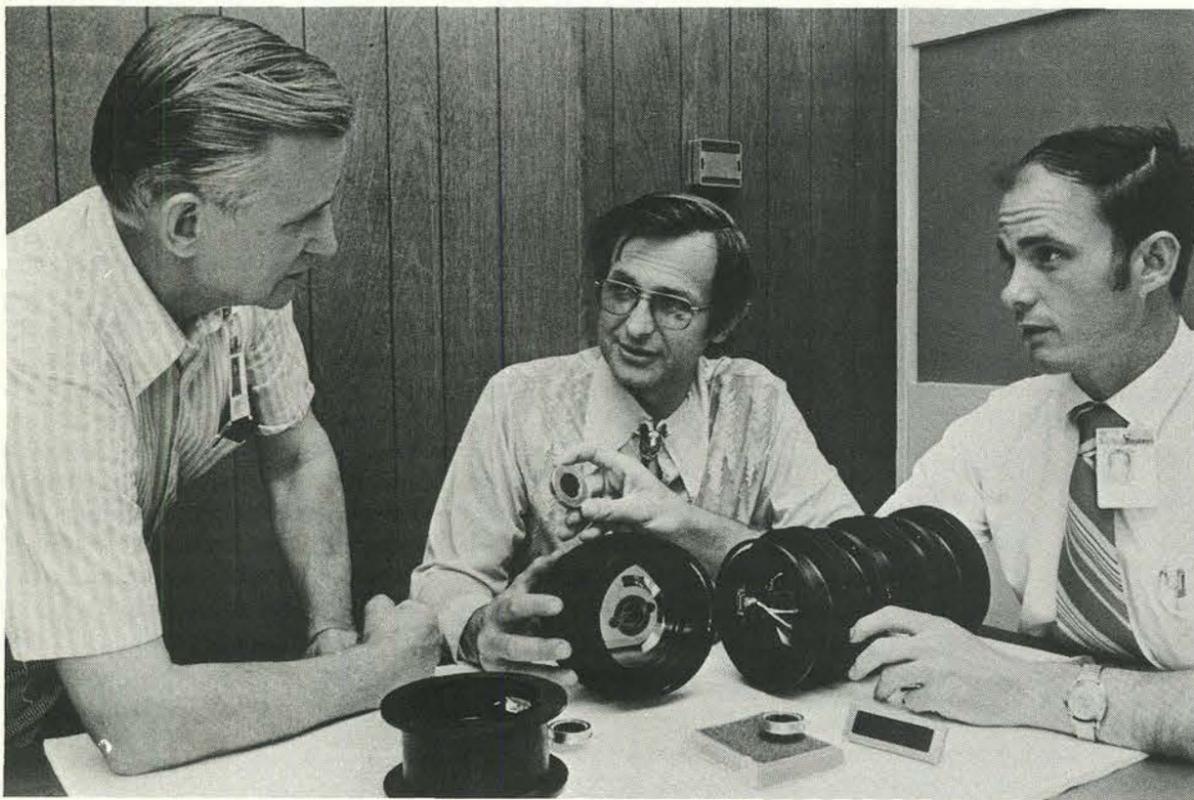


# Nuclear Weapons? NBDS Says Yes or No

## Sandia Develops Detector System



GENE ACTON, Charley Zaffery and Jim Linn examine light-sensitive element in optical detector, part of nuclear burst detection system.

Amid the din of battle in the nuclear age, the military commander faces a critical problem. How does he know if nuclear weapons have been used against his forces?

Since these forces may be deployed over areas many square miles in extent, it is entirely possible that the detonation of a small nuclear weapon could be mistaken for an occurrence such as an ammunition or fuel dump going up, or even for something natural such as lightning. The decision to use nuclear weapons — a presidential responsibility — must be based on absolutely unequivocal intelligence, and a key element of that intelligence is sure knowledge of use of such weapons by the other side.

Further, assuming use of nuclear weapons, by both sides, the military commander needs to know not only the fact of their use but also where and how powerful are the weapons set against his forces.

It was against the background of this scenario of war that the Army asked Sandia to develop what is now called the Nuclear Burst Detection System. For more than 10 years, Sandia Vela satellites have operated with spectacular success, detecting nuclear events on the earth's surface. The technology of burst detection is well understood at the Labs.

Jim Linn, Projects Division 1245, notes: "Our present satellites were not designed for battlefield management. A ground-based system that gives an immediated readout of the size of any burst, exactly when it went off, whether it was a surface or air burst and its precise location is needed. Our nuclear burst detection system furnishes that information."

Still being developed in Space Systems Department 1240, the system is simple in concept. Key element is the suitcase-size optical detector that is mounted atop one of the military unit's communication poles. The responsive element in the detector is an optical radiation transducer that converts incoming radiant power to an electrical signal. An array of these omnidirectional detectors is deployed over the several hundred square miles of concern. When each detector "sees" the unique phenomena associated with a nuclear burst, its associated electronics encodes that data into a digital format for transmission to the command terminal (usually at division headquarters). Location of the nuclear event is readily determined by correlation of the azimuths (bearings) reported by each detector.

NBDS is currently funded by the Army at \$2 million for Sandia. Jim reports that a prototype system will undergo tests this fall at White Sands when 600 tons of high explosive are set off in an experiment dubbed "Dice Throw."

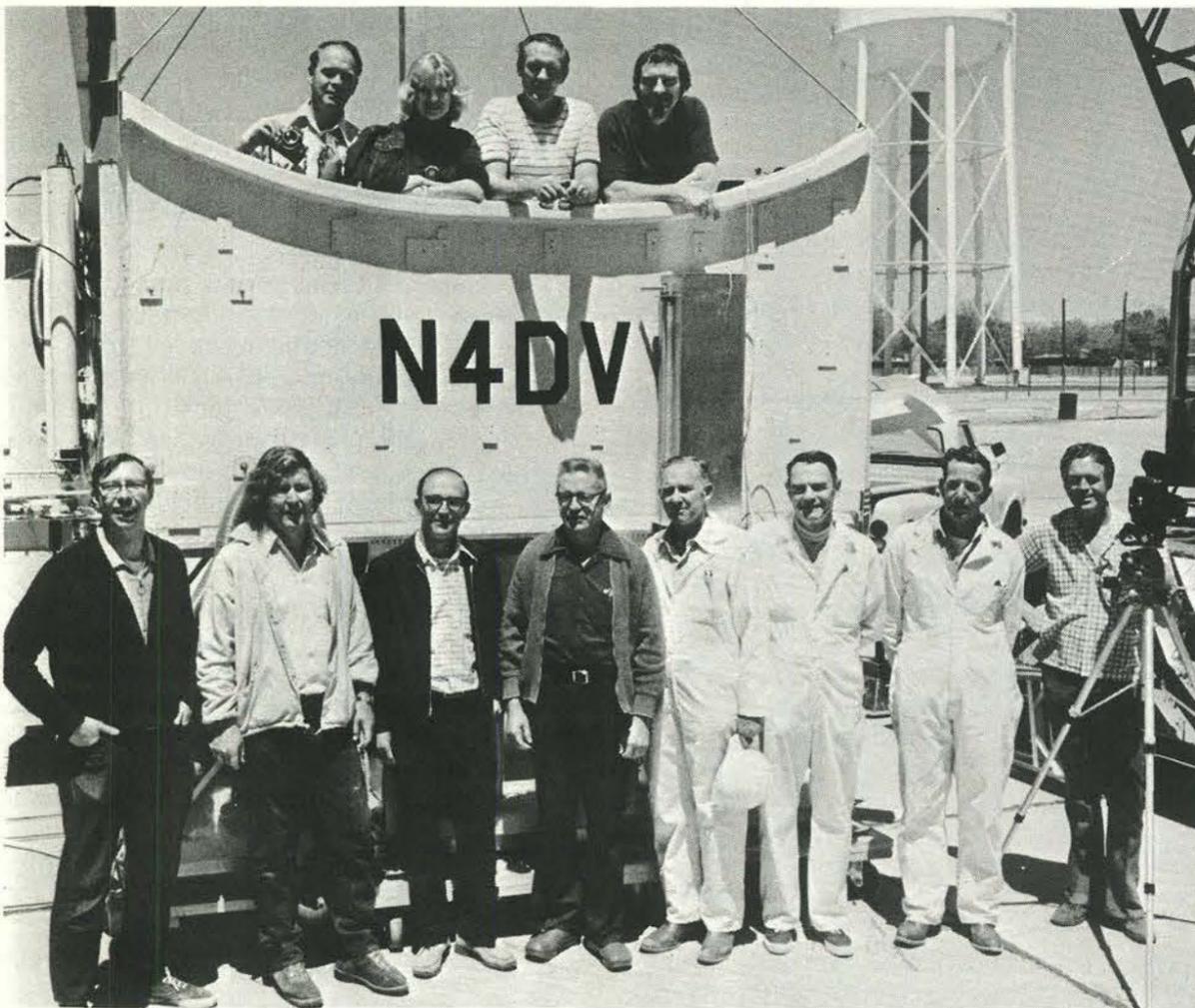
We inquired about the system's present status. "We've encountered some curious problems," said Jim. "A flash of lightning superficially resembles a nuclear burst. And then there's a nuclear event called the sun that gives us a little difficulty at dawn and sunset. But these were minor problems, and our design readily takes care of them."

# LAB NEWS

VOL. 28, NO. 10

MAY 14, 1976

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



DA VINCI II CREW paused during preparations last week for a group photo. In the gondola are the researchers who will operate experiments during the 36-hour balloon flight—Otis Imboden, National Geographic Society photographer; Vera Simons, pilot and project consultant; Jimmie Craig, pilot, Naval Weapons Center; and R.J. Engelmann, NOAA project scientist. In front are Sandians Bernie Zak (5443), scientific director; Preston Herrington (1735), project engineer; Jack Armbrust (9542), safety; Keith Smith (1735), project director; Tex Windham (1735), mechanical systems; Ed Marsh (1735), launch director; Lloyd Kelton (9718), crane operator; and Wayne Hancock (3153), documentary photoographer. See Article on page five.

# Afterthoughts

Happy ending, sort of--Last issue in this column we morosely reported the closing of the Bldg. 802 bookstand because the ripoff problem had gotten out of hand--so many books were being stolen that the stand was losing money. Here's a note we received a few days later:

"Just when I think I'm becoming cynical a news item like the one about the 802 bookstand comes along to shock me. The South 10/14 project has always seemed completely worthwhile to me, so please accept a donation to partly offset the incredibly mean-spirited people who stole the books."

With the note, a one hundred dollar bill. No signature or other identification. Whoever you are, we thank you, for your contribution and for demonstrating once again that the world isn't totally owned by the mean-spirited.

\* \* \*

Another LAB NEWS service--In case you ever have occasion to travel by military aircraft, it's important that you not stumble into some gaffe of protocol. We assume you won't slurp your coffee out of the saucer, but what do you know about getting off the plane? Precious little, we warrant, so study this (from the KAFB Bulletin):

"MAC Distinguished Visitors Deplaning Procedures. As an item of the MAC Passenger Service Improvement Program, the need to expedite the deplaning of the passengers has been identified. One change being implemented is the discontinuance of deplaning distinguished visitors (O-6 and above and civilians of equivalent rank) ahead of other passengers unless they are seated near an exit door. Holding up deplaning of other passengers until all distinguished visitors have deplaned, not only inconvenienced the majority of the passengers, but also proved to be an embarrassment to those distinguished visitors desiring to maintain a low profile. Distinguished visitors will be provided protocol service immediately upon deplaning and will also continue to be given their choice of boarding the aircraft first, last, or with the normal flow of passengers... This change should provide the best in service to all. MAC will continue to provide all other protocol courtesies normally afforded distinguished visitors."

\* \* \*

The female ethic?--"Women have, commonly, a very positive moral sense; that which they will, is right; that which they reject, is wrong; and their will, in most cases, ends by settling the moral."  
Henry Adams, The Education of Henry Adams \*js

## Sandia's Hydrofrac 'Mapping' Methods Show Promise

Sandia Labs recently completed a series of experiments in conjunction with the natural gas industry to "map" massive hydrofractures (MHF). Results of the effort are encouraging, according to Carl Schuster, supervisor of Sensors Systems Division 5733, program manager.

Hydrofracture, a standard technique of the petroleum industry, consists of pumping fluids under high pressure into a well to create cracks in surrounding rock formation. The fluids contain particles of sand which "prop" the cracks open and allow for increased flow of oil or gas. In standard hydrofracture, the cracks might extend 500 feet from the well. MHF is still an experimental technique which uses high pressure over a long period of time in an effort to extend the cracks out to 2500 feet or more from the well hole.

Sandia's goal in the experiments was to develop instrumentation and techniques to determine the extent and orientation of the fracture.

"Our seismic data are still undergoing analysis," Carl says. "The technology of mapping with seismic signals is in a very preliminary state, and we're not sure what we have yet. Our other technique -- using the hydrofrac fluid as a conductor, using the well casing as a current probe and measuring the changes of electrical potential at the surface during the MHF operation -- shows more promise. Here again, nobody has done this before and we can't say *exactly* that we know the extent of the fracture. Still, we have growing confidence that we know the orientation of the fracture, and this has proved valuable.

"Our last three experiments were conducted with Amoco, who is the major developer of the Wattenberg field 25 miles northwest of Denver. Some 480 wells have been drilled into a "tight" low permeability gas-bearing formation between 7600 and 8400 feet beneath the surface. Standard hydrofracture had helped gas production, but the field is only marginally economically productive.

"We participated in three MHF's last November, December and January, and we learned a little more each time. The data seemed consistent and improved from one experiment to the next. The gas company will utilize our data to assist them in locating additional wells to prevent overlap of the MHF fractures. Amoco plans to double the number of wells in the Wattenberg field and use more MHF. The three experimental MHF wells, by the way, are now economical."

Division 5733 is currently evaluating the seismic data and programming computer exercises. Development is continuing on sensor hardware, and plans are underway for participation in other MHF experiments during the summer. There is also a proposal to conduct hydrofrac experiments at the Nevada Test Site. After the fracture the cracks would be filled with proppant so that core drilling and mining could reveal the extent of the fracture and location of the proppant.

"This would be ideal," Carl says. "We could compare our math models and the accumulated field data with the reality of a controlled laboratory experiment. Then we could develop more confidence in our methods and predictions. Eventually, the techniques and hardware we've developed could be turned over to industry and find widespread use."

## LAB NEWS

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### SANDIA LABORATORIES

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&  
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## Medical Will Offer Flu Vaccinations

The Medical Department is prepared to offer swine flu vaccinations to employees as soon as the vaccine is available. Persons suffering from acute allergies should check with their personal physicians to determine if any risk is involved. Dr. Bliss, Sandia's Medical Director, feels that the nationwide demand for the vaccine will be so great that it may be rationed. If this happens, the Medical Department will set priorities on who should receive the vaccine first. When availability of the vaccine is known, further information will be announced in the LAB NEWS and Sandia Bulletins.

## Super Sturgeon Meets SLL Super Angler

"Every fisherman looks for that big, big fish. Now I can start over," says Ralph Jaeger (8265) who recently hung up a 91-pound sturgeon he caught on a 20-pound line in the San Joaquin River. The fish was nearly six-feet long.

An avid fisherman most of his life, Ralph notes that in terms of river fishing, a 91-pound catch is considered very large — in fact, it's the largest ever caught in that locale. Likewise, landing the fish with a medium-size pole and 20-pound tackle is a considerable accomplishment.

At first Ralph figured something was stealing his bait, next that it was a log or a catfish, or perhaps one of the 40-50-pound stripers that are common in the area. When it came out of the water, however, it didn't jump, but rather came up like a porpoise or whale, rolled over and waved its tail in the air for a few minutes. He remembers thinking, "What kind of monster do I have here?"

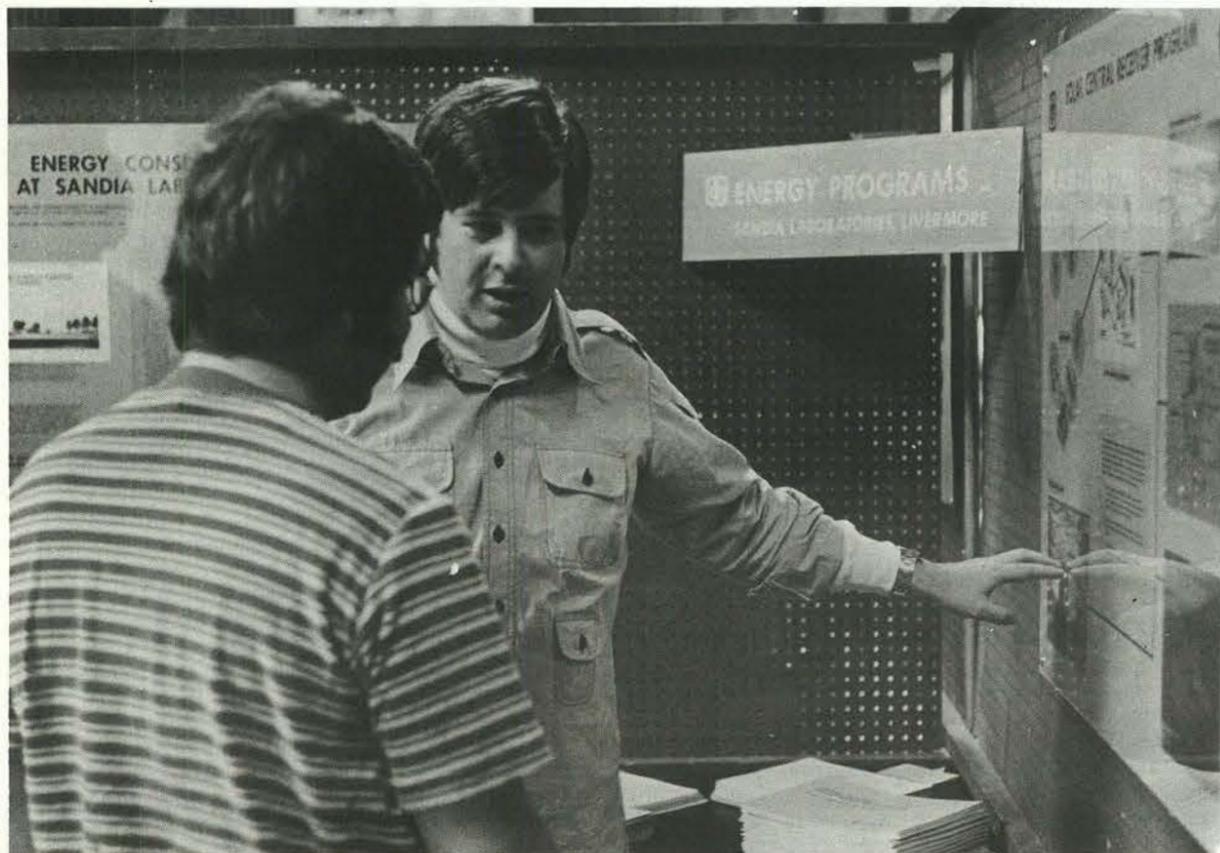
After following and guiding the fish up and down the river from shore for about an hour and a half, Ralph managed to work him into shallow water where, with the help of several other fishermen, the fish was hauled onto the bank.

"This is the biggest I've actually landed," says Ralph. "When I had a home on an island off North Carolina, I'd surf fish every day and many times I'd fight a fish for over an hour before the line would break. Some of those were really large — five, six hundred pounds. Never did land one though."

### Sympathy

To Sandra Moore (8160) on the death of her father in Livermore, April 23.

To Dorothy Andrews (8266) on the death of her mother-in-law in Pocatello, Idaho, April 11.



SLL EXHIBIT SHOWS ENERGY WORK—Sandia/Livermore was among the 35 exhibitors who participated in the recent Ecology Fair sponsored by the local Valley Ecology Center. Here Marty Murphy (8184) explains Sandia's solar central receiver program to a visitor. Another part of the display described the Labs' energy conservation work.

# LIVERMORE NEWS

VOL. 28, NO. 10

LIVERMORE LABORATORIES

MAY 14, 1976

## New Steel Alloy Patented

John Brooks, of Material Characterization Division 8314, set out over four years ago to come up with a stainless steel alloy that was weldable and hydrogen-compatible and that possessed a yield strength of at least 150,000 psi. Together with former Sandian Bob Krenzer, he has succeeded, and a patent has been issued.

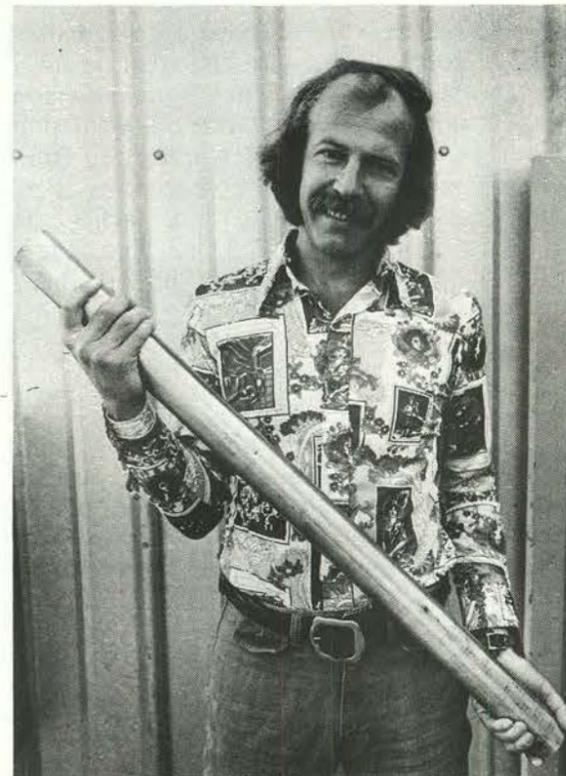
Steels exposed to hydrogen tend to get brittle; minute cracks develop and slowly grow larger until eventually — failure. In a society looking to energy transmission in a "hydrogen economy," the production of hydrogen-bearing synthetic coal gases, and storage of off-peak energy as hydrides, this kind of failure is unacceptable.

John began with a commercial alloy A-286, which is strong but not weldable and which is fair to poor in terms of hydrogen compatibility. "But it comes as close as any steel to meeting the requirements," says John.

His goal was to modify this steel chemically, probably reducing its high temperature capabilities (it's used in jet engines) but improving its weldability and hydrogen compatibility.

A-286 cracks when welded. John set out to understand why. Gradually, over 25 batches (or "heats"), he found that relatively minor modifications in the steel's chemistry would improve weldability.

At the same time, he subjected each new sample to tensile strength tests in a hydrogen environment. In ordinary A-286 stainless, hydrogen migrates to the grain boundaries and embrittles the steel. This could result in



THIS ROD may look like any other stainless steel, but it's a patented new alloy. The proud father—John Brooks (8314).

delayed failure in service. John's solution was to make chemical changes to the alloy which alter the nature of the strengthening precipitates resulting during heat treating. The precipitates now act as traps for the hydrogen and thus keep it from reaching the grain boundaries where the greatest damage can occur.

By understanding the causes of weld cracking and hydrogen embrittlement, John gradually worked toward a "recipe" which produced a new steel with the required strength and weldability.

"It's not perfect in terms of hydrogen compatibility," says John, "but it's far superior to any other steel at this strength level."

The new steel is labeled JBK-75; J for John, B for Brooks and Bob, K for Krenzer, 75 for the year. Significant contributions to the project were made by John's former division supervisor, Don Adolphson (8312), and, in the area of hydrogen compatibility, by former Sandian Tony Thompson. Frank Zanner (5833) of Sandia's Melt Lab cast the first large (500 lb.) "heat."

### Speakers

Pete Witze (8115), "The Measurement of Air Flow in Engines," Technical Seminar, Ford Motor Company Scientific Research Staff, Oct. 13, Dearborn, Mich.

Reggie Mitchell (8115) and A.F. Sarofim (M.I.T.), "Nitrogen Oxide Formation in Laminar Methane-Air Diffusion Flames," Western States Section, Combustion Institute Fall Meeting, Stanford Research Institute, Oct. 20, Menlo Park, Calif.

Carl Melius (8341) and A.P. Mortola (New York Univ.), et al., "A Theoretical Model for Chemisorption," First Chemical Congress of the North American Continent, American Chemical Society, Dec. 4, Mexico City.

## Take Note

Former Sandia VP Sol Buchsbaum, who returned to Bell Labs several years ago, has been named VP of Network Planning & Customer Services. Previously he had been executive director of Transmission Systems at the Holmdel branch.

\*\*\*

Mike Ning, Kansas City jazz pianist, performs tonight at the Simms Fine Arts Center at the Albuquerque Academy in a benefit concert for Menaul School. It starts at 8 and admission is \$3.

\*\*\*

Last time we mentioned a difficulty we had in going metric on a classified ad for a "mule, 14½ hands." Owner Don Aubuchon (1353) sent us this note: "A 'hand' is equal to 4 inches, and the animal is measured from the ground to the top of its withers (shoulders). Thus  $14.5 \times 4 = 58$  inches.  $58 \text{ inches} \times 2.54 \text{ cm/in} = 147.32 \text{ cm}$ . The mule is still for sale, same price, only now it's been converted to metric." That's probably the only metric mule in all New Mexico.

\*\*\*

Retiree Hugo Flores, formerly of Sandia's guard force, is now State Adjutant for the American Legion, in which post he serves as the full-time travelling representative of the Legion. "30,000 miles in eight months," he reports. The trips are made to the scores of Legion Posts throughout the state.

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"Our graduates are well prepared for any first grade in America," says KAFB Kindergarten Director Olga Borden. The curriculum includes phonics, reading readiness, math readiness, detect (training in rapid recognition necessary to reading), music, art, and monthly field trips. Interested parents are invited to attend classes. Call 4-8585 for more information.

\*\*\*

The Neighborhood Drama Project, directed by Gary Shepherd (2634), will present an original children's musical "Franklin's Shocking Mouse Tale," May 21-22. The theater is located at 1020 Edith SE. Performances start at 8 p.m. Gary reports that his troupe is scheduled to repeat the show at the Glorietta Conference Center this summer before an audience of 2000.

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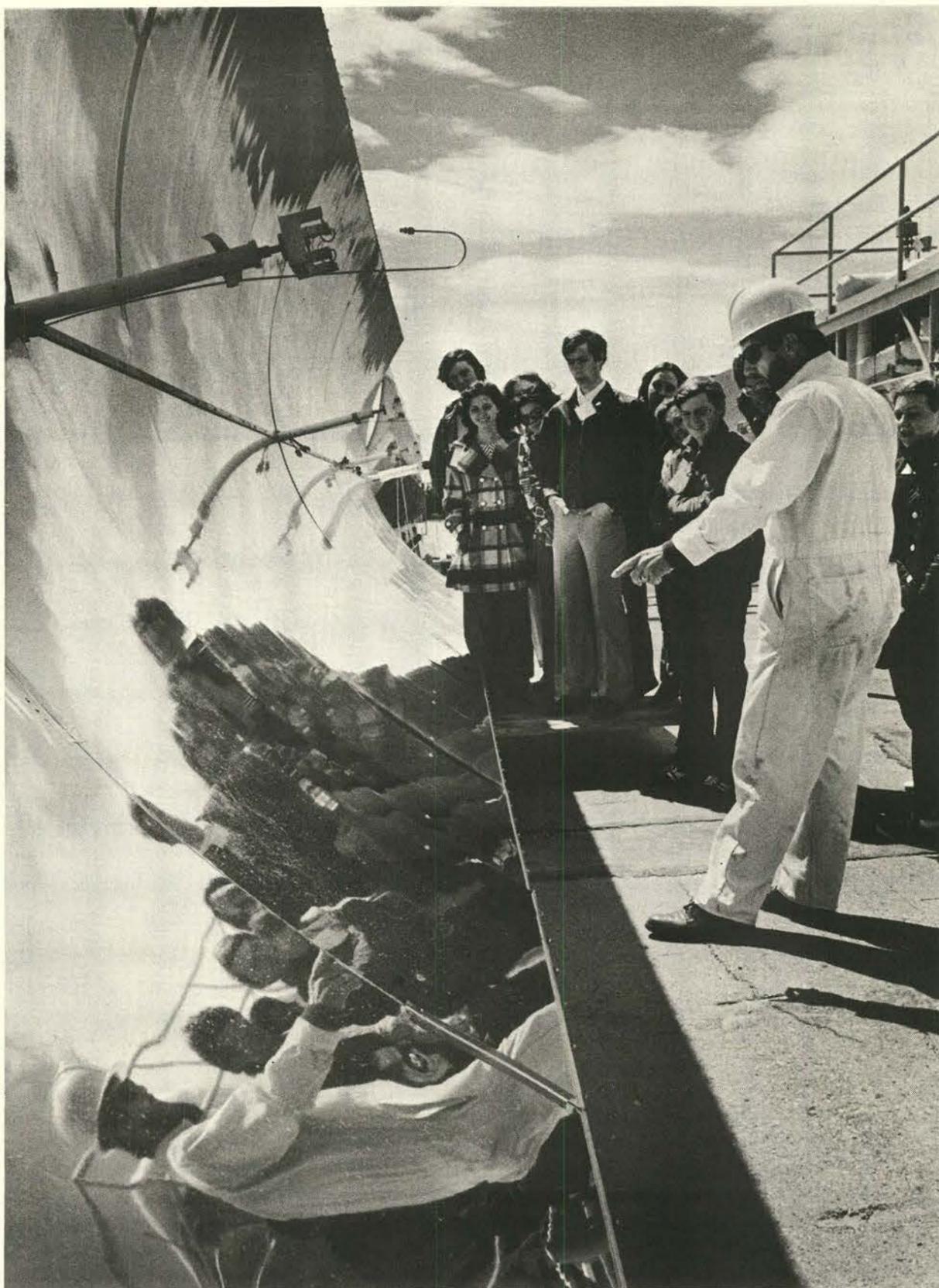
"Nuclear Power: Issues and Answers" is title of Bill Synder's (5400) presentation to the New Mexico Section of ASME meeting at 6:15 on May 19 at the KAFB-East Officers Club. Preceding Bill are an expanded-to-45-minutes cocktail "hour" and a Polynesian buffet. The first 90 to reserve (with Stan Meyer, 4-6541, or Joe Abbin, 4-8590) make the meeting. Members and guests; \$4 each.

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May issue of *New Mexico Magazine* carries a two-page article about Gene Ives (4360) and his engineering and singing career. A mainstay of the Albuquerque Opera Theatre, Gene makes his Santa Fe Opera debut this August in the American opera *The Mother of Us All*.

\*\*\*

Benefits Division 4213 mailed more than 1500 invitations to retirees last week to attend the 1976 annual retiree picnic. The event is set for Wednesday, June 2, starting at 4 p.m. at the Coronado Club. Last year, 864 retirees attended.



SCIENCE YOUTH DAY brings young people interested in science to the Labs each year for a view of science in action. Roscoe Champion of Solar Energy Projects Division 5712 describes reflector experiment to this group. About 200 students from local schools were in the tour.

## Speakers

H.T. Weaver (2354) and J.E. Schirber (5150), "Nuclear Resonance Pressure Studies of Singlet Ground State Systems"; E.D. Bergeron (5151), "A Theoretical Model for Hydrogen Diffusion"; J.P. Van Dyke (5151), "SCF-Xa-SW Calculations for Defects in Metals"; W.J. Camp and J.P. Van Dyke (both 5151), "Corrections to Scaling in the Spin-S Ising Correlation Function: Confluent Singularities, Universality, and Hyperscaling"; J.E. Schirber (5150), "de Haas van Alphen Studies and Band Structure of Gd"; J.E. Houston (5114) and M.L. Knotek (5155), "Line-Shape Analysis of Auger and Characteristic Loss Features for Ti and TiO, In Terms of Surface Electronic Properties"; D.M. Follstaedt (5151) and R.M. Biefeld (5154), "A High-Temperature NMR Study of the Ionic Conductor LiAlSiO<sub>4</sub>"; K.K. Murata (5151), "Multi-Phonon Processes and the Opposite Isotope Effect in PdH(D)"; R.C. Hughes (5814), "Intrinsic Hole Mobility in SiO<sub>2</sub>"; D.W. Schaefer (5814), "Colloidal Suspensions: Model Soft Core Liquids"; P.M. Richards (5132), "Theory of Narrow FMR Lines in an Amorphous Ferromagnet with Large Local Anisotropy"; I.J. Fritz (5132), "Pressure Dependences of Elastic Constants in InBi"; A. Narath (5000) and D. Follstaedt (5151), "A High-Field Study of Local-Moment Nuclear Relaxation in Au <sup>173</sup>Yb"; D.E. Grady and K.W. Schuler (both 5163), "Effect of the Calcite Phase Transition on the Dynamic Uniaxial Strain Yield Strength of Calcite Rock"; A.C. Switendick (5151), "Theoretical Model for Site Preference of Transition-Metal Solutes in Fe<sub>3</sub>Si"; S.M. Myers (5111), "Phase Equilibria in the Be-Al-Fe System

Using High-Energy Ion Beams"; K.L. Brower (5112), "EPR and ENDOR of Carbon-and Self-Interstitials in Silicon"; C.W. Frank (5811), "Excimer Formation in Vinyl Polymers: Effect of Weakly Interacting Solvents on Excimer Site Sampling Mechanisms"; S.T. Picraux (5111), "Enhanced Trapping of Hydrogen in Metals by Ion-Produced Damage"; L.A. Harrah and C.W. Frank (both 5811), "Energy Transfer in 2-Vinylnaphthalene Copolymerized with Vinyl Carbazole"; R.R. Lagasse (5813), "Domain Structure and Time Dependent Properties of a Crosslinked Urethane Elastomer"; R.A. Assink (5811), "The Concentration and Pressure Dependence of the Diffusion of Dichlorodifluoromethane in Poly (dimethyl siloxane)"; J.G. Curro (5813), "Computer Simulation of Polymer Chains — Radial Distribution Function"; K.T. Gillen (5813), "Use of a Thermomechanical Analyzer to Follow the Cure of A Crosslinking Epoxy"; G.E. Pike and C.H. Seager (both 5155), "Electrical Conduction Mechanism in Cermet Resistors"; R.G. Kepler (5810), "Origin of Piezoelectricity and Pyroelectricity in Polyvinylidene Fluoride"; D. Emin (5151), "Effect of Temperature-Dependent Band Shifts on Semiconductor Transport Properties"; R.A. Anderson (5814), "Sensitivity of Breakdown Voltage of an Insulator in Vacuum to Imperfections at the Insulator-Electrode Junctions"; C.H. Seager (5155), "Electron Transport in Zr Doped TiO<sub>2</sub>"; P.S. Peercy (5132), "Pressure Dependence of the Soft Mode in TbP<sub>3</sub>O<sub>14</sub>," American Physical Society Meeting, March 29-April 1, Atlanta, Ga.

## Manned Balloon

# DaVinci II Eyes St. Louis Smog

A huge balloon will carry a team of researchers and their air samplers over St. Louis in late May for a 36-hour study of air pollution. Called Da Vinci II, the project will determine physical and chemical changes in air pollutants as the pollutants drift distances up to several hundred miles from their source.

To observe these complex changes as they occur, researchers aboard the gondola will conduct more than 20 experiments as they study the moving parcel of urban air pollutants. The hoped-for result is a detailed history of a plume of polluted air, drifting in the lower atmosphere (below 900 metres) across several states.

Sandia is providing project and scientific direction for Da Vinci II. The Labs' responsibilities include systems engineering, launch and chase operations,

data recording and gondola recovery operations. Keith Smith (1735) is project director; Preston Herrington (1735), project engineer; and Bernie Zak (5443), scientific director.

The project is a joint effort by ERDA, National Oceanic and Atmospheric Administration, Environmental Protection Agency, and the National Geographic Society.

In November 1974, Da Vinci I made a 12-hour flight from Las Cruces to Wagon Mound over an area remarkably free of air pollution. It provided basic information about pollutant background levels, the suspension of fine particles in clean air, and atmospheric structure and turbulence.

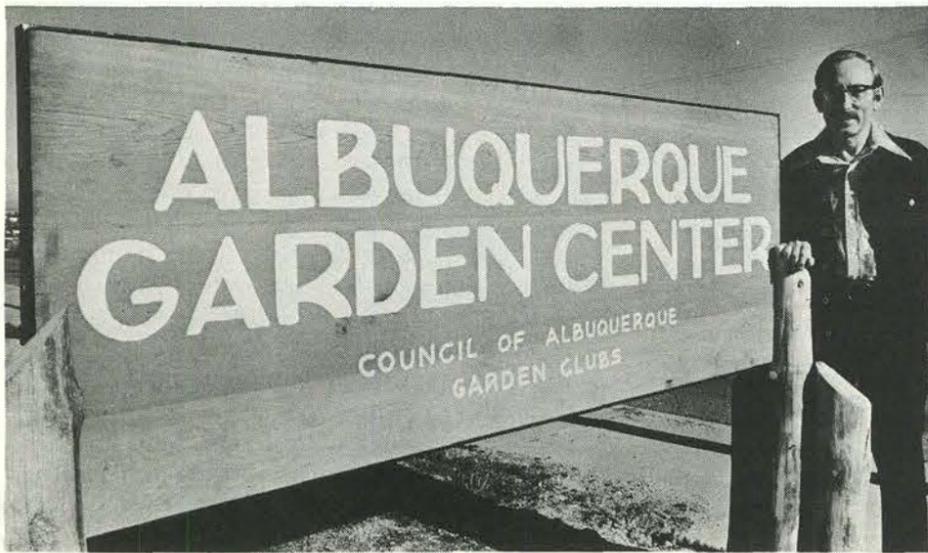
St. Louis by contrast is an urban, heavily industrialized area characterized by pollutant-filled air. Two major air pollution

studies are already focused on the city.

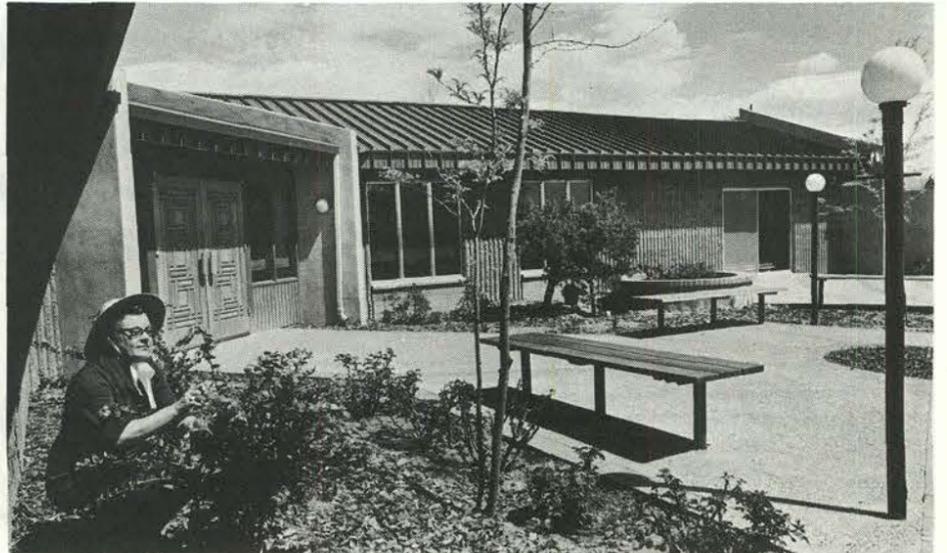
Chase vehicles manned by Sandians will follow the 21-metre (70 ft.) balloon on the ground. The motorized vans will serve as a mobile command post, communications center, and data recording station.

Other Sandians contributing to the project include Ed Marsh (1735), launch director; Hugh Church (5443) meteorology; Bob Gall (3161), public information; Tex Windham, mechanical systems, and Rex Myers, John Deasy, and Les Sandlin (all 1735), electrical systems. Jack Armbrust (9542) is responsible for project safety; Walt Troy (9553), security; and Frank Riveria (1113), administrative support.

Sandia experimenters include Bernie Zak, Ralph Schellenbaum (1735), Bob Woods (1735), Dick Elrick (5842), and Al West (8313).



ED JOHNSON, retired Sandian and treasurer for the Council, has worked hard to provide Albuquerque with a Garden Center. It's located at 10120 Lomas Blvd. NE, in Los Altos Park.



NITA HAASE, Council VP and Bicentennial Chairman, inspects plantings in Garden Center patio.

## Our Town

# Albuquerque Garden Center

"How deep should I plant this Russian olive?" "When should I prune my roses?" "Will artichokes grow in Albuquerque?" "My snapdragons have these funny little bugs . . ."

If you have a question about any aspect of gardening, pay a visit to one of Albuquerque's newest acquisitions — the Albuquerque Garden Center. One of the gardening volunteers staffing the Center will answer your questions or help you find the answers, using either the Center's reference library or working from a list of specialist consultants.

The Council of Albuquerque Garden Clubs, representing 15 local garden clubs and eight plant societies, began fund raising for the garden center 15 years ago. Last October their hard work was rewarded when the center officially opened. The facility represents a three-party contract: the city (Parks and Recreation) provided 4.2 acres of land in Los Altos Park, the county matched the value (\$80,000) of the land; and the Council contributed \$87,000. Many local firms donated labor and materials for the building or for landscaping.

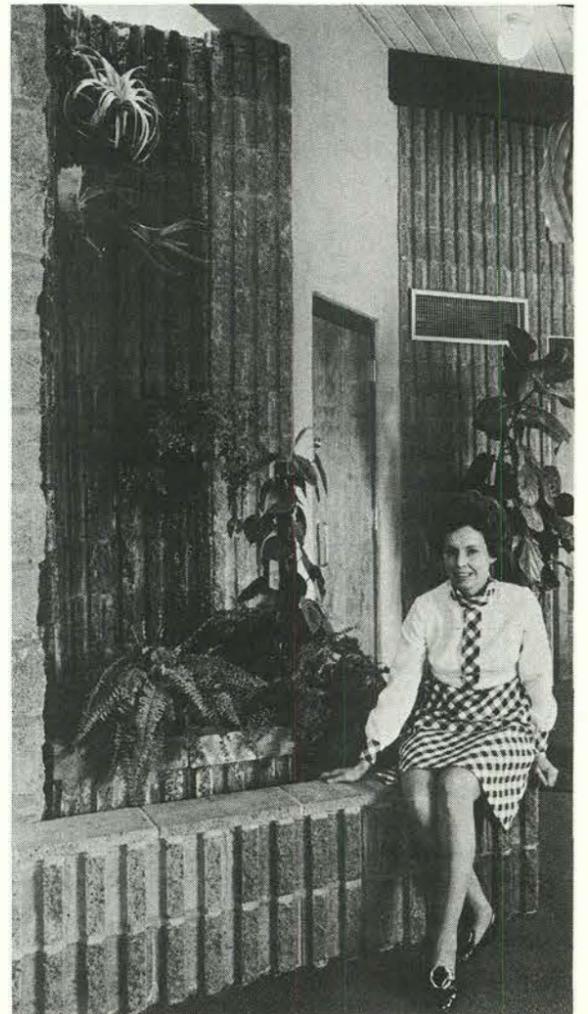
The building contains 6900 sq. ft., including a 3600 sq. ft. exhibition room, meeting rooms, kitchen, business office, show preparation room, library, and gift shop. This fall the Council will dedicate a native

botanical garden as a Bicentennial activity. Future plans include a scent garden for the blind, nature trails and an arboretum.

The gift shop features arts and crafts of many local artists, house and patio plants, containers, dried materials, and all types of flower arranging supplies. Meeting rooms can be rented for almost any type of meeting or social event. The exhibition room, for large flower shows and demonstrations, has accommodated as many as 500 people at wedding receptions. The smaller meeting room can handle about 75 people. Tables, chairs and a kitchen are available, although refreshments are usually catered.

The Garden Center's schedule includes plant sales and exchanges, lectures by the County Agent or other experts, flower arrangement workshops, flower shows, and demonstrations of how to arrange flowers, make wreaths or corsages. One of the Council's big fund raising events is coming up: a rummage sale on May 22-23. Another popular fund raiser is the Holiday Idea Show to be held in November at the Center.

The Garden Center is a pleasant place to visit even if you don't have gardening problems. Chances are that you'll leave with a couple of plants, muttering to yourself — "I know I can find room for just two more!"



DRU HAGER, president of the Council of Albuquerque Garden Clubs, relaxes by the interior fountain at the Garden Center. Construction is of concrete ribbed masonry. The interior is a pleasing combination of textured concrete and exposed wood.

# FUN & GAMES

**Bowling** — March winners of the Monthly High Score Awards are Ruth Brooks, women's scratch, 559; Eunice Simpson, women's handicap, 654; Carl Daye, men's scratch, 641; and Don Jewell, men's handicap, 708.

\*\*\*

**Running** — If you couldn't make the Boston Marathon, then you can have a go at the Merchants Bank Mesa Run in Thoreau, N.M. next Sunday, the 23rd. The mini-marathon (13.1 miles) takes off at 9 a.m. on a course described as "climbing gradually up dirt trails to the mesa top (altitude 8500') . . . It is very scenic." Call John on 4-1053 for an entry blank. Coming up, weekend of June 5 & 6, the Southwest Masters Track and Field Meet, to be held at Wilson Stadium.

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**Fitness & Health** — Dr. Lewis Thomas, MD, on the dangers of obsessive concern for health: "We are, in real life, a reasonably healthy people. Far from being ineptly put together, we are amazingly tough, durable organisms, full of health, ready for most contingencies. The new danger to our well-being, if we continue to listen to all the talk, is in becoming a nation of healthy hypochondriacs, living gingerly, worrying ourselves half to death.

"And we do not have time for this sort of thing any more, nor can we afford such a distraction from our other, considerably more urgent problems. Indeed, we should be worrying that our preoccupation with personal health may be a symptom of coping out, an excuse for running upstairs to recline on a couch, sniffing the air for contaminants, spraying the room with germicides, while just outside the whole of society is coming undone." (*New England Journal of Medicine*, Dec. 11, 1975)

## Sympathy

To Billie Palmer (3622) on the death of his father in St. Charles, Mich., April 23.

To Lloyd Kelton (9718) on the death of his father in Albuquerque, May 2.

To Jim Arthur (4370) on the death of his father in Los Angeles, April 27.

To Bill Rogers, Jr. (1241) on the death of his father in Albuquerque, April 28.



KEN GRANT (9743), center, takes a light-level reading at Irv Lenz's (9412) work bench. Ken and Roy Hart (9722) used this lab as a demonstration room in their light reduction program. Labs-wide program is planned.

## Aim: Zero Growth in Energy Use

With the end of FY 76 in sight, Harry Pastorius, manager of Plant Engineering Design Department 9740, is asking all Sandians to help save energy.

"We began fiscal '76 with confidence in our conservation program," Harry says. "We closed out '75 with a total energy reduction of 16 percent, so we had few misgivings about the new goal — 'zero growth' in usage. Although new construction would consume energy, we felt that the increase would be balanced by other planned conservation measures.

The holiday shutdown periods last winter did produce big savings but our monthly consumption of electricity and gasoline increased. Fortunately, consumption of other energy sources — natural gas, fuel oil, diesel fuel and liquified petroleum gas — decreased. At the end of March, however, electricity usage was up 3.8 percent over the same period in FY 75, and gasoline consumption was up 10.7 percent.

Operations at the Labs have expanded — new research and development programs are underway; more people have been hired; additional energy-consuming equipment is operating. "With this kind of growth," Harry says, "we've been steadily going into the red."

Several steps are being taken to improve this picture. Lighting levels have been studied and in one demonstration in a laboratory in Bldg. 880, readings at work surfaces were reduced to acceptable levels by disconnecting some light tubes and replacement of 40-watters with 35-watters. Seventy footcandles on the task is the new lighting guideline unless special operations are involved. Since the Bldg. 880 modification produced a 48 percent electrical energy reduction, Plant Engineering plans similar lighting modifications in other Labs buildings.

Other programs call for new insulation for

steam pipes, the automatic shutdown of heating and cooling in several buildings during non-operational hours and the manual shutdown of heating and cooling in other buildings.

"These actions will compensate for our growth," Harry says. "Through March of this year our total energy consumption exceeded fiscal 75 by less than 1 percent. We're working hard to recover that 1 percent. We need help — think about it before you jump into the company vehicle and, please, turn off lights not in use, particularly at the end of the day. Conserve, Repeat — Conserve."



IF the faces are familiar, there's a reason. VIP's in Sandia's recent past, now retired, visited the Labs for an informal updating by President Sparks on Labs programs. Seated, Sam Donnelly, Charley Campbell, Pres. Sparks, and "Monk" Schwartz. Standing, Kenner Hertford, Walter MacNair, Bob Henderson and Jim McCraw. Donnelly, Hertford and McCraw are alumni of AEC.

## Fill 'Er Up By Plugging In

# ERDA's EVA at SLA

It's so quiet that you may not hear it. But it's different enough that you'll hear *about* it. It's an electric car, built by Electric Vehicle Associates (EVA), owned by ERDA and assigned to Sandia.

This assignment is part of an electric vehicle evaluation program sponsored by ERDA's AA for Conservation. The evaluation is being directed by Ken Barber, a branch chief in the Division of Transportation. The Sandia conservation activities coordinator, Arlyn Blackwell (8110) as well as Glen Brandvold (5710) and Dick Braasch (5715) suggested that assigning the vehicle to Sandia would provide a variety of uses in a short time.

The car will be based in our Motor Pool," says Glen. "Stan Brooks (9721) is setting up routes and uses for it so that we can get real-life data on its performance and utility."

Sandians will see the car traveling Tech Area I, making runs to Areas III and V, making courier and taxi trips to and from the Airport, hauling mail — in short, it will be used for pretty much the same purposes as any other sedan in the Motor Pool.

Says Dick Braasch, "Stan will keep precise records of its use, its performance, its energy consumption, and its maintenance record. So we'll be able to provide ERDA with a complete service-oriented evaluation. We are not doing a detailed technical, or how-its-various-components-interact, evaluation."

The vehicle is essentially a new Renault, with radio, heater and automatic transmission — and with engine and luggage compartments filled with batteries. Unlike the electric golf cart, it drives like a car, though the total silence at stop signs is unnerving at first. In theory, it has a top speed of about 55, and it should deliver about 40 city miles to the charge.

A future LAB NEWS story will include interviews with the Sandians putting the miles on.



NEW SUPERVISORS—Paul Longmire (4364), Marv Coon (3252) and Larry Garrison (3254).

## Supervisory Appointments

LARRY GARRISON to supervisor of Customer and Supplier Accounting Division 3254, effective May 1. Following graduation from the University of Oklahoma in '64 with a BA degree in accounting, Larry joined the Labs auditing organization. He worked three years in auditing, moved on to the budget division, transferred to a purchasing price and cost analysis group, worked a year with a weapons programming organization and an additional four years with the budget division. For the past 15 months, Larry has supervised the General Accounting Section.

Larry enjoys camping, reading, woodworking and working with stereo equipment. He bicycles to work, a 15-mile round trip. Larry, his wife Lynn and their daughter live at 3407 Georgia NE.

MARVIN COON to supervisor of Employee Accounting Division 3252, effective May 1. Marv joined Sandia in January 1957 following four years in the Air Force as a budget and accounting officer. He worked in accounting and budgeting until 1966 when he transferred to the systems and procedures group. His most recent assignment has been with financial systems. Marv received his BS degree, with a major in accounting, from the University of Colorado.

Marv's off-the-job interest is photography. That combined with home projects occupies most of his leisure time. He and his wife Marge and their two daughters live at 3408 Stardust Dr. NE.

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PAUL LONGMIRE to supervisor of W80 Development Division 4362, effective May 1. Paul joined Sandia in June 1962 and was assigned to the Reliability Department doing systems analyses. In 1970 he transferred to a systems project division to work on the development of the W74 warhead. Two years later he was doing electrical engineering in the B61 project group.

Paul earned a BS in EE from Ohio State University, and his MS from UNM under Sandia's Technical Development Program. He enjoys table tennis, tennis, squash, and bicycling; he bicycles to work. Paul, his wife, Patricia and their two daughters live at 7121 Aztec Road NE.

## Congratulations

Mr. and Mrs. Harold Roberts (1132), a daughter, Julie Joy, May 5.

Mr. and Mrs. Rick Blose (5832), a daughter, Shawna Lynn, May 4.

Mr. and Mrs. Doug McGovern (1712), a daughter, Joanna Marie, April 16.



NEWEST VEHICLE in the ERDA fleet assigned to Sandia is this EVA (Electric Vehicle Assoc.) Renault. Dick Braasch (5717) reports that it will be assigned to a variety of transportation tasks.

# feedback

*Q. I find the "Harvard Medical School Health Letter," which the company distributes on a Division basis, to be very informative and would like an individual copy. Is there some way that individuals could subscribe through the Labs?*

A. The Harvard Medical School Health Letter is sent to all supervisors for sharing with their employees. The individual subscription rate is \$10.00 per year. The reason that the bulk rate (\$1 per year) is so much less is that we assume the responsibility of distribution. Since this whole idea is somewhat experimental, we are not in a position at this time to recommend to management that we spend the money, time, and effort involved in furnishing each employee with a personal copy.

S.P. Bliss, M.D. - 3300

*Q. Why not place a Celsius thermometer near each gate so that Sandians could get a feeling for the Celsius mode of measurement?*

*Above all don't place Fahrenheit and Celsius thermometers side by side for comparison. To learn a new system, the best way is to completely suppress the old.*

A. Yours is an excellent suggestion. The Metric Representatives have been looking for fresh ideas to put the SI units in front of employees.

Plant Engineering, in cooperation with 9411, will install four new thermometers at locations in Area I and Area V. All thermometers will have a dual scale; your suggestion to make all thermometers read in Celsius only was seriously considered. However, based on the experience of 9411 in using equipment for the general public and relying on the Celsius scale only, it was decided to install dual scale units initially with consideration for eventual replacement to Celsius only units after people become acquainted with the new scale.

R.E. Hopper - 9700

*Q. What can be done to reverse the trend of converting the few available conference rooms to offices and labs? There is a critical need for these rooms.*

A. We agree it is important to have adequate conference rooms — both in number and size. But I believe you will agree it is more important that employees have office and lab space. It has been difficult to find space even for a desk for some employees.

The long-term solution to this problem is new permanent laboratory-office space. We are optimistic that Sandia will get approval for two construction projects in FY 1977. However, this new construction will not be completed to provide any relief until calendar year 1979. In the meantime, we are trying to provide space in mobile office trailers, additional portable buildings and by crowding our existing buildings. We agree this isn't a satisfactory permanent solution, but with the current space shortage it is about all that we can do. We will continue to avoid converting conference rooms wherever possible.

R.E. Hopper - 9700

*Q. While updating my telephone book I notice in the organization section that some employees are listed with initials while others*

# Our Technical Capabilities

*I appreciate your sending me the "Compilation of Sandia Laboratories Technical Capabilities." I was able to review it rather thoroughly this past weekend, and I believe it will be most useful for in-depth background of Sandia capabilities and as a continuing reference in the planning and evaluation of our activities. The Compilation is a well-done effort, and I thank and congratulate those who were responsible for its preparation.*

This letter, addressed to President Sparks and signed by Maj. Gen. J.K. Bratton, Director of DMA, suggests the importance of a recently published series of reports entitled *Sandia Laboratories Technical Capabilities*.

"Technical capabilities are the basic tools we use to define and solve scientific and engineering problems," says Don Lundergan (4010), technical editor of the series. The series contains reports on 23 major technical capabilities in science and engineering. "It is this diversity of disciplines, together with the numerous contributions made to the scientific and engineering fields, that shows why Sandia is one of the eight 'national' or multiprogram laboratories in ERDA," Don comments.

Certainly, the series is important to people in the government who, like General Bratton, need to know where to go for answers to technical problems. But the series is also important to Sandians as a source of information for the preparation of reports, proposals, and presentations. It is being used as reference material for technical interchange with other laboratories and industry, and has proven useful for the recruiting of technical staff.

"The first step in compiling the series was to identify Sandia's capabilities to be sure that all were included," says Don. "Then we prepared individual reports describing each capability. 'We' includes Bob Peurifoy (4300), who initiated the study; Phil Mead (3151), publication editor for the series; the compilers of the individual reports, and those whose comments and observations strengthened the series, including Howard Stump (4010), Arlyn Blackwell (8110), Bill Alzheimer (4363), and Charles Burks (4311)."

"Yes, we are updating already," says Don. "We intend to keep the series current. It

*are listed with their first names. How do I go about changing the way I am listed?*

A. Because the telephone directory is a key communication medium, you should list yourself as you wish. The alphabetical listing will normally reflect your name as it is recorded in Personnel records. If you wish to be listed otherwise, tell your Division secretary, who is responsible for input to the organization that edits the directory. A limitation is 22 spaces to accommodate computer formatting.

K.A. Smith - 3100

*Q. How about installing Ozalid machines in 892 and 836 for the use of draftsmen when they need a check print in a hurry?*

A. Reproduction Division 3172 provides Diazo process machines and operators in Bldgs. 801, 836, 887, 892 for the express purpose of providing check prints and other



**UPDATING ALREADY.** That's the task now for the compilers of the Technical Capabilities document series. Phil Mead (3151) is publication editor, Don Lundergan (4010) the technical editor.

is a valuable tool in itself. Any lab needs to know its own resources."

The series, available by individual technical capability, as a summary document, or as a looseleaf compilation of all the documents, has unlimited distribution. ERDA, NRC, NASA, and DOD, our Congressional delegation, and the other national labs have received copies. If you have use for them, the Technical Library has additional copies available for distribution.

These people are the principal contributors: *Aerosciences* - Warren Curry (1331); *Applied Mathematics* - Bob (Robert J.) Thompson (5121); *Biosciences* - Chuck Trauth (5441); *Computation Systems* - Al Iacoletti (2544); *Design Definition and Fabrication* - Forest Baker (3624) and Ken Weidner (9623); *Earth Sciences* - Wayne Young (1325); *Electronics* - Jim Gover (2315) and Ed Franzak (2110); *Engineering Analysis* - Sam Key (1341); *Environmental Health* - Bill Burnett (3311); *Explosives, Electrochemistry, and Electromechanisms* - Norm Brown (2516), Bruce Van Domelen (2523), and Bob Fox (2325); *Information Sciences* - Danny Seager (3144); *Instrumentation and Data Systems* - Bill Hereford (9483) and Bill Paulus (1754); *Materials and Processes* - Dick Rohde (5832); *Measurement Standards* - John Southwick and Merrill Jones (both 9531); *Physical Sciences* - Lloyd Bonzon (5432), Al Chabai (5166), Ralph Johnson (5155), Jim Renken (5231), and Al Toepfer (5242); *Safety and Reliability Assurance* - Jay Grear (1232) and Eddy Walker (1221); *Systems Analysis* - Virg Dugan (5740) and Bob Clem (4350); and *Testing* - Gerry Barr (1134).

prints and reproducibles as needed. Check prints usually enjoy a high priority. However, occasionally critical weapon and reimbursable programs will cause peak demands on our time and the individual service is compromised.

Providing a self-service machine for draftsmen to make their own check prints poses other problems, e.g., the Diazo equipment requested would be an additional expense and would require special vents and space for the machine, user and supplies. Personnel would be required for daily maintenance, ordering supplies, and arranging for periodic repairs to assure continuous service. Safety is a problem because of the ammonia used to develop the image, and improper handling can cause widespread disruptions within work areas when this gas is allowed to escape. For the above reasons we do not install self-service Diazo installations.

K.A. Smith - 3100

# MILEPOSTS

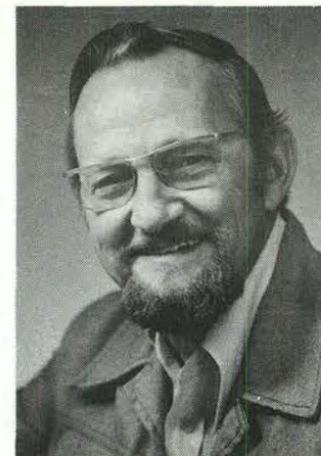
## LAB NEWS

May 1976

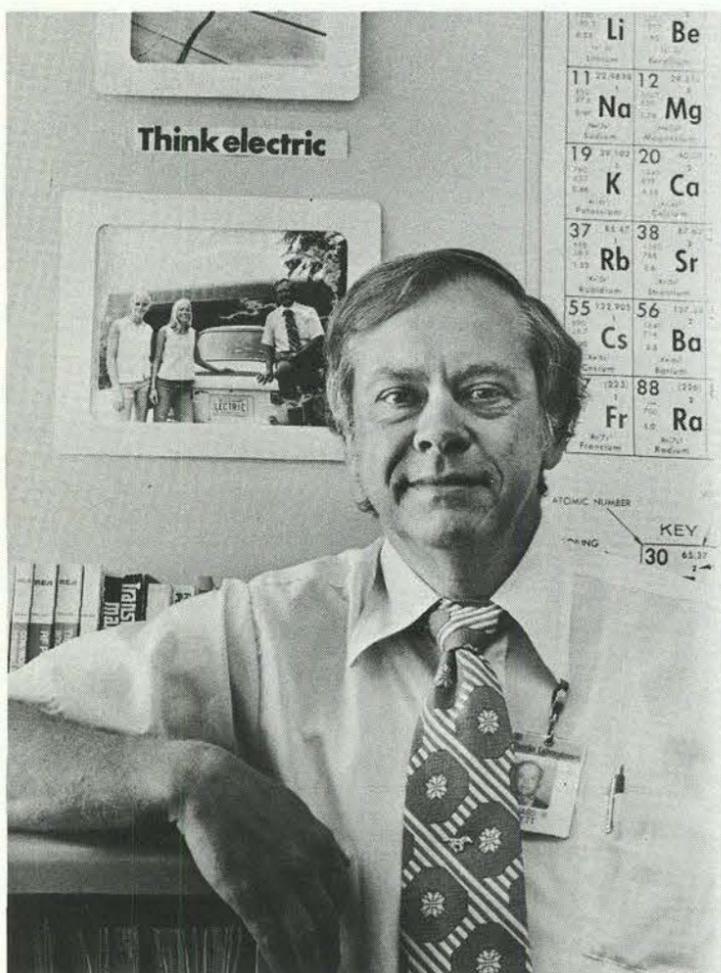


Nick DeLollis - 5813

20

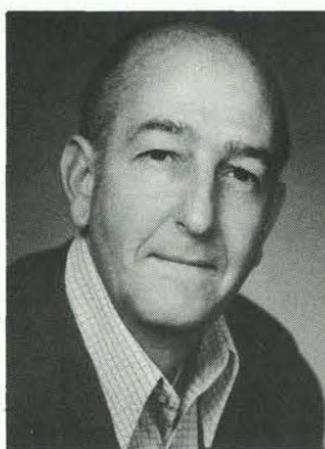


George Cosgrove - 8423 15



Dick Bassett - 2354

25



Bob Miller - 8159

15



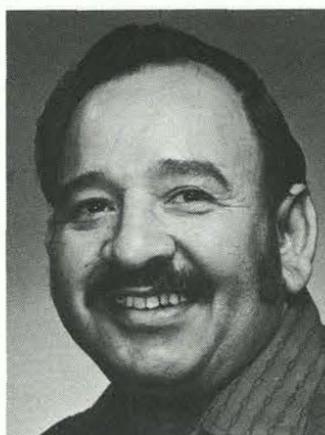
Carl Scheiber - 1525

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John Wichelns - 3714

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Edward Gonzales - 9712

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Ralph Carden - 2647

15



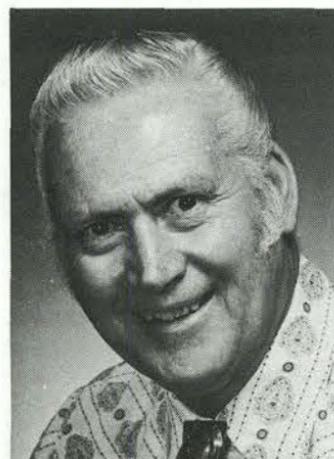
Fred Blottner - 5260

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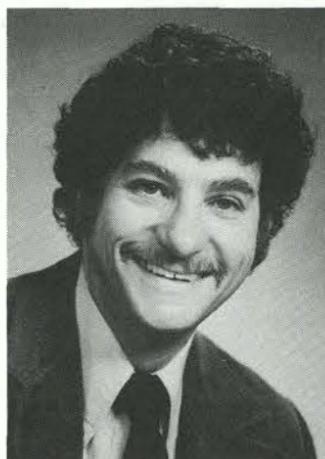
Ruth Kleindienst - 9721

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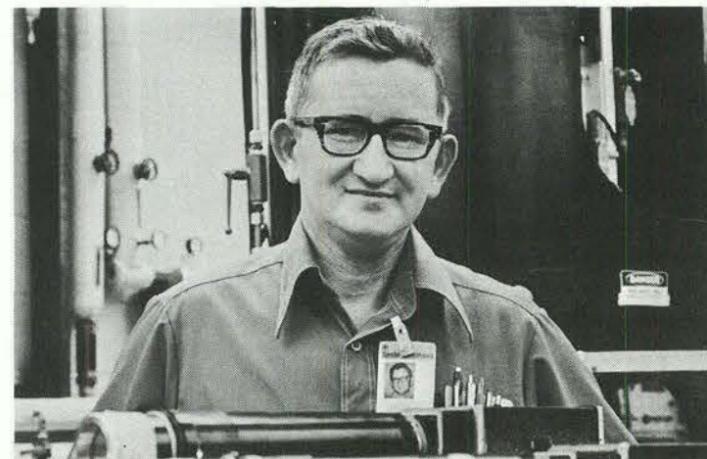
John Hiller - 2131

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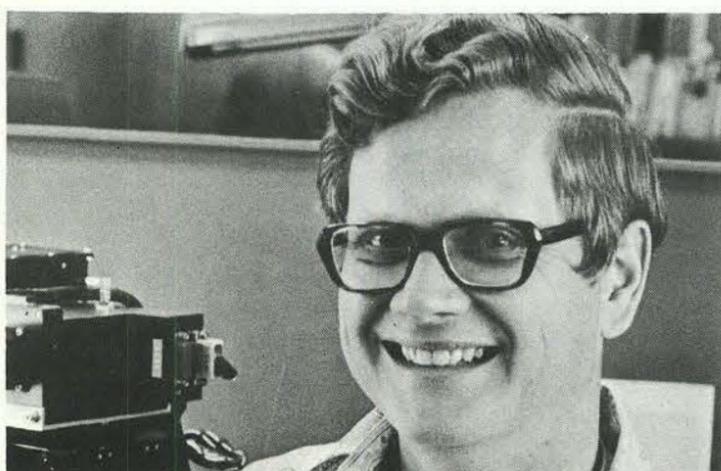
Hal Brint - 8323

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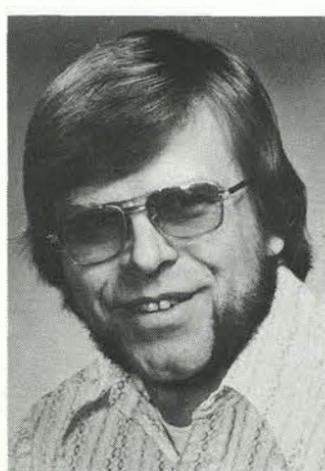
Darrell Dykes - 5847

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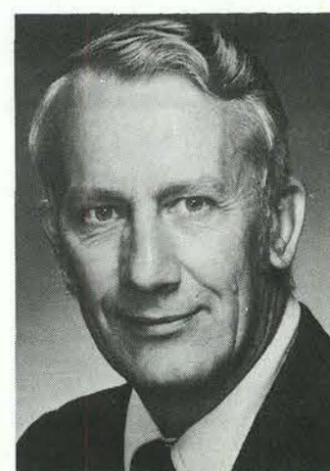
Paul Phipps - 1245

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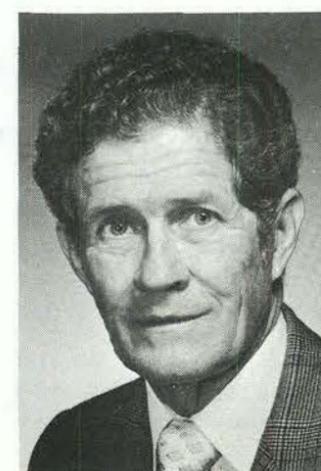
Martin Konkel - 9421

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James Mauldin - 9535

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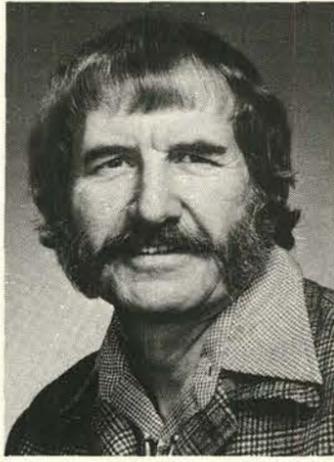


Truman Daniel - 4221

25



Eugene Cook - 1115 20



Charles Katzenberger - 2633 30



Bennie Padilla - 9713 25



Thelma Foster - 5000 15



Sandy Silva - 3732 10



Paul Kind - 9718 25



Marie Blakey - 9532 15



Perfecto Romero - 3727 20



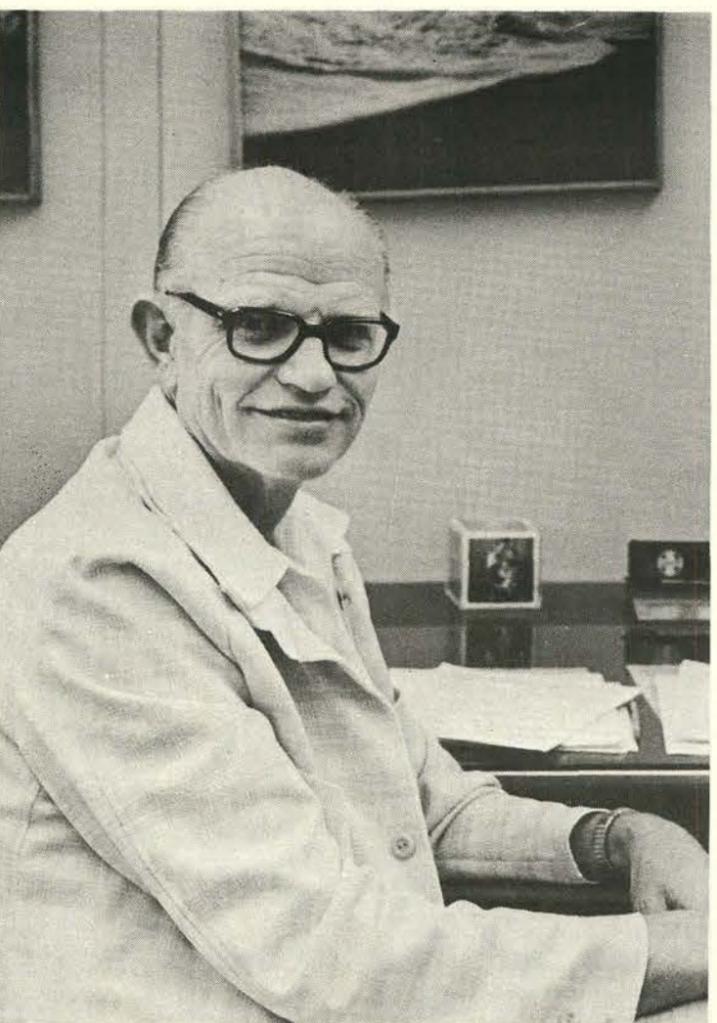
Henry Moeding - 3712 30



Fred Callahan - 3282 25



Marie Syme - 1350 20



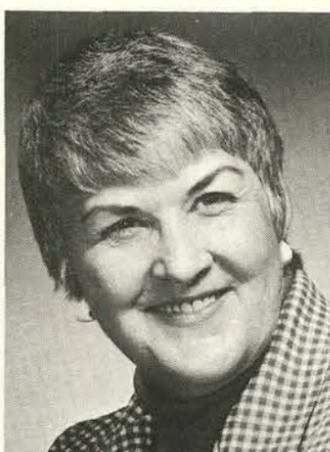
Bob Devore - 9620 25



Fred Brown - 3734 25



Tom Dragoo - 3155 10



Pat Maurer - 3731 15

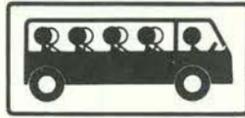


Edmund Zachewicz - 3645 30



Roy Rentzsch - 1285 15

# Bus Notes



Good News! Fifty-two new luxury buses arrive in Albuquerque between June 1 and July 31. Sandia commuters from the Far East area, it is hoped, will get one or more.

Fill out the coupon and mail it to Div. 3162 by May 28. If you come closest to guessing the exact time the first of the new air-conditioned, tinted windowed, bucket seated, carpeted, air-suspended coaches arrives, you'll win a one-year pass good on any Suntran bus anytime (including our Sandia Special routes). Next 10 closest guessers get one-month passes. (One entry per person.)



## "Guess the Date" BUS CONTEST

My Guess: \_\_\_\_\_ At \_\_\_\_\_ : \_\_\_\_\_ AM  
 \_\_\_\_\_ Month \_\_\_\_\_ Day \_\_\_\_\_ Time \_\_\_\_\_ PM

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zip \_\_\_\_\_ Phone \_\_\_\_\_

Today's Date: \_\_\_\_\_ 1976

### JUNK • GOODIES • TRASH • ANTIQUES • KLUNKERS • CREAM PUFFS • HOUSES • HOVELS • LOST • FOUND • WANTED • & THINGS

**CLASSIFIED ADVERTISING**  
 Deadline: Friday noon prior to week of publication unless changed by holiday.

**RULES**

1. Limit 20 words.
2. One ad per issue per category.
3. Must be submitted in writing.
4. Use home telephone numbers.
5. For Sandia Laboratories and ERDA employees only.
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

NIKON 200 mm lens with leather case, \$180. Lutheran, 293-4462.

BATHROOM VANITY MIRROR, sliding door, \$20. Yost, 296-9109 after 5.

DRUM SET, 4-piece with Remo heads, plus cymbals and extras, \$275. Sisson, 296-3883.

DUNEBUGGY ENGINE, complete, big bore, 40 hp, balanced, racing cam and flywheel. Sanchez, 255-4844.

TENT TRAILER, sleeps 8, stove, icebox, sink, built-in furnace, double butane, double dinette, electric brakes, \$825. Coughenour, 296-4146.

CAR SEAT, Ford Tot-Guard, for child 2 - 4, \$15. Caskey, 294-3218.

CAMPER, 8 foot, steel base, stove, icebox, sink, California standard approved, \$985. Straba, 242-3031.

ON/OFF ROAD TIRES, Tru-Trac, 1100 - 15, five for \$150. Wilson, 298-2493.

CAMERA EQPT: Asahi/Pentax zoom lens, slide copier and auto bellows, filters, backpacking tripod. Berlint, 293-5169.

TREADMILL, Sears, with odometer, new \$80, sell \$40. Pace, 299-5036.

SUEDE JACKETS, men's, new; swimming pool, 12' x 12', 3' high. Chavez, 242-9140.

NYLON TENT, 2-man, backpacker, 3 1/2 lbs. Shane, 296-4430.

GE REFRIGERATOR, 19 cu. ft., \$100. McKay, 256-3911.

REMINGTON 30-06, Sears model, bolt action with 4X scope, case. Garcia, 883-2969.

TRAVEL TRAILER, 18' Aristocrat Low-Liner, self-contained, sleeps 6. Lerma, 881-3836.

SHOP MANUALS for '76 Camaro, main manual and supplement, new, cost \$11.75, sell \$10. Hernandez, 268-5000.

GARAGE SALE: Electric range, built-in dishwasher, electric dryer; monaural Heathkit pre-

amp, amp, speakers; twin bed parts; aquarium, girls' clothes. McEwen, 881-3913.

YOUTH BED, maple finish, with mattress, \$55. Wickesberg, 294-8334.

600 X 14 6-ply tires, Datsun wheels, under 200 miles, \$25 ea.; 280Z wheel covers, \$30. Rader, 256-3069.

WIDE CHROME WHEELS, slotted, 4" dia. 5-bolt circle, with tires, \$40; four 7.50 - 16, 8-ply tires, tubes, pads, \$25; push mower, \$7. Vigil, 296-3590.

ADDING MACHINE, electric, Smith-Corona, 10-key, with extra roll tape, \$35; Honeywell electronic flash unit, fits any camera, \$35. McIntire, 294-5884.

120 BASS ACCORDION, with case; sewing machine. Johnson, 344-9369.

ROLLEICORD V camera, 2 1/4 square, with case and lens hood, recent shutter overhaul, \$55. Smith, 242-9576.

FOUR TIRES, F78-15 Goodyear, matched set, no wheels, \$75 or best offer. Schulze, 898-2880.

SEARS ROTOSPADER, 7 hp with furrowing attachment, recent tune-up, \$200. Hilty, 281-3974.

BOWLING BALL, bag, \$10. Minor, 299-1968.

BESLER COLOR HEAD for Model 23 enlarger, new, \$120. Robertson, 298-1048.

OLYMPIA elec. typewriter, Model 35-CR, \$225. Beatson, 881-2589.

20" SCHWINN girl's bicycle; Model 36 Smith & Wesson revolver, .38 cal. Causey, 881-7534.

CHILD'S saddle, \$60; indoor playhouse, \$30; outboard motor, Sears 7.5 HP, used once, \$200. Moore, 345-4030.

JACKMAN RIMS, 4 ea., 15 x 8, 8-spoke, 8-lug wheels, \$35 ea. LeRoy, 296-2953.

6' POOL TABLE, Sears Briarwood, extras included, \$175. Whelon, 898-8779.

FREE TO GOOD HOME, 9-mo. old female pug-cross. Rex, 821-8180 after 6.

SOFA, 80" wide, green, Kroehler, \$50; dining room table, 4 chairs, \$50; single bed, box springs, mattress, \$30. Perryman, 294-7040.

TWIN BABY STROLLER, folds away, \$10. Rush, 296-3136.

SPAULDING golf clubs, reg. woods & irons w/Spaulding bag & golf cart. Roth, 877-4997.

FREE KITTENS to good home, mixed breed, five left. Moss, 268-2161.

LG. DOG HOUSE free; hand mower, \$8; copper-tone trash

can, \$2. Walsh, 262-0972.

APACHE TENT TRAILER w/spare tire, sleeps 4, \$450. Metzger, 242-1028.

KING SIZE BED; 30-cup coffee maker; accordion; '70 Ford truck manual; Chilton's '69 auto repair manual. Tucker, 255-5335.

PINE BDR. SET: dresser w/mirror, bookcase hdbd. w/frame; dbl. springs & mattress, \$250; custom built corner bar, tufted roll armrest & lift gate, \$70. Doug, 298-5090.

2 SEARS elec. baseboard heaters, 6', 1500 watts, never installed, \$20 ea.; lg. set creative playthings, hd. wood blocks, \$40. Beattie, 898-2706.

HOME WATERSOFTENER, Water King, complete, \$250; 2 14" wheels w/tires mounted & balanced for '65 Mustang V-8, \$20; 14" tire, \$3. Schroeder, 344-1011.

9-KEY SINGER FRIEDEN adding machine, \$35. Goodrich, 299-6684.

TWIN-SIZE maple bedstead w/Sealey mattress & box springs, \$90. Oliver, 299-5512.

CAR TOP CARRIER, expanded metal, rests on 4 suction cups, \$8. Joseph, 299-6989.

LUGGAGE: old style Samsonite, 2 lg. wardrobe, 1 man's 2-suit, 1 women's travel, all 4 pieces \$50. Laval, 898-0518.

CRIB, walnut, w/mattress, dbl. drop sides, cost \$125, sell for \$50; net playpen, \$10; carseat, \$5. Ristine, 298-8383.

NIGHTCRAWLERS. Kindschi, 256-0531.

ETHAN ALLEN table, 36 x 154 w/2 15" leaves, nutmeg formica top, spoon foot, \$160. Dollohon, 268-5008.

**TRANSPORTATION**

'71 VW Super Beetle, stick shift, needs some work, \$1200 or best offer. Wood, 247-4566.

'68 BARRACUDA, 2-dr. fastback, AC, AT, PS, burgundy with white upholstery, \$450. Peterson, 299-0164.

'60 FORD STARLINER, 2-dr., \$100. Thatcher, 294-2731 after 5.

'72 FORD GRAN TORINO wagon, 4-dr., PB, PS, AC, radio, new tires, 350 CID, recent tune-up, 58,000 miles, \$1850. Woods, 265-7468.

4WD TOYOTA LANDCRUISER, late '71, 41,000 miles, hubs, solid hitch, asking \$2345. Jel-

lison, 296-9155.

'74 KAWASAKI FX125, fresh engine, accessories, \$600. Miller, 299-6067.

LADIES' 3-SPEED 3-wheeler with basket; men's golf clubs. Taylor, 266-3208.

'71 VW SUPER BEETLE, 39,000 miles, AC, radio, 4-speed, NADA book \$1700, make offer. Neel, 821-4270.

10-SPEED bike, 24" Stingray, \$30. Beavis, 268-3802 after 3.

'72 CAPRI, 2000cc, AT, sunroof, radials, radio, \$2000. Otero, 293-3614.

'74 MUSTANG II, AC, AT, 4 cyl., ginger brown, 13,000 miles, \$3350. Buttz, 293-4190.

'74 SUZUKI TS250 motorcycle, 2300 miles, dirt or street, \$650. Guerin, 299-4677.

YAMAHA Enduro-100, \$450. Minor, 299-1968.

'74 YAMAHA motorcycle, Enduro DT-125A, \$400. Baczek, 255-3429.

'62 SCOUT, 4-wd, 55,000 miles, 6000-lb. winch, \$1175. Munford, 296-4552.

'69 CHEVROLET 1/2-ton stepside pickup, V8, 51,000 miles, bronze paint, 4-spd., R&H, \$1300. Swain, 265-0098 or 255-7003.

SCHWINN 20" boy's hi-rise, needs brakes, \$12. Walsh, 262-0972.

'70 FORD pickup, 300 cu. in.-6, 4-spd., 42,000 miles, low shell on 8' bed, 2300-lb. load rated springs, \$1800 firm (below NADA). Rivard, 265-3164 after 4:30.

'70 TORINO, AT, AC, 302 engine, radial tires, \$1125. White, 293-2219.

'72 3/4-CHEV. Cheyenne Super, AT, AC, PS, PB, 27,000 miles; '72 10 1/2' Aristocrat camper, self-contained; Top Kat fiberglass shell, \$6000 total. Beeson, 299-6132.

'75 YAMAHA RD-350, 600 miles, make offer. Campbell, 268-5750.

BICYCLE, 3-spd. Schwinn Sting-Ray, 20", \$30. Johnson, 298-4046.

'66 FORD stn. wgn., 10-pass., AT, PS, PB, AC, camper towing pkg., \$425. Gallagher, 298-0565.

'63 VW BUS w/camper accessories; new tires & extra snow tires, 23 mpg, \$650. Caruthers, 821-4035.

'74 BMW R75/6 w/windjammer, 17,000 miles, \$2700. Anthes, 877-7805.

#### REAL ESTATE

100 FT. lot, Tijeras Canyon, 3 miles east of Western Skies, patrolled, restricted addition, natural city gas, etc., \$5500. Chavez, 298-5091.

3300 sq. ft. LIVING AREA, 4-bdr., 2 bath, garage, lg. workshop roughed in for an apt., swimming pool & tennis court. La Sala Grande area. Mattox, 296-4149.

MOUNTAIN CABIN, Jemez area, ready for occupancy, electricity, city water, septic system, fireplace. Sotel, 298-5296 after 6.

#### FOR RENT

1-BDR. APT., new, private patio, frost-free refrig., furnished or unfurnished, AC, walk-in closet. Aragon, 541 Espanola SE, 242-1651 or 268-7043.

CONDOMINIUM - Purgatory Basin -, sleeps 6, kitchen, fishing, hiking, horsebacking, Ouray, Durango, Silverton, narrow gauge train, \$25/night, weekly rates, reservations. Smatana, 299-6278.

2-BDR. DUPLEX, avail. June 1, private patio, maintained lawn, fp, new stove & refrig., dishwasher, disposal, garage w/auto. door, no pets or children. Konnick, 3801 Thaxton SE, 266-7113.

#### WANTED

SANDIA/ERDA CB'ers for LAB NEWS story. Call Hawkinson, 4-7841.

CEMENT MIXER, gas or elec. Sanchez, 299-5658.

BATTERY CHARGER for 12-volt battery; old knives, daggers & swords, will pay cash. Smitha, 293-1177.

CHILD'S wardrobe chest w/drawers. Straba, 242-3031.

'72 or '73 VW square back, manual shift, low mileage (30,000). Shunny, 265-1620.

THE ALBUQUERQUE Mountain Rescue Council needs an inexpensive FM transmitter / receiver base station in the 155 MH band, donations are tax deductible. Mattox, 296-4149.

#### LOST AND FOUND

LOST—Black pocket knife, Indian pendant, pocket calculator X50, black rim safety glasses, brown pocket knife. LOST AND FOUND, tel. 264-1657.

FOUND—Gold Cross pen, silver & corral necklace, gold loop earring. LOST AND FOUND, tel. 264-1657.

●GREEK●C-CLUB●SWIM●RV CARAVAN●PLAYA MAZATLAN●FOOTBALL●SINGLES●



DIANNE — at the Club

FRIDAY	SATURDAY
14 — HAPPY HOUR LASAGNA/SPAGHETTI BUFFET Adults \$2.95 Under 12 1.92 PRISONERS Denny In Lounge	15 — MAY BALL Treasuries of Sanado
21 — HAPPY HOUR BBQ SPARE RIBS Adults \$3.50 Under 12 1.92 UNM Film - 6 La Ultima - 6:30 NIGHTLIFERS	22 — Lounge Open (No Teen Dance)

DEGREES — both Fahrenheit and Celsius, are rising. So are the water levels in the Club's three swimming pools. You can rise too — to the occasion: take a dip this weekend or next. Get a tan even before the Grand Pool Opening on the 29th. Or swim Fridays from 3 to 9 starting the 21st. (Remind the kids to try pre-season swimming; it's almost as much fun as sneaking in.)

ARE — meatballs, lasagna, and spaghetti your kind of meal? Then the Club is your kind of place tonight. From 7 to 10, it's *The Prisoners*, and, later in the Lounge, it's Denny, living proof that it takes guts to string a guitar.

GREAT — Outdoors Indoors show coming up. First, an armchair tour of New Mexico's parks and recreational areas by John Soper, Exp. (expert). Second, a description of an RV caravan through Mexico which includes a piggyback ride through the Sierra Madres aboard a Chihuahua-Pacific train. *Caravanas de Mexico* Director Gil Andrews will show slides of the trip that

cruise ship from Miami to Haiti, Puerto Rico, Virgin Islands, and the Dominican Republic plus air fare — all for \$659 per member or guest.

SPENT — a small fortune seeing Lobo Football games last year? Get smart. Get season tickets — they're 1/3 cheaper — at the Club now. Brought to you by the Wolfpack, the offer's open to all Sandians and ERDANS, Club members or not, at \$20 per each.

GETTING — signed up for Mazatlan (after 8 a.m. June 1) means getting a great price (\$295) on a great place. Seven nights at the Playa Mazatlan with breakfast and dinner. Seven days of genuine Mexican sun. Oct. 24-31, 1976.

THEM — good ol' discount tickets for Commonwealth movie show places is still on sale — they'll save you six bits a whack till June 31.

INTERFERES — but nicely, with the usual Happy Hour routine next Friday. It's UNM's award-winning recruiting film narrated by Packer Voice Ray Scott and introduced by Bill Mondt himself. During the film, barbecued spare ribs, corn-on-the-cob, salads, garlic bread. After the film, *La Ultima*, featuring Yolanda. Later, after sundown, *The Nightlifers* to put some life in your (k)night.

WITH — summer coming on, the series of Singles Nights ends on the 28th. Live music, hors d'oeuvres, Happy Hour bar, good times. Plan now, enjoy then.

YOUR — Drink of the Week next week is a sweet young thing with a wallop — Margarita. And from May 24-29 it's one of the prettiest, most popular, and most potent of the breed: Tequila Sunrises. DOW-Jones closing price: 75¢ a share.

EDUCATION — for fisherpersons begins on the 20th. Sign up *before* then for the Fishing School taught by Bob "Fish In That There" Lake. Enrollment is limited. \$22 members, \$24 non-members.

MORE INFO — 265-6791.



JACQUI — for Greek Night

*Reader's Digest* calls "The Most Dramatic Train Ride in the Hemisphere." All Sandians/ERDANS are invited; no admission charge; 7:30 on the 17th.

UNLESS — you get your tickets today or tomorrow, you'll be up the Creek, Greek-wise: you'll miss Greek Night, and what a Night it'll be! Authentic Greek food and, straight from appearances in San Francisco, three talented belly dancers on navel maneuvers. Later, come back down to earth with *Up Country*.

THE — dates have been shifted to Sept. 9-24. The prices have been shifted (down!) to \$895 (plus Aegean Island cruise options.) It's a great way to see the Glory That Was Greece. All interested members and guests are invited to attend the Pre-Trip meeting at 7:30 on the 17th in the El Dorado Room (or call the Club for more information).

TIME — to make a decision on the Caribbean Cruise package too. Seven nights (Nov. 26 - Dec. 4) aboard a luxury Norwegian



MARIA — on the 29th



●SIERRA MADRES ●LAKE ●HAITI ●READER'S DIGEST ●