,999. Lopez, 836-7144.

3-BDR. HOUSE, Cedar Crest, 2 baths, gorgeous views, great water, brick floors, garage, alarm, solar hot water, \$115,900. Tachau, 281-0388.

3-BDR. HOME, Glenwood Hills, 2 baths, on cul-de-sac bordering foothills, large family room, formal living & dining rooms, RV pad. Draelos, 296-3078.

3-BDR. TERRITORIAL HOME, 1-3/4 baths, family kitchen, double garage, great mountain view, O'Keefe, Eisenhower, La Cueva schools, \$91,500. Meirans, 292-6139.

WANTED

USED HIGH CHAIR & CRIB, in good condition. Douglas, 281-9843.

BRIDGE TABLE & CHAIRS, in good condition only. Tanner, 881-1636.

BOARD GAMES: "Smuggler" and "The Boss." Evans, 292-2367.

MOVING INTO FIRST HOUSE, need lawn & garden equipment. Doran, 299-2635.

BABY MONITOR. Sanchez, 873-2058.

MOVING BOXES. Shoof, 828-2510.

286 LAPTOP COMPUTER, as soon as possible. Riley, 281-2059.

AIR COMPRESSOR, w/20-gal. tank, in good condition, 115V. Shuster, 296-9334.

MOVING BOXES & wardrobes. Henderson, 884-8309.

ARABIAN/HALF-ARABIAN GELDING, 4-7 yrs. old, for English pleasure, will be penned so must be sociable, less than \$700. Baldo-Pulaski, 345-1288.

MOVING BOXES for personal use. Orr, 891-1596, leave message.

SUBARU BRAT 4-WD PICKUP, '87 or '88. Ewing, 823-1112.



Coronado Club Activities**What's the C-Club Got for You? Virtually Countless Benefits!**

THE CLUB will be having a membership drive soon (watch this space!), and there are more reasons to join than we've got room to list. Among them: Albuquerque's nicest pool/patio/tennis area, which members can use regularly and even rent for private parties. Swimming and tennis lessons for adults and children. Discounts on lunch, Monday through Friday. Special interest groups — ski club, tennis club, Thunderbirds for retirees, aquatic club, bowling league for children. Discounts on movie tickets. Discounts on bingo packages and bingo buffet. And here are two new services available to members only: free notary service, and Sandia Peak Tram tickets for \$5 per person (maximum of four a day). So if you aren't a member — think it over, and watch for some special incentives soon.

GET SOCIAL — From 4:30 today, March 6, until who-knows-when this evening, the Club is featuring a social get-together in the Cantina. Music, dancing, a complimentary buffet, and special drink prices add up to one thing: FUN! Come on and enjoy.

TEA DANCES top off the two Sunday Champagne Brunches this month — March 8 and 22. The brunch menu includes a load of good things, served from 10 a.m. to 1 p.m. Starting at 1 p.m. on the 8th, the Best Shot Band plays for your dancing pleasure. On the 22nd, it's Bob Weiler and His Cool Cats. Reservations required.

FRIDAY THE 13TH it may be, but the music and the luck will be good next week when the

Isleta Poor Boys play from 7 to 11 p.m. The chef and his helpers offer prime rib or golden fried shrimp at a two-for-one price of \$16.95, or you can make another taste-tempting choice. Take our advice and reserve now by calling 265-6791 — or you might be out of luck after all!

ST. PADDY ALERT! Tuesday, March 17, the best-dressed leprechaun at the Club will win the "pot o' gold" (actually \$50 in folding green). The Bob Banks Trio will play from 5 to 8 p.m., and you can indulge in corned beef 'n' cabbage, green chile stew, and your favorite drinks at special prices. Cover charge: \$1 for members (free if you bring the coupon from the Club's March newsletter), \$2 for non-members. What does the cover charge get you? All the food you can eat!

Events Calendar

Events Calendar items are gathered from various sources. Readers should confirm times and dates of interest whenever possible.

March 6 — Explorations in World Music Series: Chinese Music and Dance Concert by members of the Chinese-American Citizens Alliance of Albuquerque; 7:30 p.m., Maxwell Museum of Anthropology, 277-4405.

March 6 — Bernalillo County Extension Homemakers Cultural Arts Show, programs include "Plant Propagation" by horticulturist Curtis Smith and "Making Microwave Jelly" by home economist Patricia Aaron; 1-3:30 p.m. viewing, programs at 2:15 p.m.; 4-H Building (1500 Menaul NW), 243-1386.

March 6-14 — "Danny and the Deep Blue Sea," by John Patrick Shanley, a man and woman struggling with their inability to communicate are caught up in a hypnotic dance of violence, Theatre-in-the-Making presentation (recommended for mature audiences only); 8 p.m. Fri.-Sat., CenterStage (3211 Central NE), 260-0331.

March 6-15 — Exhibit, "New Mexico Impressions: Printmaking 1880-1990," presents a survey of the traditional media of printmaking in New Mexico by some of the state's outstanding resident and visiting artists, the first exhibition to put such a wide variety of etchings, woodcuts, lithographs, and serigraphs into a historical context; 9 a.m.-4 p.m. Tues.-Fri., 5-9 p.m. Tues.; UNM Art Museum, 277-4001.

March 6-15 — Exhibit, "E.I. Couse: An Image Maker for America," work of Eanger Irving Couse, one of the founders of the Taos Society of Artists and a well-known painter of Native Americans for the first three decades of the 20th century, lithographic reproductions of his paintings were used extensively by the Santa Fe Railroad for advertising; 9 a.m.-5 p.m. Tues.-Sun., admission charge, Albuquerque Museum, 243-7255.

March 6-20 — Exhibit, "Star Axis," featuring drawings, models, and photographs of Charles Ross' monumental "Star Tunnel," a gigantic celestial observatory being chiseled out of a mesa near Las Vegas, N.M.; 9-4 p.m. Tues.-Fri., 5-9 p.m. Tues.; UNM Jonson Gallery, 277-4967.

March 6-29 — Exhibit, "Santiago: Saint of Two Worlds," a photo historical exhibition devoted to the history and contemporary presence of St. James, whose exploits (real or in folklore) have been celebrated in Spain, the US, and the Caribbean for centuries; 9 a.m.-5 p.m. Tues.-Sun., Albuquerque Museum, 243-7255.

March 6-April 5 — Exhibit, "Whistle Stop for the Stars," photos by William Steele and biographical information about 23 silent film stars who stopped in Albuquerque on their way between Chicago and Los Angeles in the Roaring Twenties; 9 a.m.-5 p.m. Tues.-Sun., Albuquerque Museum, 243-7255.

March 7 — "Caribbean Gala," benefits D.A.N.C.E., Inc., evening of Caribbean culture, food, and music, festivities include dinner, dancing, and silent auction (\$50/person); 7 p.m., Albuquerque Country Club, 255-7297.

March 7-8 — "Three Pigs, Three Bears, and Nursery Mimes," collection of children's stories and rhymes, conceived and directed by Jeanne Porter Cole, Albuquerque Children's Theater presentation featuring pantomime, storytelling, and an original soundtrack by

Jon Hull and Alan Stringer; 1 & 3 p.m., KiMo Theatre, 898-6679.

March 7-8 — Albuquerque Gem & Mineral Show, "Copper Mining & Minerals"; 10 a.m.-6 p.m. Sat., 10 a.m.-5 p.m. Sun.; UNM Continuing Education Center (1634 University Blvd. NE), 884-9457.

March 7-8 — Fishing Fantasy, Tingley Beach stocked with 5,000 trout (50 tagged for prizes), sponsored by Albuquerque City Parks and Recreation; noon-5 p.m., Tingley Dr. NW, free, 768-3490.

March 9 — "The Trio D' Archi Di Roma," the Chamber Orchestra of Albuquerque performs the music of Shostakovich and Brahms with guest conductor Andrew Parrott; 8:15 p.m., Popejoy Hall, 842-8565.

March 10 — Tuesday Night Garden Classes, "Soils and Compost," how to build healthy soil and recycle garden waste, instructor Ruth Bronson; 7-9 p.m., Albuquerque Garden Clubs Center (10120 Lomas NE), 296-6020.

March 11 — Indian Bread Sale & Demonstration, oven bread and pastries baked in the Maxwell Museum's horno; 11 a.m.-3 p.m., Maxwell Museum of Anthropology, 277-4404.

March 13-14 — "Euganos," stage reading by La Compañia; 7 p.m., South Broadway Cultural Center, free, 848-1320.

March 13-15 — Spring '92 Woodworking World Show, exhibitors demonstrate and sell the latest woodworking machinery, tools, & supplies; 5-9 p.m. Fri., 10 a.m.-6 p.m. Sat., 10 a.m.-5 p.m. Sun.; Flower Bldg., NM State Fairgrounds, 821-7623.

March 14-15 & 21-22 — Annual Rose Pruning Demonstration, Albuquerque Rose Society answers questions about how to grow roses in Albuquerque; call for times, Prospect Rose Garden (8205 Wyoming NE, on the grounds of the Wyoming Branch Public Library), free, 299-6501.

March 15 — "Driving Miss Daisy," prize-winning play, Popejoy Hall's 25th season celebration "Best of Broadway" series; 8:15 p.m., Popejoy Hall, 277-3121.

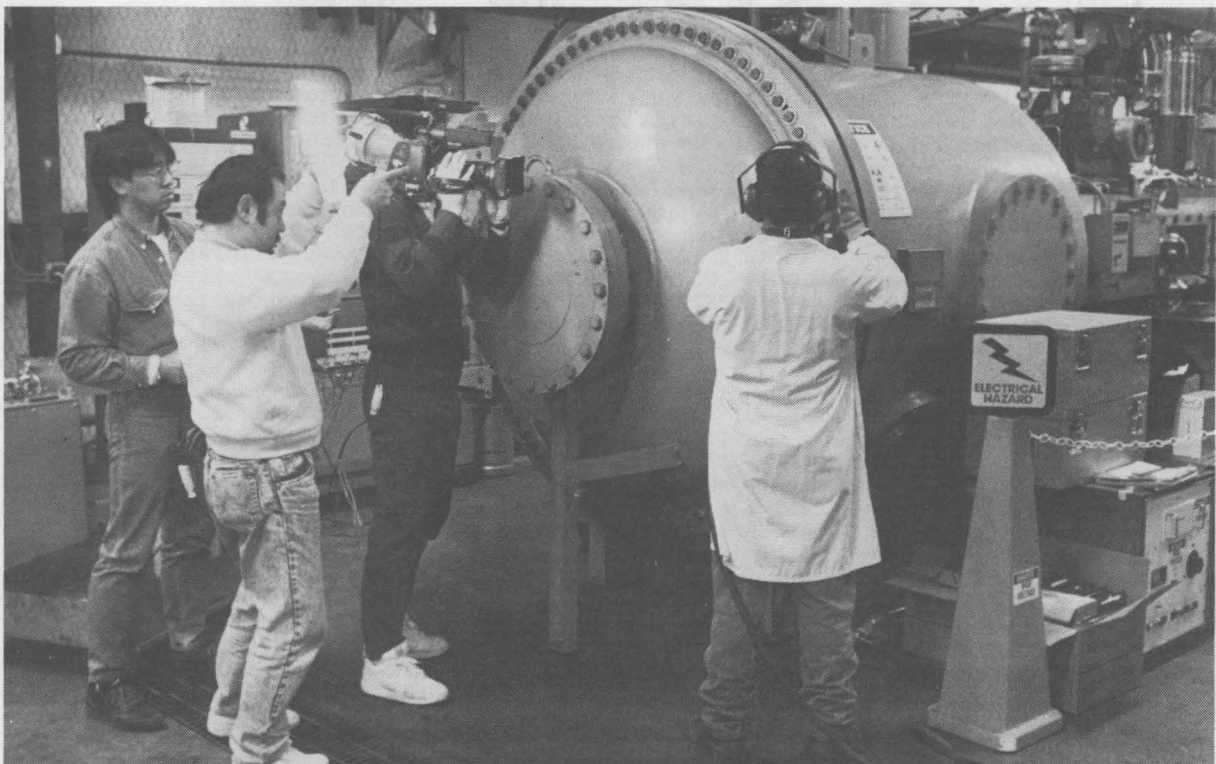
March 17 — Tuesday Night Garden Classes, "Roses in Albuquerque," everything you need to know to select and care for roses, instructed by members of the Albuquerque Rose Society; 7-9 p.m., Albuquerque Garden Clubs Center (10120 Lomas NE), 296-6020.

March 17 — "Somos Ayer Y Hoy," sit-down reading by La Compañia; 7 p.m., South Broadway Cultural Center, free, 848-1320.

March 17 — St. Patrick's Day Corned Beef and Cabbage Dinner, annual benefit, continuous entertainment; 4-8 p.m., Albuquerque Convention Center, 768-4575.

March 20-22 — Rio Grande Arts and Crafts Festival, featuring 200 exhibitors; call for times, Lujan Bldg., NM State Fairgrounds, 292-7457.

March 21-22 — Up, Up, and Away Kite Flying Contest, contests for children to seniors, food, entertainment, exhibits, kite-flying exhibitions, model airplanes, sponsored by Albuquerque City Parks and Recreation Dept.; noon-4 p.m., Arroyo del Oso Park (Spain & Wyoming NE), free, 768-3490.



CAMERA CREW for a TV program called "Space Age" films John Martinez (contractor) as he opens the end of Sandia's large-bore two-stage light gas gun. The gun is used to hurl thin disks called fliers at speeds of thousands of miles per hour toward metal plates. The impacts are used to study collisions of space debris with space stations or other craft. "Space Age" is a co-production of WQED (PBS) in Pittsburgh and NHK-TV in Japan. Filming done at Sandia was for a segment called "New Frontiers," which will examine the commercial and scientific potential of returning to the moon, constructing a space station, and journeying to Mars.