

Improved Digital System

When nuclear devices are detonated deep under Rainier Mesa at the Nevada Test Site, most of the signals last only a few micro- or milliseconds. The technical challenge of retrieving this data is formidable but necessary, since data is the *raison d'être* of the detonation, the only indication of the destructive effects of radiation on a host of Sandia-designed weapon components and systems. Constant effort goes into upgrading and improving the data gathering, handling and recording systems.

"Until recently the time frame to get data topside was unequivocal," says Bob Rutter, who heads Data Development Division 1115. "The shock wave from the detonation takes less than 200 milliseconds to travel through the ground to the components and data-gathering equipment. Our job has always been to get as much useable data as possible without loss caused either by the shock wave or the electromagnetic pulse generated by the detonation."

Several years ago, designers in Division 1115 set out to find ways around the noise from EMP that garbled some data on the data transmission cables and (in some cases) even wiped out the first few hundred microseconds of data. The other technical challenge was presented by the shock wave, which could rip loose the cable linking the measuring devices nearest the detonation to the topside recording equipment.

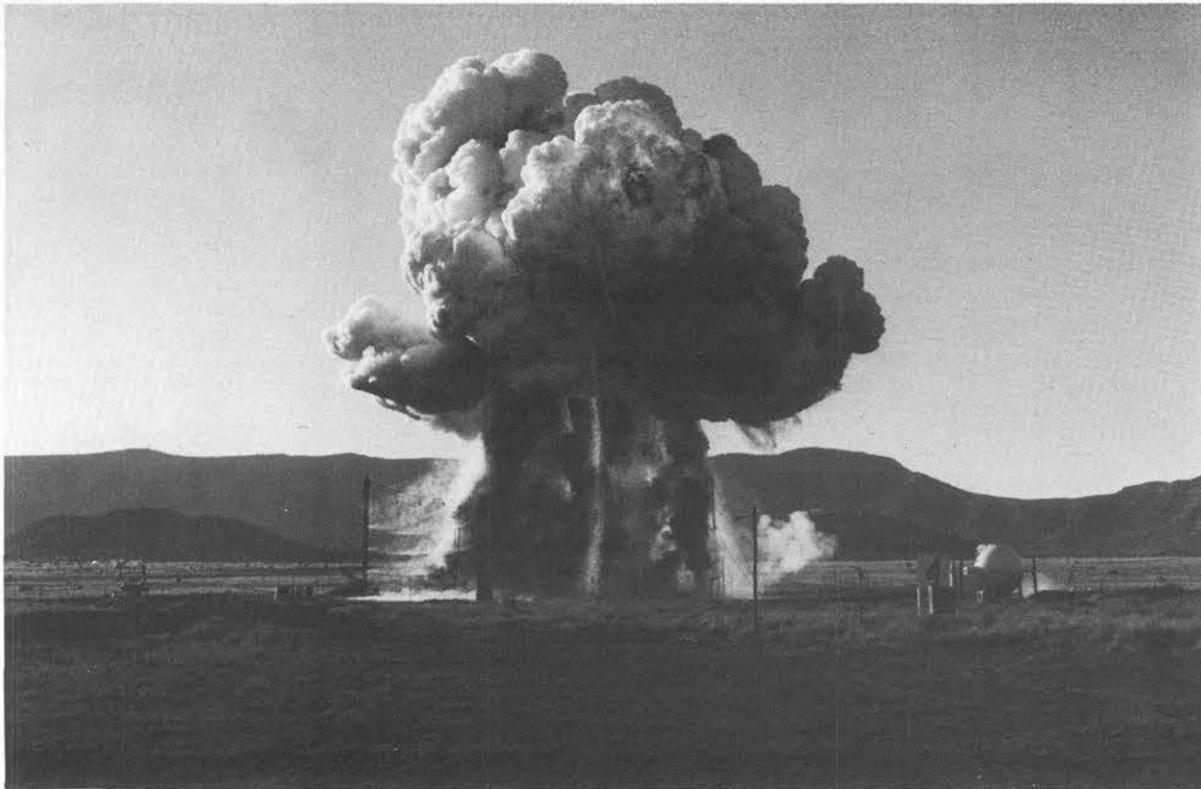
Designers approached the problems with two new systems, one above and one below the ground. The one underground was designed to digitize, store and transmit data, the one topside (in a trailer) was a computer-based digital recording and playback system. By converting analog signals to digital signals closer to the signal source, designers provided cleaner, more noise-free data records. By transmitting a great many digital records on a single cable at high frequencies, they cut costs — and the fast data playback made possible by the computer-based recording system not only aided experimenters, but reduced the data reduction demands and costs.

Bob Rutter's people were able to cut EMP blackout from 200 to less than 40 microseconds by a combination of two techniques — developing special electronic shielding and ground techniques and by moving the data recorders close in, shortening the thousands of feet of cable run by more than a factor of ten. The data was digitized underground and stored in memory to protect it from EMP. It still had to be transmitted topside within 200 milliseconds, however, which required extremely high speed transmitting and recording equipment.

"If the shock wave broke the AC power cable," Bob explained, "all the data stored in the memory was lost."

This system functioned perfectly on DIABLO HAWK last September. All the data got out ahead of the shock wave without EMP garbling. And, thanks to analysis equipment in the data trailers topside, Division 1115 was able to give experimenters good data plots in

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PHOTOMETRICS DIVISION 1556 participated recently in a DNA-sponsored experiment near Area III, simulating weapon thermal effects. For more photos, see Page Five.

LAB NEWS

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MAY 18, 1979

SANDIA LABORATORIES • ALBUQUERQUE NEW MEXICO • LIVERMORE CALIFORNIA • TONOPAH NEVADA



PATENT AWARDED — DOE has been awarded a patent for an irradiator system which uses gamma radiation to convert sewage sludge into a safe fertilizer or animal food supplement. Inventors are Jim Pierce (4535), Marvin Morris (4535, seated) and Willis Whitfield (4453). The system, now incorporated into the Sandia Irradiator for Dried Sewage Solids (SIDSS) facility in Area III, is basically a conveyor arrangement which transports steel buckets of sludge to an underground radiation chamber to pass over and under the gamma source — one megacurie of cesium-137. SIDSS is in pilot production, producing samples for cattle feeding experiments and fertilizer trials conducted at New Mexico State University. Exposure to cesium kills pathogens but does not affect nutrients such as carbohydrates and protein. The system was developed for Sandia's Beneficial Uses Program, sponsored by DOE and the Environmental Protection Agency, which aims at finding uses for two forms of waste — municipal sewage and one of the isotopes contained in nuclear waste.

Afterthoughts

Now that's class--Seems to me the human interest story of the month is that of our Albuquerque mother of four who coolly turned upon the character who was robbing the Foodway store in which she was shopping, leveled her .25 caliber automatic, and declared to the surprised bandit: "Go for it, baby...". He thoughtfully declined to employ the .38 pistol which he was carrying, the police came, and society now has one more turkey in jail. With Joans of Arc like that running around, the republic can't be in too bad shape.

* * *

To quit smoking--Science News carries an intriguing item relating that Univ. of Nebraska researchers may have found "a revolutionary, biochemical way to help people quit smoking." Noting that persons with high levels of acid in their urine were likely to smoke more while those with lower acid levels smoked less, university psychologist A. James Fix took the logical step of administering bicarbonate tablets to a number of smoker volunteers in a controlled experiment. The results--which Fix emphasizes are extremely preliminary--indicate that "the bicarbonate people (as opposed to volunteers given other substances) did best on every measure you can get--in total cessation and the ability to cut down." Further studies are planned with larger populations. Meanwhile, Fix suggest that bicarbonate alone may not be the only remedy: "adding beet and spinach greens (and other alkalinizing foods) to the daily diet might have much more profound alkalinizing effects than four grams of sodium bicarbonate."

* * *

The literary life--A fortune teller is reputed to have told Mark Twain: "Yours was not, in the beginning, a criminal nature but circumstances changed it. At the age of 9 you stole sugar. At the age of 15 you stole money. At 20 you stole horses. At 25 you committed arson. At 30, hardened in crime, you became an editor." *js

Continued from Page One

Improved Digital System

the field within hours. The design goals were met.

"Now," says Bob, "we're deep into the design of a simpler and more reliable 'Mod 2' of the system, one that's possible only because of recent advances in technology.

"The DIABLO HAWK downhole hardware weighs 20,000 pounds and is housed in seven double racks," Bob told us. "Micro-miniaturization will enable us to install the new system in four single racks that will fit inside small, downhole instrumentation shelters. We learned a great deal from the first system and we'll use many of its subsystems in

Mod 2 -- and our success in developing electronic shielding, which was shown on DIABLO HAWK, permits us to move further out from the device. This reduces our hardening requirements."

But the key to the improved system is a highspeed memory chip that functions on battery power. According to Bob, the memory can survive as long as a week on the power supplied by a 12-volt car battery. This means the data doesn't have to get out of the tunnel before the shock wave arrives, thus eliminating a major problem.

"The beauty of it," Bob sums up, "is that the improved system gives us a backup we've never had before. Even if the topside equipment fails, the digital data's still available in the downhole memory. Considering how few tests are run these days and their cost -- well, that's reassuring."

Division 1115 plans to have the improved system in the field on the next large radiation effects test, MINERS IRON.

Sympathy

To Herman Kaneshiro (1473) on the death of his father in Belen, May 7.

To Horace Montoya (1485) on the death of his sister in Albuquerque, May 8.

Congratulations

To Mark Montavon (1172) and Deb Ninedorf (REECO, assigned to 1170) to be married in DeForest, WI, on May 26.

To Mr. and Mrs. C.S. Casaus (1472), a son, April 26.

Supervisory Appointment



RAY LUCERO to supervisor of Labor and Services Section 3618-5, effective May 1. Ray joined Sandia in September 1970 as a member of a structural apprenticeship program. After successfully completing the program he worked three years with the millwrights. Since Feb. 1978, Ray has been a construction inspector with Plant Engineering.

An Albuquerque native, Ray attended Valley High School and completed a one-year drafting course at TV-I. His interests off the job include little league baseball, camping and fishing. Ray and his wife Annabelle have three sons and six-year-old twin daughters. They live in the North Valley.

Bond Update

From President Sparks . . .

We have just completed the 1979 Savings Bond campaign, and our goals were not only met but exceeded. Aside from our collective recognition of Bonds as a good investment, I see this as another example of Sandians' willingness to work as a team to meet difficult objectives. The Small Staff joins me in expressing these sentiments. We are pleased with the results and proud to be a part of this accomplishment.

And from the Treasury Department . . .

The government will raise the interest rate on its Savings Bonds half a percentage point, to 6 1/2 percent, starting June 1. The 6 1/2 percent rate will apply to Series E Bonds and H Bonds. The higher rate will also be put on the recently announced EE and HH Bonds going on sale in January 1980 and replacing E and H Bonds.



Pardon us while we look as dubious as the claims adjusters at Metropolitan Life must have when they read through some of the accident reports filed by their policy holders. "As I reached the intersection," wrote one, "a hedge sprang up obscuring my vision." Another reported that "the pedestrian had no idea which direction to go, so I ran over him." One motorist tried to drag in his long years of experience with startling results: "I had been driving my car for 40 years," he said, "when I fell asleep at the wheel and had the accident." This explanation seems almost suicidal: "I pulled away from the side of the road, glanced at my mother-in-law and headed for the embankment." The capper came from a very angry motorist who reported that "the indirect cause of this accident was a little guy in a small car with a big mouth."

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SLL Takes Measure of Internal Combustion

Sandia Livermore's DISC engine program reached a milestone recently when Sheridan Johnston of Combustion Applications Division 8352 succeeded in measuring fuel-air ratios inside a combustion chamber by means of laser Raman spectroscopy. (DISC stands for direct-injected stratified-charge.) To achieve this major goal in the engine program, Sheridan sent a beam of light from a continuous-wave argon ion laser through small windows in the cylinder wall. The scattered photons emitted when the laser beam interacted with the swirling fuel-air mixture were monitored through a fused-silica window in the top of the cylinder and analyzed spectroscopically. The result was a time- and space-resolved map of the fuel mix.

Since these Raman emissions are inherently very weak, the photon-counting electronics were set up to repeat each measurement 100 times at identical crankshaft positions during successive fuel-injection events. The results thus represent statistically significant average values which Sheridan collected at 19 points across the cylinder diameter and at each of 40 crankshaft positions beginning with fuel injection and ending with the piston at the top of its compression stroke. A detailed picture of the mixing process is thus drawn.

"These measurements are important," says Sheridan. "In the DISC engine, we need a rich mixture to ignite but after that we want the burn from a lean mixture to save fuel and to have cleaner emissions. We need to know where in the combustion chamber these lean and rich zones exist to get the engine performance we want."

In another facet of the experiment, a mirror was affixed to the top of the piston and high-speed laser shadowgraph movies of the mixing process were made. These films permit a direct visual comparison with the measurements and help to verify them. "We can actually see the flow that we're measuring," says Sheridan, "and the results match nicely."

Using a simple engine geometry and making fluid flow as nearly two-dimensional as possible, the experimenter operated the engine with an electric motor instead of under its own power. With such an experimental design, the mixing process was largely free of the effects of other events, and the task of analyzing and modeling the process was made easier while the reliability of the results was improved. Ultimately, the findings will have significant application in the design of improved auto engines.

In other experiments in this division with similar engines, Pete Witze has measured velocity and turbulence levels using laser Doppler velocimetry, Ray Smith has measured density fluctuations using pulsed laser Raman spectroscopy, and Bill Rorke has measured performance and emissions. All the experiments, done on essentially identical engines, give an excellent picture of combustion processes.

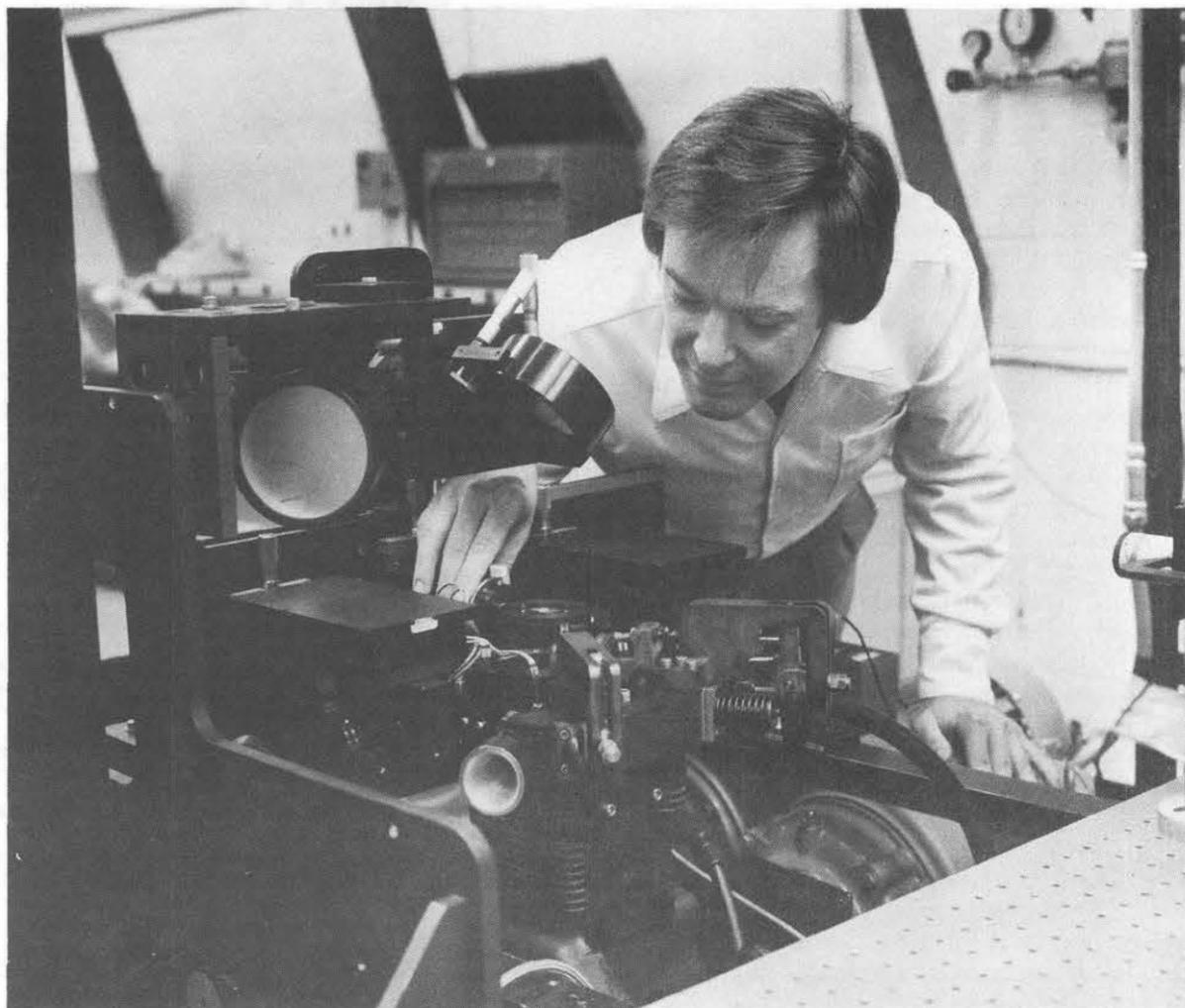
Using laser beams to measure combustion phenomena is one phase of the effort in diagnostics development pursued by Combustion Sciences Department 8350. The group is soon to be housed in the Combustion Research Facility now under construction. Laser probes are ideal for this research because, unlike sampling probes and other "hard" devices used for such studies in the past, light beams do not disturb the phenomena they are measuring.

LIVERMORE NEWS

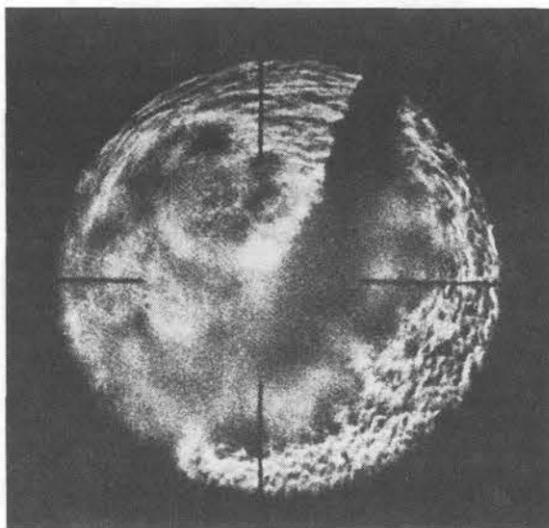
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TUNE UP — Sheridan Johnston of Combustion Applications Division 8352 checks laser Raman spectroscopy system on his DISC auto engine experiment. Set up measures and maps progress of fuel-air mixing process inside cylinder.



LASER shadowgraph, one of sequence, shows fuel jet entering cylinder (upper right), swirling clockwise as it mixes with air.

"Our aim," says Bill Robinson, supervisor of 8352, "is to get as much information from optical diagnostics as we can so that we gain an understanding of what goes on in an operating engine. Detroit car-makers can apply our data directly to help them meet the more and more stringent fuel economy and emission requirements."

The engine research program at SLL is funded by the DOE's Division of Energy Technology and the Motor Vehicle Manufacturers Association. In the DISC program itself, there is a cooperative effort between researchers at LASL, Princeton University, General Motors Research Laboratory and SLL.

Retiring



Bertha Frick (8273)



Bob Piper (8261)

At The Bottom of the Mine

Sandia Proposes Waste-Handling System

The request was simple enough.

"Assume," Project Engineer Leo Dunn (4541) said, making a broad gesture that encompassed several thousand square feet of concrete floor, "that we're standing at the bottom of a deep saltmine."

The light pouring through the open doors of the airplane hangar made that a little difficult. But the illusion took on substance as Leo, design draftsman Jim Werker (2452) and E.S.A. Howard Perdue (1133) began to demonstrate how Sandia proposes to handle low level radioactive waste underground.

The underground waste handling and transport system, which combines commercial and Sandia-designed elements, was developed under Leo's leadership as part of Sandia's engineering responsibilities in the WIPP program.

Taking a cue from industry, the proposed waste handling system makes extensive use of powered roller conveyors (which have been simulated for the demonstration with rollers and winches). And, to simplify the process, Sandia has developed two techniques to increase the size of the basic waste module. In one, a six-pack of 55-gallon drums is held together by a simple angle-iron frame and steel straps.

"These units are easier to handle and stack than single barrels," said Leo, "but our real preference is for metal boxes that would hold either six barrels, a plywood box, or be directly filled with waste."

The boxes, made of seam-welded corrugated metal, have L-shaped hooks at the upper corners to accommodate special handling gear.

"We're still considering modifications and improvements," Leo told us, "but essentially, the system concept has been verified."

Housed in Hangar 00481 on Kirtland West, the system is being demonstrated on request. The only thing missing, and you won't miss it much, is the crunch of salt underfoot (and, of course, the waste itself).

Death



Cecil Russell of Analytical Chemistry Division 5821 died May 9 after a long illness. He was 58.

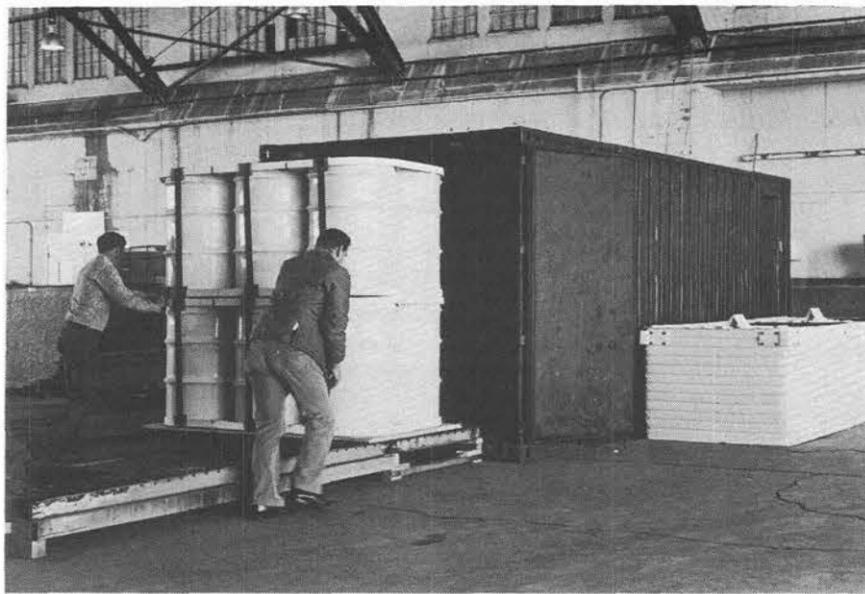
He had worked at the Labs since November 1949.

Survivors include his widow and two sons.

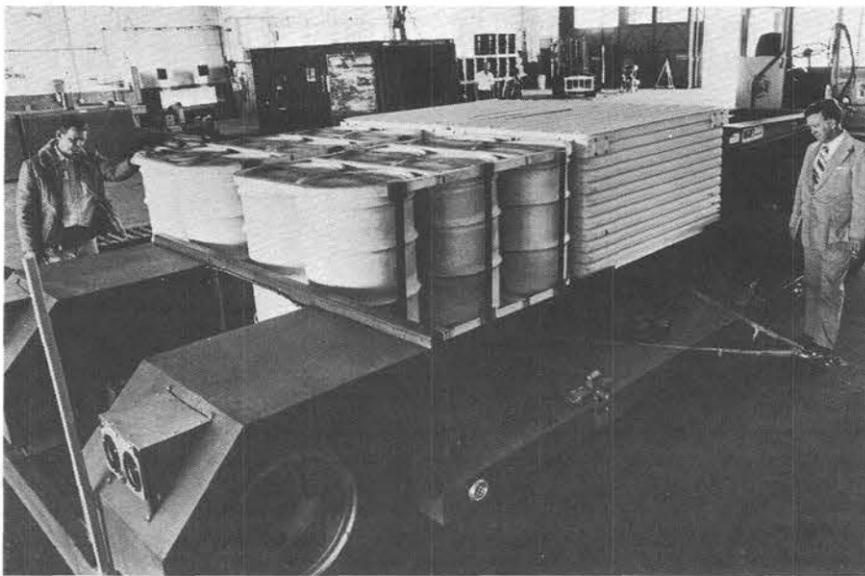
Speakers

D.C. Reda (5633), "Comparative Transition Performance of Several Nositip Materials as Defined by Ballistics-Range Testing," 25th International Instrumentation Symposium, ISA, Anaheim, CA, May 1979.

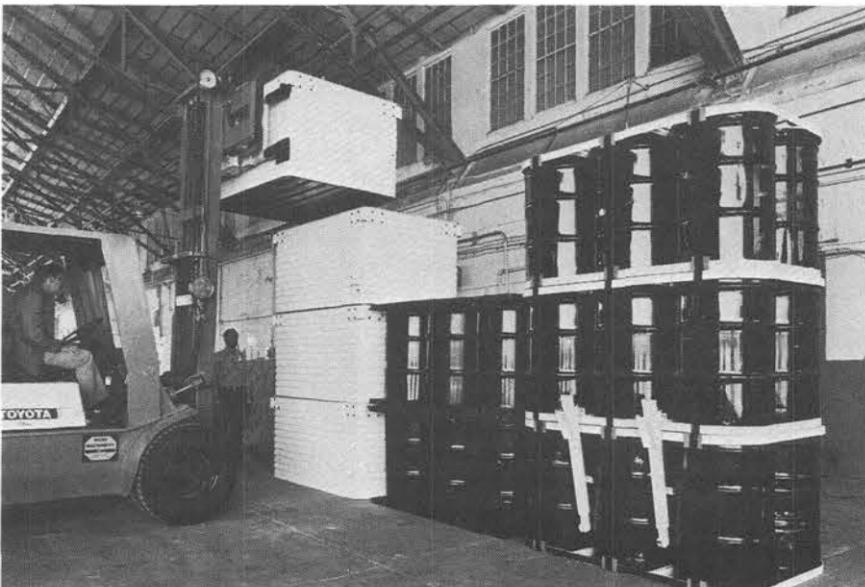
D.E. Mitchell (2514) and J.E. Kennedy (2513), "Similarities in Vapor and Chemical Explosions and Methods of Analysis," ANS 1979 Annual Meeting, June 3-8, Atlanta.



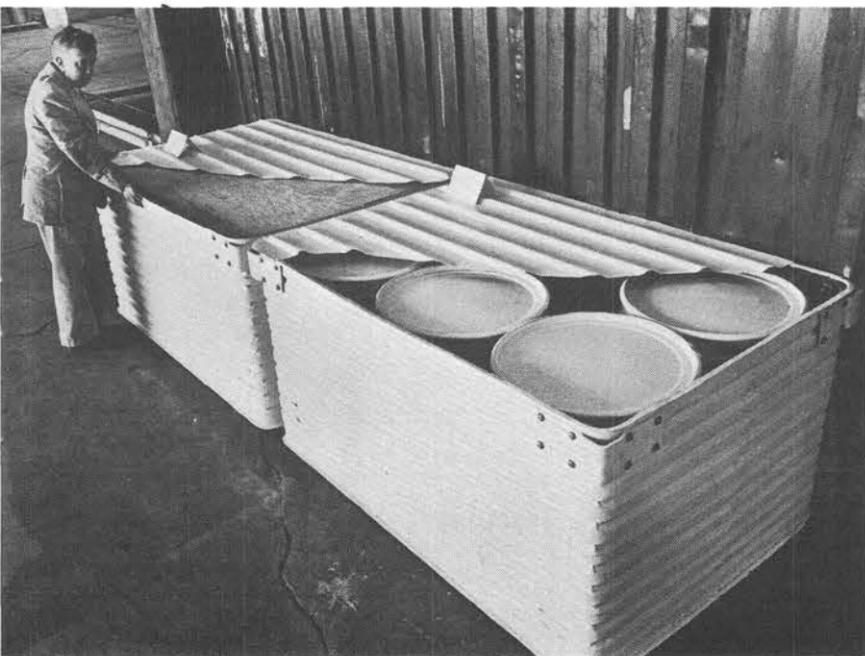
METAL BOXES OR SIX-PACKS OF BARRELS (held together by angle-iron frames and steel straps) would be rolled into standard rail cargo containers. Two of these cargo containers would be shipped to the waste repository in modified ATMX cars (the same cars now used to ship containers filled with individual barrels to temporary storage).



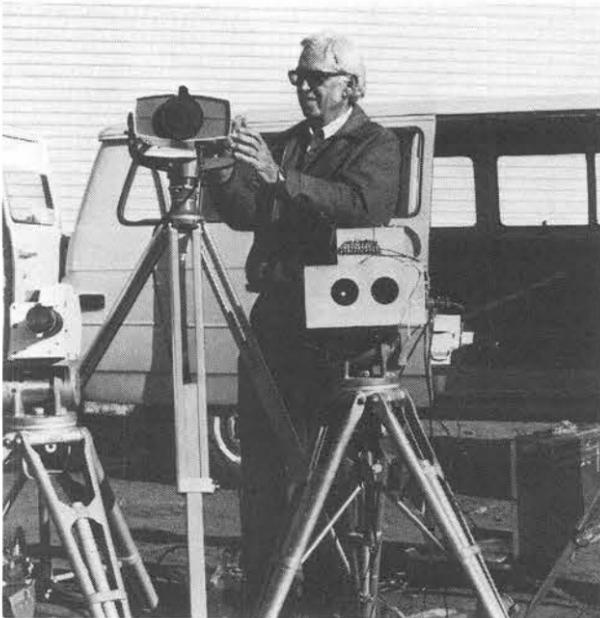
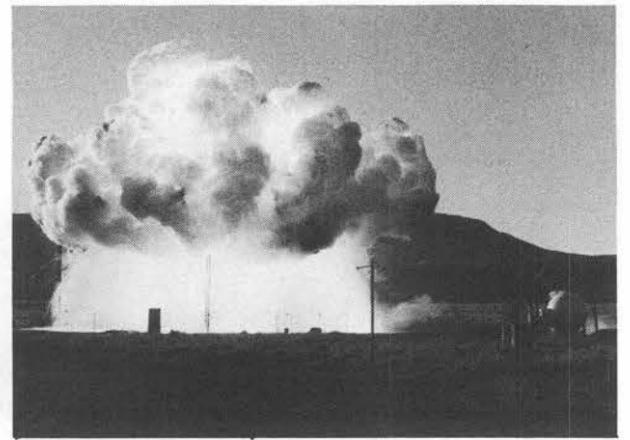
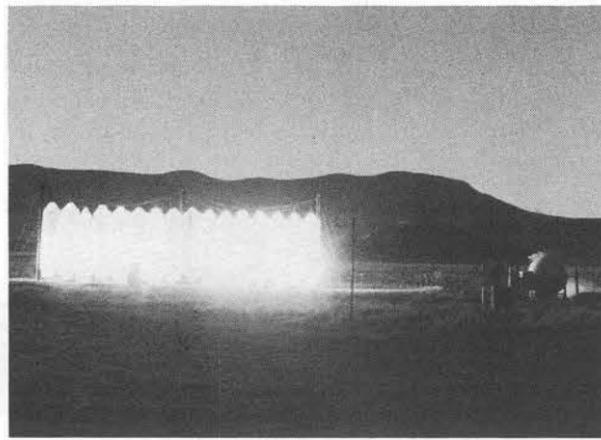
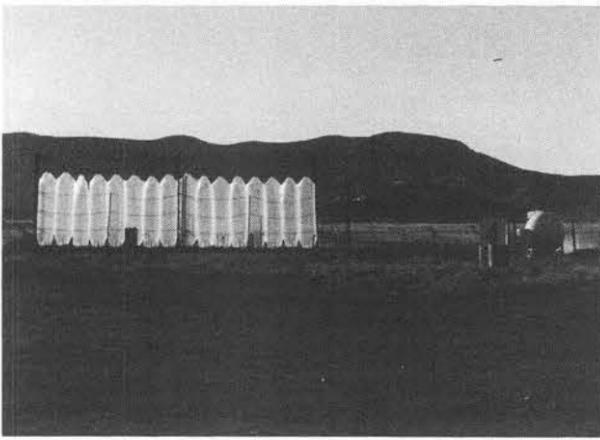
BARRELS AND BOXES WOULD BE ROLLED OR WINCHED out of cargo containers onto an elevator at the repository and lowered to the bottom of the mine where they would be transferred first to a dock and then onto this lowboy for transport to storage chambers. Two sets of rollers at 90 degree angles are used, one of which is hydraulically lowered to permit the other set to engage. Here, Howard Perdue (1133) steadies a load as it goes aboard lowboy for transport to a storage chamber while Leo Dunn (4541) looks on.



IN THE STORAGE CHAMBER, a forklift would remove waste containers from the lowboy and stack them. Instead of forks (which could puncture boxes or barrels), special gear was designed. Vertical pegs slip inside L-shaped outer corners on the metal containers and flat plates on the handling gear brace the container securely near the bottom. In this demonstration, Howard Perdue (1133) runs forklift.



LEO DUNN (4511) LOOKS OVER CUTAWAYS of the seam-welded metal containers Sandia is proposing as one method for transporting and storing low-level nuclear wastes underground. Model at left would house a plywood box filled with dry waste (gloves, wipes, etc.), model at right six metal drums.



TEST of a thermal simulator system was conducted for DNA recently near Area III. Sixteen oxygen-filled plastic bags functioned essentially as giant flashbulbs to produce 3800 K. Powdered aluminum was injected into the bags and ignited. The system, designed by Science Applications, simulates weapon thermal effects. Photometrics Division 1556 developed special instrumentation for the test. At left is Dale Fastle with electronic data gathering systems; Jim Flemins operates a field spectrograph. Irv Lenz provided photo coverage.

Fun & Games

Biking — We figure Larry Kovacic (1471) must take the distance record for commuting to work on a bike. He lives in Cedar Crest up on North 14. Larry says the downhill trip to the Labs takes 50 minutes, the return up to one hour and twenty minutes. Larry has volunteered as a Bike Guide (note other item on this page on this subject) in case anyone else on North 14 wants to join him.

Thanks to retiree Don Bliss, LAB NEWS has a fairly complete file of three magazines devoted to biking: *Bicycling*, *Bike World* and the *Bulletin of the League of American Wheelmen*. The file is available for browsing or borrowing. All three publications contain good technical data on biking, medical columns, and articles on touring or commuting by bike.

Running — Terry Bisbee (2654) and Henry Dodd (4716) returned to native ground when they participated last month in the Kansas University Marathon. Terry did the 25 miler in 3:04 and Henry in 2:49.

The Heart Association's Run for Life takes off tomorrow, May 19. For your \$3 registration fee you get the obligatory T-shirt, but you also get Frank Shorter's book on running. And a button. Entry forms: LAB NEWS office.

Dancing towards fitness — If you've ever run through your polka routine with music set to a fast tempo, there's no doubt in your mind that dancing can be strenuous. Now the C-Club's new recreation manager, Skip Dougherty, wants to start an "aerobic dance class," using a number of dance steps combined into a routine guaranteed to raise your pulse rate and, thus, to achieve cardiovascular fitness. It should be fun, and Skip says you don't have to be a dancer to begin with. Call him on 265-6792 if you're interested.

Swimming — A Masters' Swimming Program, for people over 18, is being offered by the Base and begins Monday next, May 21, at the Olympic pool. Under the program, coach Kevin Neilson prepares swimmers for competition or, for those not competitively inclined, simply makes better swimmers of those who come out. It's a five-day a week program, there's a nominal fee, and if you're interested call Major Fowler, 266-0831. Swimming sessions are set around the noon hour.

Golfing — In last month's Scramble Tournament, first place with a total score of 66 was taken by the team of Dave Kendall, Ralph Campbell, Beryl Hefley and Larry Larsen. The second and third place teams came in with scores of 67 and 69.

Bad Back?

Try Exercise Class

For those with back problems, exercise often gives more relief than medicine — and certainly the benefits are longer lasting. Strengthening the proper muscles often relieves chronic lower back pain and there's no faster way to strengthen a back after surgery.

Fifteen Sandians with back problems (and 15 only) can explore the benefits of exercise by signing up for a class sponsored by Medical Directorate 3300. The class, taught jointly by a physical therapist and an instructor in body awareness, begins May 31. It will meet Tuesdays and Thursday for four weeks from 5-6 p.m.

To join, call Wanda Cupp in Medical at 4-7169.

Want To Bike To Work?

Last issue we noted the many Sandians who have thought about biking to work but have put off actually doing it because of apprehension about which route would be best for bike commuting.

One answer to this problem, we stated, would be a bike guide — a veteran biker who lives reasonably close to the would-be biker and who would be willing to serve as a guide to the Labs until the novice got to know the route(s). Presumably, the veteran would know the optimum, least-traffic route, both going and returning.

In response to our request for volunteer bike guides we were gratified to receive over 35 replies. The bike guides have been compiled into a listing which gives, besides name, address and phone numbers, the nearest arterial intersection of the bike guide's residence. So if you would now like to begin biking to work, give LAB NEWS a call on 4-1053 and we'll send you a copy of the bike guide list.

Events Calendar

Tonight and weekends through June 3 — "Three Men on a Horse," Corrales Adobe Theatre, 8:30 p.m., 898-3323.

May 18 — Concert by Taos musician Tom Ehrlich, original works for hand-drum, other percussion instruments; Downtown Center for the Arts, 216 Central SW, 8 p.m.

May 19 — A May Musical Celebration, classical and jazz improvisational music plus classical guitar; Albuquerque United Artists and Community Cultural Affairs Program, 8:15 p.m., KiMo Theater, tickets \$4 at door, 766-4658.

May 18-19 — N.M. Symphony Orchestra and Chorus concert, 8:15 p.m., Popejoy.

May 20 — "The Story Painters," adaptations of fables, stories, legends, music and poetry geared toward children, 2 p.m., Old Town Plaza.

May 20 — Chamber music by The Bosque Trio, 2 p.m., tickets \$2 general, \$1 students at the door, Kimo Theater.

May 27 — May Day at the Zoo, performance of Art-in-the-Parks groups, 12-5 p.m., Rio Grande Zoo.

June 1, 3, 5, 7, 9 — June Music Festival, The Guarneri String Quartet, Woodward Hall, UNM, 8:15 p.m., 265-3689.



SANDIANS participating in the upcoming car show sponsored by the New Mexico Car Council (which includes 50 clubs ranging from the Model A Club to the Corvette Association) include Roger Campbell (2631), Ken Bixler (4321) and Terry Bisbee (2654). Roger has owned his classic 1931 Ford slant windshield 4-door Model A sedan since 1972. He spent more than a year

restoring it, and has since driven it more than 15,000 miles. Ken spent almost a year scrounging parts and restoring his 1942 Harley-Davidson motorcycle originally built for the U.S. Army. Terry occasionally drives his '76 Corvette to work, plans to show his classic 1955 Chevy in the show. Some 150 cars will be on display Sunday, May 20, at the State Fair Grounds from 10 a.m. to 4 p.m.

Transmits Signal

Electronic ID Badge Developed

An electronic credential system which automatically detects passage of people into or out of controlled areas has been developed and successfully field-tested by Sandia Laboratories.

The system includes an entry/exit portal, which looks much like an airport metal detector, and a small credential badge worn by workers. The badge, activated by an alternating magnetic field produced by the portal, transmits a signal to a receiver/decoder.

"When the system is placed at strategic locations such as corridors or doorways leading to critical areas," says project engineer Thurlow Caffey (1584), "it automatically monitors, identifies, and electronically logs the individual credential badge entering or leaving the area."

Major advantages of the system are: (1) the badges are long-lived because they use no batteries; (2) they are detected automatically when they pass through the portal; and (3) individual badges can be detected and accurately counted even though separated by as little as two feet when they pass through the portal.

This means, says Thurlow, that "two Olympic sprinters with badges attached to their uniforms could run through a portal just an arm's length apart and still be detected by the system."

The basic system consists of a multi-turn coil or loop, called an exciter. This loop, which is wound within the portal, transmits a

continuous tone of 112kHz. The badge, which weighs only one ounce, also contains a loop that transmits bursts of a 56kHz tone when passed through the portal. These signal bursts, transmitted back to the portal, contain a unique code for identification of the badge. When the signal is decoded, it is sent to a computer which notes that the badge has either just entered or exited the portal.

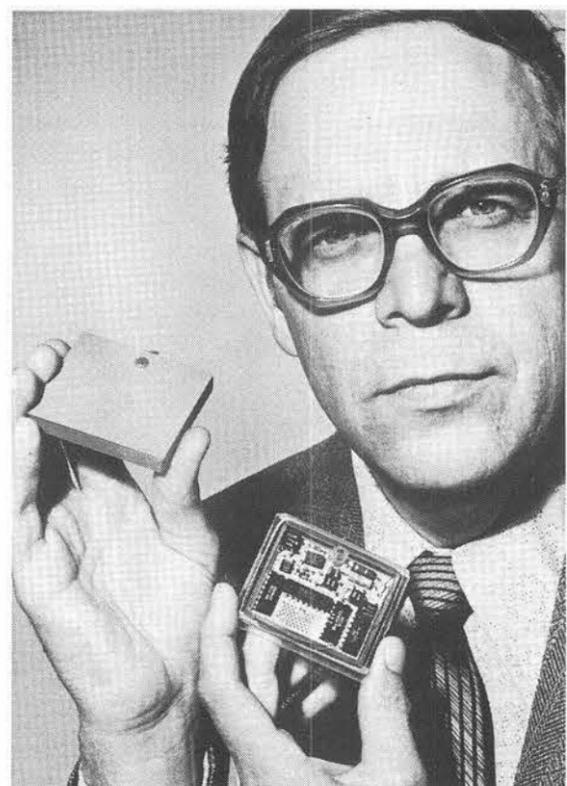
Depending upon the needs of the user, the badge's transmitted signal can trigger other actions. It can deny access to an area, for instance, if the allowed number of badges is already logged into an area.

Also, in the event of an emergency — for example, an accident within a facility — the system could be designed to identify any workers in the danger zone.

The credential system can be incorporated into a physical security system if measures are taken to insure that the credential badge is being worn by the person to whom it was issued.

"This can be done by several methods," Thurlow says. "For instance, the badge's code could instruct a computer to call up a photograph of the person authorized to use a particular badge. TV monitors at a guard station would then show pictures of both the photograph and the badge wearer."

For its successful field test, the self-energized credential system was incorporated into a Plutonium Protection System developed by Sandia for demonstration at a government nuclear facility.



NEW BADGE — Thurlow Caffey (1584) holds personnel badges designed and developed at Sandia as part of a self-energized credential system used to detect passage of people into or out of controlled areas. "See-through" model shows arrangement of electronic components.



If you've got the fidgets, this might be a good time to take a test. A Univ. of California physiologist reports that fidgeting test-takers get better scores. Seems foot tapping and paper crumpling increase blood flow circulation and that in turn stimulates the brain. No mention is made in the reports on the efficacy of jogging or other more radical forms of fidgeting.

To Be Slender — A Matter of Calories, Exercise

By Susan Brammer, Nutritionist, Sandia Medical



Although the theory underlying weight reduction is beautifully simple (eat less, exercise more), in practice it is not so simple for many of us, or we would all be slender. The fact that so many Americans have a weight problem is ample evidence (excuse the pun) that most diets do not work.

A lifestyle that emphasizes sensible eating habits along with regular exercise is the key to weight control. A knowledge of the caloric values of your favorite foods and beverages can be very helpful in developing sensible eating habits. The "calorie makers," from most to least, are fats, alcohol, protein, and carbohydrates.

A caloric frame of reference may be helpful. A pound of stored body fat equals 3500 calories. The average male can lose one pound per week, the recommended rate of weight loss, on about 1500 to 1800 calories per day, while the average female can lose at this rate on about 1200 calories per day.

Fats, needed by the body mainly for energy, are the most concentrated source of calories at 9 calories/gram. In fact, fat is more than twice as concentrated a source of calories as either protein or carbohydrates. Limit fat and you limit calories. Here are common sources of fat: butter, margarine, fried foods, salad dressings, meats, dairy products, and rich foods such as pie crust. The best ways to lower caloric intake from fat are to take

smaller portions of lean meats, eat fewer fried and rich foods, and use lowfat dairy products.

Alcohol, also a concentrated source of calories at 7 calories/gram, adds nothing in the way of nutrients — only calories. For example, a four-ounce glass of wine contains 100 calories.

Protein, to build and repair body tissue, contains 4 calories/gram. But protein is rarely pure and is usually found in combination with fat. For example, over 60 percent of the calories in a prime rib come from fat, the rest from protein. Therefore, foods we commonly think of as good sources of protein — meat, fish, poultry, dairy products, nuts, and grains — are really higher in calories than 4 calories/gram. An easy way to lower caloric intake from protein is to keep meat or main dish serving sizes small. Fill up on the low calorie green vegetables and salads.

Carbohydrates, a term covering both starches and sugars, are needed by the body for energy. Common carbohydrates are starchy vegetables, pastas, breads and cereals, and all types of sugar including table sugar, honey, jams and jellies. Carbohydrates contain only 4 calories/gram. This fact surprises many people because carbohydrates have an undeservedly bad reputation as being fattening. We get into caloric troubles with carbohydrate foods by loading them up with calories, for example by putting lots of margarine (at 100 calories/tablespoon) on a baked potato (at 100 calories per average-size potato).

The best way to become familiar with the caloric values of common foods is to buy a calorie counter booklet, available in most supermarkets for about 50 cents. Then begin to put your calorie knowledge to work. For example, when choosing a topping for a baked

potato, which would have fewer calories, a tablespoon (T.) of margarine or a tablespoon of sour cream? It's the sour cream, which has only 30 calories/T. versus 100 calories/T. for butter or margarine. The difference is due to the percentage of fat in these items.

Ideally, about 30 percent of total daily calories should come from fat, 12 percent from protein, and the remaining 58 percent from carbohydrates. To achieve this pattern, most of us need to decrease our fat intake and increase our carbohydrate intake (especially of starches).

Exercise is helpful in weight control. Moderate exercise often decreases appetite and, of course, it burns up calories. As a rule of thumb, walking or jogging one mile uses up 100 calories. Further, exercise makes you feel good.

To encourage weight conscious Sandians, Szabo Food Service, with advice from Sandia's Medical Department, has started a nutrition awareness program, called "B-Fit," at the cafeteria. Selected menu items will have their caloric content posted. To help you plan and select a well-balanced diet, "Basic Four Food Charts" are now available in the cafeteria. The charts have been provided by the Dairy Council.



If safety is one of your major concerns, you might give some thought to traveling exclusively by elevator. It's three times safer than going by car according to a Michigan Department of Labor study which notes that only one person is killed for every 100 million miles of elevator travel (compared to three for the same number of miles traveled by car).

Polaroid Developer To Give Talk

The chief executive officer of the Polaroid Corporation and developer of the instant picture camera, Edwin Land, will discuss his theories of color perception during a Sandia Labs colloquium at 10 a.m. May 23, at the Kirtland AF Base-st Theater.

In his talk, "The Role of the Retinex in Color Vision," Land discusses optics and color, showing inconsistencies in the classical concepts of how color is sensed. Land has shown in a variety of experiments that color is not dependent upon the relative amounts of the primary colors coming into the eye, but instead is based on at least three independent image-forming mechanisms called retinexes.

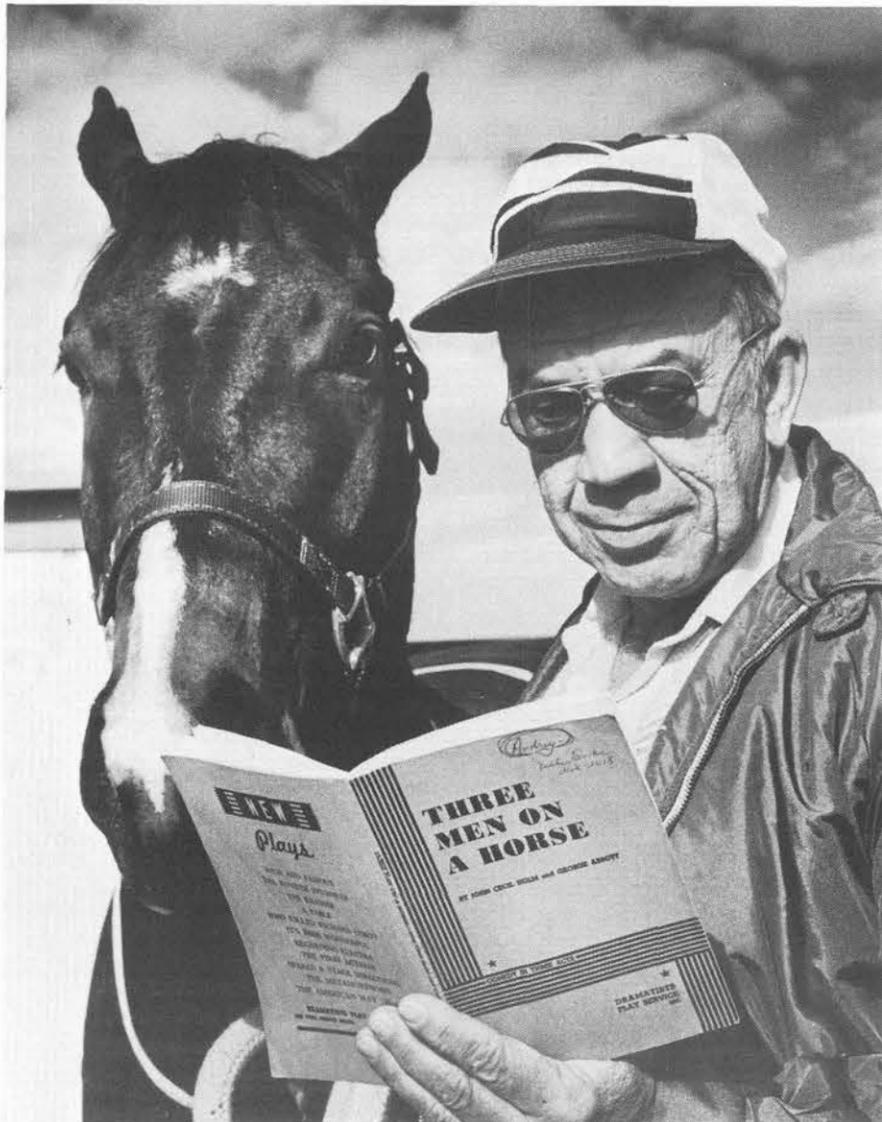
Land has been chairman of the board and director of research for Polaroid since the corporation's inception.

Retiree Picnic Set

The 14th annual picnic for Sandia retirees is set for Tuesday, May 29, from 4 to 7 p.m. at the Coronado Club. With more than 1700 retirees, a large turnout is expected. Parking is available at both the C-Club and the NCO Club, and a shuttlebus will operate from the NCO parking on "B" St.

Members of the Large Staff will be joining retirees and their spouses. Sandia retirees now reside in 39 states and 2 foreign countries.

"I WANT TO TALK to you about a weight restriction ..." *Three Men on a Horse*, a comedy directed by Phil Mead (3151) opened last night at Corrales Adobe Theatre, runs tonight through Sunday. Performances are also scheduled Thursdays, Fridays, Saturdays and Sundays through June 3. This is the eighth play Phil has directed. He's more a performer, having appeared in some 50 productions here and in California and has also had parts in several movies. Corrales Adobe Theatre has four more productions scheduled through the summer. Season tickets cost \$15, are good for five admissions and are available from Joe Laval (3163), 4-6531. For reservations call 998-3323.



Jemez Country

"Jemez Country." For anyone who has been there, these words conjure up a vision: red sandstone canyons, red earth dotted with piñon trees; cottonwoods along a stream; ponderosa pines and tumbled boulders in a canyon filled with the sound of snow-fed torrents; quiet glades with wild flowers where the only sound is a whisper of aspens.

This was the environment which was sustaining inhabitants of the canyons and mesas when the conquistadores arrived. The years under Spanish domination were years of change for the Jemez people. Along with their work of conversion, the Franciscans taught the young Indian boys to read and write and to sing for church services. They taught crafts too and introduced better irrigation methods which tended to bring together the scattered pueblos because they were then better able to utilize the small plots of arable land. Two settlements evolved: one on the site of present day Jemez Springs where the ruins of the old mission, San José de Jemez, are now a state monument, and the other near the present pueblo.

But 17th century Jemez was not a peaceful place. Navajos continually harassed, and conspiracies against the Spanish were always fermenting. The Jemez people were being hanged by the Spanish for their revolts or ambushed by the Navajos.

Revolt, abandonment and re-establishment of the villages was a way of life for about 100 years. Following the reconquest of New Mexico in 1692, the Jemez people staged one last fight against the Spanish in 1696. Defeated in a fierce battle, the people fled to Navajo country, deserting their mesas and canyons for several years. When finally they returned, they resettled near the site of the present pueblo.

Missionary Fray Joaquin de Jesus Ruiz wrote his *Observations*¹ in 1776 while assigned to Jemez. Here is his description of life at the mission — and it was probably much the same during the 16th century.

Mass — "... Each couple has its own place designated in accordance with the census list. When there are many, the married couples make two rows on each side, the two men in the middle and the women at the sides. This may seem a superficial matter, but it is not, for experience has taught me that when these women are together they spend all the time dedicated to prayer and Mass in gossip, showing one another their glass beads, ribbons, medals, etc., telling who gave them to them or how they obtained them, and other mischief. Therefore the religious who has charge of the administration must have a care in this regard. After all, it is a house of prayer, not of chitchat.

"From the pulpit to the altar on the Epistle side are seated in order the boys receiving instructions in doctrine . . . The girls are on the Gospel side. Beside them are the two fiscales mayores [minor functionaries] and their subordinates, six in number, so that they may not permit them to play games and laugh (which they do even under this regime) or play pranks or fall asleep or draw unseemly things on the wall.

"Do not entrust the key of the baptistry to the sacristans. Take great care lest they steal the holy oils and consecrated water for



JEMEZ STATE MONUMENT — These ruins of the Mission of San Jose De Jemez are on the north edge of the town of Jemez Springs. The monastery across the road from the ruins was once the site of one of the ancient Jemez pueblos. As early as 1601, a rude chapel existed at this site; historians suggest that the mission was constructed between 1617 and 1621. Fray Alonso de Benavides visited Jemez in 1626 and reported to Philip IV of Spain that the people had been scattered and decimated by famine and war but had been gathered together at two missions. He described San Jose as "... still standing, having a very sumptuous and attractive church and friary ..."

their superstitions. Remove the water from the font in winter so that the bowl may not be damaged by ice.

"Keep your cloth vestments in your cell, for even if the chest in the sacristy is good, there are many mice."

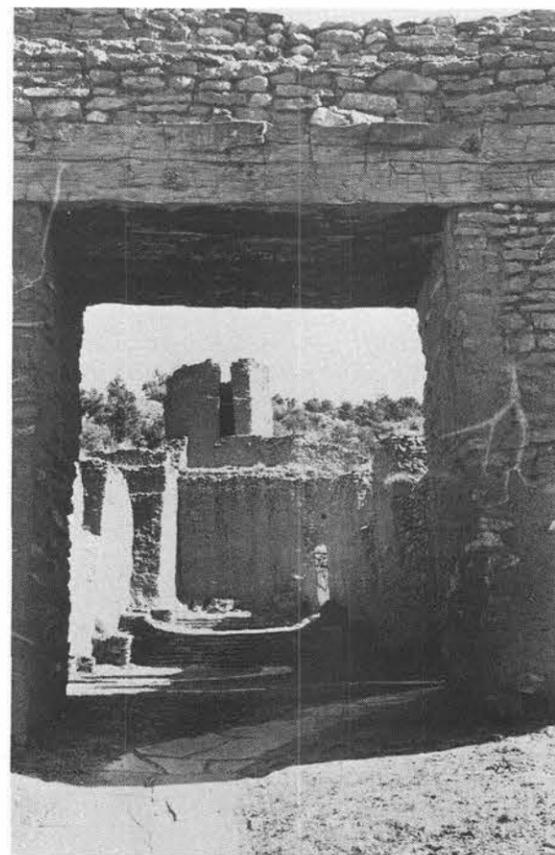
Wood for Winter — "... On Sunday when they come to Mass, all without exception bring two logs for the father, the sacristans, and the cooks. Keep this wood in a room, for if you do not, they will take it away again and you will congeal with cold before they bring it back ..."

Harvest — "... If you do not watch the fiscales, they will take it [the wheat] to the threshing floor, either with the intention of carrying it off that night or of letting it get wet and damaged so that they may have an excuse to take it, for they use it in this condition for the bread they make. If there is a fresh breeze early the next day, have them take it to the threshing floor, which is opposite, and keep all the boys and women away, for they will carry it all off, pretending it is chaff . . . If the fiscal undertakes to have those children under instruction help, give it all up for lost . . . By no means allow the women to take part, for if they go to the cornfields to weed, they cover the grass and join the older youths in wanton and wicked dalliance . . ."

When you next drive through the Jemez country, add another dimension to your enjoyment. Imagine the Indians, the Friars, the soldiers, the traders moving up and down the canyon. Life couldn't have been all toil and turmoil in such a setting.

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¹-Adams, Eleanor B., and Fray Angelico Chavez
1956 *The Missions of New Mexico 1776*.
Albuquerque: University of New Mexico Press.



Retiring



Marge Smith (1522)

Through Barranca del Cobre With Brush & Easel

As a vacation spot, the Grand Canyon of Mexico isn't exactly Palm Springs or Miami. It's something of a hassle to get there, and no picnic after you arrive. But Doug Ballard (1551) and his wife, Pat, went once and could probably be persuaded to do it again.

The area they visited (and painted and sketched) is 300 miles SW of El Paso in the heart of the Sierra Madre Mountains, one of the most rugged areas on this or any other continent, and home of the Tarahumara Indians, one of the most primitive tribes in Mexico. They have lived in virtual isolation in Copper (Cobre), Urique and Tararecua Canyons since the 17th century (when they fled there to escape persecution by both the Spanish and the Mexicans) until 1961. That was the year the Mexican government, after an 80 year effort, finally completed the Los Mochis Railroad (575 miles long, 86 tunnels, 39 bridges) that links Presidio, Texas, with Los Mochis on the Gulf of California. Between the two, it traverses a long section of the Continental Divide along the backbone of the Sierras.

"I first read about the Tarahumara in the May 1976 *National Geographic*," Doug says. "Pat and I talked then about a painting trip. So when Milford Zornes, a watercolorist with whom we'd studied before, offered a two-week workshop, we just packed our bags and brushes and went."

The group of 12 met in El Paso, went by bus to Chihuahua, then into Tarahumara country in single engine aircraft.

"There were four of us in each plane," Doug recalls. "Our baggage was piled all around us and we were holding our easels. When the pilot wheeled out another cart, I told him I thought we were overloaded."

"'Oh, no, señor,' he assured me, 'We still have plenty of room for beer.'"

It was a two-hour flight to the end of the Tarahumara range. The pilots flew right down the canyons and buzzed the mesa-top settlements. Normally, Doug says, they'd land if they saw a signal fire indicating someone was sick or the Indians had craftware to sell or trade. On this trip they were too loaded to land, but they buzzed the settlements anyway.

"It didn't take long to realize that there wasn't anywhere to crash land," Doug says. "One woman claims to have spent the entire two hours with her hands over her eyes."

When they reached their destination, the village of Cerocahui, the winds were so variable and the valley so deep, the pilots circled three times to line up on the short dirt strip.

"We saw Tarahumaras (which means foot runner) running out of the village on our first pass," Doug says. By the time we landed, several of them were already at the airstrip, which was over a mile out of town. They each ran back into town carrying 40 or 50 pounds of baggage. Some of them made two roundtrips before the carryall arrived from the motel to take in the passengers."

During the trip, the group spent three days each in Cerocahui (the place of the grasshoppers), Bahuichivo, Divisadero and Creel.

"We painted about six hours a day," Doug says. "Then we'd go back to the motel for critiques. Pat and I painted fast and our watercolors were more like sketches than finished paintings."

They also filled several sketch books and took several hundred slides. Asked about lodging and food, Doug says the motels were primitive but clean and the food simple but



IN THE VILLAGE OF SISQUICHI — Doug Ballard (1551) sketches with the interested assistance of Indian children. Village was reached by four-wheel drive jeep. As part of a workshop group of painters, Doug and his wife, Pat, painted and sketched up to six hours a day.

nourishing. Electricity was produced by gas generators and available only three hours a day, one hour in the morning and two at night.

"Most of the staff at the motels were Tarahumara," Doug says "and the law prohibits serving liquor when Indians are present. When the staff left at five, they'd ring a bell which meant you could go to the bar and buy a drink."

Doug and Pat felt they were documenting a way of life that's disappearing. No longer persecuted, contact with the outside world is changing the Tarahumara, none the less. They still follow the seasons, wintering in the tropical bottoms of the canyons, working their way up the canyon walls in the spring with their goats and sheep, spending summer at 8000 feet on the high plateaus where they raise corn. But their society, says Doug, is changing fast.

"The traditional ways are still there," he says, "but how much longer that will be true is hard to say."

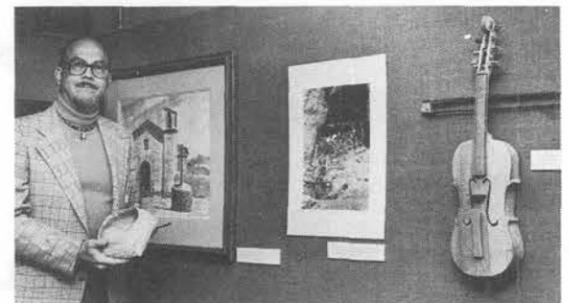
By majority vote, the group returned to Chihuahua by train, then spent two days at a modern hotel featuring hot baths and swimming pools. Doug's exhibit of the trip — some of the paintings, photographs and craftwork — came down recently in building 802. Those who missed it should plan on visiting the Ballard booth at the New Mexico Arts and Crafts Fair in June.

"We'll have all of our Tarahumara paintings done by then," Doug says.

Any special reason?

"It's an absolute necessity," Doug says. "In July I'm flying 80 miles north of Nome, Alaska, into Eskimo country for two weeks of sketching, painting and photographing a gold mining operation run by an old college friend."

And so it goes. Just one ho-hum vacation for the Ballards after another.



AS PART OF THEIR TRIP TO TARAHUMARA COUNTRY in Mexico, Doug Ballard (1551) and his wife Pat painted, sketched, photographed and collected examples of craftware. Here Doug displays a handwoven bear grass basket. Behind him is his watercolor painting of the mission church in Cusarares (the place of the eagles). In photo at center, a typical Tarahumaran cave dwelling. Crude violin was carved from native woods to a design copied from models introduced by Spanish priests in the 17th Century. It's played with a horsehair bow.

Logistics — Total cost for the two weeks (excluding fees to the University of Oklahoma) was roughly \$400/person. This included bus, plane and train fares from Albuquerque to El Paso to Chihuahua to Cerocahui and back again. Transportation costs would vary depending on the mode of travel you chose. Rooms and meals in Tarahumara country cost between \$14 and \$16 a day per person, but rates have undoubtedly inflated. Doug has brochures and addresses where you can check on current prices and make reservations. ● cec



They finally invented a fluorescent light bulb that can be screwed into an ordinary incandescent bulb socket — which is good news for anyone who's ever struggled to replace one of those long, unwieldy tubes. It could also be good news for the nation. Fluorescent bulbs are three to four times more efficient in converting electricity to light than Edison's incandescent lamp. By one estimate, if the two billion incandescent light fixtures in the U.S. were all using fluorescent bulbs, national annual electricity consumption of two trillion kilowatt hours could be reduced by 150 billion kilowatts.

MILEPOSTS
LAB NEWS
MAY 1979

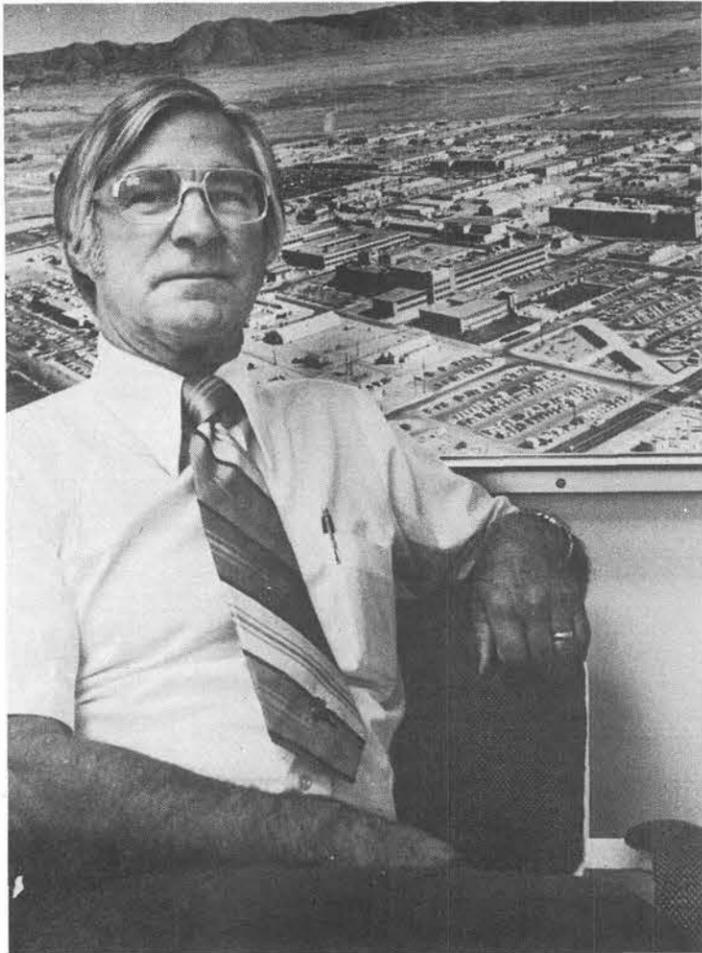


Helen Richardson - 5530 15



Juan Serrano - 3426

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Ted Sherwin - 3160

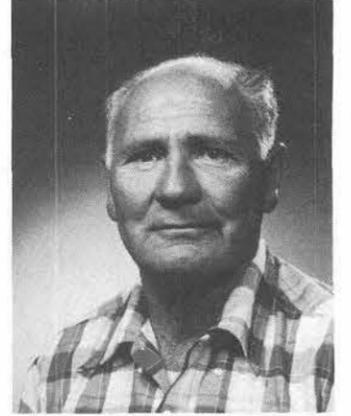
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Gene Frye - 1472 25



Bob Bailey - 4322 30



Don Sonnier - 3618 25

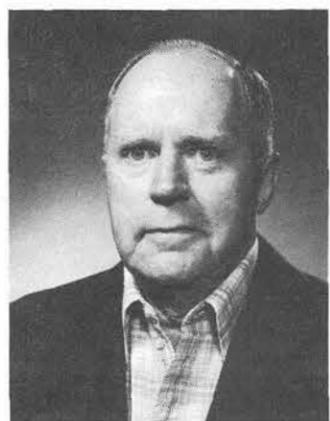


Harold Schulte - 2457 25



Mary Bacon - 3154

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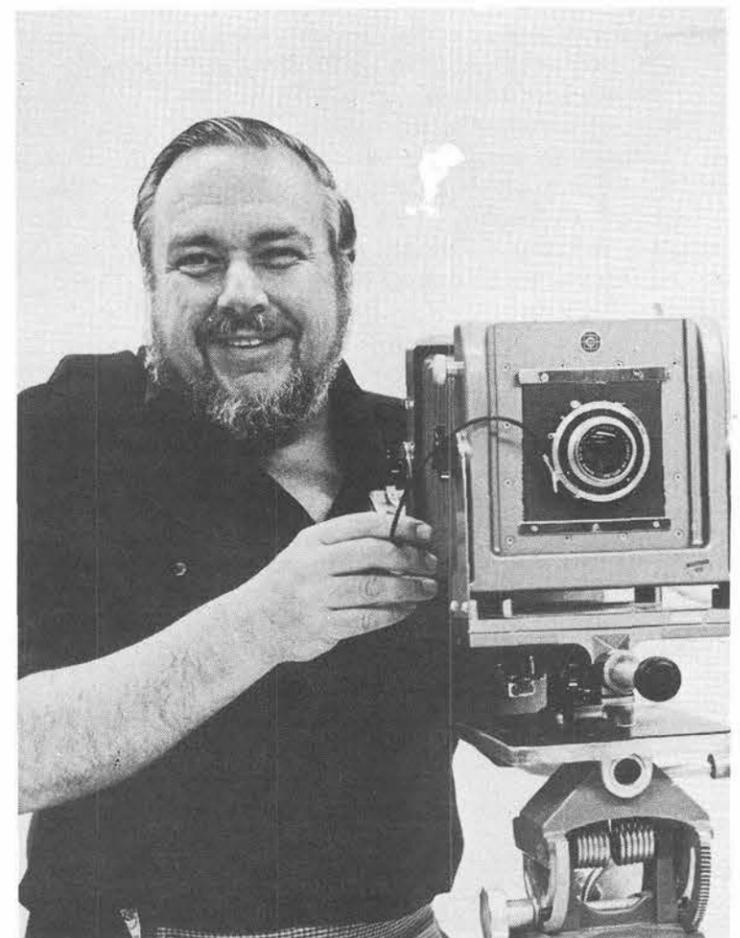
George Johnson - 2553 25



Ed Sanchez - 3618 15

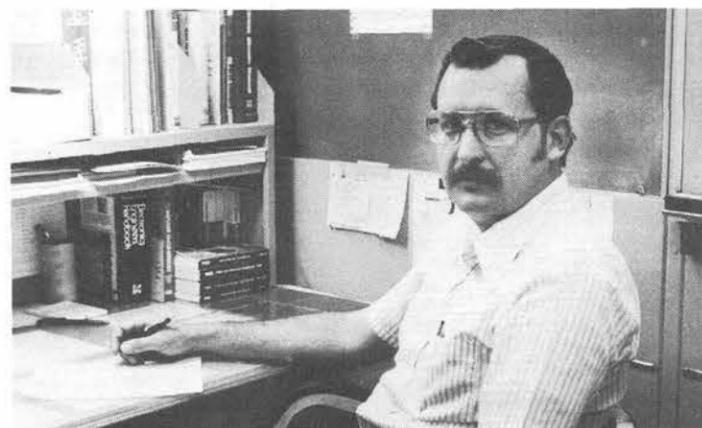


Bernie Hulme - 5642 10



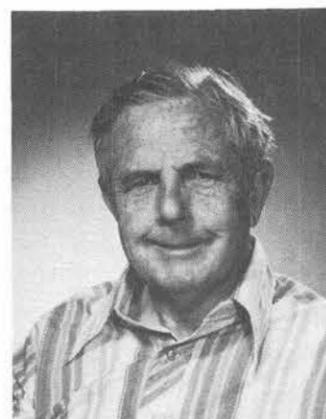
Bob Ezell - 3154

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Terry Unkelhaeuser - 2648

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Tom Harrison - 4721 25



SOFTWARE SYSTEMS TEAM Ron Domres, John Brabson, Joe Ashcraft and Doug Brown (all 2641) spent six months developing software for the system package BART (Batch Access for Remote Terminals). Replacing several existing software packages, BART will be used with the new Modcomp mini-computer based terminals. The first of these terminals has been installed in Area IV (Electron Beam Fusion Facility), and others will replace terminals in Bldgs. 806, 836, 880, 632 and Area V. BART means more terminal sites, greater reliability and increased capability in the form of hardcopy graphic plotters at several sites. Future plans call for all scientific remote batch terminals and the upcoming mini-computer network to be connected to BART, thus providing a common command language for all batch terminal users. Some terminals will also have a classified mode available. Team members not shown are Jack Hudson (2641) and Hugh Walker (1523).

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

MISCELLANEOUS

HAMSTERS, 2 female, free. Shipley, 298-2433.
 CAMPER for pickup, 11' self-contained, cab-over, shower, gas/110VAC refrig., stove, heater, carpeted, jacks, \$2300. West, 299-7314.
 BABY BED w/innerspring mattress, \$35; crib w/foam rubber mattress, \$10. Gregory, 299-2461.
 FREE STANDING vented natural gas room heater, 15,000 BTU, complete w/blower, vent pipe, gas line, \$75. Ottinger, 242-7935.
 EQUALIZER trailer hitch, draw bar, head w/ball, torsion bars & trailer clamps, complete & ready for installation, \$100. Hill, 256-3507, 821-0042 p.m.
 IDLE-TIME camper, insulated, unfinished, short wide bed, 1 yr. old, \$350. Marshall, 281-5821.
 GOLF CLUBS, set of 9 Ben Hogan Apex irons, \$85; 19" color TV, portable/stand, \$150; water skis. Chandler, 296-3323.
 BALDWIN Orga-Sonic concert organ w/Leslie speaker, solid walnut cabinet & bench, \$750, consider offer. Lyon, 299-9423 or 884-8515.
 FRENCH HORN, Holton Farkas double, nickle plated, case & accessories, \$750. Kerr, 299-7527.
 YARD SALE: furniture; clothes; household goods; some antiques. May 18, 19, 20, 8 a.m.-6 p.m., 1111 Major NW. Warrick, 344-5057.
 DISHWASHER, Whirlpool port., hoses & connections included, white, \$35. Mattil, 294-0331.
 ORANGE velvet swivel chair, contemporary, \$35 or best offer. Monk, 881-0784.
 COMPRESSOR w/everything, \$300; grinder-composter, \$250; bench saw w/almost everything, \$250; work benches, \$50 ea. Calek, 281-3285.
 GARRARD turntable Z2000B w/Sure cartridge, Fisher speakers XP85A 50W-RMS, Marantz receiver model 2230, sell as a set. Newman, 256-9174.
 2300 ALCAM MAX FIRE small rifle primer, sell or trade for large rifle primers or anything I can use. Stuart, 299-9190.
 FIBERGLASS hardtop for 1969-72 Chev. Blazer or Jimmy, \$400. Myers, 298-2677.
 TRAVEL TRAILER, 1978 17½', rear bath, 46-gal. water, 2 holding tanks, refrigerator, range, oven, battery, \$3995. Ludwick, 296-6447.
 ROYAL COACH camper, 10½', self-

contained, refrig. is gas or elec. Harrison, 883-5411 after 5.
 GRASS TRIMMER, stand-up, 110V, \$10. Merritt, 884-8487.
 15-METER BEAM ANTENNA, \$40. DePew, 255-3231.
 WASHER/DRYER combination, apt. size, 3 yrs. old, Frigidaire, 220V, \$150. Damrau, 881-4576.
 NORWEGIAN ELKHOUND, all shots, spayed, license, \$40; Panasonic 5 cu. ft. refrig., \$100, Barnard, 831-4114 evenings only.
 REAR BUMPER for Ford pickup, \$25; 2 650x16 truck tires, almost new, \$20 ea. Kennedy, 293-9455.
 CABOVER CAMPER, 8½', \$495. Myers, 821-8318.
 AIR COMPRESSOR, Wards ½ hp, 2 cfm, 40 psi, 110 VAC, \$125. Marchi, 299-3653.
 ROUND OAK TABLE, large, antique, \$275; small desk, \$15; map-blueprint file, \$15; modern office chair, \$12. Sander, 299-5761.
 COLOR TV, Maganvox 21" console, \$80; brown vinyl couch, needs rework, \$40; box springs, \$15. O'Connell, 255-6575.
 SEARS 4'x18' swimming pool; Suzuki 550; Simca, '68 4-cylinder. Apodaca, 299-8515.
 AIR CONDITIONER, Sears, refrig., 220V, 13,500 BTU/hr., used one season, casement type, approx. 15"x20"x24" deep, \$150. Parsons, 897-2726.
 HEADER MUFFLERS, 1 pr. used 4 months on '66 Mustang 200; will throw in headers needing repair, \$30. Kepler, 298-5652.
 FREE to good home, small male dog, half poodle, half cocker, less than 1 yr. old, housebroken, shots. Snelling, 294-5751.
 SEARS Pakapottie port. toilet, new price \$70; used once, \$50 for toilet & supplies. Berg, 296-2695.
 47-PIECE Franciscan earthenware fruit pattern, \$50; karate uniform, new Castello brand, size 1, \$12. Gregory, 268-2022.
 CHEST, 10-dwr., dbl. headboard; toy box w/attached shelves. Widenhoefer, 298-2510.
 REFRIGERATED air conditioner, GE, 8500 BTU/hr., 115V, high efficiency, used 2 summers, \$200; blown glass hanging lamp, \$15. VanDenAvyle, 898-6474.
 SEARS swimming pool, 15'x3', w/all chemicals, 300 gals., used 2 summers, new price, \$90, \$80. Davis, 294-0139.
 MAPLE HEADBOARD for twin bed, \$7; 3'x6' Brunswick air hockey table, \$50 or trade for folding ping pong table. Lohkamp, 298-6494.
 UTILITY TRAILER, Wards, one-wheel. Make offer. Cover, 881-3860.
 MARTIN 12-STRING guitar w/hardshell case. \$375 or best offer. Cook, 299-5061.
 NINE ARIZONA CYPRESS trees, 8' tall, \$8 ea. Esterly, 881-1973.
 COUCH, white, \$50; Juarez chandelier, green glass & wrought iron, \$30; 6' chrome & glass etagere, \$50. Graham, 1100 Glorieta NE, 293-8823.

TRANSPORTATION

'67 MG 1100 sedan, 4-dr., rebuilt engine, radial tires. Westfall, 881-1184.
 '74 OLDS Cutlass Supreme stn. wgn., AC, AT, PS, PB, low mileage. Braasch, 268-8416.
 FISHING/SKI boat, 15' Starcraft, 85HP Johnson outboard, trolling plate, anchor, bait lights, HD trailer, \$2600. West, 299-7314.
 '78 FIAT Spider conv., AM-FM cassette, lug. rack, mag wheels, below book. Humberstone (Los Alamos) 662-9634.
 '78 CHEV. pickup, ¾-ton, long bed, Scotsdale Deluxe, AT, PS, PB, AC, fiberglass camper shell, 15,000 miles, reg. gas, \$6900, take trade. Roeder, 881-9472.
 '65 VW BUG, rebuilt engine, good gas mileage, \$795. Trowbridge, 299-1819.
 SEA RAY 22' cruiser, head, galley, dinette, teak platform, camper canvas, sleeps 6, 188 Mercruiser, Boyes, 281-1171.
 '63 CORVAIR 4-dr., orig. owner, AT, R&H, S.R. tires, \$1500. Kerr, 299-7527.
 '65 OLDS 88, orig. owner, PS, AC, \$850. Johnson, 298-1011.
 JEEP, CJ2, V6 engine, roll bar, bucket seats, vinyl top, \$1600. Hammons, 281-1205.
 '77 CHEV. Bonanza C-10, AT, PS, SB, 6-cyl., 19,000 miles, camper shell, orig. owner, \$4400. Chandler, 292-3893 after 1 p.m.
 '71 PONTIAC Trans-Am, 400 V-8, 4-spd., new upholstery, orig. paint, stereo, \$2500. Daut, 255-2529.
 '72 HONDA CB-450, 30,000 miles, fairing, new battery, chain & front tire; 10-spd. Motobecane, Suntour derailleur, Michelin tires, alloy crankset, fits person about 5'9" tall. Lagasse, 299-8357.
 CB 750K HONDA, 4800 miles, accessories: Windjammer SS w/lowers, lug. rack & trunk, cruise control, radio panel (no radio). Aldaz, 294-4803.
 '77 HONDA XL100, 2900 miles, adult ridden, 80 mpg, street legal, \$675 or best offer. Schulze, 898-2880.
 '77 CHEVROLET Impala, 4-dr., AT, PS, PB, AC, Cruise Control, 37,000 miles, \$3800. Keeling, 296-9729.
 '69 CHAMPION motor home, dual gas tanks, self-contained, fully equipped, dual wheels, Dodge frame, 58,000 miles. Priddy, 884-8392.
 '72 PONTIAC Ventura II, 32,000 miles, 307 V8, AT, PS, radio, \$200 below book, \$1375. McIlroy, 299-4977.
 '78 PONTIAC Bonneville Brougham 4-dr., AC, PS, PB, PW, power seats & locks, tilt wheel, cruise control, AM-FM stereo, below book. Giles, 821-8638.
 '72 DATSUN 510, low mileage, new tires, clutch, brakes, alternator last 6 months. Lane, 298-3366.
 '78 MERCURY Monarch, AT, AC, PS, PB, cruise control, vinyl top, sports package, 6-cyl., silver w/maroon trim, only 1600 mi, owner deceased, \$4850. Walter, 298-0471.
 '77 OLDS CUTLASS, 2-dr, V-6, 17-20 mpg, 29,000 miles, air & power,

AM/FM 8-track stereo tape. Syme, 296-4758.

REAL ESTATE

TWO ACRES in Peralta, bounded by Riverside Estates & the bosque, irrigated, in alfalfa, \$32,000, terms. Watterberg, 294-6759.
 1½ LOTS & 12'x60' mobile home, well insulated, partly furnished, 2-bdr., 1¼ bath, fenced, near Elephant Butte Lake, \$17,500. Cordova, 881-2209.
 LARGE NW HOME, 5-bdr., 2 baths, FR w/fp, LR w/fp, lg. country kitchen, walking distance to school & shopping. O'Malley, 836-0092.
 SANDIA HEIGHTS, 1-yr. custom, energy, 4-bdr., 1.17 acre, mountain/city views, 9.25% mortgage assumable, 40,000 CTL, \$625 PITI, \$106,000. Chang, 296-7264.
 4-BDR., 1¼ bath, den w/kiva fp, near intersection Lomas & Tramway, \$64,900. Baca, 293-8710.
 CONCHAS LAKE ESTATES, 12x60 mobile home on 1/3 acre, all utilities, lg. patio w/cover, gravel drive. Sherwood, 299-2169.
 NE HTS., 3-bdr., 2 baths, LR, DR, FR w/fp, dining area in kitchen, landscaped, 2½ yrs. old. Dawson, 296-6173.
 2-BDR., 1½ baths, den, hw floors, enclosed backyard w/brick patio & barbecue, sprinklers, SE area. Cameron, 266-0018.
 TWO improved lots by Sandia Manor, over 30,000 sq. ft. w/city view, \$30,500+ assessments, \$6,500 down. Chavez, 831-6470.
 HOLIDAY PARK, 3-bdr., paneled den, fp, 1¼ baths, covered patio, in-ground swimming pool, high walled yard, \$70,900. Flower, 298-0632.

WANTED

BABYSITTER in my home for summer months; need room & board for 32-year-old UNM fall semester male student. Westfall, 881-1184.
 UTILITY TRAILER, 6'x8' bed, 2" hitch, 1500-lb. gross wt. minimum; gun case for 30-06. Cropp, 296-1877.
 2-BDR. HOUSE OR APT. to rent, prefer UNM area, w/yard allowing child & trained dog, \$200-\$270 including utilities. DiPaolo, 883-4604.
 RENT, BORROW, buy or share "Print-O-Matic" postcard printer. Orear, 256-1941.
 CARPOOLER from Four Hills (western), non-smoker. Erickson, 296-0126.
 EXERCYCLE, must have odometer & adjustable tension. Underhill, 294-5774.
 PING PONG TABLE. Schultheis, 881-7269.
 PARTIAL ROLL or pieces of fiberglass insulation. Stuart, 299-9190.
 BASKETBALL backboard & goal, w or w/post, good condition or repairable. Worrell, 299-0381.
 NON-SMOKER car pool from Paradise Hills, beginning June, hours adjustable. Voorhees, 265-1831.
 LIKE TO HELP a 90-year-old invalid? Houston, 842-1831 after 6.
 NINE MORE TO FILL A RAFT for a Colorado River trip, July 4-9, Lee's

Ferry to Whitmore Wash. Duliere, 296-4785.
 CANOES TO RENT for Boy Scout group, June 17-23. Cover, 881-3860.

FOR RENT

NE HTS., 3-bdr., 1¼ bath, carpeted, CFA heat, evap. cooler, new range & refrig., ¼25/mo. w-s-r paid, DD. Hewitt, 294-1952 or 265-2439.
 1-BDR. DUPLEX, LR, kitchen, full bath, no pets, \$155 plus utilities, 324B Princeton SE. Butler, 242-5398.
 2-BDR. APT., fp, major appliances furnished, 3 blocks from Sandia bus route, available June 1. O'Bryan, 293-4621 after 5.
 HOUSE in NE (Eastridge), avail. 8/15/79-9/1/80, 3-bdr., 2 baths, trailer access, all major appliances included, no pets, \$375/mo., water included. Reif, 299-2665.
 CONDOMINIUM STUDIOS near Winrock, furnished, utilities paid, pools, rec. room, weight room, sauna, jacuzzi, covered parking, storage, security, \$225/mo. Orlando, 883-6980.
 3-BDR., 1 bath, close in NE heights, \$295/mo. plus deposit, avail. June 1, Gallegos, 881-3289.
 SMALL 2-bdr. house, fenced back yard, partially furnished, ½ block from UNM, avail. June 1, \$240/mo. Abbin, 296-7678 or 883-8665.
 NE, 1½-yr. brick, 4-bdr., 1¼ bath, LR & FR, fp, AC, w/w carpeting, dbl. garage, dishwasher, backyard access, \$450/mo. Lutheran, 293-8364 or 299-9656.
 FEMALE ROOMMATE (non-smoker) to share 2-br. house in S.E. Heights. Available July 1, \$130/mo plus ½ utilities. Michelle at 256-3207 or 294-8624.

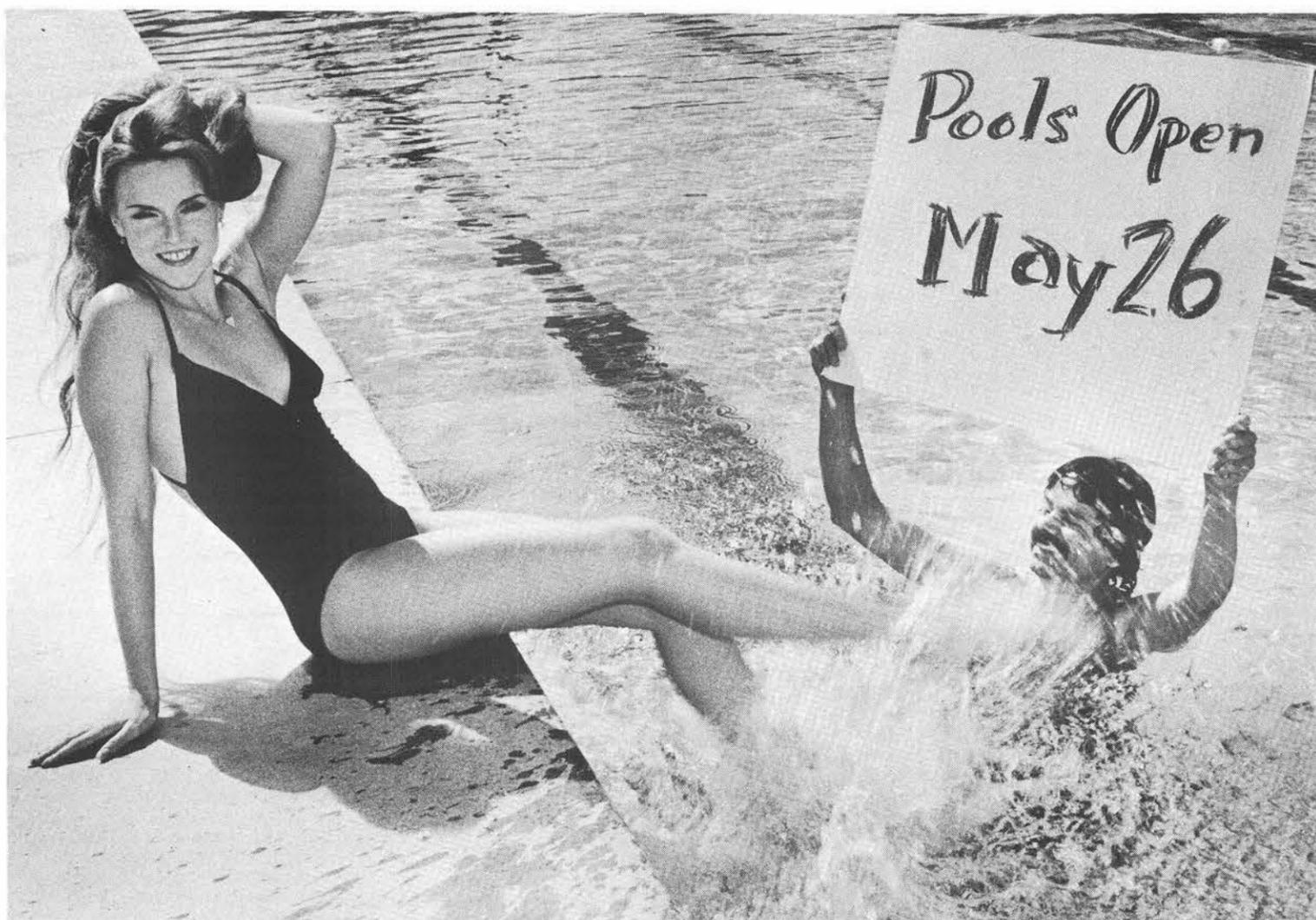
WORK WANTED

HAVE TRUCK, will haul, paint, wash windows. School photographer, take & print photos, insurance photos of possessions a specialty. Peter Shunny, 265-1620.
 RESPONSIBLE young man will house sit, house clean, yard work, pet care, etc., references provided. Stuart, 299-9190.
 YARD WORK done by experienced UNM student. Houston, 842-1831 after 6.

LOST AND FOUND

LOST — Glasses in black leather case, gold brooch w/simulated topaz & seed pearls, checkbook, safety glasses in black case, bifocal glasses.
 FOUND — Calculator in case, pocket day timer w/pen & I.D. "David J. Bailey." LOST AND FOUND, Bldg. 832, 264-1657.

DEADLINE
For Next LAB NEWS
Is Thursday Noon,
May 25



A LITTLE PUBLICITY here for the grand opening of the Coronado Club's three swimming pools on Saturday, May 26. The fun starts at 11 a.m., runs 'til 6, Happy Hour prices in effect, snack bar open, and Mike Michnovicz and accordion entertaining in the afternoon. Members and families only, please. Gerse Martinez of LAB NEWS volunteered to hold the sign but Elizabeth Blackhurst (Classic Modeling Agency) is not impressed.

FRIDAY	SATURDAY
18 — HAPPY HOUR Fancy Stuffed Shrimp Adults \$5.95 Under 12 2.95 SHALAKO	19 — WESTERN HOEDOWN Watermelon Mountain Jug Band Members \$6.25 Guests 8.50
25 — HAPPY HOUR Beef Kabobs Adults \$5.25 Under 12 2.60 BOB BANKS TRIO	26 — POOL & PATIO GRAND OPENING CELEBRATION 11 a.m. - 6 p.m. Happy Hour Bar

Coronado Club Activities

Pools Open May 26

HAPPY HOUR tonight sees a group called Shalako on the bandstand, fancy stuffed shrimp on the buffet. Next Friday's Happy Hour features the Bob Banks Trio on the bandstand, beef kabobs topping the buffet menu. To reserve buffet tickets, call the Club office, 265-6791, by mid-week.

TOMORROW the Watermelon Mountain Jug Band plays the stomping music for the Club's special Western Hoedown. All kinds of barbeque are on the dinner menu plus all the trimmings. Dance from 8:30 to 12. Call the Club office *right now* to see if any tickets are left.

SWIM SEASON OPENS Saturday, May 26, at the Club's three pools. The fun starts at 11 a.m., and Happy Hour prices are in effect all day. The snack bar will be open for sandwiches and goodies. Mike Michnovicz and accordion entertain in the afternoon. Admission is free to members, but members only please.

The pools will remain open through the Memorial Day holiday, Monday, May 28, then close until the following Saturday, June 2, when they reopen for the remainder of the summer. In the meantime, the snack bar and patio area will be open on Friday, May 25, and again on Friday, June 1, from 5 to 9 p.m. if you want to bring your kids and have a family-type outing in the patio area during Happy Hours.

TRAVEL DIRECTOR Ed Neidel will present "Germany - Part II" at Travelogue Night Tuesday, May 22, starting at 7:30 in the Eldorado Room. This is a continuation of movies and slides on Germany and Octoberfest Ed started last month.

Ed will also be in the Club lobby tonight from 6 to 7 with the word on vacation packages to Las Vegas, Hawaii and Europe.

Take Note

David Judd (2625) is one of several Sandians who are members of *Die Polka Schlingles*, a German style musical group, and he reports that they are heading to Denver shortly to participate in a 3-day Polkathon for the American Cancer Society. To help defray trip expenses, David & Co. are playing at Shakey's Pizza on Louisiana and Central on May 21, and Mr. Shakey has agreed to toss in a dollar for every Sandian who shows up with this item (cut it out!) and buys a pizza. Sounds complicated, but you'll enjoy the music.

Friends of Arnold Draper (2551) are giving a pot luck dinner in his honor tonight, May 18, at 6:30 p.m. at the 1st Congregational Church on the corner of Lomas and Girard NE. Arnold has developed amyotrophic lateral sclerosis (Lou Gehrig's disease), and his friends and fellow workers are helping to defray the cost of a power-driven wheelchair which Arnold now needs to get around. If you can't make the dinner, you can still make a donation in the name of the The Arnold Draper Fund and send it to any member of the working committee: Frank Anderson (2551), John Cunningham (2553), or Bill McKinney (2552).

The General Services Administration is conducting another spot bid sale on 110 used government vehicles on Wednesday, May 23. The offering includes pickups, sedans, carryalls, buses, forklifts and panel trucks. The vehicles may be inspected May 21 and 22 from 8:30 to 3:30 at the GSA motor pool, 1800 12th St. NW, and the sale begins at 9:30 a.m. on May 23 at the Indian School Auditorium, 1000 Menaul NW. Under a spot bid, offers are submitted in writing to the sale officials who then select the highest offer. LAB NEWS has been informed that about half of the vehicles up for sale have come from Sandia.

