

## **EPOCH: Unique Facility for Study of Electron-Beam Propagation**

In Sandia's EPOCH (Electron Propagation On Channels) facility in Area IV, high-power electron beams have been made to travel about 50 metres, more than half the length of a football field.

It's the first time that high-power e-beams of microsecond duration have been made to travel farther than about 10 m—and that involved a pulse duration so short that beam instability was not a consideration. (Powerful e-beams are difficult to make move in a line for any distance; they tend to become unstable and whip around as the electrons try to repel each other; see "Advantage of Long Pulse Duration" story.)

### **What's an EPOCH? Why Troll?**

EPOCH consists of an e-beam accelerator; a propagation tube; and cameras, instruments, and computers to gather and analyze the data. Its 184-ft.-long, 3-ft.-diam. aluminum propagation tube is the longest and largest such tube available anywhere for high-energy beam studies.

EPOCH is located in, and protected by, a 350-ft.-long concrete tunnel, a semicircle 24 feet wide at the base and 12 feet high. The propagation tube could be extended to the tunnel's full length at some time in the future.

The tube is surrounded by coils that produce a low-intensity magnetic field that helps form a plasma (highly electrified gas) in various low-density gases introduced into the evacuated tube. This 2-cm (0.8-inch) plasma channel—which serves as a guide for the powerful e-beam—can be formed by first sending a low-energy e-beam of several hundred volts through the tube. (Alternatively, a krypton-fluoride laser beam can be used to form the plasma channel without the need for magnetic-field coils.)

In addition to studying the propagation of e-beams in a vacuum, propagation can be studied at normal atmospheric pressure by shooting the beam directly through the tunnel instead of using the tube.

The accelerator—called Troll because it lives in a tunnel—consists of a 46-stage Marx generator (banks of energy-storage capacitors) and a high-voltage diode that converts the energy to an e-beam. It is designed to produce beams ranging from 1 to 4 million electron-volts in energy, from 0.5 to 5 kiloamps in current, and from 0.3 to 2 microseconds in duration.

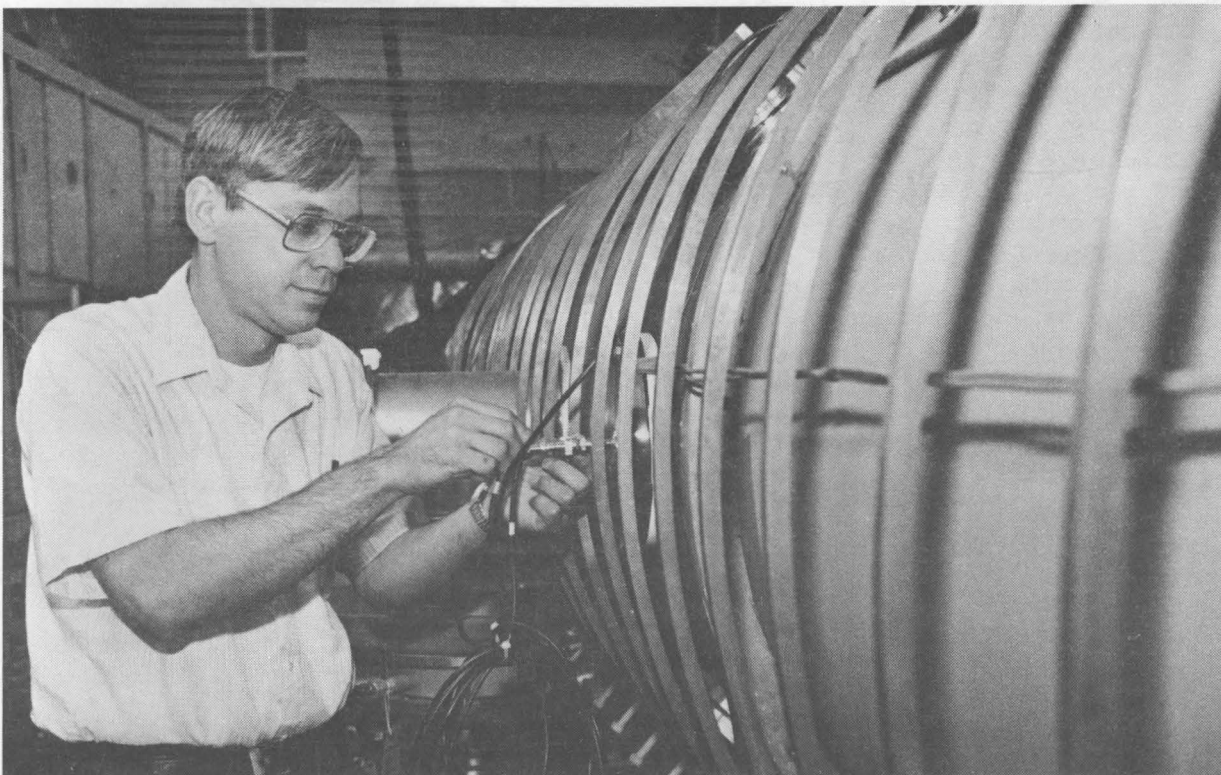
EPOCH was specially designed for study of the transport of multimillion-volt, long-pulsed e-beams over long distances. It is capable of producing the longest-duration multimillion-volt, multikilo-amp (thousands of amps) beam available—lasting up to two millionths of a second.

### **SDI and Other Applications**

A relatively stable means to transport high-energy e-beams interests researchers involved in Strategic Defense Initiative studies. But such beams could also be used for flash radiography (high-speed X-ray photography), welding, the study of properties of materials subjected to rapid heating, and simulating the effects of nuclear bursts.

For many of these applications, increasing the distance that a given amount of electron-beam energy can be transported is desirable. To do that, various instabilities have to be overcome. EPOCH is currently being used to find ways to overcome a predicted instability (called electron-ion hosing) and thus allow a tighter, more energetic beam to be propagated over long distances.

*(Continued on Page Four)*



GEORGE KAMIN (1274) makes some adjustments to the apparatus that produces low-intensity magnetic fields in the 184-ft.-long EPOCH propagation tube. The fields, in turn, help form a plasma that guides an electron beam down the tube. Recent EPOCH tests have, for the first time, produced high-power electron beams of microsecond duration.

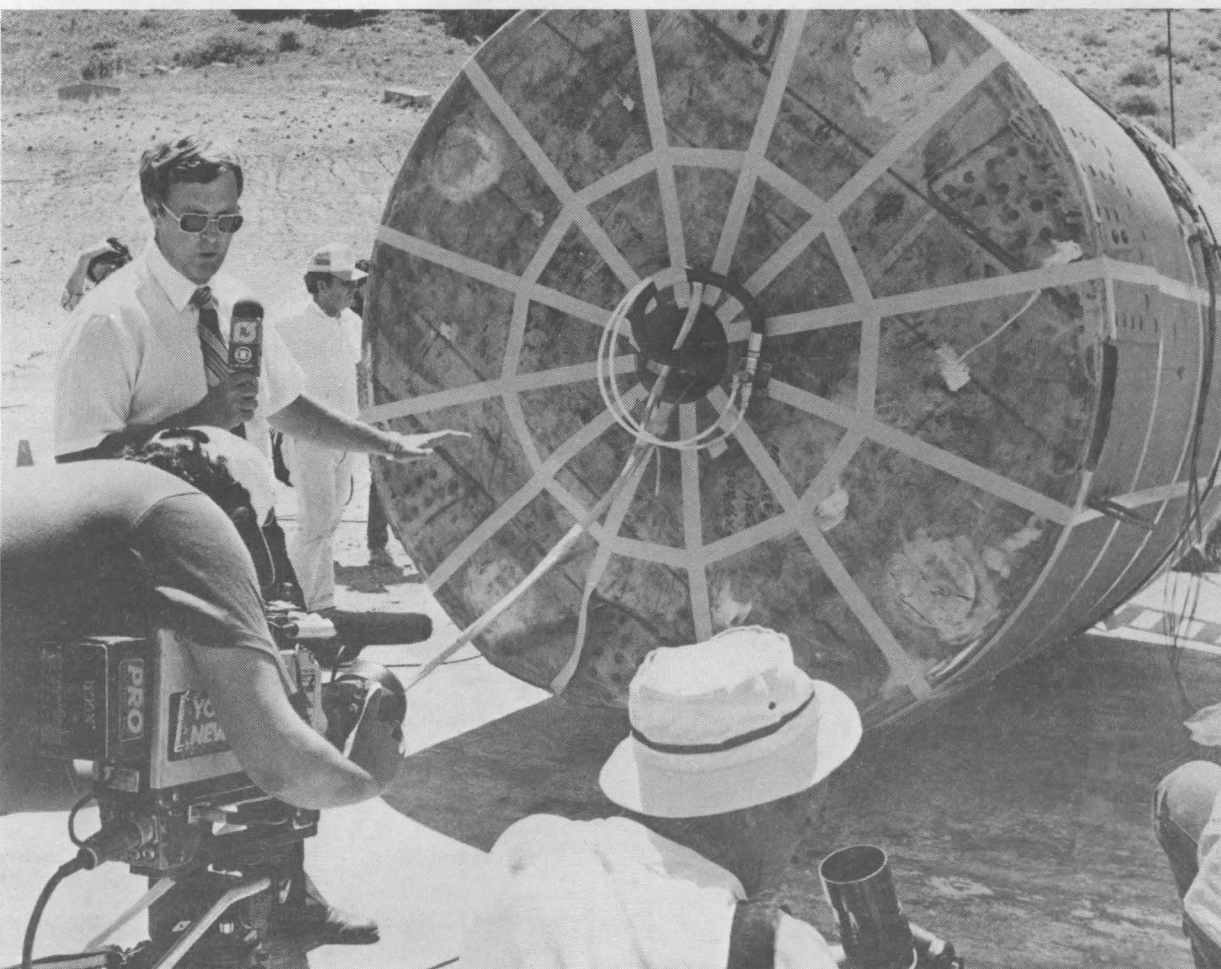


# **LAB NEWS**

VOL. 40, NO. 15

SANDIA NATIONAL LABORATORIES

JULY 29, 1988



FIRST DROP TEST of the TRUPACT II waste canister at Sandia's New Cable Site on July 22 attracted representatives from most of the local media. If it and its identical twin pass the required series of tests (drop, puncture, and fire), the Nuclear Regulatory Commission will certify the design, and such canisters will be ready for use in transporting transuranic wastes to the WIPP (Waste Isolation Pilot Plant) site near Carlsbad. Each TRUPACT II (TRansUranic PACKaging Transporter) canister is 8 ft. in diameter and 10 feet high, and can hold fourteen 55-gal. drums filled with contaminated clothing and other items generated by national defense facilities. Transportation Systems Technology and Analysis Div. 6322 pressurized the test canister and instrumented it with accelerometers to provide data on its performance after a free fall of 30 feet onto an unyielding surface. Here, DOE/AL's Manager for Waste Transportation, Jim Tollison, shows members of the media the damage sustained by the canister. Preliminary data indicate that the package performed just as predicted.

## **So Long, Smitty!**

**See Pages Six & Seven**



# Antojitos

Time Once Again, Boys and Girls, for a rundown of the misaddressed correspondence Sandians have received in the last year or two. Given the massive intellectual challenge posed by words such as "Sandia" and "Albuquerque," the mistakes aren't surprising. But such fun.

The most common sender's mistake is to assume that western places are named for Spanish saints -- San Diego, San Ysidro, etc. Hence, the spate of San Dia Natl Labs references (one of them from AT&T). Then there's San Dina and San Sandia. The AAAS sent one to San Diego Natl Lab, and the Army sent one to San Luis Obispo Natl Labs. Well, we're located in California too, but . . .

Another common one is Saudia (as in Saudi Arabia) Natl Labs. Now for the non-duplicated ones: Gloria Millard (3314) got one from the Navy addressed to "Person in Charge, Sandimat Natl Labs." She thinks she's been promoted, but at the wrong place. Cheryl Haaker (2644) got two to Sanded Natl Labs -- yes, it can be abrasive here. Ben Sedlack (7213) got one to Sandie & Natl. Lab (well, that's what it sounds like).

Paul Baca (7472) works at Seneia, Joe Deveney (5128) at Sanelia, Cliff Blossom (was 7135) at Sandria Labo in Alberque, John Gardner (3153) at Savannah, Barry Schrader (8522) at Sabdua Kab (some typist's right hand didn't keep a respectful distance from the left). The Library is located at Sandria, Sanida, Savelia, Sardia, and Dandia Natl Labs. Coincidentally, John Stathis (2632) works at Dandia too. Margaret Carroll (3317) is a supervisor at Spandia. High Precision (sic) Inc. got Sandia right but put it in Dan Dia, NM.

Then there are the folks who assume we're mod and today and contain no artificial preservatives: Michael Quintana's (6222) letter came to San Dia Natural Lab, the Library's to Sandra Natural Labs, and Rodema Moseley's (5268) to Sandra Natural Life. Mel Olman's (2614) suggests a place to clone pop singers -- Sandia Madona Lab. Merton Brooks (7472) got one addressed to Sandia Nahond Labs, another to Sudia. Gordon Smith (3314) works at US Doe Sandia Nation (it's east of the Navajo Nation).

"National Labs" sounds easy enough to Sandians, but not to all in The World Out There: Margaret Carroll's magazine label specifies Sandia National Lake, Nigel Hey (3161) got a letter addressed to Sandia National Bank. Hal Pruett (2311) works at Sandia Nail Labs, and Dick Casey (7170) at Tonopah National Forest.

Bob Palmquist's (2542) New York hotel reservation was addressed: S.A.N.D.I.A. / NO ST. ADDRESS IN MEXICO / ALBUQUERQUE, NM 87185. One of our 50 was missing for a while there, but it was found again. (The acronym? Probably "Serving All National Defense Issues Adeptly.")

As the above suggests, Albuquerque is not an easy word to spell. Columbia Univ. Libraries goes for Alburque, Longman publishers for Albuguenque, a hotel for Albercky. Others spell by ear -- Generic Software Inc. likes Albecurcy, ChemCentral goes for Alburkerky, R. R. Bowker for Albekerky, Nautilus Inn for Albokerky, and Digitronics for Albequerque. Computer Security almost got it right -- Albuquerquee.

(Note to Outside World: Sandia is Spanish for "watermelon," the sometime color of the Sandia Mountains east of Albuquerque at sunset. Albuquerque was named for an 18th-Century Duke of Alburquerque -- he couldn't spell it either.)

●BH

\* \* \*

Departing Comment by Senior Member of Large Staff: "When new programs are considered, the question should always be 'Is it in the national interest?' -- not 'Is it good for Sandia?' " --Leon Smith

## Glen Cheney Named VP 2000

Glen Cheney has been named Vice-President for Component Development 2000, effective July 18. He joins Sandia from AT&T Bell Laboratories, Allentown, Pa., where he was Director of the Microelectronic Subsystems Design Laboratory.

Glen is no stranger to New Mexico. "Joint interest by Sandia and Bell Labs in radiation-hardened static RAMs brought me to New Mexico frequently in the past few years," he says. As a youngster, he often traveled through New Mexico with his family from Tucson, and later San Diego, to visit his grandparents in Arkansas. City names, such as Tucumcari, Roswell, Lordsburg, and Deming are familiar to him. "My wife and I also spent a pleasant vacation three years ago in Santa Fe," he says.

Of his assignment to Sandia, Glen says, "I'm excited and pleased to be here. I've got a lot to learn. But, I'll be working with an absolutely splendid group of people who will quickly help get me on board."

An early desire to know how things work was Glen's incentive to pursue mathematics and science. Since then, he has earned an AB and an MS in physics with an emphasis on solid-state physics, both from San Diego State College. In 1987, he completed the Harvard University Graduate School of Business Administration Management Program. He's a member of IEEE.

Glen joined AT&T Bell Laboratories in March 1964 after working for Convair Astronautics and General Atomic in San Diego. While at Convair, he worked on the Atlas missile program. His work at General Atomic included research on radiation effects, thermal properties of refractory materials, and direct conversion of thermal energy to electricity.

At AT&T-Bell Labs, Glen was supervisor of the MOS Digital Circuits Group from 1968 to 1975 and the Memory Design Group from 1975 to 1979. From 1979 to 1982, he was Head, Memory Design Department. He was Director of the Silicon Device Development Laboratory from 1982 to 1987. As Director of the Microelectronic Subsystems Design Laboratory, he was responsible for the design and development of microprocessors, digital signal processors, linear and digital telecommunications circuits, and high-performance VLSI circuits.

Glen's management philosophy centers on people. "I believe my job is to tap the creative and innovative potential of the people who work in my organization, and to lead them in productive directions. But the key is the people."

He and his wife Jo have two grown children. In his spare time, Glen enjoys physical activities such as running, biking, cross-country skiing, and hiking.

## LAB NEWS

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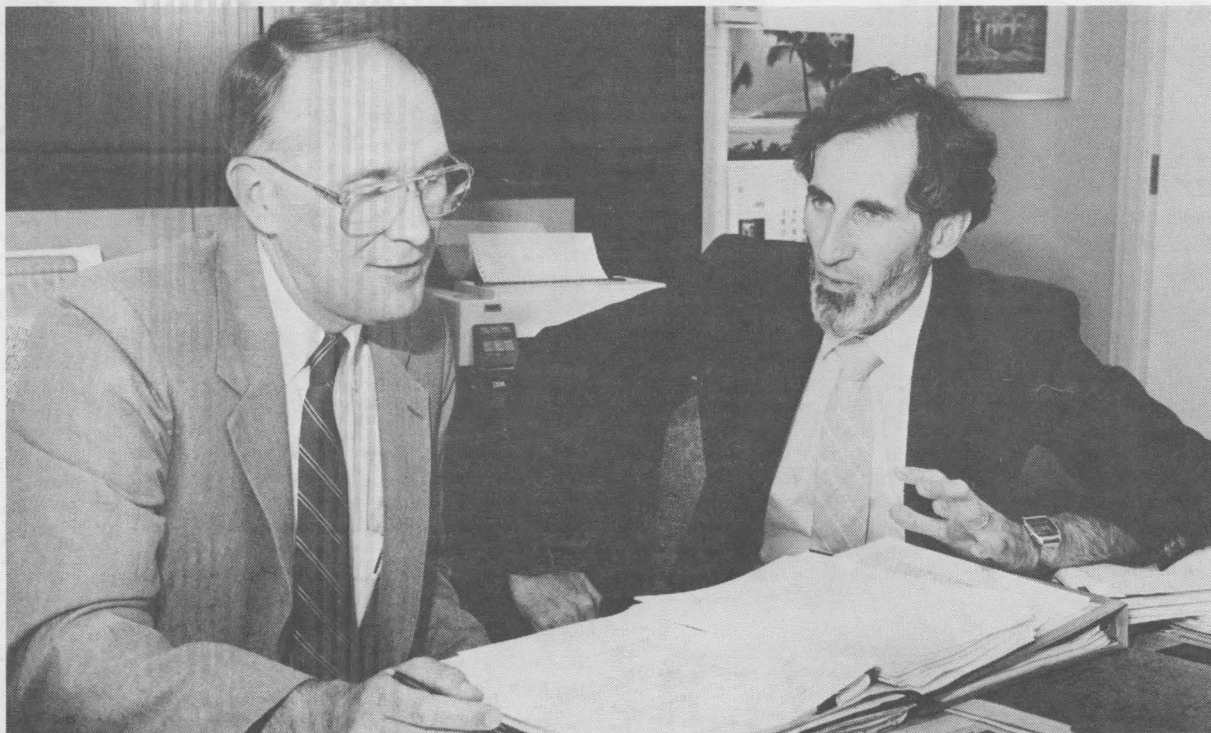
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BRUCE HAWKINSON, Editor (505/844-1053)  
PHYLLIS WILSON, Writer (4-7842)  
DONNA RIX, Writer (6-6888)  
RANDY MONTOYA, Photographer (4-5605)  
GERSE MARTINEZ, Asst. Photographer (4-5605)  
JANET WALEROW, Editorial Assistant (4-7841)  
KATHY ABEYTA, YOT (4-7841)  
BARRY SCHRADER, Livermore Reporter  
(415/294-2447; FTS 234-2447)



NEW VP 2000 GLEN CHENEY (left) was briefed on his new duties by former VP 2000 Larry Anderson, who returned to AT&T Bell Laboratories on July 1 to become Executive Director of the Interconnection and Power Technology Division in Parsippany, N.J. "Sandia has been my best job ever," said Larry before his departure. In his new position, he will report to former Sandia Director and VP of Components (1971-75) Klaus Bowers.



## SAND DEVIL Can Keep a Secret

Two Sandians are developing a compact digital video system for use in high-altitude, unmanned missions that require encryption of sensitive data before transmission back to earth. Currently, there is no small, lightweight means to send secure video data from a moving satellite (or other vehicle) to earth in "real time."

Cory Ottesen (8142) and Mike Bell (8143) began working early in 1987 on the design of a *Sandia Digitally Encoded Video Link (SAND DEVIL)*. SAND DEVIL digitizes the analog video signal (converts each picture element to black or white rather than infinite shades of gray). Digitizing permits standard NSA (National Security Agency) encryption techniques to be used to protect the secrecy of data.

"We set out to build a system with small volume and light weight, plus relatively low data-transmission rates," says Cory. "We wanted to be able to take video from a camera, digitize it, and run it through an encryption device."

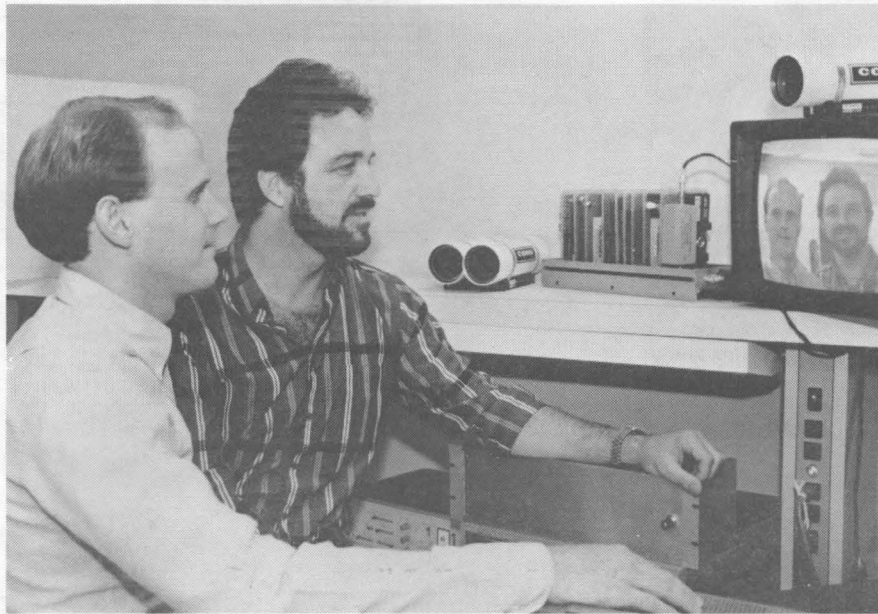
"And we wanted the design to be fairly simple, yet have enough sophistication that we could lower the data-transmission rate to between 1 and 10 megabits per second [normal range for TV signals is 40 to 100 megabits]. Lowering the bit rate saves power and reduces the transmitter size."

Cory and Mike used existing technology to design their system. State-of-the-art integrated circuits, known as Erasable Programmable Logic Devices (EPLDs), can be programmed to implement complex custom logic functions. When design changes are needed, Mike and Cory go to their computer, write a new algorithm, reprogram the chip, and then plug it back into the system.

### No Customized Chips

"So, instead of having a custom chip built each time we make a change, which takes months and costs upwards of \$50,000, we can program the EPLD in a matter of minutes and come up with a fairly complex system that fully meets our needs," says Cory. "Each EPLD in our system replaces more than two dozen standard logic chips."

SAND DEVIL consists of an encoder that converts standard analog video into digital form for transmission and a decoder that transforms the received data back into analog. "Multiple cameras can be connected to the encoder," Mike notes. "Depending on the type of mission, we can switch from one camera to another. Or, with all cameras running simul-



LOOKING AT THEIR OWN IMAGES on the digital video system are Cory Ottesen (8142, left) and Mike Bell (8143) with the encoder/decoder breadboard in rack to the left of the monitor. Camera is tubular device atop the set.

taneously, we can do time-division multiplexing — take one frame from each camera in sequence, and transmit that pattern to the decoder, which displays the images from each camera on separate TV monitors."

After the multiplexer selects the desired camera, the signal is digitized and fed into a memory buffer to transmit it at a reduced bit rate. One way the system reduces the data rate is by a controller that decides which data coming from the camera should be saved for transmission. "Just before the data are transmitted, we compress each pixel [picture element] from eight bits down to three," says Cory. "The decoder reconstitutes each pixel with full eight-bit resolution and converts the data back to a standard video format."

"Our plans are to build the units from off-the-shelf parts at as low a cost as possible," Cory continues. "The 6-watt battery-powered encoder will be about the size of a Sony Walkman [4x5x2 inches]." Cory feels that by using hybrids and surface-mounted components the encoder could be miniaturized even more — down to the size of an audio-tape cassette case (3x4x1 inches). "We would also like to reduce the camera [currently 3 inches in diameter by 12 inch-

es long] to about the size of a soft drink can," he notes.

Total weight of the units going into space could be about three pounds. Jerry Henderson (8131) has been working to package the cameras in smaller volumes. The package design must also protect the camera from the extreme environments of space flight.

The team intends to have the units ready to use in a flight test by early 1989. In addition to their current purpose, there is potential for other applications — for example, in remotely piloted vehicles for surveillance on the ground and in the air.



### Congratulations

To Lisa and Andy (8245) Lutz, a daughter, Amy Christine, July 6.

To Darcy (8161) and Mike Roberts, a daughter, Lauren Michael, July 18.

## Welcome to Livermore

### California

Sandra Miller (8522), Livermore  
Carol Caldwell (8514), Livermore  
Tim Shepodd (8313), Pasadena  
Mary Ernesto (8522), Dublin  
Lizbette Cox (8522), Ione  
Sandra Warner (8524), Tracy  
Grace Petines (8522), Stockton  
Arlene Franke (8522), Pleasanton  
Paul Yoon (8164), Palo Alto  
William Yoshimoto (8271), Lodi  
Thomas Clark (8271), Fremont  
Duane Sunnarborg (8362), West Pittsburg  
Michael Mills (8314), Saratoga

### Florida

Anne Hallman (8514)

### Hawaii

Mark Mitchell (8357)

### New York

Tim Johnson (8525)

### Virginia

George Sartor (8357)

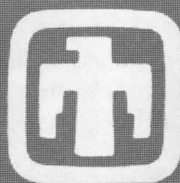
### Washington

David Andaleon (8432)

Brad Halverson (8165)

### Wisconsin

Carl Hayden (8353)



## SANDIA LIVERMORE NEWS

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SANDIA NATIONAL LABORATORIES

JULY 29, 1988



SUMMER PROGRAM PARTICIPANTS at Sandia Livermore include 17 college faculty and students working under Sandia-sponsored programs, another five as a part of the Associated Western Universities program, and one faculty member from the Industry Initiative for Science & Math Education. Nine of those gathered recently for an orientation session. Standing (from left) are Robert Silk (AWU), Prof. Arvind Kumar, Dana Madsen, Brian Jennison, and Ben Jones. Seated are Victor Wu, Scott Doyle, Bill Replogle, Kristin Hagberg, and David Rosenzweig (8522), who conducted the orientation.



## Supervisory Appointments



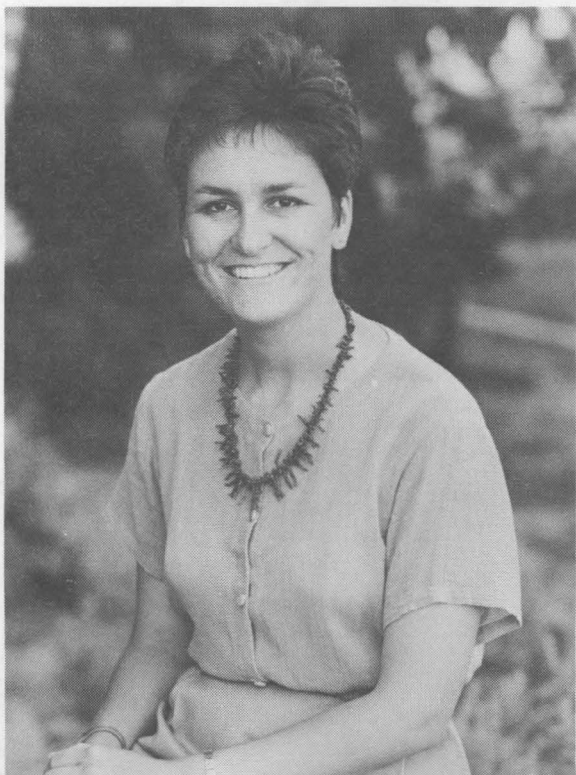
JANET SJULIN to supervisor of Electronic Parts Quality Assurance Div. 7251, effective May 16.

From August 1983, when she joined Sandia, until her promotion, Janet was a member of the Components and System Reliability Division. Her work included security-fault and reliability analyses of command and control equipment.

She has a BS and an MS in electrical engineering, both from Oklahoma State University. She is a member of the American Society for Quality Control and the National Society of Professional Engineers.

In her spare time, Janet enjoys playing the piano, reading, and working on home improvement projects.

She and her husband Mike (7265) live in the NE Heights.



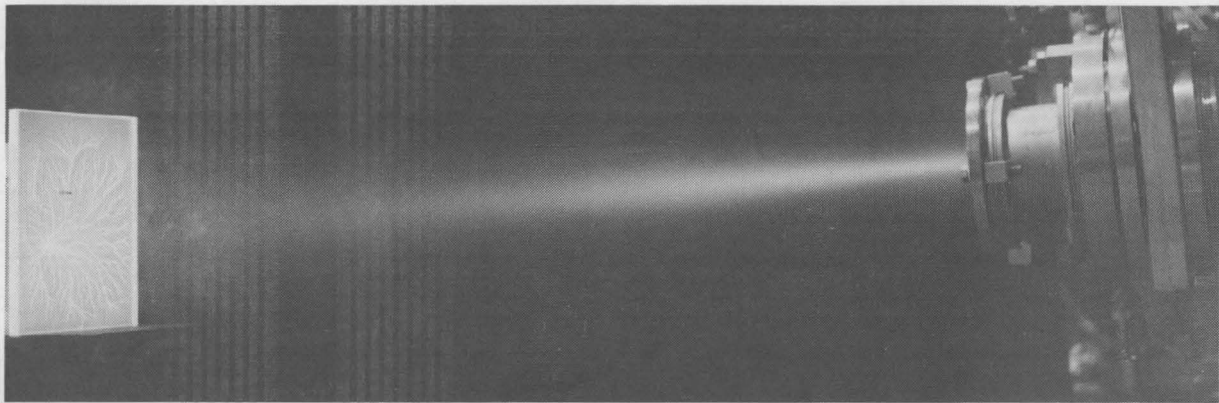
CYNTHIA FIGUEROA-McINTEER to supervisor of Presentations and General Art Section 3155-1, effective June 16.

Cynthia has been a member of Sec. 3155-1 since she joined Sandia in September 1985 as a technical illustrator. Before coming to the Labs, she worked for two years as an illustrator at Tech Reps.

She received a BA in architecture from UNM under a Presidential Scholarship, and is currently working on an MA in the same field. She is the editor of *MASS*, the journal of the UNM School of Architecture and Planning.

In her spare time she enjoys pencil and ink drawing, watercolor painting, sewing, and other handcrafts.

She and her husband Bob have one son. They live in the NE Heights.



ELECTRON BEAM is invisible in the vacuum inside EPOCH's propagation tube. This photo shows what the beam looks like in air — and its result: a Lichtenberg pattern in the Lucite target.



WARREN KLEIN to supervisor of Technical Publications Support and Standards Division 3151, effective July 1.

Warren joined the Labs in February 1984 as a member of Management and Staff Development Div. 3523. He worked in management development training, strategic planning, and management consulting. He was the organizational-effectiveness specialist in Div. 3523 when he was promoted.

He has a BS in social science from Troy State University and an MA in public administration from the University of Colorado. Before coming to Sandia, Warren served 20 years with the US Army as a helicopter pilot and organizational-effectiveness consultant.

Warren's spare-time activities include physical fitness training and skiing. He and his wife Debbie have two children. They live in the NE Heights.

### Congratulations

To Pamela Proctor (1821) and Jim Puissant, married in Pueblo, Colo., June 17.

To Theresa and Tom (2132) Hill, a daughter, Colleen Bridget, June 17.

To Senaida and Sam (3426) Gurule, a daughter, Samantha, June 17.

To CeeKay and Brad (3426) Nation, a son, Christopher, June 27.

To Irene (7472) and Frank (2522) Lasky, a daughter, Nicole Roxanne, June 27.

To Cheryl and Douglas (2858) Hodge, a daughter, Andrea Krystyne, June 28.

To Grace (2132) and Mike Bujewski, a son, Kurt Michael, July 3.

To Janie and Edward (7223) Thomas, a daughter, Katie Elizabeth, July 3.

To Marie Baumgardner (3743) and Dan Rosales, married in Albuquerque, July 6.

To Mary and Hank (6233) Westrich, a son, Bradford James, July 6.

To Julie and Ayden (2345) Young, a daughter, Shannon Nicole, July 8.

To Janice and Terry (7483) Smith, a daughter, Megan Michelle, July 10.

To Stephanie Kunz (2512) and Jeffrey Brinker (1846), a daughter, Lina Marie, July 11.

## The Advantage Of Long Pulse Duration

The amount of energy delivered to a target by an electron beam (e-beam) can be raised by increasing either the electron energy, the current, or the pulse duration.

Increasing the electron energy is usually the most difficult approach because high-voltage accelerators are difficult to make; furthermore, this approach does not increase the energy deposited per unit mass very much because high-energy electrons penetrate materials deeper.

Increasing the beam current above a few kiloamps is difficult because the charge of the beam becomes greater, making the beam more difficult to control.

So long-duration beams, if techniques can be developed to make them stable, will be the simplest and most cost-effective way to increase the energy transported to the target. Another reason that long-pulse beams (beams on the order of several-millionths-of-a-second duration) are of interest is that interactions between the beam and the guiding plasma channel tend to erode the front of a beam propagating through a plasma channel; a beam must last long enough so that some of it survives this erosion process.

*(Continued from Page One)*

## EPOCH

Results from EPOCH experiments thus far suggest that high-energy e-beams may be a more efficient way than lasers to transport pulsed energy between widely spaced points, according to Ron Lipinski, supervisor of Directed Beam Research Div. 1274, which oversees research in the EPOCH facility. "A high-energy e-beam can be generated with an accelerator that is typically many times lighter and simpler than a laser that produces a light beam of the same energy," says Ron.

"The electron penetrates deeply into the target, deposits its energy throughout that depth, and produces X-rays," he continues. "These features open up a number of possibilities — flash X-ray radiography, welding, basic materials-properties experiments, and national defense. Also, the transport techniques we're studying could be used to propagate a beam within a large accelerator.

"The EPOCH facility should help in bringing these advanced capabilities closer to fruition," Ron concludes. "It's a unique facility able to address the issues associated with long-pulse, long-distance e-beam propagation."

EPOCH has already demonstrated the transport of a 2-MeV, 1-kA, 1-microsecond e-beam over a 184-ft. (56-metre) distance. The first lead experimenter was Tom Lockner (now 1264), who organized the EPOCH lab and obtained some of the early data. George Kamin (1274) has led the beam-propagation research effort for the past year.

●KFrazier (3161)



# New PBX System Raises Speed Limits for Computer Users

The little blue Gandalf boxes (from Gandalf Data Inc.) familiar to computer users — even to those of us who've never quite understood *precisely* what it is the boxes do — are about to be replaced with little beige boxes. That's because the Gandalf boxes (which convert digital signals to analog, and vice versa) are part of the old terminal-switching equipment that is now being replaced with a new PBX system.

PBX is the telecommunication industry's acronym for "Private Branch Exchange." It means simply that the system is privately owned (by Sandia, in this case) rather than leased from a communications company. Sandia's PBX is a branch of a larger network that includes other Sandia sites.

"Essentially," says project leader Spencer Nelson (2647), "what the new PBX system does is raise the speed limit for terminal users. Advances in computer power and versatility have come at an almost dizzying rate — computers now in our system are capable of doing faster, more complex work than ever before. But, in many instances, the old terminal-switching network imposes a speed limit that is much slower than the capacity of the computers linked by it.

"The terminal-switching part of the new PBX system gives computer users the ability to link up easily and quickly with any of the 150 or so host computers at Sandia, at least with those that have corresponding connections to the network. Other functions of the system allow high-speed data interchange between one computer and another.

"A terminal switching system allows a computer user to access a particular system — COMET, JIT, a time-shared scientific computer, or a department computer, for example," notes Spencer. "With a terminal-switching network in place, connections between terminals and computers, regardless of where they are physically located within the system, can be made almost as easily as dialing up someone on the telephone — except that the request is entered on the computer keyboard."

The new equipment has already been installed in Area IV and in parts of Bldg. 880 in Albuquerque, and in Bldg. 910 in Livermore.

Jeff Quintenz (1265) in Area IV says there are other benefits besides ease of use: "Our computing speeds have increased by a factor of two, and our graphics capabilities have been greatly enhanced," he says. "We had a few start-up glitches, but they were ironed out fairly quickly, and the system is proving to be very reliable."

## Labs-Wide Linkup Coming

Installation of the new equipment in Area IV and Bldg. 880 is the first phase of a project to install the new terminal-switching equipment throughout Sandia's entire secure data communications network — the network of wiring and auxiliary equipment that links individual computers and work stations to each other and to large mainframe computers.

"We expect to have all the terminal-switching equipment in the entire communications network replaced with the new PBX equipment in about a year," says Spencer.

It's not surprising that the project should take that long: Sandia's communications network covers several hundred buildings — a total of three million square feet — that are scattered throughout the square-mile area of Tech Area I and several areas that are a mile and a half to five miles distant.

The system that provides data communications services to all the buildings in these areas was begun in the 70s with the Central Computing Facility's con-



OPERATION OF NEW PBX SYSTEM is reviewed by (from left) project leader Spencer Nelson (2647); Larry Tolendino (also 2647), who assisted in designing the system; Computing Director Larry Bertholf (2600); and Joe Sena (2648-1), who will complete its installation. The new system has already been installed in Area IV and in parts of Bldg. 880. Installation throughout Sandia should be complete within a year.

struction of a copper cable network.

By 1979 the first blue Gandalf box linked users in Tech Area I with a limited number of host computers.

But soon after, a more sophisticated data communications system that divided Sandia's campus-like area into nine communication regions — seven in Area I and two in the remote areas — was designed. Each region consists of two or three large buildings with clusters of ancillary buildings. A technical control center in each region houses terminal-switching equipment, modems, multiplexers, center-to-center communications equipment, and communications diagnostic instruments. Copper cables link each center to offices and labs within its scope.

Installation of a fiber-optic cable system was begun in 1981. It now links all the technical control centers, many distributed computer rooms, and some individual work stations to the Central Computing Facility.

The new PBX will use a combination of the older copper cables (still used to link the control centers to labs and offices) and the newer optical-fiber cables to form a greatly improved network-switching

system that will provide high-speed data connections to scientific and administrative computer users. It also supports Ethernet interconnections and IBM SNA communications.

"The new system will give Sandians a reliable, high-speed data communications system that will greatly expand the use of high-resolution graphics for scientific work," says Larry Bertholf (2600). "It will be the core of our communications services for at least the next five years.

"The new PBX, eventually, may have to handle eight to ten thousand subscriber connections in addition to linking Albuquerque and Livermore labs. We already have more than 5000 work stations, terminals, and personal computers in use in Albuquerque alone — and more are being added daily.

"For the future," he continues, "we envision the replacement of the remaining copper cables with fiber-optic cables for further enhancement of the system. But that's at least five years down the road."

In the meantime, as the new PBX system is installed in each region, new little beige boxes will do the work performed previously by blue Gandalf boxes — and do it better. ●DR

## Take Note

Paul Percy (1140) was elected 1988 Second Vice-President of the Materials Research Society (MRS). Tom Picraux (1110) was elected to a three-year term on the MRS Council (the Society's governing board).

\* \* \*

Charles Harmon (6451) was elected vice-president of ISE (Ideas in Science & Electronics, Inc.) for 1988-89 by the ISE Board of Directors. In ISE's general elections last month, John Bedingfield (3731) was selected to serve a three-year term on the Board.

\* \* \*

After 31 years of military service, Charles Arning (5213) has been promoted to Sergeant Major in the US Army Reserve, the highest enlisted grade achievable. He's Chief Operations Sergeant in the Directorate of Security, Plans, and Operations of the 156th Support Group, an Army Reserve unit in Albuquerque.

\* \* \*

Sue Ann Gunn (wife of Nigel Hey, 3161) has converted the children's story, "The Emperor's New

Clothes," to stage-play material. Albuquerque Children's Theatre presents her version of this special children's show on July 29 at 10 a.m. and 2 p.m. and July 30 at 1:30 and 3:30 p.m. at UNM's Rodey Theatre. For more information, call ACT on 888-3644.

\* \* \*

A call for papers has been issued for the AT&T Symposium on Fault Tolerance 1988 to be held Nov. 1-2 at AT&T Bell Laboratories auditorium in Middletown, N.J. Symposium is open to AT&T employees only; Sandia employees are eligible to submit papers developed in connection with current Sandia responsibilities. Papers in the form of 20- to 30-minute presentations are sought in the areas of: applications of fault-tolerant computing, commercial and military fault-tolerant systems, reliable software design and software fault tolerance, fault-tolerant architectures and interconnection, design for testability and built-in test, fault tolerance in the manufacturing environment, and fault-tolerant system modeling and evaluation. Send submissions to Andrew Reibman, AT&T Bell Laboratories, Rm. 2L-518, Crawfords Corner, Holmdel, NJ 07733, by Aug. 15.

### Help for Users of New PBX

Mel Olman (2614) can provide painless instruction over the telephone to new users of the PBX system. Call him on 4-7701; in Livermore, call 4-3436.



## Leon Smith — 40+ Years of Memories: From Manhattan to Monitoring

The nickel landed “heads” up. Leon Smith (formerly 9200, now retired) had called “tails” before the coin flip. That meant he wouldn’t be going along as weaponeer on the *Enola Gay* when it headed for Hiroshima.

Instead, a fellow weaponeer, Morris Jeppson, would be aboard the flight — checking out the Little Boy bomb’s systems — as the B-29 sped toward the Japanese city from Tinian Island in the South Pacific on an August morning in 1945.

“We flipped the nickel to determine who would go,” says Leon, who retired from Sandia at the end of June after more than 40 years’ service. “At the time, though, I wasn’t sure if I had lost or won.”

### Would It Hold Together?

“The vertical bank and break-away turn required after the Little Boy bomb drop meant the *Enola Gay* would reach speeds far in excess of its ‘red-line’ value,” Leon continues. “So we weren’t even sure if the bird would hold together.”

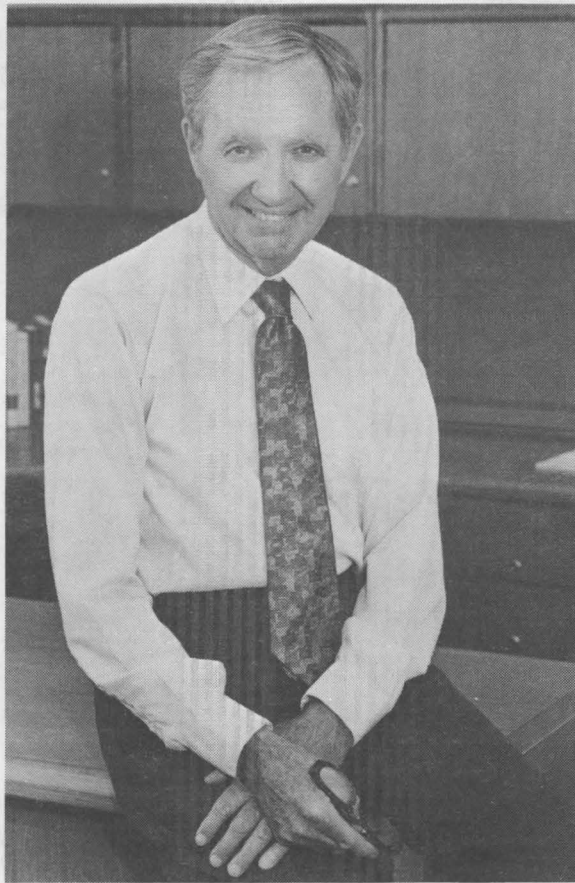
When Leon left the Labs on June 30, he took a lot of memories with him. He agreed to share some of those recollections with LAB NEWS shortly after he retired.

Leon’s long career in the weapons program began in 1944 when, as a second lieutenant in the Army Air Force, he was assigned to the Manhattan Project at Wendover, Utah — the field test station for Los Alamos. His background made him a natural for the Los Alamos tour of duty; he was just one semester short of an EE degree at the University of Wisconsin when he was drafted in 1943, and had attended AAF schools in communications, electronics, and radar at Yale, Harvard, and MIT, respectively.

His work at Wendover involved testing fuzing and firing systems for the first atomic bombs, as well as participating in flight drop-tests at Salton Sea, Calif., to check out the bombs’ fuzing and safety systems.

### The Three Weaponeers

From Wendover, Leon and two other weaponeers — Jeppson and Phil Barnes (Barnes would eventually participate in the Nagasaki drop) — were transferred in 1945 to Tinian, the staging and preparation site for the Little Boy and Fat Man bomb drops on Japan. The three weaponeers set up testing labs on the island to check out the bombs’ fuzing,



LEON SMITH (formerly 9200) retired June 30 after more than 40 years of service.

firing, and safety systems.

“The cruiser *Indianapolis* transported Little Boy to Tinian,” recalls Leon, “but shortly after it delivered its cargo, the ship was torpedoed and sunk by the Japanese.” Fat Man, on the other hand, was delivered by aircraft to the island.

The Tinian experience wasn’t to be Leon’s last in the South Pacific. He was mustered out of the service at Lowry AFB (Denver) in 1946, and immediately headed — at the request of Los Alamos — to the island of Bikini to serve as the civilian weaponeer for the Able shot of the Operation Crossroads atomic tests.

“Crossroads was a series of Navy tests to test the effects of atomic weapons on ships and their cargo,” says Leon. “And the Navy wasn’t about to have an Army Air Force weaponeer on the scene — service rivalry, and all that. That’s why I was mustered out in record time — about half an hour — at Low-

ry. All it took was a phone call from General Arnold — the 5-star in charge of the AAF — to the Lowry commander.

“I understand that Arnold said ‘Get him out of the service in an hour.’ Suddenly the red tape disappeared.”

After Crossroads, Leon returned to Los Alamos, picked up his wife Marie — an operator on the Harvard cyclotron there — and headed back to Wisconsin to finish his EE degree in 1947.

### An Offer He Couldn’t Refuse

After a short stint at Eastman Kodak Co. (Rochester, N.Y.), Leon received an offer he couldn’t refuse — a job at Los Alamos’s new (Sandia) branch in Albuquerque. Lured by a slightly higher salary and the opportunity to rent a new two-bedroom house on Sandia Base (now Kirtland AFB), he and Marie loaded all their belongings — along with their new son — into the family Chevy and headed west.

Was it the right decision? “I never had a regret,” Leon says. “For more than 40 years, I had a job that was fun. By ‘fun,’ I mean that it’s exciting to help identify a project or program that’s of importance to the nation, and then to find out how to bring our [Sandia’s] capabilities to bear on it.”

Leon signed in at Los Alamos’s fledgling Albuquerque operation on Oct. 8, 1947. His first assignment was working on firing sets, a job that took him once again to the South Pacific to participate in Operation Sandstone — whose purpose was to check out several new bomb designs — at Eniwetok atoll.

In 1951, Leon joined Sandia’s supervisory ranks, where he remained — at successively higher levels — until he retired. He first supervised an electrical division that provided support on a number of bombs then under development. “At that time, different electrical design approaches were being used for different weapon systems,” says Leon, “and I proposed that a group be formed to coordinate electrical systems activities with the objective of a more efficient — and consistent — design effort.”

Thus, the Electrical Systems Department was created in 1956; Bob Henderson (retired VP, then Director of Engineering) asked Leon to head the new organization.

Five years later, Leon was promoted to director of electromechanical component development, the first of nine directorates he would eventually head. The new directorate job was an “exciting assignment,” Leon says, because of events going on in Washington.

“The Kennedy administration — and Defense

### Integrity and Ethics

## On Management Style — And Other Matters

Leon Smith, in his trademark soft-spoken manner, talked about “What makes Leon tick” during a recent LAB NEWS interview.

“Way back when,” he says, “I took a page from the management-style book of Jim McRae [Sandia president, 1953-1958]. Jim had a remarkable warmth with people. He taught me one very important lesson: Help people if they ask you for assistance, but turn the problem back to them to handle in their own way.”

“In other words, trust people to get the job done. Enable them to be productive in their own right.”

“I always used to tell my first-level supervisors ‘Don’t compete with your people; give them assignments and then bask in the glory of their accomplishments,’” Leon continues. (One supervisor in Leon’s organization didn’t heed the advice; he’d assign work to employees and then work on weekends on the same thing to come out ahead of them. He was quickly demoted.)

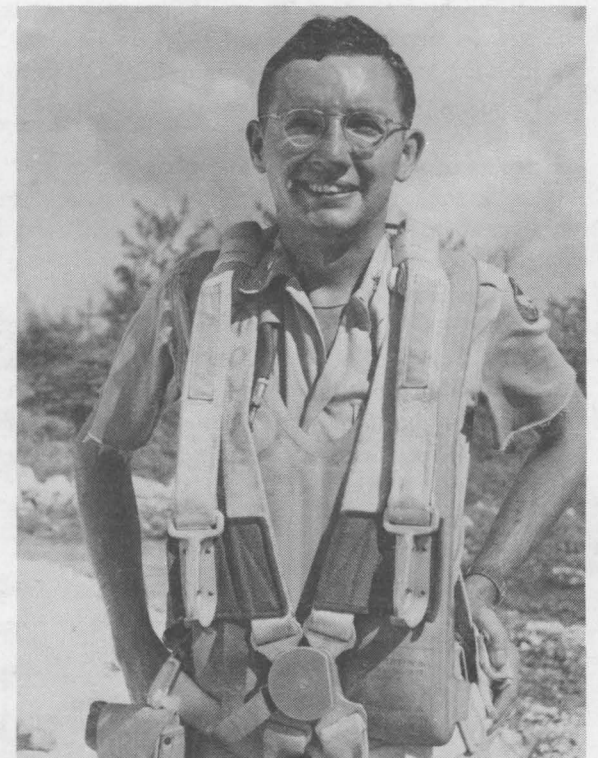
Leon says that yes-men (or women) aren’t

his style. “I always want people around me with the courage to keep me from making mistakes. At Sandia, I looked to people in my group to tell me when I was off course — and why.”

What impressed Leon most about Sandia in his more-than-40 years at the Labs? “This may sound corny,” he says, “but integrity and ethics top my list. Never once at Sandia was I forced to do anything that would compromise my personal integrity or ethical standards. That meant more to me than anything else.”

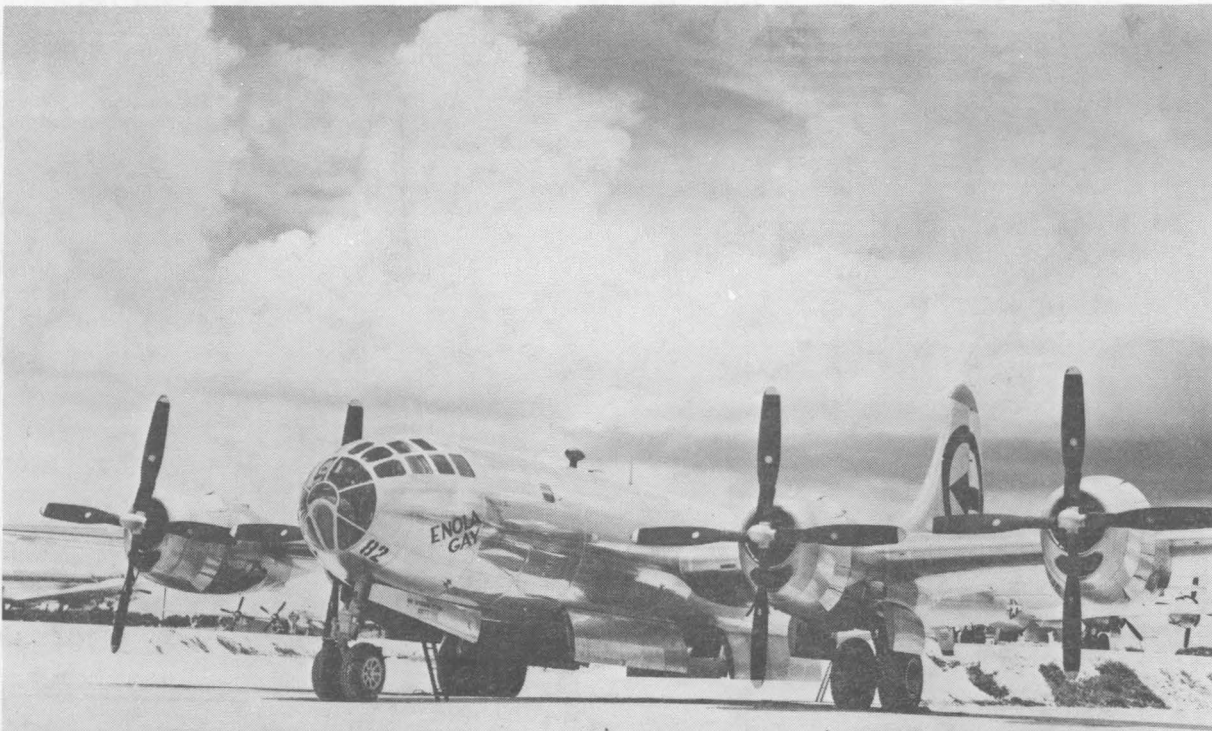
On a related subject, Leon says that Sandia’s no-fee, no-profit status puts the Labs in a fortunate position. “The Labs’ no-profit status permits a degree of objectivity that needs to be carefully preserved,” he notes. “When new programs are considered, the question should always be ‘Is it in the national interest?’ — not ‘Is it good for Sandia?’”

Soft-spoken, perhaps. But the words make you sit up and take notice.



A SOMEWHAT YOUNGER Leon Smith demonstrates state-of-the-art quick-release parachute harness during his stay on Tinian Island in 1945.





THIS PHOTO of the *Enola Gay*, taken by Leon at Tinian, has appeared in many publications, he says.

Secretary McNamara — took great interest in command and control activities,” Leon says. “The main concern was that there were — then — no really effective ways to prevent unauthorized persons from taking over nuclear weapons and using them for their own purposes. The concern was an international one, since we had weapons based in several countries.”

Leon says the congressional Joint Committee on Atomic Energy — an “effective and powerful group,” in his words — played a leading role in defining the command/control concern, then set the wheels in motion to address the issue.

Working with the Joint Committee in Washington were key people from the national laboratories: Jack Howard (ret. EVP), then director of systems development at Sandia Livermore; Don Cotter, manager of SNLA’s systems engineering department; Harold Agnew of Los Alamos; and John Foster and Marvin Gustavson, both of Lawrence Livermore.

### ‘Out on a Limb’

One responsibility of Leon’s directorate was to implement new control-system concepts. “Political pressures were enormous,” Leon recalls, “and my organization ‘went out on a limb’ after talks with the folks in Washington by accelerating development and production of the first PALS.” (PALS — permissive action links — are electronic locking devices, much like locks on safes, that separate physical possession of weapons from the capability to use them; the devices ensure that a weapon is useless to anyone who does not have specific authority, originating with the President, to use it.)

Going out on a limb paid off, according to Leon. In May 1962, he, Bob Henderson (then weapon programs VP), and others attended a meeting with President Kennedy’s science advisor, Jerome Wiesner, and Spurgeon Keeney — Wiesner’s right-hand man. “Keeney asked, ‘Mr. Henderson, what words do we have to use to tell you what we want, and who has to tell them to you?’ ” Leon recalls. “The National Security Council detailed its requirements for PAL devices a few weeks later.

“Because we had that head start, PAL devices were installed in Jupiter missiles in Europe by September 1962.”

When Leon took over the systems development directorate in 1963, there was only one substantive Phase 3 (full-scale development on a weapon system) in the future. Clearly, the country needed other strategic and tactical weapons. Leon, along with Don Cotter and Tom Cook (ret. EVP), recognized the need for an extensive advanced development program, and did something about it: “At first, the systems development group had just 11 people looking toward the future — and they were all working on advanced PAL systems,” Leon says. “In a relatively short time, we had some 80 employees working on advanced concepts in several areas.”

One of those programs was Pebbles/Halberd, whose purpose was to come up with ways to enhance US penetration of Soviet missile defenses. “In effect,

our Pebbles work was based on the premise that a good offense is the best defense,” says Leon.

Pebbles/Halberd concentrated for the first time on the development of small, hardened reentry vehicles (RVs) with yields that could not be ignored. The activity led to development of the Mark 3 RV, a MIRV (Multiple Independently-targeted RV), for the Navy’s Poseidon missile.

“I don’t like to pin down highs and lows in my career,” says Leon, “but certainly I’d have to call the small-RV and PAL programs significant highs.”

From those days in the early 60s until his recent retirement, Leon saw many changes at the Labs, including job changes for himself. During the rest of the 1960s and the following decade, he headed five different directorates: advanced systems development, advanced systems research, electromechanical and control component development, weapons electrical subsystems, and weapons analysis. In 1983, he was named director of instrumentation systems.

One of Leon’s responsibilities in both the weapons analysis and instrumentation systems groups was Sandia’s satellite program, which doubled in size during Leon’s 11 years at the helm. From the program came some significant verification technologies, including satellite and ground-based systems; the National Seismic Station (NSS) is an example of the latter.

### NSS Concept

The NSS concept was conceived for use in the event of a Comprehensive Test Ban Treaty. Ten NSSs, systems that transmit seismic data from underground detonations in real time, would be placed in each signatory country (the USSR and the US) to verify treaty compliance if a CTBT were signed. With an eye toward eventual use of the NSS system, a delegation of 17 Soviets visited the Labs in August 1979 to discuss NSS technology, according to Leon.

“Over the past several years, five NSSs were



SHARING A PUP TENT on Tinian Island are weaponeers (from left) Morris Jeppson, Phil Barnes, and Leon Smith. Jeppson and Barnes were aboard the Hiroshima and Nagasaki bomb-drop flights, respectively.

installed on the North American continent to check out instrumentation capabilities,” says Leon. “The testing allowed us to be prepared on short notice should a treaty requiring that type of verification be signed.

“In April of this year, an advanced NSS program, Deployable Seismic Verification Systems, got under way to develop an updated NSS using today’s technology and parts.”

In 1986, Leon became director of monitoring systems in the new 9000 vice-presidency, Exploratory Systems Development. “It was a job different from all the others because it had nothing directly to do with nuclear weapons,” says Leon. “The organization concentrates mainly on monitoring techniques that could be used to verify the provisions of future nuclear weapon treaties — exciting work, because it’s at the edge of advanced electronic technology.”

### The Future

So what does a person who’s spent much of his career anticipating what the future will bring see in store for Sandia — and for himself?

“There will probably be less emphasis on nuclear weapon technology,” says Leon. “I don’t see the program expanding — at least in the near term. But I also don’t see the need for deterrence going away; US nuclear weapon capability has been a key to non-embroilment with the Soviets for a long period of time.

“So the message is clear: Sandia and its sister weapon laboratories [LANL, LLNL] must maintain the high standards and capabilities for which they’re known. Maybe that’s done by taking on other kinds of tasks — the kind of work that would keep the labs at the forefront of technology and, at the same time, have applications in the weapon program as well. As long as we are dependent on weapons for deterrence, it’s important to keep a viable capability.

“As for myself,” Leon continues with a smile, “I don’t see any around-the-world jaunts in the short term; I’ve spent too many hours on planes for Sandia in recent years. However, I enjoy playing tennis, and hope to get back on the golf course — a place I haven’t been for a while.

“Marie and I also like to take occasional fishing trips, and now I won’t have to schedule them around the work load. She has also accepted my application as assistant gardener!”

With his wealth of experience, Leon has also been asked to do some part-time work as a Sandia consultant; he traded his standard Sandia badge for a green consultant badge on June 30. “I don’t know yet what kind of assignments I’ll have at the Labs,” he says. “But I’m looking forward to them. It’ll be kind of nice to keep my finger in the pie.” ●PW





## The Challenge: Curb the Rate of Increase

By B. J. Jones (3545)

In this series of articles, I have discussed the rising cost of health care in general and at Sandia specifically (1/29/88); examined various approaches that many companies, including Sandia, are using to control medical costs (3/25/88); and offered some suggestions to help Sandians become skilled health care consumers who are better able to manage medical costs (5/20/88).

In this article, I will list some of Sandia's medical care expenditures in 1987 and mention some ways that we can help to curb the rate of increase in these costs.

In calendar year 1987:

- We spent approximately \$26 million on medical claims (not including vision and dental), and those costs — which come directly from Sandia's operating budget — have been rising at 15 to 20 percent each year since 1978;
- More than one-third of the claim dollars paid went for treatment of cardiovascular (heart and blood vessels), musculoskeletal (muscles and bones), and mental and nervous diseases (including psychiatric treatment and substance-abuse rehabilitation);
- More than one-fourth of the claim dollars paid went for treatment to less than one percent of the population covered by the Medical Care Plan (MCP). These "catastrophic" cases averaged more than \$50,000 each;
- More than three-fourths of the dollar amount of claims filed were for hospital, surgery, and physician charges (the other one-fourth were for prescription drugs, nursing care, diagnostic tests, and miscellaneous items);
- The MCP issued more than 100,000 checks, an average of almost nine checks per MCP participant (employees, retirees, and surviving spouses). Each check issued costs Sandia approximately \$6 for check preparation, banking fees, and administration (which includes verification of charges).

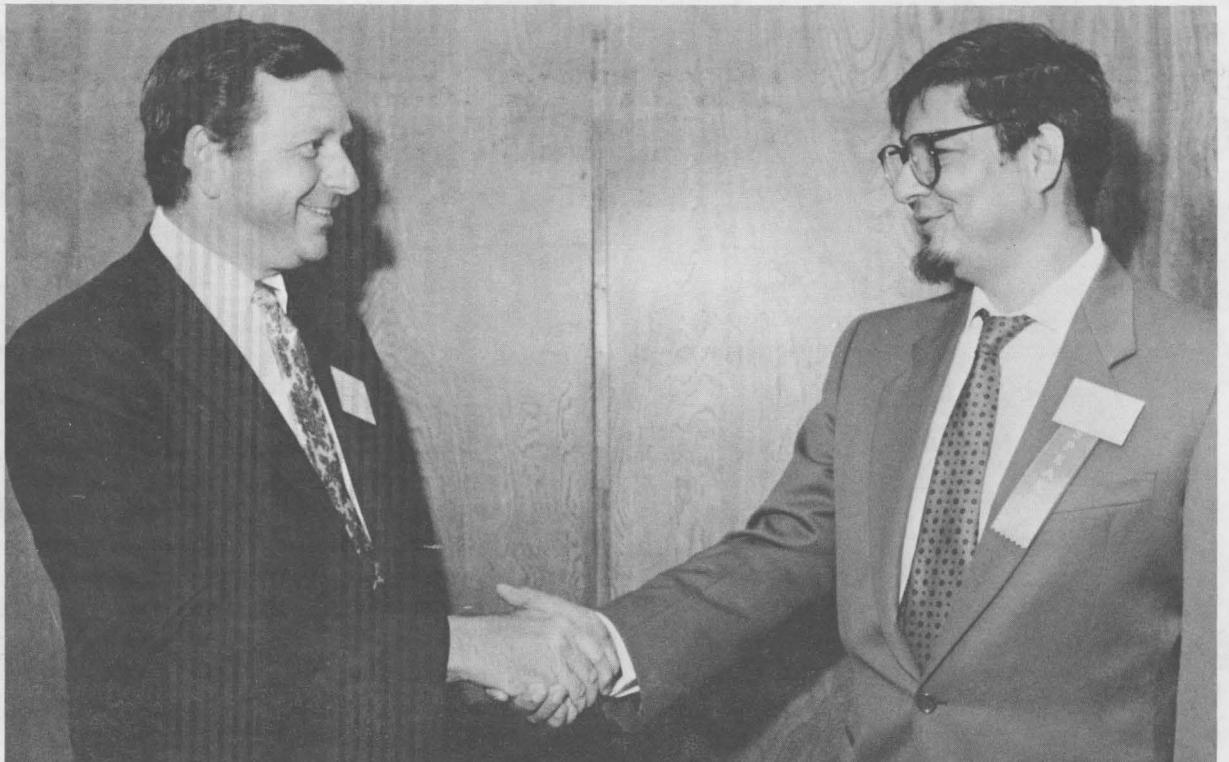
Analyses of these and other statistics suggest several areas in which we can improve the value of services received for the money spent by Sandia — while maintaining the benefits provided by the MCP. For example, the necessity for hospital admissions and surgeries can be verified, inpatient hospital stays can be reviewed to ensure that hospitalization is not longer than medically necessary, and more cost-effective alternatives to inpatient hospital care (such as home health care) can be encouraged.

Another approach to managing costs and care is a program to manage "catastrophic" medical cases. Such a program uses teams of medical professionals who work with attending physicians to develop treatment plans tailored to the patient's medical condition and home situation. (That is, the team would deal with questions such as: Does the patient live alone? Do family members need special training to care for the patient? Does the home need modifications?)

The teams suggest alternative providers and settings that provide quality care on a less costly basis. This approach can also be used for psychiatric and chemical dependency-rehabilitation care.

We in Benefits can also examine volume buying as one way to purchase medical services in a more cost-effective manner. This means that Sandia and other employers could negotiate discounts and special prices with certain medical providers.

We are also investigating options for reducing the number of MCP claim checks issued and the number of small-value checks, which require additional follow-up by Sandia Finance if not cashed. We may batch the payments to a given payee, or we may



AMONG THE SPEAKERS at the third annual EEO Awareness and Training Seminar, "Experience + Education x Opportunity = Excellence," was demographer David Hayes-Bautista (right) of the Chicano Studies Research Center, UCLA. His presentation, "Minority to Majority in the Year 2000," and several others were attended by VP Dennis Roth (3000, shown here), VP Roger Hagengruber (9000), and Personnel Director Ralph Bonner (3500). "In the last few years, there's been some noticeable change in the emphasis and direction taken in the whole EEO area," says Dennis. "It's moving away from notions like remediation to a focus on the value of diversity in our society. In part, it's a recognition of projected demographics and the resulting necessity to develop the talents of all people." The event, held at UNM, was sponsored by the state's EEO Council (of which Sandia is a member) and was attended by representatives of 15 organizations across the state.



BENEFITS FRINGE: Collating and assembling employee benefits binders — and the booklets inside — for all regular Sandia employees was a giant task; just ask the 17 Sandians and 8 Career Services employees who worked days (12), nights (8), and one Saturday to complete the job. Some of them shown here, not quite buried in boxes of binders, are (from left) Rebecca Spires (3544), B. J. Jones, Ginny Moore (both 3545), and M. J. Hinrichs (3544). As of this week, most of the new binders have been mailed to employees; if you haven't received yours by Aug. 8, call 4-5072.

## Welcome

### Albuquerque

Billy Black (5246)  
David Denning (2534)  
David Goodnow (2631)  
Debra King (3426)  
Lisa Richter (3426)  
Jeffrey Rienstra (9222)  
Leon Sikora (3714)

### Arizona

Jeffrey Lunsford (2345)

### Georgia

Eric Snyder (2146)

### Illinois

Joan Zaorski (121)

### Kansas

James Heise (2153)  
Scott Nichols (5238)

### New Mexico

Stephen Gentry (9223)

### Ohio

Terry Bast (5142)  
Timothy Miller (7535)

### Oregon

Ward Patitz (2343)

### Pennsylvania

James Fleming (2132)

### Texas

John Ellis (7265)  
Mark Meindl (7262)  
Mary Mosqueda (2631)

### Washington

Dennis Nelson, Jr. (6451)

pay claims via electronic funds transfer.

This article concludes my series of columns about rising health care costs. These costs constitute a real problem in future operation of the Laboratories. They must be brought under control. Over the next few months, we will be reviewing changes that will support the benefits currently provided, while controlling the mounting costs of Sandia's medical care expenses.



# New Administrative Computer Offers New Flexibility

Over the next four years, a host of administrative functions, including Payroll, will migrate from the old UNiSYS computer to the IBM 3090-120E computer recently installed in the Bldg. 880 Computer Center. The 3090-120E is one of several IBM administrative computers that will comprise the administrative network, "ADNET."

The 3090-120E is the smallest computer system in the 3090 family, and represents the newest and latest technology. It cost less than a million dollars. "We didn't select the 3090 only because it's new and, relatively speaking, inexpensive," says Karl Waibel, manager of Information Systems Dept. 2620. "We chose it because it allows us to buy commercial software, so we won't have to continue to develop all our own software in house."

"It also allows us to upgrade to larger processors as we need them in the future," says Karl. "In other words, we can add computing capacity in incremental steps. Given that flexibility, this computer should meet Sandia's administrative needs from now into the 21st century."

The first — and arguably most important — function to be shifted to the 3090 will be Payroll. It will be followed by other Human Resources systems (personnel and benefits), the Integrated Procurement systems (including accounts payable, receiving, and some purchasing reporting data), the Financial system (budgeting, accounting, reimbursable program controls, and DOE's financial reporting systems), and Assets Management (property control and inventories). The migration is expected to be complete by early 1993.

"The 3090 will help us provide the entire Sandia community, including our technical organizations, with better and more timely financial reports on program status," says Tom Ferguson, supervisor of Systems Planning and Development Div. 2624. "Once the financial systems are on-line, users will be able to create interactive budgets — do financial modeling, in other words, ask 'what if?' questions and get responsive answers."

"ADNET will help the administrative organizations meet their functional responsibilities as well as provide new services to our technical customers," adds Herb Pitts (3100), chairman of the Org. 30 Computer Advisory Committee. "For example, the 3090 will give managers instant access to the personnel, procurement, and property data bases."

## May 1988 Earnings Factors

|   | Earnings Factors |
|---|------------------|
| <b>Savings Plan for Salaried Employees (SPSE)</b>               |                  |
| AT&T Shares   | 1.0232           |
| Government Obligations  | 1.0003           |
| Equity Portfolio  | 1.0035           |
| Guaranteed Interest Fund  | 1.0073           |
| South Africa Restricted Fund                                    | 1.0048           |
| Diversified Telephone Portfolio                                 |                  |
| Unrealized Appreciation   | 1.0421           |
| Realized Appreciation   | .0001*           |
| <b>Savings and Security Plan — Non-Salaried Employees (SSP)</b> |                  |
| AT&T Shares   | 1.0235           |
| Guaranteed Interest Fund  | 1.0073           |
| South Africa Restricted Fund                                    | 1.0047           |
| Diversified Telephone Portfolio                                 |                  |
| Unrealized Appreciation   | 1.0419           |
| Realized Appreciation   | .0000            |

\* The 1 has been removed from the earnings factor. Current month's DTP earnings may be calculated directly: Earnings Factor x DTP Current Worth = Current Month's Earnings.



AS SYSTEM DESIGNERS and prospective users look on, project leader Arthurine Breckenridge (2624, left) explains the advantages of the new IBM 3090-120E administrative computer to Herb Pitts (3100), chairman of Org. 30's Computer Advisory Committee; Karl Waibel, manager of Information Systems Dept. 2620; Wayne Potter, supervisor of Payroll Sect. 152-1, an early user of the new system; Larry Arellano (3545), a programmer assigned to the Benefits Department; Tom Ferguson, supervisor of Systems Planning and Development Div. 2624, and Lorraine Elliott (3532), representing the division in charge of the personnel data base.

"The new system has some real advantages for all of us," concludes Karl. "Use of commercial software packages, for example, and the capability for on-line, interactive computing — rather than the batch environment represented by the old UNiSYS. These advantages mean that we'll be able to help all our users increase their productivity." ●BH

### Sympathy

To Fran Sanchez-Conroy (4030) on the death of her mother-in-law in Albuquerque, June 17.



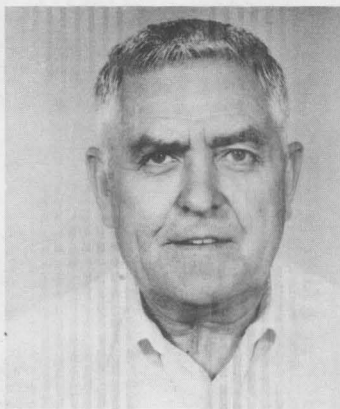
AT THE REQUEST of Sen. Pete Domenici, Sandia hosted a recent meeting on "Support of the US Oil and Gas Industry by the National Labs"; it was attended by executives of 22 companies. Program included presentations on collaborative efforts by industry, universities, and labs; an open discussion of the industry's views of the labs' energy R&D programs; plans for future interactions between the government and the private sector; and a tour of Sandia's radiation-hardened microelectronics facilities. Here, Allen Wampler (center), DOE's Assistant Secretary for Fossil Energy, and Sen. Domenici look on as Harry Hardee (6231) explains the downhole seismic source, a Sandia-developed device that generates coherent shear waves to allow accurate mapping of underground oil and gas deposits.



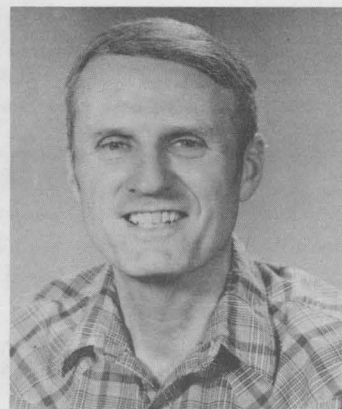
# MILEPOSTS

## LAB NEWS

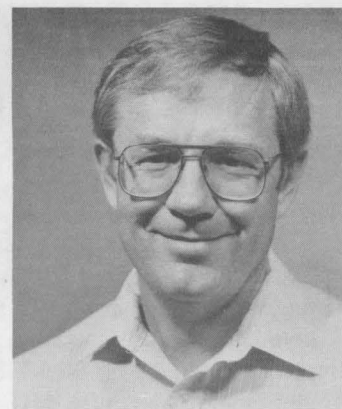
JULY 1988



Joe Salas (3414) 25



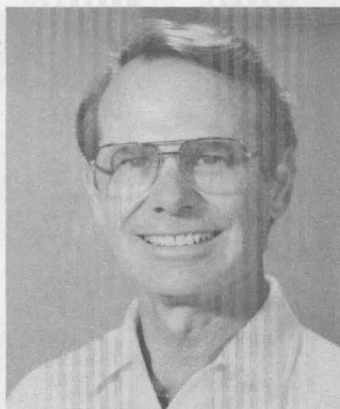
Wallis Cramond (6412) 25



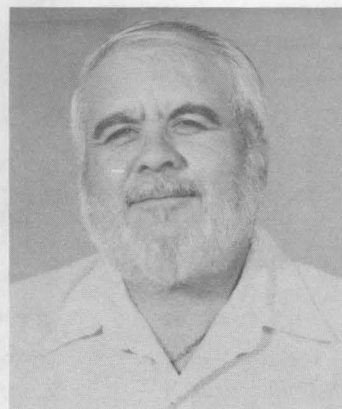
Jim Solberg (7555) 25



Adam Trujillo (7135) 35



Ron Syler (5246) 30



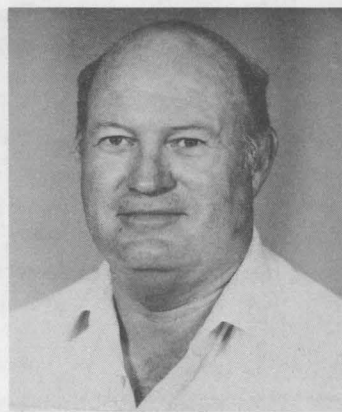
Jose Salazar (7473) 25



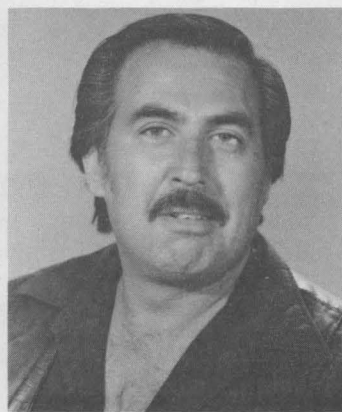
Melvin Smith (7413) 25



David Barton (132) 25



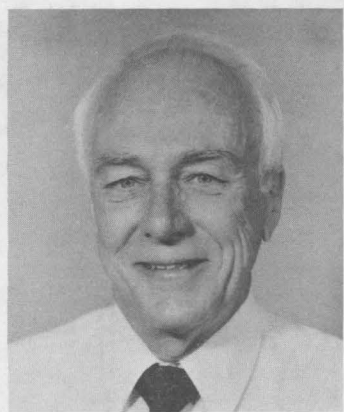
Chauncey Matthews (6222) 25



Manuel Gonzales (7234) 20



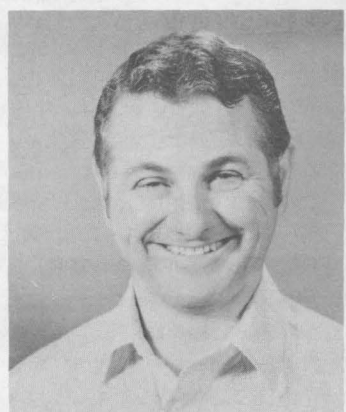
James Ney (7230) 25



Dick Volk (7231) 30



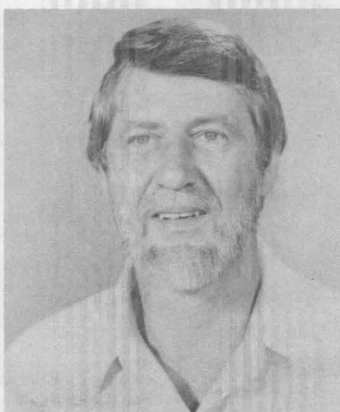
Duane DeWerff (5121) 25



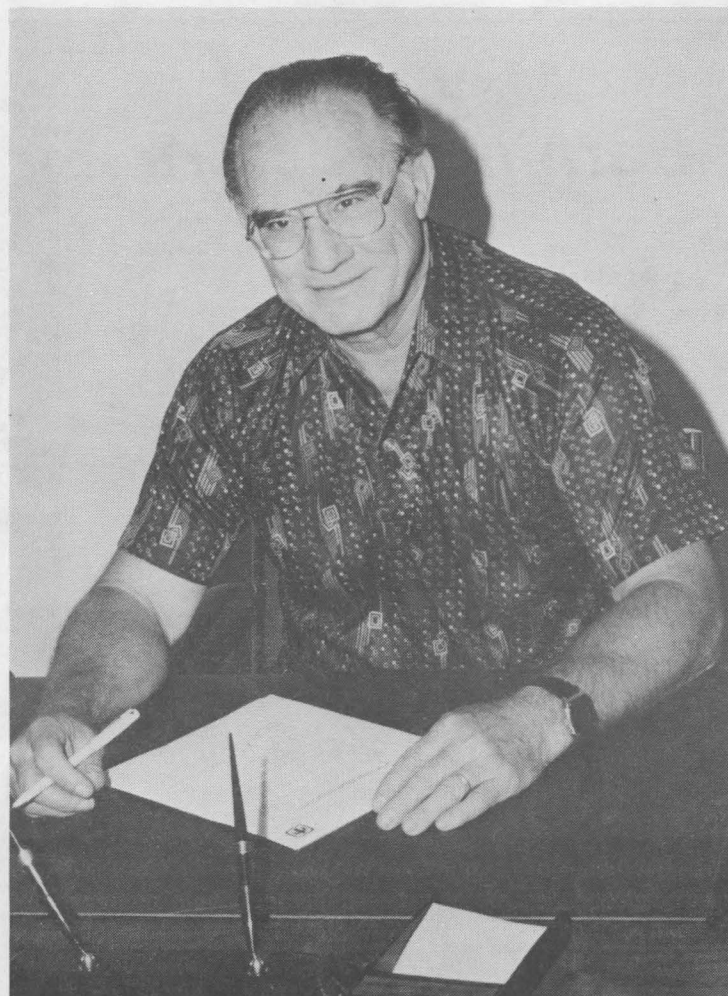
Dale Berg (6225) 20



Pete Hernandez (7522) 35



Danny Drummond (9241) 20



B. G. Edwards (7131) 35



**MISCELLANEOUS**

TRAVEL TRAILER PACKAGE: '77 Nomad, loaded, 21', w/campground membership (free storage/camping) plus nationwide camping at \$1/night, \$7500. Justice, 822-0505.

JAPANESE FRAMED PRINT, small Chinese ivory carving, 2 embroidered Spanish pictures, Mexican ironwood carving. Krahling, 268-8126.

STOVE TOP, double oven, range top, harvest gold, \$80/all. Babb, 296-7955 after 5.

CEDAR CHEST, 48" x 20" x 16", solid cedarboard, \$50; Hamilton clock (Sandia), \$75; electric sewing machine w/cabinet, \$25. Rhoads, 298-6157.

CAMPER TRAILER, '79 Play Mor, sleeps 4, \$2600 OBO. Toledo, 888-4348.

RELOADING EQUIPMENT for .44-Magnum handgun, complete, \$100. Dickenman, 892-9561.

GO-CART, live axle; Gemini Combo water skis, pair; Maharajah concave slalom ski; Octa-Gym exercise unit. Peterson, 883-8463.

CHARDONNAY "HENRY LINK" BEDROOM SET, \$1000; antique bedroom set, \$800; truck side mirrors, \$10. Baca, 296-8474.

FREON: 50 lbs. R12 and 30 lbs. R22, \$120 value, sell for \$50. Thalhammer, 298-8521.

QUEEN-SIZE WATER BED, complete w/heater, \$100; dresser, \$60. Ingber, 293-4419.

MOVING BOXES, all sizes, \$1/ea. Brady, 828-2262.

MCA COLOR TV, 19", w/cabinet, \$110. Chadwick, 889-0249.

SOFA, \$150; rocker, \$70; tables, \$20 & \$30; credenza w/stereo, \$100; fountain, lamps, pictures, more. King, 821-4692.

BASE CB and 16' base antenna, \$35/ea. Cibicki, 877-7098.

CHEST FREEZER, Philco refrigerator. Chavez, 298-1649.

GIRO BICYCLE HELMET, 7.5 oz., soft-shell, blue/white covering, ANSI and SNELL tested/approved, size med., \$50. Monaco, 293-2754.

MACINTOSH 128K COMPUTER, w/Imagewriter printer, mouse, manuals, and software including Macwrite, Macpaint, Electric Checkbook, and Ultima, \$600. Cieslak, 294-2383.

SEARS CAR-TOP CARRIER, best offer; Sears 2-burner propane barbecue grill, w/bottle, \$100 OBO. Miller, 292-5634.

AMMUNITION: Remington 222, 50 Gr., 20 for \$4.50; Winchester magnum 300, 150 Gr., 20 for \$5; Savage 300, 180 Gr., 14 for \$3. Stuart, 299-9190.

QUEEN-SIZE WATER BED, Aqua-Firm II mattress, solid wood, padded sides, mirrored headboard, heater, \$200. Lucero, 831-0125.

FORMICA DINETTE TABLE, \$40; antique White sewing machine, \$50; Dumont radio/phonograph console, \$65; US rocket fins-booties, \$40. Treadwell, 884-4221.

STEREO: Sansui receiver 20/20, SR222 turntable, 2 Trend speakers, Onkyo cassette deck, \$150; miniblinds, off-white, 29-1/2" x 64", \$5/ea. Montoya, 821-5189.

LOUNGE CHAIRS, 1 pair patio recliners, Samsonite, enameled-steel frame, yellow & white polyester mesh fabric. Lagasse, 293-0385.

GARAGE DOOR, 7' x 16', metal swing-up, all hardware, \$25; engine stand, \$15. Fellerhoff, 884-5061.

ROTH VIOLA, 14", w/bow and case, \$400. Widman, 293-7279.

SEWING MACHINE, 26" color TV, make offers; small cross-breed puppies, born May 18, free to good homes. Pryor, 294-6980.

SEVEN SALAD PLATES/SOUP BOWLS, Noritake "Asian Song" ivory china, \$30. Anderson, 296-3352.

CUSTOM DASHBOARD MAT, blue, for '82 through '85 Honda Accord, \$20; semiautomatic stereo turntable, \$20. Burstein, 821-6688.

CAR SEAT, \$20. Foty, 268-0412.

CHEST-TYPE FREEZER, 18 cu. ft. Hayes, 883-9276.

DISHES: Franciscan Desert Rose, 5 place settings, gravy boat, serving dishes, \$180; Noritake china, Sunny Side, \$45/set. Simonson, 296-2713.

ALLWOODS ALUMINUM SHED, 10' x

8', new, unassembled in original box, \$100 OBO. Langlois, 293-3097.

OUTBOARD MOTOR, '74 Johnson 25-hp, 500 hrs., 2 spare props, shop manual, \$500. Holmes, 292-0898.

ADAM COMPUTER, 80K RAM, H/S digital drive, color monitor, LQ printer, joy sticks, word processing, BASIC, arcade games, \$195. Hollister, 296-8055.

BLUE SPRUCE TREE, 20', free if you dig it out. Randall, 821-0388.

TIRES: P225/75R15 w/rim, P215/75R15 w/rim, two F70-14 w/rims, 7.35/14 w/rim, two E78-14, make offer. Hudson, 884-7621.

DAYTON WRIGHT ELECTROSTATIC SPEAKERS, partly restored, cost \$3800, sell for \$800 OBO. Babcock, 892-7199 after 6.

UTILITY TRAILER, for off-road hauling, 4' x 5' bed, 2' sides and front, coupler for 2" ball, \$100; 16' log chain, \$15. Hughes, 299-6674.

'68-'70 CHARGER PARTS, 383 engine, needs rebuilding, \$60; Chev. Rallye wheels from Camaro, w/caps and rings, \$100. Summers, 881-7765.

WATER BED, Hibernation Series, mirrored headboard, padded side rails, heater, \$175 OBO; Zenith console B&W TV. Gutierrez, 292-7224.

CHILD'S CAR SEAT, full coverage, \$15; 2 auto-electric radiator fans, \$19/ea. Baney, 294-8970.

BABY ITEMS: play yards, \$15; table-mount booster chair, \$10; stroller, \$20; high chair, \$12; security gate, \$12. Skinner, 275-2418.

LOFT-STYLE BUNK BEDS, \$200. Denison, 892-9313.

BICYCLE STORE GIFT CERTIFICATE, worth \$250, sell for \$150; new DGB/DMD projector bulb, \$4; wet bar w/sink, 5'9", orange glamour-stone counter, \$50. Newcom, 293-5180.

THREE-FAMILY YARD SALE, Sat., July 30, 9 a.m.-5 p.m., 3208 Blume NE (east of Eubank, north of Candelaria). Fisher, 298-0526.

WOODEN PORCH TWIRLS, assorted colors and striping, \$10, \$6, and \$4. Worden, 299-7839.

REFRIGERATOR/FREEZER, gold, General Electric, 11.5 cu. ft. Vargo, 294-8226.

KING-SIZE WATER BED w/sheets; handmade queen-size platform bed w/cedar headboard; 14-month-old female blue heeler. Blatt, 281-9221.

"MORRIS" CAT, free to single-cat home. Martin, 266-9050.

TWENTY-FIVE-FOOT POLE, meter base, breaker, 2 outlets, \$200; six lengths of 3/4" copper pipe, 15' to 22', \$1.50/ft. Werme, 299-2788.

TWO-BURNER COLEMAN STOVE, \$25; Coleman lantern, \$20. Daniel, 296-3676.

MAHOGANY/TEAKWOOD BAR, custom-made in Philippines, \$400; RCA console TV, \$125; couch, \$25; Lifestyle rower exerciser, \$50; misc. Scheibner, 298-1606.

PARTS FOR '79 DATSUN 210: 1397cc engine, transmission, radiator, front grill, windshield, tail lights. Perez, 275-1192.

JUNIOR GOLF CLUBS w/bag, \$45; 11-cu.-ft. freezer, \$75; end table w/doors, \$95. Biffle, 293-7043.

STANLEY QUEEN-SIZE BEDROOM SUITE: headboard, mattress, box spring, double dresser, double mirrors, 2 nightstands, \$1000; 2 oak-finish bookcases, \$325. Odom, 883-5068 after 5.

DOG KENNEL, for med.-size dog; Apple IIE computer, hard and dual floppy disks, software, table, printer stand; AKC English springer spaniel, 2-yr.-old male. Cox, 344-2221.

ENTERTAINMENT STAND, solid wood, holds all types of video and audio equipment. Shortencarier, 292-3575.

TWO BAR STOOLS, \$30/ea.; Atari 5200 w/9 games, \$75; wedding dress & veil, \$150; Panasonic Penwriter electric typewriter, \$100. Malone, 828-3696.

BLACK & DECKER WORKMATE 200, new in box, \$45; approx. 1/3-cord pinon fire wood, \$30. Aragon, 881-4795.

NEW TIRE, H78-15, mounted on 6-hole Chev. rim, \$35. Shunny, 265-1620.

PARLOR GRAND PIANO, 1920s Knabe, \$2200 OBO. Thomas, 268-1532.

COMMODORE MPS-1000 PRINTER, \$100; 1571 disk drive, \$100; drafting table, \$20; ping-pong table, \$25.

Madrid, 298-0641.

WATER SOFTENER, Kenmore extra-high capacity, 70-grain maximum hardness, \$250 OBO. McClure, 898-5551.

NORTH STAR COMPUTER, w/monitor, software, \$125. Hall, 298-8617.

THREE-FAMILY GARAGE SALE, July 30, 8:30 a.m.-3 p.m.: patio furniture, bookcases, desks, living room furniture, mower, toys, more, 5804 Papaya Place NE. Ratzel, 298-7167.

REFRIGERATOR, 18 cu. ft., \$200; Ford wheels, wire basket, 4-hole, \$60; bed, twin extra-long. Nagel, 298-2779.

TIRES: Goodyear, power cushion, H78-15, original equipment, never on road, \$25; 2 LR78-15LT, for spares only, \$4. Morosin, 298-0994.

UPRIGHT PIANO, Bradford, oak, \$1000. Gonzalez, 877-2248.

**TRANSPORTATION**

'84 SUBARU GL, hatchback, AC, AM/FM cassette, 65K miles, \$4200. Dowdican, 293-1534.

'78 MERCURY ZEPHYR SW, 20K miles on rebuilt engine, 92K miles, 6-cyl., 4-dr., AT, one owner, new brakes & tires, \$1200. Crawford, 897-3282.

18' FIBERGLASS BOAT, 90-hp motor, trailer, boat cover, life vests, ladder, paddle, more, \$2400. Dickenman, 892-9561.

'81 YAMAHA 250cc MOTORCYCLE, \$295 OBO. Peterson, 883-8463.

'79 TOYOTA CELICA GT, liftback, AC, AM/FM cassette, new tires. Volk, 256-9214 after 5.

'85 YAMAHA 200E 3-WHEELER, shaft drive, electric and pull start, yellow paint, \$800. Chavez, 888-1599 after 5:30.

'73 DODGE, \$375. Allison, 294-5476.

'86 YAMAHA 225TT DIRT BIKE, retails for \$1900, book value \$1200; sell for \$950. Orth, 292-6174 after 5:30.

'83 TOYOTA PICKUP, long bed, AT, AM/FM cassette, new mags and tires, \$2800 OBO; Schwinn bicycles: man's "World," woman's "Mesa Runner," \$200/ea. Cook, 296-1786.

10-SPD. BICYCLE, 24", \$40. Baca, 296-8474.

KAWASAKI KZ-440 STREET MOTORCYCLE, 12.5K miles, windshield, luggage rack, 2 helmets, \$475 OBO. Heifetz, 275-2648.

'84 VW WESTPHALIA CAMPER, AC, 22K miles, water-cooled engine, \$9400. Class, 281-3836.

'74 MUSTANG, 2000cc motor, red on white, new transmission and brakes, \$950 OBO. Marchi, 299-3610.

'79 TOYOTA COROLLA, AM/FM cassette, 78K miles. Roach, 296-0432.

'81 CHEROKEE CHIEF, 56K miles, V-6, sunroof, AM/FM cassette, CB, trailer hitch, manual transmission, running boards, owner's manual, \$4500. Martin, 821-0037.

'76 CHEV. LUV PICKUP, bucket seats, stereo, tool chest, alarm system, \$1700 OBO. Berman, 296-5640.

'80 OLDS. CUTLASS, 2-dr., AT, AC, V-8, needs paint, \$2100 OBO. Richards, 281-9471.

'78 BMW R-100/S MOTORCYCLE, Luftmeister fairing, Krauser luggage rack, more. Weaver, 294-8031.

'83 BRONCO, full-size, two-tone paint, 4-spd., PB, 302 CID, towing package, locking hubs, \$6500. Trujillo, 869-6119.

'86 HONDA REBEL 450, silver, 5.7K miles, backrest, 2 matching helmets, \$1400. Cox, 293-2465.

'83 MAZDA RX-7, loaded, \$4600. Wright, 296-3850.

CHILD'S MOUNTAIN BIKE, Cannondale 16" frame w/24" wheels, \$375. Johnson, 296-1236.

'79 MERCURY COUGAR, cruise, one owner. Ward, 836-3124.

'83 BUICK SKYLARK, 4-dr., standard, one owner, AC, AM/FM, V-6, \$3500. Smith, 268-1640.

SCHWINN 27" 12-SPD. RACER, toe clips, \$110. Asprey, 296-6673.

'85 YAMAHA IT200 TRAIL BIKE, '87 Shogun mountain bike, make offers. Pryor, 294-6980.

'78 TOYOTA LAND CRUISER, 2-dr. hardtop, 82K miles, \$4000. Anderson, 292-2484.

'81 JEEP RENEGADE CJ-7, hardtop, 6-cyl., PS, 59K miles, \$4500 OBO. Mills, 344-6380.

'73 LINCOLN CONTINENTAL, white, 2-dr., 83K miles, AC, PW, PS, power seats, \$1500. Anderson, 296-3352.

'78 PINTO SW, PS, PB, AC, standard, new tires and brakes, rebuilt engine, \$500. McKenney, 268-7390 evenings.

MOTOR HOME, converted Ford school bus, fully self-contained, 390 engine, new tires, stereo, CB, generator, propane, 3-way refrigerator. Gipson, 298-7073.

TOMY ELECTRIC ATV, \$30. Babcock, 892-7199.

'82 YAMAHA SECA 750, new candy-red paint, new rear tire, \$1100. Knutson, 296-1106.

'87 JAYCO MMH, 23', 2.4K miles, Ford 460, cruise, tilt, AC, generator, sleeps 4, extras. Clay, 292-2130.

'84 CUTLASS SIERRA SW, 3.0 V-6, 8-passenger, AC, OD, stereo cassette, PL, PW, below book. Finley, 299-0739.

DIAMONDBACK SILVER STREAK BICYCLE, 3-piece crank hand brake, CAC-lite pads, mushroom grips, Comp III tires, \$175. Harstad, 298-6551.

'84 DODGE RAM 250 CUSTOM CONVERSION VAN, 318 V-8, 33K miles, wheelchair lift, AT, AC, PB, PS, new tires. Iverson, 281-3747.

BOY'S BICYCLE, 16" Diamondback BMX, \$60. Denison, 892-9313.

'77 TOYOTA PICKUP, long bed, 4-spd., \$950. Vanderburg, 836-1169.

'79 CAMARO RALLY SPORT, blue, AC, PB, PS, AM/FM cassette, 85K miles, \$1800 OBO. Brooks, 298-3294.

'72 FORD COURIER PICKUP, 71K miles, new clutch, needs work, diagnostic report shop manual, \$300 OBO. Arlowe, 298-1770.

'81 PLYMOUTH RELIANT SW, AC, PS, PB, 4-spd., AM/FM stereo, 62K miles, \$2800 OBO. Mozey, 822-0296.

'55 CHEV. BEL-AIR, 4-dr., 6-cyl., rebuilt engine and transmission, 13K miles, no rust, best offer over \$3800. VanDeVelde, 255-8174.

'73 KAWASAKI 400 OHC, \$450; '73 Mustang Mach I, \$1500; '85 Ford Escort, \$3400. Scheibner, 298-1606.

'84 KAWASAKI 1100LTD CRUISER, shaft drive, original adult owner, highway/city driving, \$2195. Norwood, 292-0072.

'80 DATSUN 200SX, 5-spd., AC, AM/FM, sunroof, new struts, 106K miles, \$1400 OBO. Huffman, 296-0453.

'74 VOLVO SW, 4-WD, AT, recently professionally rebuilt engine and transmission, \$1800 OBO. Blair, 294-0824.

'88 ITASCA MOTORHOME, by Winnebago, 27', 8.9K miles, extras, \$37,500. Rader, 256-3069.

'80 SCIROCCO, stereo system, new tires, \$2200 OBO. Colgan, 883-2713.

'87 MERKUR XR5Ti, turbo, 2-dr. hatchback, \$15,500. Malone, 828-3696.

'75 FIAT SPORT COUPE, needs muffler, engine rebuilt in '83, \$500. Balthaser, 298-5794.

'65 SCOUT, 4-WD, 58K miles, \$1500. Dean, 299-3281.

FIBERGLASS KAYAK, w/apron, \$95; '81 Honda XL-185 motorcycle, luggage rack, 12K miles, 100-mpg, \$425. Shunny, 265-1620.

BIKES: 27" man's, \$50; woman's, \$60. Nagel, 298-2779.

'77 FOUR STAR MOTOR HOME, 23', on Ford 1-ton chassis, new tires, awning, 57K miles, \$7500. Gonzalez, 877-2248.

'72 CHEV. WINDOW VAN, 350 V-8, PS, PB, white, \$1100 OBO. Snow, 883-1268.

**REAL ESTATE**

3-BDR. HOUSE, study, 1-3/4 baths, 2-car garage, corner lot, sprinklers, views, 1300 Jewett NE, 1475 sq. ft., \$79,900. Russell, 298-0162.

41 WOODED ACRES, Manzano Mtns., borders road, 3 miles west of Torreon, \$29,000. Stearns, 298-0444.

2-BDR. MOBILE HOME, '80 Wayside, 14' x 64', 2 baths, landscaped, skirting, deck, upgraded, NE Heights, \$12,900. Rightley, 822-0383.

7/16-ACRE LOT, in Sandia Park, hilltop view of Santa Fe, borders national forest, water at 140 feet, \$25,000. Sanderlin, 298-7147.

'81 MOBILE HOME, Woodlake, Del Rey

Park, sell or trade for late-model van. Baker, 888-0410.

3-BDR. HOME, Holiday Park, 1680 sq. ft., shaded back yard, 2-car garage, den w/FP, \$93,950. Bowman, 299-5799.

2-BDR. MOBILE HOME. Hill, 294-7534.

2-BDR. HOME, 6001 Redlands NW, garage, \$5000 below market price, no qualifying, \$48,000. Gilbert, 298-9026.

3-BDR. MOBILE HOME, Town & Country, 14' x 84', 2 baths, 8' x 16' attached room, storm windows, FP, central AC, skirting, \$18,500. Shannon, 281-3038.

3-BDR. MOSSMAN HOME, formal LR/DR, FR w/FP, carpet, drapes, appliances, pool, patios, assumable 9-1/2%, near UNM, \$107,500. Daly, 255-7763.

CONDO WEEK at Pagosa Springs, Colo., 2-bdr. plus loft, sleeps 6+, available Aug. 27 through Sept. 3, 1988, \$275. Ater, 822-9697.

SIX BUSINESS LOTS in Estancia, on Hwy. 41, contiguous, \$15,000 w/terms. Johnson, 255-2846.

3-BDR. HOME, views, Paradise Hills, near pool, park, playground, cul-de-sac, patio, 9% assumable, \$83,900. Tebo, 897-0403.

3-BDR. HOME, NE Heights, hot tub, 1600 sq. ft., \$72,000. Nunez, 298-0481 or 298-4880.

2-BDR. HOME, Ridgcrest area, 1000+ sq. ft., 1 bath, FP, hardwood floors, new pitched roof, separate 550-sq.-ft. hobby shop, fruit trees, \$74,500. Dalphin, 265-4029.

3-BDR. HOUSE, 1500 sq. ft., 1-3/4 baths, 700-sq.-ft. flagstone patio w/grill, landscaped, pantry, great room, mountain/city views. Gwinn, 299-7167.

2-BDR. MOBILE HOME, '79 Centurion, 14' x 56', 1-1/2 baths, washer, dryer, AC, range, refrigerator, skirting, adult park, \$10,000. MacKenzie, 299-1806.

CUL-DE-SAC LOT, NE Heights, 4908 Danube, 9000+ sq. ft., underground utilities, views, S.Y. Jackson, Eisenhower, Eldorado schools, \$44,000. Appel, 292-0463.

2-BDR. MOUNTAIN HOME, on 5 acres, off Zuzax exit on I-40, 25' trees, proven water, \$70,000. Johnson, 415-443-9418.

**WANTED**

SOCCER TEAM MEMBERS, girls born in 1979, for Duke City League team that plays against boys and girls. Geer, 265-2094.

MEMBERS FOR PAINT-BALL WARGAMING TEAM, upcoming tournaments. Hubbard, 281-1779.

HOUSEMATE, female, share home in Taylor Ranch, private bedroom w/private patio and bath, \$250/month plus utilities. Bassett, 897-4712.

HOME TO RENT w/another female or single parent. Brigham, 293-6914.

HARLEY-DAVIDSON MOTORCYCLE, in good condition, reasonable, any year. Gorman, 255-4431.

WORD PROCESSOR SYSTEM including printer, must be reasonable price. Coleman, 884-5009.

DOUBLE STROLLER. Jaramillo, 864-8153.

ENCLOSED CAR-TOP LUGGAGE CARRIER, bumper-type bicycle carrier. Bauhs, 281-2688.

HOT TUB or portable spa. Pierce, 299-2801.

CAR CADDY for mid- or full-size vehicle. Blaine, 299-1036.

BABYSITTER in SE Heights, to care for baby 7 months old, Tues. and Thurs., 10 a.m.-1:30 p.m. McBrayer, 293-4076.

COMPUTER, printer, color monitor, possible trade for VCR. Snow, 883-1268.

SUBARU RIM(S) for 13" tire, 4-hole, w/8 broad white spokes. Hill, 299-0019.

**LOST**

SILVER WATCH, handmade silver band w/turquoise inlay, lost at the C-Club (probably in the shower room) July 4, has sentimental value. Benedick, 268-8460.



# Mix or Match the Fish and Fowl At Beach Party Blast Tonight

THE BEACH BOYS won't be there, but the New Mexico version of that well-known group — those famous Isleta Poor Boys — *will* be. They'll strum their stuff under the stars for dancing on the patio tonight from 8 p.m. to midnight. It's billed as "beach party night," and what could be more appropriate before the stompin' starts than an old-fashioned chicken and fish fry? Mix or match 'em — one portion each of fish and fowl, or two of either; salad bar's included, along with your choice of corn-on-the-cob or french fries and coleslaw. Bring the family — kids under 12 get one piece of chicken or fish, plus the other goodies, for \$1.50.

FAMILY BINGO NIGHT — set for tomorrow evening (July 30) in the pool/patio area — features low-cost eats (sandwiches, salad bar, pizza) served from 5 to 7:30 p.m., cartoons on the big-screen TV, family-style bingo (with lots of prizes) from 6 to 8, and swimming until 8.

SPEAKING OF BINGO, the regular crowd gets together again on the patio next Thursday night (Aug. 4) for another shot at some fabulous gaming rewards and door prizes. Card sales start at 5:30 p.m., and the early-bird game begins at 6:45. Don't bother cooking, because reasonably priced soup and sandwiches are available.

CHOOSE YOUR OWN STEAK — then watch it sizzle — a week from tonight (Aug. 5) at another Friday night patio party. It's your choice of T-bone, New York, or filet mignon; dinner includes a full salad bar as well. Afterward, stomp the night away to the strains of the good old (Poor) Boys from Isleta from 7 to 11 p.m.

THUNDERBIRDS WILL BE SCARCE around Albuquerque next Thursday (Aug. 4), as this bunch of retired party-people plan to picnic at Doc Long's in the Sandias that day. (Doc Long's, for the uninitiated, is located two miles off NM 14 on the road to Sandia Crest.) Alfresco action starts at 10 a.m. The T-Bird club furnishes the meat, buns, beer, wine, coffee, soft drinks, and watermelon. Picnickers

should bring their own eating utensils and plates, along with a small salad or dessert. A yes or no phone call will help the food buyers plan amounts; call Bernie Brown (281-3608), Bob Butler (299-5626), Charlie Kaspar (821-5521), or Bob Jeffrey (294-4676).

Another T-Bird note: The card sharks are back at the tables in August on the 11th and 25th (both Thursdays). Wheeling and dealing start at 10 a.m. both days. Free refreshments and door prizes along with the gaming.

SWIMMING'S FREE FOR C-CLUB MEMBERS every Friday night between 5 and 9 p.m.; guests pay just \$1. And, if you don't feel like splashing around after a wacky workweek, indulge yourself with a tall cool one at Happy Hour (4:30-7 p.m. every Friday at the patio bar).

Speaking of weekly events, keep in mind that every Wednesday night all summer long is Family Night in the pool/patio area. All facilities — including the snack bar, grill, and pool are open those evenings until 8 p.m. Here's a great way to beat the heat! Regular admission rates: free for pool-pass holders, \$1.50 for C-Club members without passes, and \$2.50 for guests.

THE CORONADO WOLFPACK'S setting its sights on pigskin season at a poolside party Aug. 6 at 2 p.m. at the home of Judy and Roy Carroll (8917 Osuna NE). The Pack gets the straight scoop that day from UNM football coach Mike Sheppard, who'll talk about what to expect this fall. The price of \$3.50/person includes steak, bread and butter, wine, beer, and soft drinks; attendees bring a side dish, lawn chairs, eating utensils, and paper plates. Send your check by Aug. 1 to Ed Brass (2000) or to Ed at his home (4725 Westridge Pl. NE, 87111).

CRUISING DOWN THE RIVER is the theme song of the folks who travel the mighty Colorado (Lee's Ferry to Lake Mead) from Aug. 8 to 15. The \$750 tab covers all meals on the river trip and bus transportation back to Lee's Ferry. Hop to it — there may still be some room. Give leader John Shunny (ret.) a call to find out (265-1620).

## Fun & Games

**Bowling** — SANDOE Bowling Assn. Bowlers-of-the-Month for May are: Scratch — Lyle Davis (2113), 641; and Trinie Chavez, 563. Handicap — Fidel Perez (7485), 593 and 680; and Shirleen Perez (3426), 502 and 661.

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**Golf** — SWGA's new mentor program showed how well it's working when novice golfer Chris Foral (wife of Dave, 7526) swung into her first hole-in-one at Los Altos Golf Course on July 13. She used a 7-iron on Hole 5 (a par 3 course of 102 yards). Her mentor, Janice Montoya (152), was on hand to share the thrill.

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**Volleyball** — Sandia Labs Volleyball Assn. will hold a Fall '88 Season organizational meeting at 5 p.m. on Aug. 9 at the Coronado Club patio. Election of officers will be held and league business discussed. Tentative start date of the fall season is Sept. 11. Deadline for team rosters is 5 p.m. Aug. 29. Membership is open to Sandians, their spouses, and dependents 18 years or older (out of high school), and, with SERP membership: contract employees, Kirtland employees, and military personnel. For more information, contact Fred Gunckel (2543) on 6-7235 or Ben Garcia (6452) on 6-6852.

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**Recreation** — KAFB's MWR Supply Branch has changed its name. It's now Logistic Support Branch (Recreation Supply). Telephone (4-4990 or

4-5915) and Bldg. (20410 KAFB East) numbers remain the same. Ten new canoes, ten boats and motors, and ten Scamp travel trailers (five 13-footers and five 16-footers) have been added to the supply. Camping, sports, and other recreation equipment are available for rent to Sandians with an MWR card.

### Just What Albuquerque Needs . . .



A new grass being developed by the University of Florida for subtropical climates may need watering only four times a year.

Lynn Asinof, Wall Street Journal



FAJITAS, TAMALES — you name it, they have it at the a la carte Mexican buffet, available every weekday on the Coronado Club patio from 11 a.m. to 1:15 p.m. Here, C-Club employee Jimmy Harbour serves up a fine-looking taco.

## Events Calendar

July 29-30 — "El Barberillo de Lavapiés" by Francisco Barbieri, presented by Viva Zarzuela!; Spanish comic opera co. production of lively Spanish zarzuela (musical comedy) of political intrigue set in 18th-Century Madrid; 8 p.m., KiMo Theatre, 883-2838.

July 29-Aug. 6 — "A Little Night Music," romantic musical comedy presented by the Albuquerque Civic Light Opera Assn.; 8:15 p.m. Fri.-Sat., 2:15 p.m. Sun.; Popejoy Hall, 345-6577.

July 29-Aug. 31 — "Dinosaurs in Action," exhibit of four mechanical dinosaurs: adult and juvenile triceratops, brontosaurus, and tyrannosaurus; 10 a.m.-5 p.m., NM Museum of Natural History, 841-1374.

July 29-Oct. 10 — "Spectacular Vernacular," traditional desert architecture of West Africa and Southwest Asia, exhibit circulated by the Smithsonian Institution Traveling Exhibition Service; 9 a.m.-4 p.m. Mon.-Fri., 10 a.m.-4 p.m. Sat.; Maxwell Museum of Anthropology, 277-4404.

July 30 — Summerfest '88, Greek Night: food and entertainment; 5-10 p.m., Civic Plaza, 768-3490.

July 31 — Arts in the Parks: Aztec dance group, Los Bohemios, Los Reyes, Los Tapatios, and Freddie Chavez; 1:30-4 p.m., Old Town Plaza, free, 764-1525.

July 31-Sept. 18 — Exhibit opening, "Garo Z. Antreasian, A Retrospective," 9 a.m.-4 p.m. Tues.-Fri. (5-9 p.m. Tues.), 1-4 p.m. Sun.; UNM Art Museum, 277-4001.

Aug. 2 — Our Lady of the Angels Feast Day: Bull and Corn dances; Jemez Pueblo, 843-7270.

Aug. 3 — Zoo Music: Cuicani, Andean folk music; 7:30 p.m., Rio Grande Zoo, 848-1370.

Aug. 4 — Arts in the Parks: Igor's Cowboy Jazz Band (blend of western vocals and traditional Dixieland jazz) and Cadillac Bob and the Rhinestones, sponsored by Friends of the South Broadway Cultural Center; 6:30-10 p.m., Tiguex Park, free, 848-1320.

Aug. 4 — Santo Domingo Feast Day: Corn dance; Santo Domingo Pueblo, 843-7270.

Aug. 4-6 — Kachina Morgan Horse Show: classes include English pleasure, Western pleasure, carriage driving, and others; 9 a.m.-5 p.m. and 7-10 p.m. daily; Horse Arena, NM State Fairgrounds, 265-1791 or 848-5736.

Aug. 6 — Summerfest '88, Irish Night: food and entertainment; 5-10 p.m., Civic Plaza, 768-3490.

Aug. 6 — Concert, classical music of northern India with G. S. Sachdev on bamboo flute and Alope Dutta on tabla; 7:30 p.m., Woodward Hall (UNM), 242-3167.

Aug. 7 — Arts in the Parks: Musica Antigua, Mirage Dancers, Early Music Ensemble, Magic Dancers, and Society for Creative Anachronism; 2-4:30 p.m., Bataan Park, free, 764-1525.

Aug. 10 — Zoo Music: Alan Lewine Quintet, original jazz; 7:30 p.m., Rio Grande Zoo, 848-1370.

Aug. 11 — "Very Special Arts": story-telling, face-painting, magician, mask-making, spin art, and more, for children ages 6 and up; 9:30 a.m.-3:30 p.m., South Broadway Cultural Center, 848-1320.