

Adding Some ICE to the Advanced Manufacturing Brew

The two Sandians were separated by half a continent, but they could see each other in windows on their computer screens, they could hear each other, and they could both work on the same 3-D engineering drawing.

Chris Montoya of CAE (Computer-Aided Engineering) Support Dept. 2884 at Sandia/New

Mexico and Tom Pratt of Networking Dept. 1954, who was at the Supercomputing '92 conference in Minneapolis, were sharing work environments through the technology of Interactive Collaborative Environments (ICE) software. About the only thing they couldn't share in this demonstration was the bag of carrot sticks Chris had put nearby because it

looked as if the demo might last beyond lunchtime.

Sandia's ICE project was in effect previewing how designers, production engineers, marketers, and even the people responsible for eventual disposal of a product are likely to work together as agile manufacturing becomes a reality. (Watch for LAB NEWS articles about this subject early next year.)

The system was developed by the ICE team to link people in different locations who need to collaborate on the details of a project. Although commercial systems can do some of this, says project leader Rodema Ashby of Software and Integration

"People who aren't in the same location need to be able to look over the same drawing and get work done."

Technologies Dept. 2862, ICE is providing capabilities that can't yet be bought off the shelf.


"The ICE project exists because people who aren't in the same location need to be able to look over the same drawing and get work done as if they were gathered around the same table," says Rodema. "They'll still have to get onto planes from time to time, but with a system such as this, they won't have to do it so often."

A 'Must' for Agile Manufacturing

This kind of collaboration is a building block for advanced manufacturing approaches that will emphasize work going on concurrently, rather than in sequence, say experts who are looking toward
(Continued on Page Five)



AT ONE END of a linked work environment that allows people to collaborate electronically, Chris Montoya (left, 2884) and Rodema Ashby (2862) demonstrate Sandia-developed Interactive Collaborative Environments software.



LAB NEWS

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'Step Forward' for Advanced Manufacturing

Center for Microelectronics Technologies Will Strengthen Industry, Enable University Research

Early next year should see the beginning of installation of equipment donated by International Business Machines Corporation (IBM) for the newly formed national Center for Microelectronics Technologies (CMT) at Sandia/New Mexico.

Formation of the CMT was announced last week in a ceremony attended by DOE Secretary James Watkins. Also present was Paul Horn, Director of the Advanced Semiconductor Technology Laboratory at IBM's T. J. Watson Research Center.

Expert personnel from IBM will assist during the installation and checkout phases, which will be completed in late 1993. The equipment is valued at about \$20 million.

The CMT will support cooperative research and development by universities, industry, and government in advanced semiconductor technologies. It will combine the major IBM donation of integrated-circuit processing equipment with facilities and equipment made available by Sandia. Together, the IBM equipment and Sandia's extensive "Class 1" clean room facilities will form an advanced integrated-circuit research line that will be the core of the Center.

Reorients Tradition

The Center is the latest example of a major reorientation of the traditional approach to research and development in the US. The new

approach emphasizes collaborative efforts among government labs, universities, and industry in R&D of technologies vital to the nation's economic future.

President Al Narath calls the Center a "step forward" in the Labs' Advanced Manufacturing Technology effort. "This is an exciting development," he says. "The Center will be an innovative way to bring government, university, and industry

The CMT is a "manifestation of . . . GUILD — for government, university, industry, laboratory development."

researchers together to help keep the US microelectronics industry strong and dynamic. We're very happy to have it here at Sandia.

"It meets a need long felt by industry, and it is the latest manifestation of a concept we have been strongly pushing. We call it GUILD — for government, university, industry, laboratory development. It's a new, cooperative way of doing R&D in this country." (Watch for more about advanced manufacturing in LAB NEWS articles early next year.)

"The Center is an important new capability in silicon-based microelectronics," says Paul Percy, Director of Microelectronics and Photonics 1300. "In addition to our internal programs,
(Continued on Page Four)

ECP Campaign Once Again Surpasses Goal

Every year, it seems, Sandians dig a little deeper in their pockets and pull out more money for their communities. During 1992's Employee Contribution Plan (ECP) Campaign to raise funds for the United Way of Greater Albuquerque and other charitable agencies, employees continued the tradition.

The 1992 campaign goal was to raise \$1,525,000. Results are in, and pledges from Sandians total \$1,561,779, a 2.4 percent increase over last year.

"Although our overall participation slipped slightly (total participation dropped from 90.2 percent to 87.4 percent) — because of the tough economy and earlier criticisms of the United Way of America — those Sandians continuing to participate gave a little more and made up the difference," says Will Keener (7161), 1992 ECP Executive Secretary.

Fair Share (0.6 percent of salary or more) contributors pledged \$956,572. Gold Share (1 percent and above) contributors pledged \$321,380. The average pledge for participating employees was \$242, up from \$227 per employee last year.

**What's Happening
In the Defense
Programs Sector —
See Page Eight**

This & That

1992 - Whew! - No news is not good news when you're in the news business, but a lack of news certainly hasn't been a problem this year. Keeping Sandians updated on all the developments and changes was a challenge for the LAB NEWS staff. We resisted the temptation to do one of those typical year-end summaries, but here's a small sampling of the subjects we covered in 1992: AT&T "disconnection" and the selection process for a new Sandia management contractor. Restructuring and renaming. Lotsa new cooperative work with industry. A passel of new directors. New "Ombuds" program. New and expanded technical initiatives. Cooperative projects with Russians and others in the former Soviet Union (whoda thunk it five years ago?). Management "road shows." Establishment of national centers for Advanced Manufacturing Technology and Microelectronics Technologies (see page one). Easier movement into Member of Laboratory Staff ranks. Visits by President Bush and President-elect Bill Clinton. Increasingly dominant role for Sandia sectors.

I don't wanna think about it yet, but next year could make this one look tame. C'mon holiday break!

* * *

Travelers: Beware the Mistletoe - Getting caught under the mistletoe can sometimes be a pleasant experience, but based on a little ditty that he saw in *Reader's Digest*, Mike Rex (7521) offers some free advice to Sandians who plan airline travel during the holiday season: Don't check your luggage if mistletoe is hanging over the ticket counter - it means you can kiss your luggage good-bye.

* * *

Have They Finally Flipped? - That was my first reaction when I learned that my colleagues in Sandia's Public Relations Dept. 7161 have invited a couple of Albuquerque-area activists - Don Hancock and Michael Guerrero - to speak at a Community Focus event at the Labs next month. Hancock, affiliated with the Southwest Research and Information Center, is a long-time, oft-quoted critic of the Waste Isolation Pilot Plant (WIPP) near Carlsbad. Guerrero and his Southwest Organizing Project have been instrumental in persuading the Albuquerque City Council to examine in great detail its policies governing disposal of low-level radioactive wastewater through the municipal sewer system - even wastewater that's less radioactive than milk or beer. They're scheduled to talk in the Tech Transfer Center at noon on Jan. 14.

So, have my PR colleagues indeed flipped? I guess we'll have a good indication around 1 p.m. on Jan. 14.

* * *

Four Grand from Sandia Souvenirs - Retired LAB NEWS editor John Shunny reports that about \$4,000 in "profit" was distributed in 1992 to needy folks and charitable causes from the sale of Sandia logo T-shirts, mugs, caps, and knives. Much of the money goes to help needy families in several rural New Mexico villages. Other contributions go to regional, national, and international charities, including the Salvation Army, Red Cross, Amnesty International, and more. Several volunteer groups at Sandia, including the LAB NEWS, sell the Sandia souvenir items. All money not used in restocking the items goes to charitable causes.

* * *

I May Be All Wet, But... - Here's the start from my "favorite" recent piece of junk mail - sent to me personally, an editor: "Dear Water Professional: Let's face it. You're Busy - and that's with a capital B." Right - I'm drowning in junk mail. Crumple, crumple, toss! •LP

Sandia Has NOT 'Refused to Pay'

Workers' Comp Issues Still Pending

An Albuquerque news report last week misstated Sandia's policy concerning payment of workers' compensation benefits to seven employees who used to work in the now-closed Bldg. 880 Hybrid Microcircuits Laboratory. (The Dec. 4 LAB NEWS reported that some employees may have experienced various ill-health effects resulting from their work there.)

An *Albuquerque Journal* article several days later incorrectly stated that "Sandia will refuse to pay them workers' compensation benefits."

Dr. Larry Clevenger, Director of Occupational Medicine Center 7030, emphasizes that "Sandia has never refused to pay workers' compensation benefits if they were judged to be appropriate either by our medical organization or by the New Mexico Workers' Compensation Administration."

The seven employees have filed claims with the state administration, which has recommended that additional medical diagnostic tests be conducted. That is ongoing.

Consequently, not all of the information necessary to render a judgment on the relationship between the health problems of the employees of the old Hybrid Microcircuits Lab and their work history there is yet available, says Larry. •

Sandia Calendar Debuts Jan. 8

The LAB NEWS will begin a new feature on Jan. 8 - a Sandia Calendar of upcoming events. The Labs-wide calendar will be published in each issue and will include events for the coming month or so, depending on available space.

It will include events at all Sandia locations, notes LAB NEWS Editor Larry Perrine (7162). "We are particularly interested in listing events that are open to all Sandians or that affect a lot of Sandians," he explains. "We don't have space to publish routine events such as classes or organizational meetings that are published in the *Weekly Bulletin*."

"We think Sandians will find this new calendar helpful in planning what they want to attend for the coming weeks," he continues. "That's the real purpose of the calendar, plus to list upcoming visits from VIPs that we know about."

Sandians Invited to Submit Items

The LAB NEWS staff will automatically include events they know about, but Sandians in charge of events are encouraged to submit announcements for publication. Please include all vital information, including event name, brief description, date, time, place, who may attend, and who to contact for more information. The individual submitting the item also should include his or her organization number and telephone number.

Information should be mailed or faxed to Sandia Calendar, Department 7162, fax 844-0645. Items must be submitted at least one week before each LAB NEWS publication date. The paper is published every two weeks (fortnightly) on Fridays unless the schedule is altered by major holidays.

Sandians at all locations are encouraged to begin submitting Sandia Calendar items right away. Because of the holiday break, the deadline for the next issue (Jan. 8) is noon on Thursday, Dec. 24.

At the same time the LAB NEWS is starting the new Sandia Calendar, it is ceasing publication of the Albuquerque-area cultural events calendar. "We regret this," Larry says, "because many Sandians have said it's the best one in town - thanks to Janet Carpenter (7162), who compiled it. However, our readership surveys show that it's among the least-read items, and the local newspapers publish lots of information about upcoming cultural events. We'll use the extra space to cover more work-related items." •



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Attention Retirees

RSVP Has a Place for You

The Retired Senior Volunteer Program (RSVP) has a place for you. It offers positions for retirees, age 60 and over, with more than 200 nonprofit agencies in Albuquerque, Bernalillo County, and Rio Rancho.

You can work a lot or a little, set your own hours, do something you've always done or try something you've never done. The community has needs for everything from tutoring children and youth or serving as a docent at the zoo to outside forestry work and helping the environment.

RSVP also helps recruit for many special events in the area for retirees who prefer an occasional job.

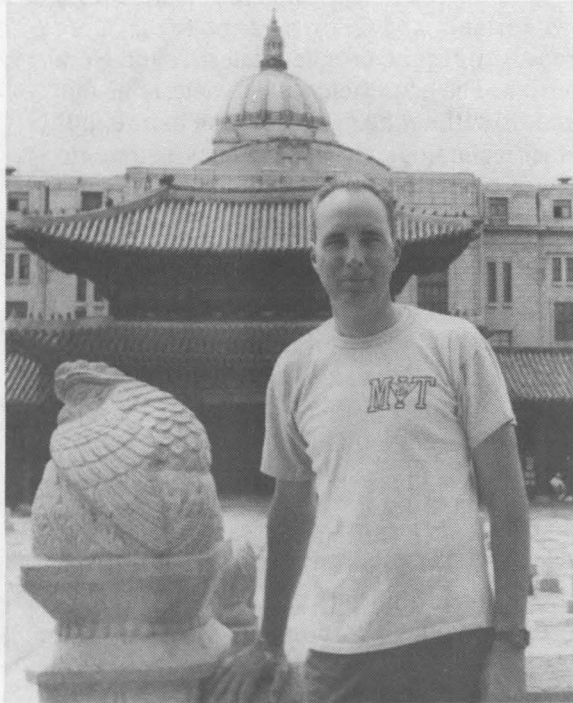
RSVP offers special benefits as well as the reward of giving of yourself. For more information, call the RSVP office on 764-6420.



12-Hour Watches during Computer Simulation**UN Exercise in Korea Gives Sandian A Close Look at Modern War-Gaming**

Sandia/California's Jim Hogan (5371) recently helped the military services "move" several hundred thousand troops by land, sea, and air — without any of them boarding a troop carrier, ship, or plane. In the process, he got a first-hand look at how computer simulations have taken over the process of modern war games.

As a part of his Naval Reserve training this fall, Jim spent 23 days in South Korea (the Republic of Korea) participating in the first large-scale, international, multi-service computer war game.



TIME OUT for a little tourism: Jim Hogan visits the Imperial Palace in downtown Seoul, South Korea.

Though no units were actually moved during the phase Jim participated in, 36,000 players in several command posts participated in the mock assault that, in theory, involved several hundred thousand troops on land, in the air, and at sea.

"The exercise simulated casualties, flow of refugees, and clogged highways," Jim explains. "Senior commanders had information passed to them by staff. In one instance, they had to find ways to provide back-up support no longer available because of lost bases in the Pacific."

In the Naval Reserve for 10 years now, Jim is an engineering officer. His usual assignments have taken him to naval facilities to help manage engineering for assorted research projects.

In Korea, as an "umpire," he observed the war game and reported on performance and problems. Twice a day, he gave reports to the "chief umpire" and the exercise commanding general. He also was a briefing officer for foreign news media, visiting general officers, and dignitaries.

Jim says he was chosen because of his experience in computer simulations. As part of his job at Sandia, Jim participated in Global War Games at the Naval War College in 1991 and 1992.

Should Bolster Sandia Work

The experience was professionally rewarding, says Jim: "I saw signs that computers and computer simulation are becoming increasingly accepted at the command level in the operational planning and execution of missions. The experience will help me improve the simulations to support our defense program work at Sandia."

"The project also helped me understand the specific needs of the military, which is important because the services are a primary customer. In this changing world environment, personal experience in the field is particularly valuable."

The exercise was a far cry from moving pins around on a map, the old way war games were played. This was a three-part United Nations exer-

cise designed to test the defense of the Republic of Korea. Part one tested the mobilization of military from South Korea. Part two — which Jim participated in — tested Command Post operations and trained senior staff in the US Army, Air Force, and Navy. Part three was a field exercise to test whether the computer simulations would have worked in real life.

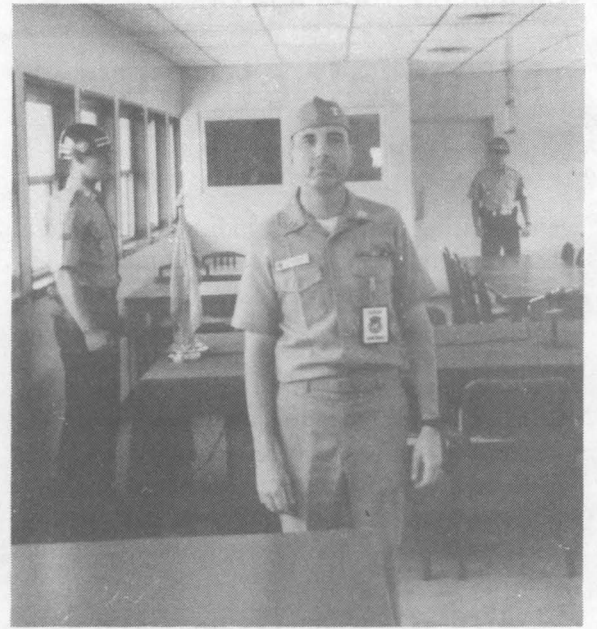
Computer Links in Korea, Germany

To accommodate the enormous computing requirements, the war game was distributed on several computers. Three of the simulations were run in Germany and three in Korea. All the computers were linked together and run in real time using satellite feeds and transoceanic fiber-optic cables. New technology also depicted the minute-by-minute results of the war on four-by-five-foot projection screens.

Jim says he was impressed with how seriously the participants took their roles. Information flooded into the command posts as if it were a real war. The "war" started in response to hostilities from North Korea. US forces became involved immediately and worked with the Republic of Korea and allies to drive North Korean troops back.

There wasn't much time for personal sightseeing during the assignment. The "war" went on 24 hours a day for three weeks. On a 12-hour watch, Jim had time for little else but travel back and forth to his quarters in Seoul.

He says, however, that he was glad he followed the recommendation to visit the front lines, which meant traveling through a series of four fortifications. The trip showed him that real-life tensions are a daily reality for North and South Korea. Technically, the two countries are at war — only a cease-fire exists. The military armistice commis-



JIM HOGAN (5371) stands inside the Military Armistice Commission building at Panmunjom in the room where the UN and North Korean negotiators meet regularly. The table directly behind Jim is located on the 38th Parallel and has a line running down its center to designate where each side must sit.

sion still meets at Panmunjom, and infiltration and gunfire still occur across the border.

He says, "Touring the DMZ [demilitarized zone] made all of us aware of the high cost of war. We all knew that the computer statistics we were working with would represent real losses if a battle ever took place."

But there was a bright spot in real life: "While we were in the middle of the war games, we heard that South Korea was meeting with the People's Republic of China, North Korea's last friend. We all were very excited, hoping that this might eventually lead to a peaceful resolution to the conflict. Our hope was that our computer war game was as close as anyone would come to real battle." ●



SANDIA CALIFORNIA NEWS


THREE SANDIANS have earned the Golden Goose award by accomplishing their action plans after completing the Covey Leadership for the Future class. Some 350 employees from the California Laboratory have completed the course. This trio (from left) — Brian Maxwell (8000), Henry Hanser (8007), and Bill Trento (8742) — are the first to carry out their Leadership Action Plan and complete the documentation for related activities that result in the award. Henry, who coordinated the Covey program in support of the Quality Initiative, chose a porcelain goose, while the others received brass figures.

(Continued from Page One)

Microelectronics Center

we're inviting universities, industry, and federal labs to propose ways they can best make use of the new capabilities."

The Center will be available to experts from universities, industry, and the government to work together on concepts for devices, circuits, and tooling/processes for future microelectronics technologies. Researchers will be able to use the facilities to make prototype integrated circuits with selected feature sizes as small as 0.1 micrometer. (An average human hair is about 80 micrometers in diameter.)

Industry Helped Define CMT

Industry expressed a strong need for a facility to fill the gap between university research and industry. "Universities and industry need an 'incubation' facility where advanced research concepts can be inserted into a fully equipped integrated-circuit fabrication line so they can be refined and validated," Paul says.

Paul has worked with the Semiconductor Research Corporation (SRC) to define the facility operation and to help university researchers take

The Center fills "a critical gap in accelerating the transfer of university research to industry."

advantage of the opportunities it offers them. The SRC, based in Research Triangle Park, N.C., is an industry-formed body that funds microelectronics research at universities.

Larry Sumney, SRC chief executive officer, says, "The SRC views the Center as filling a critical gap in accelerating the transfer of university research to industry. It will allow the development of engineering prototypes in those instances where the change in technology is too dramatic to allow a direct transition from the university researcher to the industrial environment."

Supports Precompetitive Research

"The primary purpose of the Center for Microelectronics Technologies is to help strengthen the US microelectronics industry by supporting precompetitive device, circuit, and processing research and by providing advanced equipment validation testing," says Paul Fleury, VP for Research

Comments about the CMT

'Foresight and Innovation' Praised

We desperately need the intellectual quality of these laboratories, working together



SECRETARY OF ENERGY
JAMES WATKINS

with the private sector and academia, to bring our very best minds to bear on a most complex world. . . . IBM has made a corporate decision that it's best for them, best for us, best for the new partnership, to place a \$20 million capability here that we can pick up and, with academia, work together now as partners in the microelectronics area which is so critical to almost every area of international competition.

Secretary of Energy James Watkins

I commend Sandia and IBM for their foresight and innovation in establishing this new, high-tech R&D facility. Once again, Sandia is leading the way in charting a new course for our national labs. Their collaboration on this important project with government, universities, and the private sector will be highly beneficial to the Labs.

It is also important to note the great interest of the private sector to work with Sandia on this project. This is a powerful testament to the strength and wide-ranging abilities of the Labs. This is an inspiring example of diversification.

US Senator Pete Domenici

Congratulations to Sandia and DOE for the formation of this Center. Special thanks, of course, go to IBM for its contribution of approximately \$20 million worth of advanced laboratory equipment to this Center. This initiative is an excellent example of the new paradigm in technology development in the US. This new paradigm places much more emphasis on collaborative effort among government, industry, and academia for the development of new technologies vital to the nation's economic future.

As our country prepares for the next century, our main competitors are Japan, Korea, Switzerland, and Germany, not Texas, Colorado, California, or other states around New Mexico. The battlefields which determine our success will not be geographic in nature, but rather technological. This effort is a strategic step in preparing for the economic competitiveness of the US in the future.

US Senator Jeff Bingaman

Microelectronics clearly is a critical element in our high-technology future in New Mexico and nationwide. I am very pleased and proud that Sandia is once again taking the lead as we enter a new era of collaboration among our scientific community — private industry, government, and universities. This kind of cooperative R&D is absolutely critical if the US is to maintain its competitive edge in the semiconductor industry. This facility offers a host of exciting opportunities for Sandia, private industry, and students and faculty of universities in New Mexico and across the country. In particular, I am excited because it helps fill the current gap between university research and industry, providing an incubation facility to speed the transfer process.

US Congressman Steve Schiff

and Exploratory Technology 1000. "It will enhance substantially the DOE's initiatives in developing technology platforms for advanced manufacturing. It will both draw from and contribute to several other programs at Sandia."

The Center complements Sandia's existing program with SEMATECH, the consortium of US semiconductor manufacturers based in Austin, Tex., and the Contamination-Free Manufacturing Research Center recently formed at Sandia by

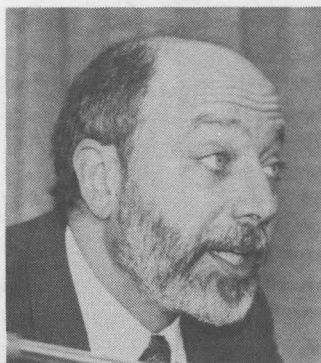
SEMATECH. Bill Spencer, President and Chief Executive Officer of SEMATECH, says, "Sandia has had a long and profitable investment in microelectronics. SEMATECH has leveraged these capabilities with Sandia in a number of areas and looks forward to expanding these interactions through the new Center."

Access to the facility will be through an industrial board that will review proposals.

•KFrazier(7161)/CS

CMT Will Be a 'National Meeting Place'

At the ceremony last week announcing the formation of the Center for Microelectronics Technologies, representing IBM was Paul Horn, Director of the Advanced Semiconductor Technology Laboratory at IBM's T. J. Watson Research Center. Following is part of what he said:



PAUL HORN

Over the last decade, the national technology establishment has become far more competitive and effective. It has done so by increasingly interacting with the private sector — with industry

and universities — in the pursuit of excellence. Today, with the formation of the Center for Microelectronics Technologies, we take a very big additional step in that direction. From

my perspective, the CMT will be a new paradigm for cooperation in microelectronics, one that brings together industry, universities, and the national labs.

The Center will provide a capability which is unique in the US: a capability that will establish a technology base, an infrastructure, for future generations of semiconductor technology.

With the CMT, Sandia will become a national meeting place, a focal point where a community of experts from diverse institutions will explore radical new ideas in a setting of cooperation and innovation.

The Center will enable the best scientists from the universities, from industry, and from national labs to work together and test their ideas on the most advanced equipment.

I believe that industry, and IBM as a member of that industry, will use the CMT as a facility to demonstrate and prove new concepts of broad industrial interest and to infuse new and renewed skills into our workforce.

Employee Deaths

Michael Petruno of New Initiatives Dept. 4112 died Nov. 26 after a long illness.

He was 57 years old.

Michael had been at Sandia since 1979 and was a member of the technical staff.

He is survived by his wife, two sons, and two daughters.

Jimmy Lee of Test Planning and Fielding Dept. 9323 died suddenly Nov. 26.

He was 49 years old.

Jimmy had been at Sandia since 1967 and was a senior technical associate.

He is survived by his mother and sister.

Sympathy

To Scott Nichols (9538) on the death of his daughter in Albuquerque, Nov. 23.

To Robert Williams (9137) on the death of his father in Missouri, Nov. 26.

To Gerald Kerley (1432) on the death of his stepdaughter in Albuquerque, Dec. 4.

(Continued from Page One)

Add Some ICE

that next step in global competition.

To respond quickly to market demands — and to make sure that a design takes into account all possible factors from research results to financial considerations to inventory status to disposal — the people who are responsible for getting a

The whole spectrum of activities required to develop new products can be modeled at the Labs.

new product successfully to market will have to share information frequently and smoothly even between widely dispersed locations.

Sandia is a good place to develop and try out the systems that can meet industry's needs, says Rodema. Labs products are frequently taken from research to concept to design to prototype production, all in-house — so the whole spectrum of activities required to develop new products can be modeled here.

Users Bring Wish Lists

"Our work is a response to needs that users have expressed to us," says Rodema. "We have found that after they try out one capability — such as seeing the same image on computer monitors at several locations — they realize that they would like to do more, such as being able to manipulate that image from any of the locations."

Along with Rodema and Chris, Sandians in the ICE project include Han Lin and Bob Pastorek (both 2862), who do much of the code design for the software. Rodema's predecessor was Craig Dean (5716). Jim Yoder (2801), formerly Department Manager over the project, was an early supporter of the concept, says Rodema, as was Arlyn Blackwell, Director of Design Engineering Center 2800.

The ICE mode of operation is first to evaluate what commercial products are on the market — there's no need to spend time and money duplicating something that already exists. Usually, though, commercial software for sharing has too many limitations. Some programs share an image, but only one user can make changes; others run only on particular types of computers; others require modifying the operating system of the computers.

Works in Standard Environments

What ICE has done is develop software that can run on any computer system with the widely used X Windows interface — the basic package is referred to as multiplexed X — with standard software applications and operating systems. The complete ICE package, including remote pointing and marking capabilities, acts as an intermediary between a software application, such as a computer-aided design (CAD) program, and the multiple users in different locations. The CAD program

ICE might also aid evaluation of medical images and preparation of business documents.

responds to commands from any of the locations just as it would to a single user.

Teleconferencing adds a dimension to the shared software. Rodema says her group has so far been working with systems recommended by the Distributed Audio/Video Environment group in Distributed Computing Dept. 1952 at Sandia/California, which has the same level of interest in distributed audio and video that the ICE team has in shared computing. "At first we expected video to be a frill," she says, "but we've learned that it has solid benefits. It's especially useful for showing models, or for showing the environment of dif-

Re-learning How to Confer

New Rules Evolving to Suit Remote Collaboration by Electronics

Most people know what's expected of them during a meeting in the same room, but what are the rules for a meeting conducted in multiple locations? Pilot trials of Interactive Collaborative Environments (ICE) software suggest how pervasive the effects on corporate behavior will be as people become accustomed to working together through electronic links.

Some behavior tends to carry over, says ICE project leader Rodema Ashby (2862). For example, people behave with someone else's video drawing on the screen much as they would with a paper document — they're reluctant to make changes without a "may I?" just as most people consider it discourteous to scribble uninvited on someone else's paper document.

"More questions arise the deeper we get into this technology," she says. "How do you record and store the results of one of these sessions to make sure that everyone understands which is the 'true' version of a design? When is video intrusive — should people be able to signal whether they're available to the camera? When do you use ICE and when do you need to travel for face-to-face meetings?"

The ICE technology is both fascinating and impressive in operation, but equally so are the prospects for redefining how people interact with each other. It's clear from these early steps that the corporate world being created isn't bounded by the computer screen. Fundamental shifts in the relationships of technology and business are just over the horizon.

ferent users. As a way of helping people work together remotely, it's more powerful than I had expected."

The ICE group concentrates on three main areas: R&D, which includes reviewing academic and commercial work to see what's available, as well as developing new software; pilot projects, in which feedback is obtained from groups of users; and collaboration with industry. The second and third of these are just getting into full swing. Links for pilot uses have been tested between Sandia/New Mexico and Sandia/California, Los Alamos National Lab, Allied Signal Kansas City, and most recently the Supercomputing '92 conference.

Cooperative R&D agreements (CRADAs) are being negotiated with three companies, says Rodema: "Some companies are interested in sim-

ply getting the use of our system, and some are interested in commercializing it."

There's potentially a wide market for this kind of software. The ICE project has so far concentrated on CAD applications, because those are of the most immediate interest to Sandia's needs. Other possibilities, though, are limited only by users' ingenuity. As a starting list, the ICE team has suggested evaluation of medical images, preparation of business documents such as spreadsheets or viewgraphs, and cooperative decision-making in a variety of forms.

In short, as Craig Dean said at an earlier stage of ICE's development, it's a way to switch from "I'll make some changes, then you review them and let me know" to "Let's look at the effect of changing this together and make a decision about it right now." ●CS

feed iiback

Q: In trying to contact someone in the hazardous waste department, I was appalled to learn that Chemical Waste Management Dept. 7721 was moved offsite. What was the logic here?

Why weren't Patents, Legal, or Education — organizations that can do a lot of their work on the phone and don't need one-on-one contact with the staff, and whom many of the staff never interact with — moved instead?

What are we supposed to do if there is a spill and we need help? Hasn't a safety hazard been generated here?

Moving an organization that has — that requires — daily interaction with the Sandia population offsite is foolish.

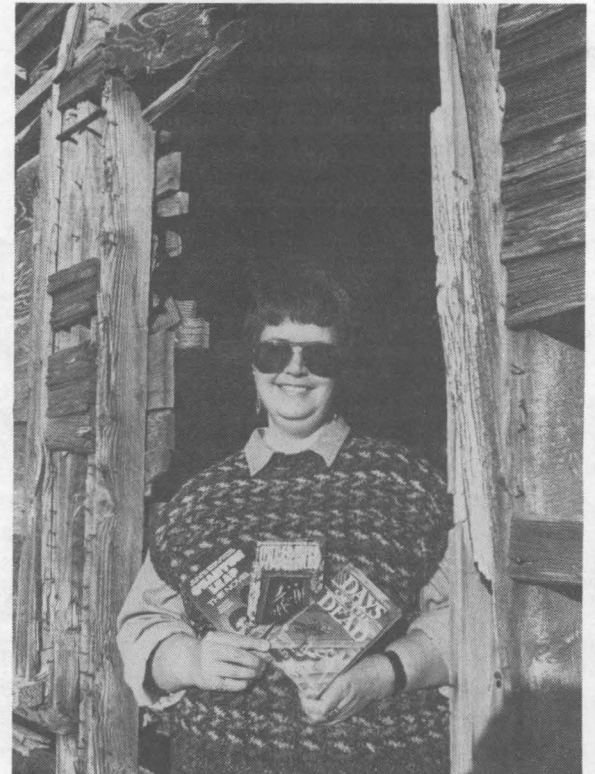
A: The ES&H area is growing at a rapid rate. Currently, there is no space available on-site to accommodate our growth. In discussing our space needs with the Facilities organization, the only feasible alternative to meet our current space crunch was to move some ES&H organizations off-site.

Since many of our people are out and around serving the ES&H needs of the Labs, we assessed the off-site move and determined that the inconveniences would be within 7700 and balanced by the advantage of having our staff and contractors here in a contiguous home base.

If you have an instance where our current response to an ES&H spill did not meet requirements, please contact me personally. We have teams prepared to respond as necessary around the clock.

Thank you for taking the time to express your concern for ES&H.

Joe Stiegler (7700)



SCARY STUFF — Ashley McConnell, a policy analyst in Financial Requirements and Corporate Policy Dept. 157, writes Southwest horror stories by night and Sandia policy by day. *Days of the Dead* (set in New Mexico) was released in September and *Quantum Leap: The Novel* (set in Oklahoma), a tie-in to the popular television series, was released in November. Her first book, *Unearthed* (set in Nevada), was released last year. Ashley has two more "Quantum Leap" books in the works, one set for release in April and another next September. Ashley is a member of several national writers' associations: Horror Writers of America; Novelists, Inc.; and Sisters in Crime.

Diversity at Sandia Today and Tomorrow**Creating a Diverse Workforce: It's Really a Business Issue**

Teamwork — does it mean pulling together, avoiding differences of opinion, going along with the group mentality toward a consensus that's comfortable for everybody in the group?

Or is it something more, a way of sharing people's talents and opinions so that everybody on the team contributes to the final solution?

The traditional way teams work is not good enough for the competitive demands facing Sandia today, says Mike Robles, Director of Sandia's new Diversity Leadership Center 600. Too often, traditional teams produce variations on traditional solutions, rather than truly innovative ones.

That's where a diverse workforce can help, he says.

Take two employee teams, for instance. The first team is made up of similar people with similar backgrounds. Team 1, a cohesive and task-oriented group, works well together. Members think alike, so differences of opinion are rarely expressed during meetings. The resulting solution is quick and decisive.

The second team is made up of diverse types of people. Some members are task oriented while others are concerned more with group dynamics and members' roles in the group. During meetings, members sometimes disagree about the best approach.

Even though Team 2 may be more difficult to manage, says Mike, it may offer a more innovative solution than Team 1 because it draws on the creativity of all members.

That's what a diverse workforce accomplishes, he says. It opens up the floor for more input. It invites disagreement. It involves people who don't normally participate. And many times it offers a more creative solution.

Some Frank Words

That kind of diversity isn't a reality yet at the Labs, says Mike, but helping achieve it is one of the goals of the new Diversity Leadership Center 600. Another is to work with Human Resources Center 7500 in making sure that federal hiring requirements are met.

During a meeting of Sandia managers, Executive VP Lee Bray used some frank words to sum up Sandia's need to improve its workforce diversity performance, saying that we need to become better equipped to allow our employees to make full contributions. "Serious limitations exist

at Sandia because we don't take full advantage of our different cultures, backgrounds, management styles, and educations," he said. "We must find a way to appreciate these differences, or we won't be nearly as successful as we could be or as we are committed to being."

Mike says the Labs is now dealing with some internal compliance problems, and many Labs employees are concerned more about diversity than ever before. The Labs is also due for a US Department of Labor audit, expected to begin at Sandia/New Mexico in the next few months.

"It's clear that Sandia needs to attract and retain a more diverse workforce," says Mike, "not just because it helps us comply with federal regulations, but because we won't be able to compete in today's more competitive business environment if we don't."

Work's Cut Out for Us

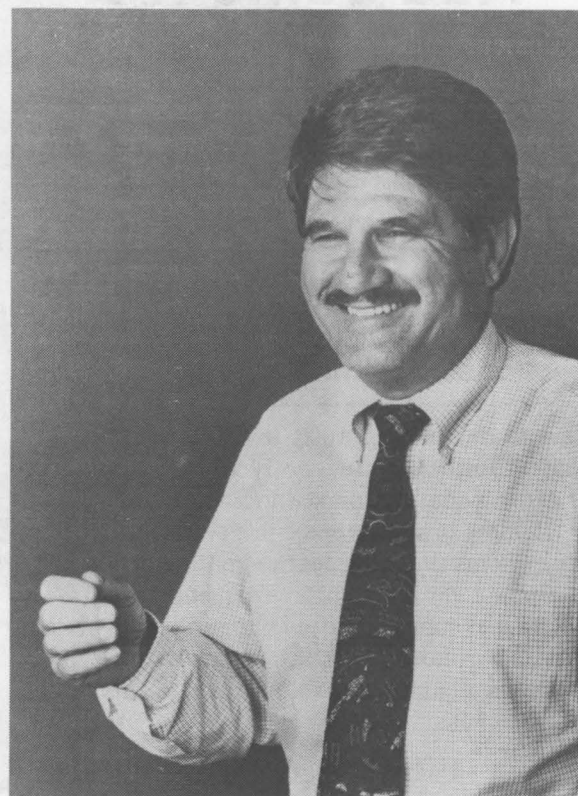
Among the challenges the Labs must overcome to succeed at diversity is educating employees about the goals of diversity programs, says Mike.

Already, he says, creation of Diversity Leadership Center 600 earlier this year gives diversity programs greater leverage and higher visibility, and it helps shift the focus away from federal hiring requirements and toward the business aspects of a diverse workforce. (See "Affirmative Action vs. Valuing Diversity" on page seven.)

"Although immediate compliance issues are short-term problems that we must solve," he says, "we must also anticipate what Sandia's workforce will need to look like in five or ten years. Then we need to create programs to work for those goals."

Sandia's diversity leadership staff, along with a Labs-wide team of employees, plans to devise a diversity plan for Sandia that includes goals and objectives, he says. This group will benchmark what other successful companies are doing in the diversity arena and then create a vision for a future Sandia workforce. (See "Managers Hear How Johnson & Johnson's Diversity Record Gets Such High Marks" below.)

"We're working for long-term change here," says Mike. "Sandia needs to ensure that its workforce is diverse throughout all job groups and that the work environment is positive and supportive for people from all cultures and backgrounds."



MIKE ROBLES, Director of Diversity Leadership Center 600: "It's clear that Sandia needs to attract and retain a more diverse workforce, not just because it helps us comply with federal regulations, but because we won't be able to compete in today's more competitive business environment if we don't."

To help understand Sandia's work environment and shed some light on the root causes of diversity problems, he says, "leadership style" questionnaires were administered recently to several hundred Sandia managers during diversity workshops.

The questionnaires were scored on a scale of one to ten. A higher score signifies that a manager values competition, independence, and rugged individualism. A lower score indicates a manager values teamwork, group consensus, and an all-for-one mentality.

From one to ten, says Mike, most Sandia managers scored between seven and ten. Most women and minorities who take the test score between four and six. And Japanese managers

(Continued on Next Page)

Managers Hear How Johnson & Johnson's Diversity Record Gets Such High Marks

Jim Rose, VP of Human Resources at the Johnson & Johnson Company, has witnessed a major culture shift at his company that has changed the way employees and managers think about people's differences.

But the company's transformation from toad to prince in the diversity storybook required more than a kiss from Elsie Cross, a diversity consultant to such big-name companies as American Express and Eastman Kodak. Although Cross was a key character in J&J's cultural transformation, the change was a slow and sometimes painful process driven primarily by employees.

Rose and Cross delivered their message to a crowd of about 200 Sandia managers Oct. 23 as part of a meeting sponsored jointly by Diversity Leadership Center 600 and Organizational Effectiveness Dept. 4302.

During the meeting, Cross said managing diversity requires getting to the root causes of racism, sexism, and any other form of discrimination in the workplace. The goal is to move away

from a white-male-dominated organization to a culture that promotes teamwork and contributions from all employees. "That's what managing diversity is really all about," she said.

Woman-Friendly Company

The cultural transformation at J&J took place over a period of 20 years, starting in the early '70s when the term "managing diversity" popped up at the company. Today, the company is at the forefront of diversity leadership, and *Business Week* recently included the company in its list of top woman-friendly US companies.

Rose said the cultural change at J&J is most apparent at Ortho, a division that manufactures birth control products. Ortho's transformation involved three steps. The first was compliance with affirmative action and equal employment opportunity requirements, which initially helped create a diverse workforce and made further progress possible.

But hiring and promoting women and minori-

ties was only a first step. Next, Ortho began its educational campaign to inform employees about the meaning of "valuing differences" and to make them aware of the dominant culture. "We call it 'exploiting the richness of the difference,'" said Rose.

In the final step, "managing diversity," Ortho began to reap the benefits of a diverse workforce. All kinds of people are now involved in business decisions, and the company has gained a competitive advantage through innovation and increased productivity. But by far the most clear measure of these benefits, said Rose, is "if you talk to people, it's a whole different place to work."

"Diversity is not just about job performance, it's also about feelings," he said. "The feelings that people bring to work regarding respect for their work, opportunities for creativity, and the value of their contributions affect their productivity. The better the feelings, the better their contributions."

Kirtland Gets Tough!**Take Your Vehicle to an Air Care Station, Kirtland Now Requires It**

Three good reasons to give your vehicle an emissions test: One, because automobile emissions are a major cause of Albuquerque's air pollution problem. Two, because if you're a Bernalillo County resident, it's the law.

And three, because a new Air Force regulation says you must before you can get a base decal or renewal sticker for your vehicle allowing you to drive on Kirtland Air Force Base.

That's right, says Ray Chavez, Supervisor of Visitor Access and Administration Team 7437-1: Sandia/New Mexico employees who drive to work will be required to prove that their vehicle has passed a Bernalillo County emissions test the next time they register for a base decal or renewal sticker with the Sandia badge office.

That means if you have a '92 renewal sticker on your vehicle now, you'll be asked to "prove it" before you can obtain a '95 renewal sticker from the badge office ('95 is the next expiration year being issued by Kirtland). Employees who already have a '93 sticker need not comply until the beginning of calendar year 1994, says Ray.

"The tough new rules will apply to everyone who applies for a permanent base vehicle registration: military, civilian, or contractor," according to *Focus*, the Kirtland AFB newspaper. The new regulation is mandated by the federal Clean Air Act, which requires federal installations to match local emissions standards.

Who Is Affected?

Sandians who live outside Bernalillo County will be most affected by the new requirement, says Ray; they will have to visit any Bernalillo County Air Care station to have their vehicles tested before a new decal or renewal sticker can be

Sandians who live outside Bernalillo County will be most affected by the rule.

issued. Employees who live outside Bernalillo County must bring their New Mexico Motor Vehicle Registration and a Bernalillo County Emission Certificate to the Sandia badge office to obtain a decal or renewal.

Most employees, those who live within Bernalillo County, must already have their vehicles' emissions tested before they can register their vehicles with the state, he says. Those employees need show *only* their New Mexico Motor Vehicle Registration when requesting a base decal or renewal sticker for their vehicle, proof enough that their vehicle meets County

It's That Time of Year Again: Remember to Renew Your Decal

Ray Chavez (7437) reminds employees who drive to work that although '92 renewal stickers officially expire on Dec. 31, Kirtland gate guards will not hold up vehicles as employees return to work after the holidays on Jan. 4, 1993.

The '92 stickers will be honored until the end of February, he says. On March 1, however, drivers who haven't renewed their base decals will probably be asked to "step inside the guard shack" to obtain a temporary visitor pass before they can drive on base.

emissions standards.

Retirees who drive on base must also comply with the new Air Force requirement, says Ray. Renewal stickers will not be mailed to home addresses; retirees must come in person to the Sandia badge office with their New Mexico Motor Vehicle Registration and, if they live outside the county, a Bernalillo County Emissions

Certificate as well.

There are exceptions to every rule, says Ray, and the Air Force regulation is no exception. New motor vehicles (model years 1992 and 1993) and all motorcycles are exempt from the requirement. So are vehicles from model years 1974 or earlier. For those vehicles, regardless of what county the owner lives in, a New Mexico Motor Vehicle Registration is sufficient to obtain a base decal or renewal sticker.

Inconvenient but Necessary

In addition, he says, owners of diesel and electric-powered vehicles can obtain a no-fee Exemption Form from the Vehicle Pollution Management Headquarters Station (1500 Broadway NE, phone 764-1770). When requesting a base decal for your diesel or electric vehicle, you may show the Exemption Form in lieu of a Bernalillo County Emission Certificate.

"Complying with the new regulation may be inconvenient," says Ray, "but our cooperation is necessary, both in terms of meeting federal air quality standards and helping Kirtland meet its requirements." ●JG



IT'S NO PICNIC unless it's a snow picnic — Mike Heiser (7327) makes fresh tracks among the tables outside Bldg. 892 after a recent Albuquerque snowstorm. (Photo by Randy Montoya)

(Continued from Preceding Page)

typically score ones and twos.

What this implies, he says, is that the dominant culture at Sandia rewards employees who work autonomously, the task-oriented individualists. This mentality often excludes other kinds of people from making meaningful contributions in the workplace, even though their contributions may be just as valuable.

Linda Logan-Condon of Organizational Effectiveness Dept. 4302 says it this way: "Managers tend to hire people who are like them. What they get is more of the same."

"The greater the difference, the more creativity is possible," says Mike. "Our ability to benefit from people's differences really does influence how innovative and productive we are as a company." ●JG

**Affirmative Action vs. Valuing Diversity**

The line that distinguishes Affirmative Action programs from diversity programs sometimes gets a little fuzzy, says Mike Robles, Director of Diversity Leadership Center 600.

Basically, all Affirmative Action programs work toward compliance with a set of legal requirements aimed at protecting people from job discrimination, whether it be based on race, sex, national origin, color, religion, age, or disability.

Such federal requirements mandate that a company's employee population adequately reflect the female and minority composition of the group or geographic area from which that company recruits and hires.

Valuing diversity, on the other hand, is a way of using people's differences for the benefit of the company and the people who work there,

says Mike. Such differences are not limited to gender or cultural background. Diversity is aimed at respecting and valuing the contributions of all individuals, including white males.

"Affirmative Action goals are still as important as ever," he says. "But now, in addition to complying with requirements, we are relying more on cultural changes to shape a more diverse workforce. By focusing on diversity, I believe we'll be able to find and correct the root causes of some of our non-compliance issues."

"Valuing diversity does not mean we're changing our standards," he adds. "It just means that we as a company will be able to attract and benefit from a more diverse workforce. We must do this to survive as a company."

What's Happening in the Defense Programs Sector?

By Roger Hagengruber (VP-5000)

Editor's Note: This is the second in a series of LAB NEWS articles written by Sandia's line vice presidents, discussing what's happening in their areas. The first, by Dan Hartley (6000), was published Dec. 4. The next, by Gerry Yonas (9000), is scheduled for Jan. 8.

Just a few weeks ago, I made a series of trips to Omaha, Cheyenne, Livermore, and Amarillo to discuss the future of strategic weapons and to see everything from missile silos to nuclear weapons in dismantlement. Upon returning to Sandia, I entertained the Russian ambassador to the US, who decided to "drop by since he was in the neighborhood." Imagine the dramatic variety — in the span of a week to see the young men and women in charge of missiles on alert against strategic attack, and to visit with a Russian official on areas of cooperation.

And in terms of variety, in this same month we have had to continue to juggle budgets in the Defense Programs (DP) Sector that are down more than \$35 million in weapons R&D, down nearly 25 percent in nuclear effects testing, up perhaps \$20 million or more in non-proliferation, and up dramatically in technology transfer. Budget negotiations with line organizations are beginning to be as important and tenaciously complex as arms control negotiations used to be with the Soviet Union.

Truly, we have entered into a profoundly uncertain period for our world, our nation, and Sandia. I believe that Sandia can do well in this environment and establish the basis for future decades of exceptional service to the nation, but only if we are proactive not reactive. Opportunities for leadership in providing truly new options and methodologies in national security are numerous; however, they can only be fully accessed if we act with the national interest, rather than self-interest, as a focus.

The DP Sector's philosophy in restructuring our plans, approach, and even our management is to provide an agile response to the challenging and different environment we now face. We are shifting ourselves and our approach to respond to this new world while exercising special care to avoid losing sight of the enduring factors in the confusion of change. It is our view that the true stewardship expected from an institution such as Sandia is to provide both leadership for change and preservation of that which is essential through and after any change.

What is the DP Sector?

Defense Programs represents that business area at Sandia which is all the traditional national security work funded by DOE. This includes all nuclear weapons, arms control and non-proliferation, safeguards and security technology, and

intelligence work. The total funding is about \$750 million, with more than \$600 million of that amount in the nuclear weapons area. More than half of the support for our core competencies and support capabilities and most of our construction and maintenance work is supported by the DP Sector. Our principal DOE customers are Richard Claytor, Assistant Secretary for Defense Programs; Rear Admiral Gerry Ellis, Deputy Assistant Secretary for Military Application; and Bruce Twining, Manager of DOE/AL. We have other key DOE customers in headquarters, Nevada, and Albuquerque, and key DoD customers in both Washington and various military commands.

How Are We Organized?

Jim Ney (5003) manages the DP business office, John Meinhardt (5002) is responsible for external relationships, Paul Stokes (5004) coordinates the interrelationship between weapons, arms control, intelligence, and safeguards and security, and there are four directors who serve as deputy sector managers for the key strategic areas of the nuclear weapons program. Each of these directors manages a portfolio of interrelated programs and projects and a funding level of more than \$100 million. Harry Saxton (5400) is responsible for the production complex, is the principal interface to DOE/AL, and manages the Stockpile Support (formerly Production and Surveillance) budget (some \$140 million). Dennis Hayes (5600) is

"The DP Sector's philosophy is to provide an agile response to the challenging and different environment we now face."

responsible for all DP Washington assignees and our technology base program (some \$150 million), and is our principal interface to technology transfer, education, and core competencies. Jack Wirth (5800) is responsible for the weapons technology base, which includes core support capabilities, exploratory work, surety technology, components, and a variety of other essential activities involving some dozens of organizations and more than \$110 million in funding. Gene Ives (5200) is responsible for the stockpile and all activities associated with maintaining or modifying it. These include committed programs, military liaison, and advanced development — a package totaling more than \$150 million.

This excellent DP team, together with myself and the other support staff, is charged to provide leadership inside and outside Sandia by anticipating customer needs (internal and external) and the environmental context (such as budget or defense policy) and developing and executing effective

strategies. While we end up doing more "management" at the beginning, our true reason for being is to develop vision and strategy, and then to provide leadership. We work hard to separate the DP Sector function from Division 5000 operations to maintain an unbiased approach to investment/disinvestment. This challenge of striving toward leadership rather than management, and in keeping "separate books" between sector strategies and divisional needs, is a central theme of the approach to reorganization/restructuring that President Al Narath had in mind.

Complex 21

I am really excited about the transformation that will be required to create the nuclear weapons complex (research, development, and fabrication) of the 21st century. Consider the following observations: The current complex is not acceptable for the 21st century; it is old, large, and expensive. However, despite reductions in nuclear weapons, a viable complex must be maintained. And, the government owns the entire product realization cycle from R&D to disposal. These observations provide a tremendous opportunity to serve the national interest even in a time of declining budgets and rapidly shrinking stockpiles. The characteristics of this new complex will be flexibility, low cost, rapid product cycles, multiple-use production capability, small-lot fabrication, quality control for small quantities, worker safety (explosives and radioactive material), rapid information exchange, and fully integrated research-to-development-to-manufacture capabilities.

These characteristics may sound familiar because these are the very same features that industry sees as needs for the 21st century. Indeed, we have taken dual use and commercial relevance as priority requirements for Complex 21 and for Sandia in planning our R&D capabilities and expertise for the future. This vision is most energizing as our engineers and scientists will integrate advanced simulation capabilities, computer-based design, robotics, waste stream management, quality tools, fiber-optic communication, etc., to produce a complex that will reach beyond the needs of the nuclear weapons program. The complex can become a showplace for R&D manufacturing integration and a testbed for developing new and needed industrial processes.

The vision welds together sectors and divisions across the Labs and fits into the middle of Heinz Schmitt's (VP-2000) advanced manufacturing initiative effort. We will prototype this new product realization in the new Integrated Manufacturing Technology Laboratory facility at Sandia/California with a design developed by Org. 2000 to fit systems requirements from Org. 5000 with materials and process expertise from Orgs. 8000 and 1000. Environmentally conscious manufacturing (Org. 6000) and relevance to DoD and industry (Work for Others Sector and Org. 4000) will be part of the plan from the beginning. This integrated effort involves teamwork across the Labs and will show the synergy we believe will be created by placing a central focus on Complex 21.

Strategic Surety

Surety is a word we use to describe constituent elements of safety, security, and use control. These elements have been a central part of Sandia's job in the nuclear weapons program and are the key to explaining what our weapons development focus will be in the future. I have tried to capture this strategic thrust by stating that our job is to ensure that the surety features of our nuclear stockpile are "always modern." That is, we should assume that the nation's expectation is that its investment in the talent and technology base in the weapons laboratories will always guarantee that the effectiveness

DURING HIS VISIT to the Labs Nov. 17, Russian Ambassador to the US Vladimir Lukin (left) chats with Roger Hagengruber (VP-5000) about a Sandia-designed container for transporting and storing fissile material from dismantled Russian weapons. The US may provide as many as 45,000 of the containers to help the Russian Federation in its dismantlement effort. The Ambassador's visit included briefings about other cooperative ventures between Sandia and the Russian Federation in the areas of dismantlement and non-proliferation.



of the safety, security, and use-control technologies in nuclear weapons is a benchmark for our technical society. A public that has shown an insatiable demand for safety features in cars (such as airbags) will be intolerant of a nuclear stockpile with surety features that are 20 years dated, and this will be the situation in the next decade unless we continue a vigorous improvement program.

As the risk of death in war is perceived to be diminishing and less of a measure of concern to our citizens, and as risk is measured by more remote and less devastating alternatives, we should expect the acceptable standards of nuclear weapons surety to advance accordingly. Our efforts to anticipate this change, creatively develop options before they are needed, and to spin off these developments to other applications in our society is what I call "Strategic Surety." This thrust in continual improvement, in dual-use technologies, and toward zero defects is in the best tradition of stewardship for the nuclear weapons program in its time of unprecedented change. In executing this strategic direction, we will not only serve the weapons program well, but we will also encourage strong efforts in such areas as information and software surety that look like exciting possibilities for commercial use.

Maintaining Competence

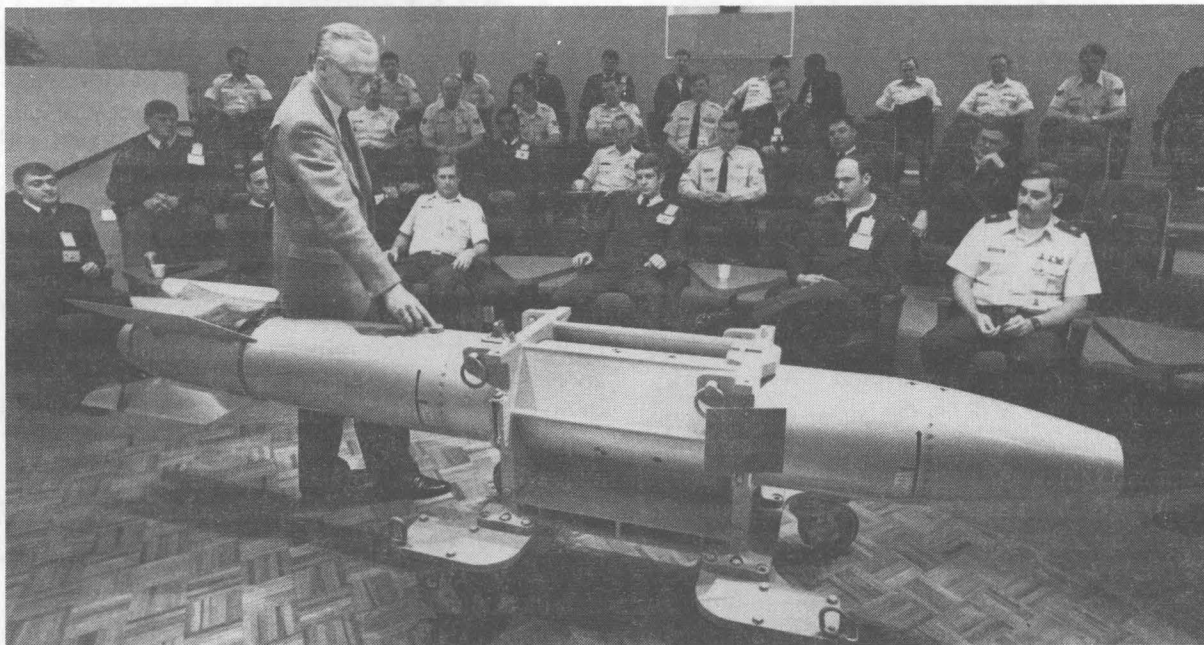
In the past, Sandia received most of our weapons budget as "level-of-effort" funding, allowing us broad freedom to allocate money to protect critical skills while investing in new capabilities against future needs. In this period of declining weapons R&D budgets and with more

"We are challenged to get smarter and more strategic in protecting critical expertise and developing new skills for the future."

and more of our funding in defined projects, we are challenged to get smarter and more strategic in protecting critical expertise and developing new skills for the future.

The DP Sector has developed a plan to accomplish this through several initiatives. First, our sector office structure gives each of the sector directors a special role: Dennis Hayes works with Paul Fleury (VP-1000) and Peter Mattern (1010) to plan an effective match between our customers' priorities, Paul's priorities for core competencies, and Peter's plans in Laboratory Directed Research and Development (LDRD); Gene Ives funds efforts in California and New Mexico under the names PRESS (Pit Reuse for Enhanced Safety and Security) and MAST (Multi-Application Surety Technology) to keep our systems engineering expertise current and energized; Jack Wirth funds efforts to develop new weapon technologies and components, and selects the most promising through the "Focal Point" program; and Harry Saxton is leading our efforts to maintain or expand our manufacturing-related expertise. Our second thrust is to target certain cross-sector, cross-divisional areas for initiative funding.

Let me explain a bit of the approach philosophy to clarify some of these acronyms: We are shifting our technology base support toward a stronger emphasis on R&D for processes to provide a better balance with products. Our Focal Point Program is selecting the most promising product directions for enhanced funding by providing a systems focus, thus giving us some strong technology thrusts despite reduced funding. An example of a Focal Point project is the optical fireset in which we replace electrical currents with laser light to improve safety. Components or subsystems judged to have continuing applicability to many future systems are then developed for production through STEP (Stockpile Transition Enabling Program), which is intended to reduce the cost for some Sandia-designed weapon



THE NUCLEAR STOCKPILE is getting smaller, but intensive training of US and Allied military personnel who maintain the stockpile and handle nuclear weapons is still necessary, and Sandia's Defense Programs Sector is in charge of such training. Here, Don Benoist (5513) instructs a US Air Force group about the B61 bomb.

components by developing commercial sources for them. Our Laser Diode Ignition project (to replace electrically initiated explosive devices with light-initiated ones) is among others that could utilize STEP.

PRESS and MAST are system development programs that are focused on improved surety in designs that would be one-for-one replacements for the current stockpile. These projects are running much as Phase 3 (full-scale development) activities of the past. Focal Point is a program to keep the shelf filled with significant advancements in technology; MAST and PRESS are programs to ensure that we can implement our best technologies rapidly and reliably in a complete system. In our initiatives area, Harry is sponsoring, with Joan Woodard (6600), an advanced manufacturing initiative to assure that we can be a leader in providing DOE with options in effective, responsive, and environmentally conscious manufacturing technologies.

All of these efforts are part of a vigorous program to maintain critical capabilities and evolve new ones in a time of tight money.

Nonproliferation & Former Soviet Union

A very unsettled world mixed with regionalism, growing ethnic and religious confrontations, and a huge inventory of weapons and nuclear material in an unsettled Former Soviet Union (FSU) are the elements that have raised nonproliferation to a priority for our government. Sandia, because of its expertise in nuclear weapons technology and its long history in arms control, is well positioned to make contributions in reducing prospects for proliferation. Tom Sellers (9200) is the DP program manager for arms control and nonproliferation, and he has been leading an effort to expand our contributions in this area. Tom and Bill Childers (5900), who is in charge of foreign technology assessment, have developed a variety of initiatives that are drawing a significant increase in funding. We expect this area to be up more than 20 percent this year and probably to continue to

"Sandia . . . is well positioned to make contributions in reducing prospects for [nuclear] proliferation."

expand at 10 percent or better in the next few years. This is clearly a future major strategic priority for Sandia and for DP.

Our contacts with the FSU are expanding almost daily across Sandia. Paul Stokes is responsible for keeping tabs on all contacts and for promoting appropriate new opportunities for all of Sandia. As a highlight, Surety Program Manager Dave Nokes (5801) is responsible for the interface on nuclear weapon discussions. Dave and a cross-

section of Sandians from around the Labs have been negotiating, and are developing technologies to help in the safe shipment and storage of FSU weapons and nuclear materials. We have been the leading contributor to dismantlement aid to the FSU under the funding authorized these past two years by US Senators Sam Nunn and Richard Lugar.

Dismantlement

I never thought it would happen so quickly, but suddenly we are forced to live the dream and dismantle weapons faster than we built them. During this decade we will dismantle more than 10,000 nuclear weapons, and we will do these operations in the new ES&H/Conduct-of-Operations environment.

Paul Longmire (5407) is the DP Program Manager for Dismantlement and, as such, is responsible for an effort that involves every division within Sandia.

We are striving to be an effective resource to our DOE/AL customer and especially to our partners at the Pantex Plant in Amarillo. In this effort, we have struggled with how to actually assay one of our subassemblies for hazardous materials (we ended up pulverizing it so that we could statistically sample the debris), and we are designing new tele-operated systems to allow unmanned inventory and monitoring.

Besides having an opportunity to be of direct value to Pantex and DOE/AL in these intense times, these activities have offered us some good learning experiences in preparing for our Complex 21 responsibilities.

Quality and Relationships

One of the first things that the DP Sector did last year was to do Malcolm Baldrige training for several dozen sector people and key program managers. We did this as a cross-organizational team to set ourselves firmly on the course to being the best that we can be. It is tough to progress rapidly to change a culture, but we have made some exciting progress. This year, every DP dollar is within a project structure that can be related to a specific customer and a project plan. All projects are collected under programs where they can share a higher level of strategic direction. And many of these program managers now shaping broad strategies for the future are from that talented and experienced pool of level-two managers that was made available through restructuring.

A frequent complaint is that this new DP structure requires organizational managers to negotiate with more people than ever before. We recognize that this new sector-program-project setup has this feature, but in our new culture I have been encouraging people to see this as a positive, an opportunity for team building, and a chance to have four or five influential people from several

(Continued on Page Ten)

Former Light Family Residence

New LightHouse Cares for Brain-Injured Men

It was one of the most terrible and senseless family tragedies imaginable. On May 1, 1989, Ron Light (then a Sandia computer micro-processor developer), his wife Jane, 4-year-old son Christopher, and 6-year-old daughter Rachel, were out for an evening walk in their Albuquerque neighborhood. A mentally deranged woman deliberately drove her car into the family. Jane was uninjured, but Rachel was killed, Christopher suffered a broken leg, and Ron sustained severe, permanent brain damage.

After more than a year of hospitalization and rehabilitation in Texas, Ron was able to return home to Albuquerque in the summer of 1990, but he required around-the-clock care. Jane tried at first to provide that care herself, but it simply proved too much for her. She tried to locate a residential group home in Albuquerque where people with head injuries could receive around-the-clock care, but she found there were none in New Mexico. There are homes that provide services for the disabled and aged, but none that provide specific services for severely brain-injured clients. That need sparked the idea for the Four Corners LightHouse, a non-profit corporation founded

by Jane, her family, and friends.

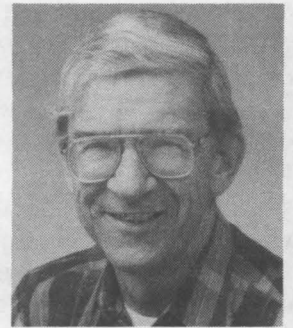
The former Light family home was remodeled and includes special "roll-in" showers that accommodate wheelchairs, computers for memory exercises, exercise equipment, arts and crafts programs, and other special equipment for people with severe brain damage. The home provides attendants who assist the four current residents with personal care, dressing, food preparation, and other 24-hour services. Volunteers also assist.

The mission of Four Corners LightHouse is to provide an alternative long-term living arrangement for survivors of severe brain injury, at an affordable cost. The goal is to establish more residences for groups of four-to-six clients.

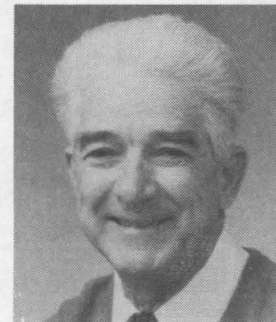
LightHouse residents are charged \$1,200 to \$2,000 a month depending on the level of care required, but this is not enough to cover all expenses. Additional funds are raised through donations, fund-raising events, and other means.

Sandians who want more information about the LightHouse, including information about volunteering or donating, can contact administrator Njal Schold on 880-0431. •JC

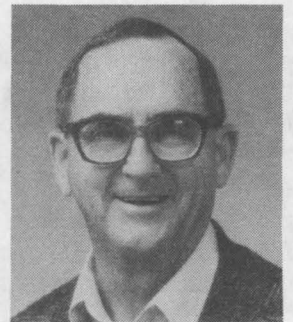
Recent Retirees



Murl Moore
7902 34



Jim Collier
363



Vern Gibbs
38 5514 31

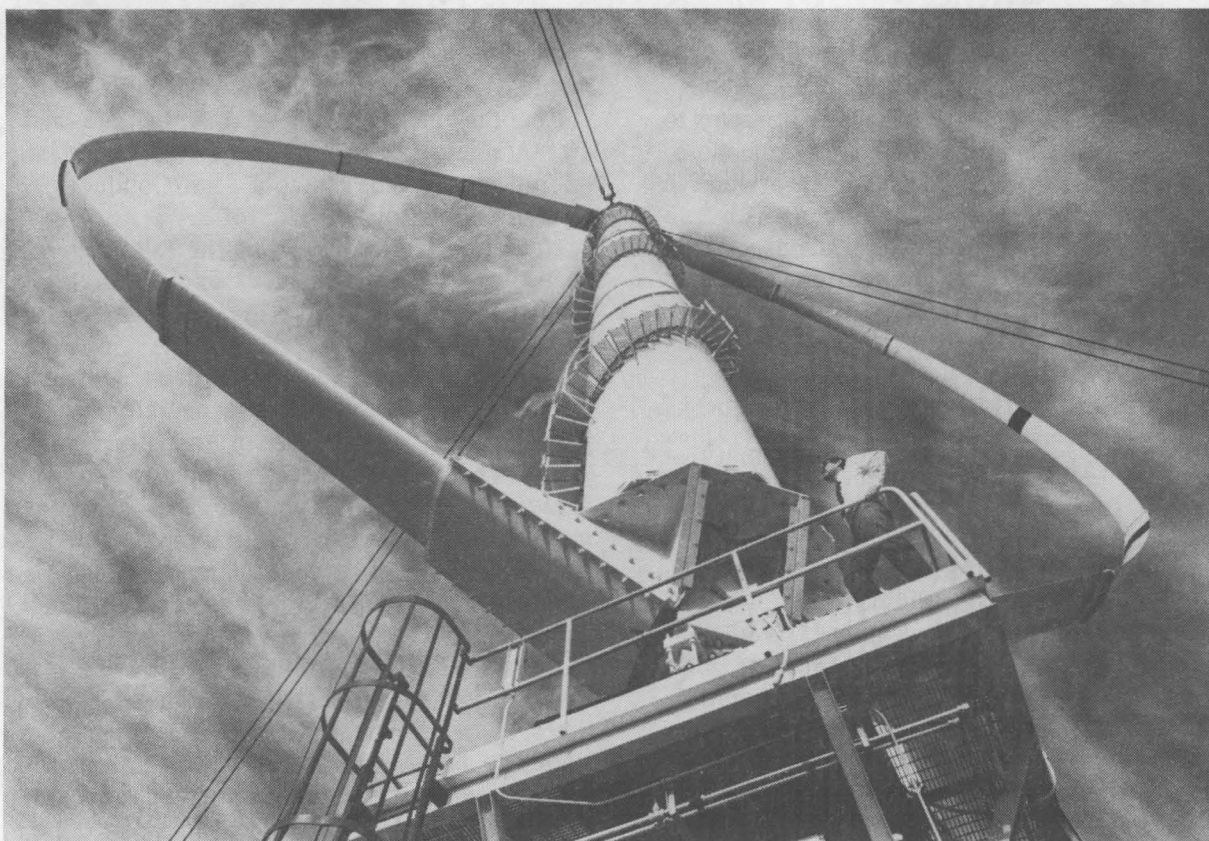
Sandia's FY92 Payroll Tops \$452 Million

Sandia's payroll for fiscal year 1992 totaled \$452 million. Of that amount, more than \$392 million went to approximately 7,550 employees located in New Mexico and approximately \$56 million went to 1,050 employees at Sandia/California. Another \$3 million was paid to employees at Sandia's Nevada operations, including Tonopah Test Range and the Nevada Test Site. On Sept. 24, Sandia had almost 8,600 employees.

During the same period, Sandia spent more than \$734 million in New Mexico. This figure takes into account employees' salaries, in-state commercial purchases, and New Mexico gross receipts taxes. (Sandia paid about \$51 million to the State of New Mexico in gross receipts taxes during fiscal year 1992.)

Sandia purchased goods and services worth \$291 million from commercial vendors in New Mexico and \$133 million from vendors in California. Total commercial purchases by Sandia amounted to more than \$644 million.

A report released earlier this year showed that DOE installations in New Mexico — including Sandia, Los Alamos National Laboratory, the DOE Albuquerque Field Office, and the Waste Isolation Pilot Plant — accounted for 12.8 percent of the state's total economic activity. The report, prepared by DOE in cooperation with New Mexico State University, listed nearly \$8.5 billion in DOE economic activity in New Mexico in FY91. •



WIND POWER — Three years of testing on this 50-meter-tall vertical-axis wind turbine (VAWT) in Bushland, Tex., has shown that certain design features result in greater efficiency and lower operating costs, according to a recent Labs study. The VAWT, designed by Sandia, uses multiple-sectioned tailored blades and a generator that works at various speeds, features that minimize stresses and maximize energy capture. Tom Ashwill of Wind Energy Technology Dept. 6214 says the study should help demonstrate to the utility industry that wind power can be a reliable and cost-effective power source. (Photo by Randy Montoya)

(Continued from Page Nine)

Defense Programs

organizations supporting a common view. Rather than investing more and more time in inventing better organization charts, we are asking people to invest more time in personal relationships in the confidence that the road to, and energy for, solutions to tough problems lie in our talented managers across Sandia.

Future Prospects

There is more going on than can be related in this article, and there should be for \$750 million. Future prospects are uncertain, especially as we look at total program size. What is certain is that

the nature of our work and, in turn, the types of expertise we need to have are changing. There will be more focus on surety, manufacturing science and engineering, nonproliferation, and dual-use technologies. If we are proactive and leaders in changing ourselves, prospects for stability in the DP Sector budget are quite good; however, a reactive, business-as-usual approach is almost certain to result in significant decline.

The centerpiece of our approach is, in the midst of adversity and uncertainty, to seek win-win approaches to everything inside and outside Sandia, between divisions, our sister laboratories, and our production-complex partners. We are trying hard to hear everyone's view of the future and their ideas for change, and then to integrate them in the optimum plan for everyone.

In this regard, we have strong and constructive relationships with the other sectors and with Labs initiatives such as manufacturing, technology transfer, and education. The nuclear weapons program lies at the heart of the DP Sector's business just as it occupies a central place in Sandia's ability to maintain its competencies and its capacity to rapidly transition to new national needs regardless of which sector or division will eventually be responsible. If we are truly national leaders in transforming ourselves and responding to the new character of the nuclear weapon mission, we will quite likely preserve the exceptional support and flexibility that has allowed Sandia the freedom to change in the past. That is the DP Sector's principal challenge and the one that makes life interesting. •

Underground Volunteer**Inside the Earth, That's Where Jim Werker Had Rather Be**

Jim Werker (2851) has spent a lot of his life underground.

For years he worked at the Nevada Test Site as a mechanical designer and pressure advisor for the Design Definition Department, helping to install and retrieve underground experiments. From there, he moved to the Waste Isolation Pilot Plant outside Carlsbad, another deep hole in the ground. Recently, he was transferred back to his hometown of Albuquerque, but that doesn't keep him from continuing to spend weekends in caves.

These are not just chance assignments, as his wife, Zana, points out. Jim volunteered for all of them.

Caving, of course, is a hobby, not a work assignment. But like most cavers, Jim does a fair amount of volunteer work for public agencies, including the US Forest Service, Park Service, and Bureau of Land Management. The work can range from scrubbing formations, mapping underground passages, building gates, and rescuing people to teaching safety, giving tours, attending public hearings related to cave management, and conducting inventories of cave minerals and biology.

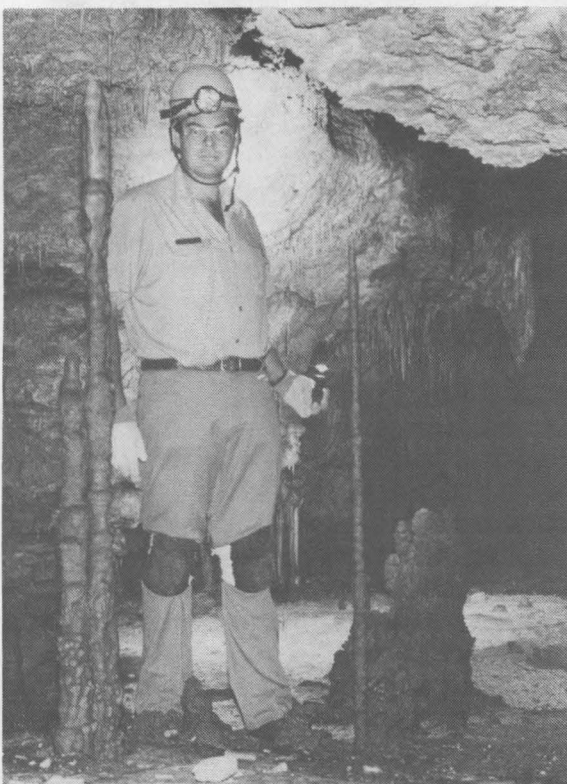
Restores Cave Formations

Jim's specialty is restoration — particularly the restoration of damaged cave formations, such as stalactites (those are the ones that grow from the ceiling) and stalagmites (the ones that grow upward from the floor). He also repairs draperies (formations that look like curtains hanging from the ceiling or the walls), soda straws (extremely thin and fragile stalactites), helictites (crooked branchlike protrusions), and virtually anything else that needs some tender loving care.

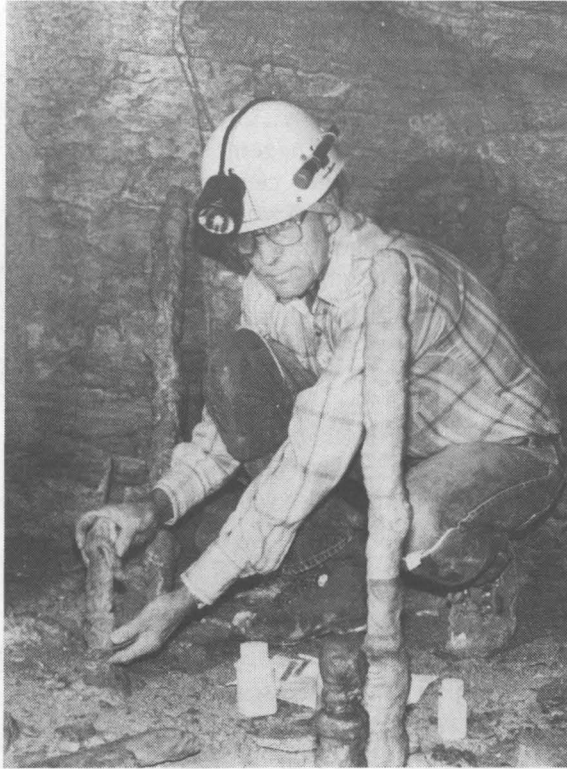
In fact, it was Jim who successfully repaired some top-heavy formations that the US Forest Service had tried several times to repair without success in the 1980s in Cottonwood Cave in southeastern New Mexico. (See "Replacing a 'Coke Table.'")

Jim is also involved in setting up a photomonitoring system — the use of photographs to study changes in caves over time. He designed a bubble plate that is essentially the same as a carpenter's tool to keep the camera level. He is working on other improvements as well.

Catalysts for change in caves can be as natural as wind-borne dust or as artificial as scuff marks



CAVE OF THE TWINS — Ransom Turner, a cave specialist with the Forest Service's Guadalupe Ranger District, serves as guide in this backcountry cavern of the Guadalupe Mountains in southeastern New Mexico.



MIXING CAVE DIRT into epoxy adhesive, Jim Werker (2851) not only repairs a broken stalagmite in Cave of the Twins, he makes the repair look as natural as possible.

from hiking boots. Life forms, such as certain insects and molds, can be introduced by humans. In fact, because caves are so fragile and difficult to maintain in a pristine state, a caver has to be willing to make a contribution to cave conservation to get permission to go inside some wild caves. Sightseeing is sort of a fringe benefit.

Even though Jim considers caving a pastime rather than a job, his career at Sandia has helped in

The slip of an unsteady foot or hand can shatter a cave formation.

his restoration efforts. He has often consulted with other Sandians about adhesives and repair techniques and is always looking for input on ways to improve the process.

"We can always use more help in cave restoration," says Jim. "Taking care of caves is another part of protecting our environment. We're only just beginning to make studies of the cave environment to find out what needs to be done."

A Fragile Environment

A recent trip to the Guadalupe Mountains, a mountain range replete with caves in southeastern New Mexico, found Jim repairing stalagmites with Ransom Turner, a cave specialist with the Guadalupe Ranger District of the Lincoln National Forest (which borders on Carlsbad Caverns National Park). Their conservation work was in Cave of the Twins, a backcountry cavern that can only be visited with a Forest Service guide. Getting there requires a long, tedious trek over high ridges, path-blocking boulders, saw-toothed yuccas, and needle-pointed lechuguillas.

"One would rather not have to repair formations at all," notes Turner, "but once the damage is done, repair can at least help put the broken pieces back in order. This is important not only to future visitors who will enjoy the scenery, but to scientists who study the geology and mineral deposition patterns of caves."

Damage to cave formations is an ongoing problem. The slip of an unsteady foot or hand can be enough to shatter them. Vandals sometimes break into wild caves and do permanent damage, occasionally even stealing formations that can never be replaced and that lose their beauty outside their natural environment. Problems such as these make public servants like Turner understandably protec-

tive of cave resources. Most caves require permits, and many have gates.

"The Forest Service is not only concerned with how to preserve caves for this generation, but for future generations," says Turner. "It may take thousands of years for a stalactite or stalagmite to form, depending on water seepage conditions, and once it's gone, it can't be replaced. The more we learn about caves, the more we realize the extent of human impact."

Jim first began repairing formations in 1988, when the Forest Service had difficulty restoring stalagmites in Virgin Cave, another cavern in the Guadalupe. Forest Service technicians had tried several different epoxies that failed to adhere to wet cave formations. Based on his experience, Jim suggested a different epoxy that would work on wet rocks, and succeeded in using it to repair these fragile cave formations. Since then, he has repaired formations in Carlsbad Cavern and in backcountry caves throughout New Mexico.

"Thanks to people like Jim," says Turner, "agencies managing caves for public use are able to restore some of the damage caused by careless visitors. With more education, human impact on these fragile, non-renewable resources will be minimized." •LDoran(4526)

It Took Epoxy and Steel**Replacing a 'Coke Table'**

To repair top-heavy "coke tables" in Cottonwood Cave — so called because they look like soda-fountain-style tables with narrow pedestals — Jim Werker (2851) used a two-part epoxy that took 24 hours to harden. He mixed cave dirt with the epoxy to match the natural color of the cave.

The biggest challenge, says Jim, was attaching the narrow base of the formation where it had been broken to the soft floor beneath it. To connect the two parts — the top-heavy table and the short base that remained in the floor — he drilled a hole downward into the floor and upward into the formation, and then inserted a stainless steel pin in the hole to give the structure vertical stability.

Curing of epoxy can be a real problem in the normally humid environment of a cave. Even in the dry caves of New Mexico, hygrometers typically show humidity readings of 99 to 100 percent. To assist the curing process, Jim has designed several clamping fixtures to aid in holding formations in place while the adhesive is drying.



JIM WERKER and "coke table" in Cottonwood Cave.

Management Signs On

Seven-Point Plan Points Labs toward 'World-Class' Quality

The Quality initiative at Sandia entered the new fiscal year with a new plan, a seven-point program the director of Quality efforts says will make it more a part of the Labs' day-to-day operations.

Charles Tapp, Director of Quality Improvement and Primary Standards Center 4300, says the new approach was developed by a team focused on attainable goals.

"We took a team of some of the brightest and best that we have around here, from several different levels, and had them analyze areas of improvement that would establish quality as an everyday way of doing business," says Charles. "Basically, they sorted a bunch of variables into a critical few."

The "bunch" Charles refers to were strengths and areas for improvement listed by an AT&T team that evaluated Sandia as a part of the Labs' submission procedure for the Chairman's Quality Award competition. The team of Sandians examined the list of areas needing improvement to determine the best course the Labs could take in working toward winning the Chairman's award.

Most Critical to Success

That turned out to be seven things seemingly most critical in making the Labs "world class" in satisfying customers.

Meanwhile, Sandia scored 429 of a possible 1,000 points. That's below "world class" level, but well past the goal of 300 points, and a creditable showing for an organization in the early stages of incorporating quality principles into its management structure, Charles says.

"The team recommended that the Sandia Quality Council (SQC), our top quality management team, agree to back the new plan, with one SQC member serving as the advocate or champion for each of the seven initiatives," he says, "and they agreed to it wholeheartedly."

The seven points of the plan, with Charles' brief explanation of each, and the champion and owner of each, are:

- Develop — and review at every SQC meeting — metrics that are corporate-wide, results-focused, and customer-oriented. "At every meeting, we would be looking at certain very important facets of our work, and measuring actual accomplishments against goals." President Al Narath,

champion; Charles and Corporate Metrics Process Management Team (PMT), owners.

- Extend to the individual Sandian the Labs' commitment to cascade vision (long-term vision beginning with top management and extending through sectors, divisions, centers, etc.), goals, and metrics. "Wouldn't it be wonderful if you knew how your personal goals fit into your department's goals, your center's goals, and on up right into the Labs' strategic plan?" Al Narath, champion; all vice presidents, owners.

- Develop a structured but flexible approach to managing customer interfaces. "What is your process for assuring that you've satisfied the customer the first time every time?" Orval Jones (20), champion; Tom Hunter (6900), Sam Varnado (9900), Peter Mattern (1010), Gene Ives (5200), Jack Wirth (5800), Harry Saxton (5400), and Dennis Hayes (5600), owners.

- Develop a flexible system that facilitates management decision-making based on data. "We need to improve our processes for managing based on data, rather than on opinion." Orval Jones, champion; Melodie Eyster (150), Peter Mattern, Gene Ives, John Wirth, Harry Saxton, and Dennis Hayes, owners.

- Benchmark one key process each from corporate-wide processes, each sector, core competencies, and critical support services. "Benchmarking is a critical element of world class companies, measuring your processes against those considered to be the world's best, and adjusting according to the results." Glen Cheney (7000), champion; Art Trujillo (4313), owner.

- Use industry "best practices" to establish a Corporate Education and Training program. "This is just now being studied by a corporate-wide education team, but the concept is to support job and career goals for Sandians and help them improve their performance through first-rate education and training." Paul Robinson (4000), champion; Corporate Education PMT, owner.

- Align the performance and recognition system with the corporate values and sector goals. "We should change our performance and recognition system, where needed, to align it with corporate values and sector goals in order to maintain a Labs-wide focus." John Crawford (8000), cham-

pion; Ralph Bonner (7500), owner.

The seven-point plan is significant, Charles believes, because all seven points are "powerful things the SQC has agreed to do" that will affect every Sandian.

"It's exciting to me," he says. "I don't believe ever in the history of this company that a staff-level team has made a set of recommendations that have been adopted by top management and then had that same management agree to be publicly accountable for achieving the goals."

"That's cultural change, and I think it's very significant." ●HK

Welcome

Albuquerque — Susan Carson (6622), Geraldine Crespín (121), Rose Marie Marra (21), Barbara Meloche (21), Irene Myers (21), Judy Neff (7144), Carla Scott (21), Gregory Shirley (121), John Sichler (7442), Sandra Tonnesen (7145), Stephanie Whitlock (7611).

Elsewhere: California — Gregory Cone (250); *Illinois* — Brian Boughton (5165); *Indiana* — Kenneth Cutshall (7144).

Retiree Deaths

William Foy (67).....	Nov. 7
William Fribley (74).....	Nov. 7
George Pasko (74).....	Nov. 10
Evelyn Smith (82).....	Nov. 11
Gene Mead (65).....	Nov. 12
Mary Wormeli (81).....	Nov. 14
Kathryn U'Ren (78).....	Nov. 15
John Cavanaugh (81).....	Nov. 20
John Dishuck (79).....	Nov. 21
Leonard Motichko (74).....	Nov. 22
Linus Phillips (74).....	Nov. 26
James Allen Jr. (70).....	Nov. 27
Roy Smeltzer (90).....	Nov. 30



FLEET FLAT FIX-IT MAN — Wayne Hill (contractor) does one of the more unusual jobs at Sandia: He maintains Sandia/California's fleet of 198 Lab-owned bicycles, used by employees inside the California-site tech area. Wayne, who has worked at the Labs for 14 years, says he fixes about six bikes a day. When a bike needs a repair, he says, the rider simply turns the bike upside down, signaling Wayne to pick it up. (Sandia/New Mexico had a similar bike fleet until the late 1970s.)



Sandia News Briefs

Some Kirtland Gates Closed for the Holidays

Both the Eubank and South Valley gates to Kirtland Air Force Base will be closed during the holiday shutdown. The Eubank Gate will close at 6 p.m. on Thursday, Dec. 24, and will reopen at 6 a.m. on Monday, Jan. 4. The South Valley Gate will close at 5:15 p.m. on Dec. 24 and will reopen at 6:15 a.m. on Jan. 4. Employees should use the Wyoming, Gibson, or Truman gates during this time. Refer questions to Capt. Garland Tilley (7435) on 4-6410.

Note: Effective immediately, anyone requiring key service to the South Valley Gate at times other than normal operating hours (6:15 to 8:15 a.m. and 3:15 to 5:15 p.m.) should contact the Kirtland Police Desk Sergeant on 6-7913. Sandia Security cannot provide key service at Kirtland AFB perimeters.

Technical Safety Appraisal Postponed Until May, June

DOE Defense Programs Office in Washington has notified the Laboratories that the Technical Safety Appraisal (TSA) of Sandia facilities has been postponed. The TSA Pre-Appraisal, originally scheduled for Dec. 14 through 17, is now scheduled for April 1993.

The Appraisal for Sandia/California, originally scheduled for Jan. 19 through 28, is now scheduled for May 1993. The TSA for Sandia/New Mexico, originally scheduled for Feb. 22 through March 5, is now scheduled for June 1993. The status of the simultaneous DOE/AL Appraisal has not yet been determined.

Labs Communicators Take 14 Awards in Recent Competition

Sandia technical communicators won 14 awards in this year's Technical Publication and Art Competition sponsored by the New Mexico Chapter of the Society for Technical Communicators, the first time Sandia has led the competition in total awards received.

In the art category, John Bell (7155) won an Award of Distinguished Technical Communication for his Pullout Switch entry. Awards of Excellence went to Lee Cunningham (7155) for his Microwave Facility illustration; George Dooley (5512) for his SRAM Missile Deployment illustration; Bonnie Skenandore (7155) for her "Sandia Summer Employment for Students" and "Summer Employment for Native Americans" design entries; and Fay Ganzerla (7155) and Mary Monson (4212) for their HEART Conference poster.

Also in the art category, Awards of Merit went to Mike Lanigan (7155) and David Northrop (6112) for their Advanced Technology for Oil and Gas Recovery exhibit and Linda Gillis (7155) and Cynthia Figueroa-McInteer (7013) for their "Battery Energy Storage for Utilities" brochure. Awards of Achievement were presented to Tom Drago (7155) for his MK4 AF&F Assembly certificate and his Typical Universal Arms illustration; Mitzie Bower (7155) for her First International Conference in High Temperature Electronics illustration; and Mona Aragon (7155) for her Dolomite/Thermocouple illustration.

In the publications category, Linda Gillis, Carmen Drebing (7151), and Cynthia Figueroa-McInteer won Awards of Achievement for their "Preferred Process" and "Deployable Seismic Verification Systems" brochures.

Albuquerque Hosts World's Largest Space Nuclear Power Confab

Albuquerque Convention Center is the site of the 10th Symposium on Space Nuclear Power and Propulsion, the world's largest conference on space nuclear power and propulsion issues. About 700 scientists, engineers, and government representatives are expected to attend the event, scheduled for Jan. 10 through 14.

This year's conference will feature a retrospective look at accomplishments during the 10-year history of the conference as well as a look into the future of space nuclear power. More than 250 technical presentations will be made on topics ranging from fuels and materials to space nuclear safety, including several by Russian scientists and engineers relating to their work on the TOPAZ-II space nuclear reactor. The Strategic Defense Initiative Organization, NASA, DOE, and the Air Force are co-sponsors of the event. For registration information, contact Mary Bragg on (505) 277-2813.

UNM Engineering Class Helps Launch Business Ventures

A spring 1993 engineering course at UNM may help budding Sandia entrepreneurs launch their own business ventures. The course, titled "Entrepreneurial Engineering," groups students into four teams. Each team typically launches one new business or product during the semester. Ideas for business ventures are proposed by students, who are working engineers or advanced engineering students at UNM.

Sandians, especially those who have specific business ventures in mind, are encouraged to enroll in the spring 1993 offering of the course (Mechanical Engineering 456). The class meets Tuesdays from 5:30 to 8:45 p.m. beginning Jan. 19 in Room 218, UNM's Mechanical Engineering Building. In-state tuition for the three-hour course is \$217. Enrollment must be completed by Jan. 22 at the UNM Registration Center (Student Services Building, 277-5548). For more information, call Professor Bill Gross on 277-6297.

Send potential Sandia News Briefs to LAB NEWS, Dept. 7162.

Earnings Factors September 1992

Long-Term Savings Plan for Management Employees (LTSPME)	Earnings Factors
AT&T Shares	1.0402
Government Obligations	1.0090
Equity Portfolio	1.0135
Guaranteed Interest Fund	1.0064
South Africa Restricted Fund	1.0144

Long-Term Savings and Security Plan (LTSSP)

AT&T Shares	1.0402
Guaranteed Interest Fund	1.0064
South Africa Restricted Fund	1.0144
Equity Portfolio	1.0134
Employer Stock Fund	1.0403

Retiree Open Houses

The Labs is holding an open house in honor of retiree Ann Ercole (2831) in Bldg. 822, Conference Room B, on Tuesday, Jan. 5, from 9 to 11 a.m. Refreshments will be served. Friends and acquaintances are invited.

The Labs is holding an open house in honor of retiree Zern Phillips (2858) in the Area 1 Cafeteria (Bldg. 861) on Tuesday, Jan. 5, from 2 to 4 p.m. Refreshments will be served. Friends and acquaintances are invited.



Sandia in the News

This is the first appearance of a periodic column. It's designed to provide a sense of what's being written about Sandia in newspapers and magazines around the world, and what's being said on TV and radio newscasts. Thanks to Rod Geer, Manager of Public Relations Dept. 7161, for providing the information.

The *Milwaukee Journal's* coverage of a Johnson Controls/W. R. Grace research venture in lithium-polymer batteries as a future power source for electric cars reported that Sandia "will research materials and conduct studies related to the Johnson Controls-Grace project."

El Paso's KVIA-TV called Sandia "the DOE's premier research facility" in its coverage of President Al Narath's recent address at the University of Texas at El Paso.

A *Chicago Tribune* article about a recent Council on Competitiveness Report quoted Erich Bloch, former National Science Foundation Director, as saying Sandia is "well-positioned to address generic issues and technologies critical to the competitiveness of American industry such as manufacturing processes, creation of new materials, . . . information technology, and biotechnology."

Computing magazine *Open Systems Today* carried this headline: "Sandia Labs Secures at 3 Levels." The article detailed our approach to securing computer networks. Bill Rahe (1932) and Arthurine Breckenridge (1944) are quoted.

Mechanical Engineering printed a color picture of Cliff Loucks (1611) along with an article about our automated edge-finishing system.

"Sandia . . . is out to do away with chlorofluorocarbons," *Electronic Products* reported in its coverage of our new CFC-less soldering process.

IEEE Spectrum's five-page special about technology transfer at DOE labs concentrated on Sandia's efforts, and widely touted them. It quoted Ted Dellin (2205) and Dan Arvizu (4200).

In its "Environment" column, *The Wall Street Journal* discussed joint Sandia/University of Dayton/Air Force/Circuit Center efforts on a self-developing photoresist.

An Associated Press article about our work with the State of New Mexico on a "cheat-proof" vote-by-phone system appeared in hundreds of dailies around the country.

The New York Times and *Science*, in their post-election coverage, dug out quotes that President-elect Clinton made while at Sandia.

In a long piece headlined "New Advancements for Diabetics," *Women's News* magazine discussed the Sandia/UNM glucose sensor.

A recent *Aviation Week & Space Technology* cover story — the story was six pages long — featured Sandia. One part discussed the prototype hypersonic weapon we tested last summer for the Defense Advanced Research Projects Agency, and mentioned Walt Williamson (9814). Another section concentrated on Dan Rondeau's (9911) work dealing with how the "power of massively parallel computing may one day enable pilots to test fly new aircraft long before they are built." •

Fun & Games

Bowling — SANDOE Bowling Association's August/September Bowlers-of-the-Month include: Scratch — Milt Stomp, Jr. (6200), 661; and Eileen Marek, 550; Handicap — Ron Husa (2314), 605, 677; and Frances Baca, 527, 671.

October Bowlers-of-the-Month are: Scratch — Dick Radtke, 676; and Diana Dobias (6907), 588; Handicap — Perry D'Antonio (324), 582, 726; and Dotti Castro (DOE), 440, 635.

With an 836 handicap series, Jerry Long (ret.) won the Four-Game No-Tap Tournament held at Fiesta Lanes Oct. 24-25. Second place went to Tony Montoya (2412) with an 822 handicap series.

Winners of the Best Ball Tournament held at Holiday Bowl on Nov. 21 and 22 were Daniel (7813) and Frances Baca with an 816 composite handicap series. Second place winners were Ron (2314) and Charlie Husa with a 773 composite handicap series.

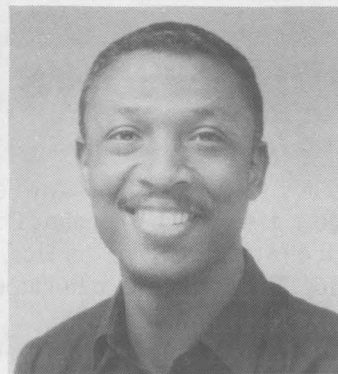
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LAB NEWS

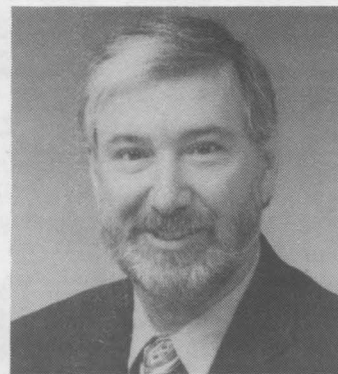
December 1992



Edward Graham
7800 25



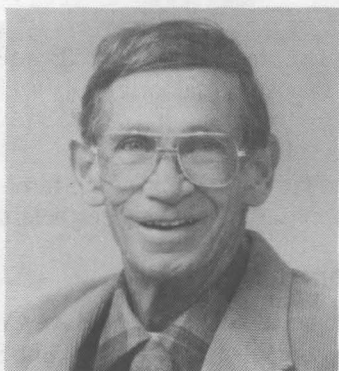
James Walker
2313 15



Eugene Neau
1243 30



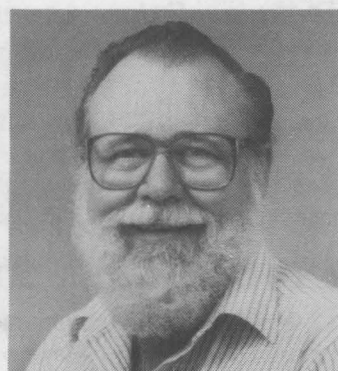
Jake Aragon
7435 40



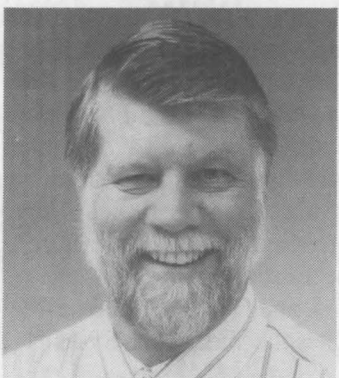
James Gearhart
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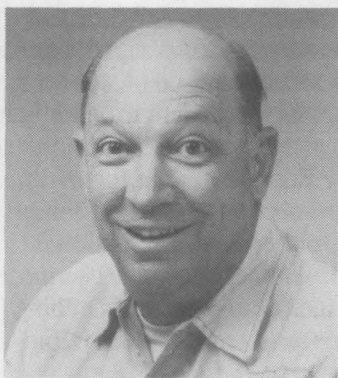
Gary Montague
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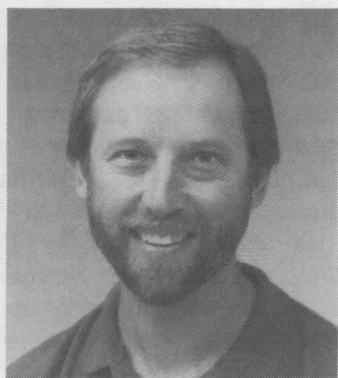
Jack E. Cannon
6219 35



David Baldwin
2645 20



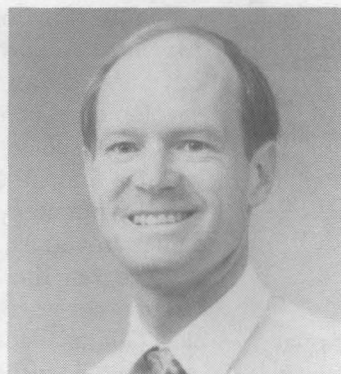
Paul Leonard
7818 35



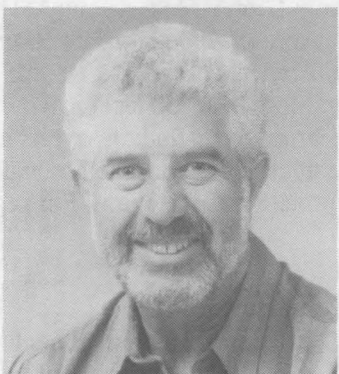
Rick Anderson
2482 15



Ernest Sanders
9533 35



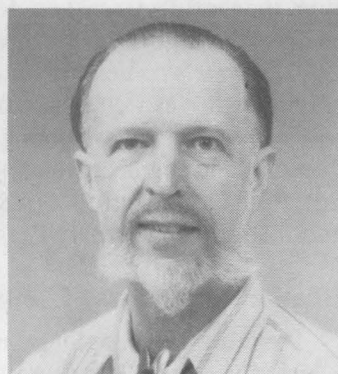
Ronald Lipinski
6514 15



Larry Wilhelm
7328 35



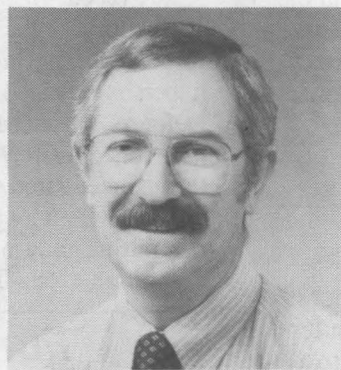
Wayne McMurtry
5922 15



Fred Bailey
9216 25



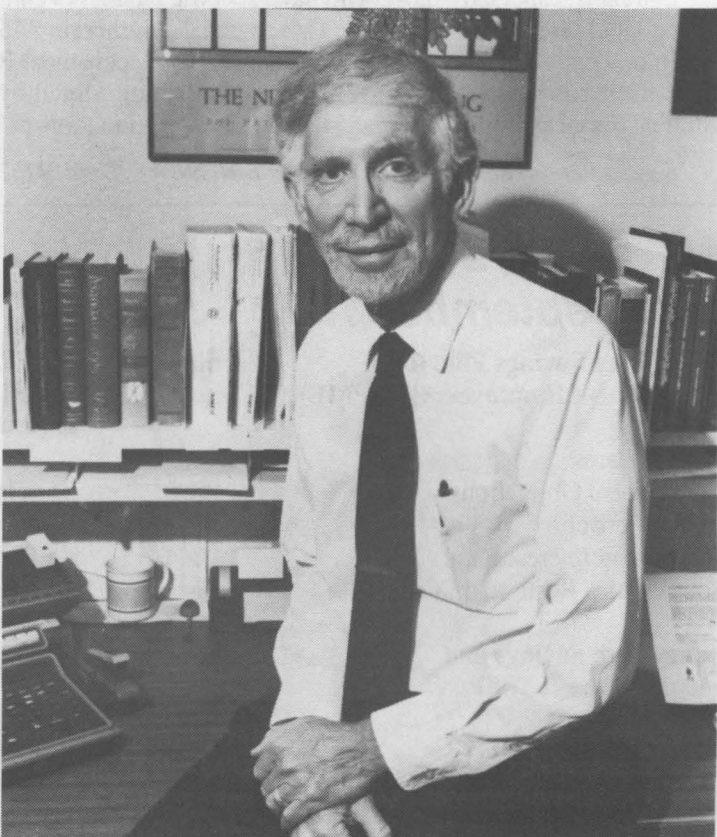
Ted Garcia
7301 30



Art Verardo
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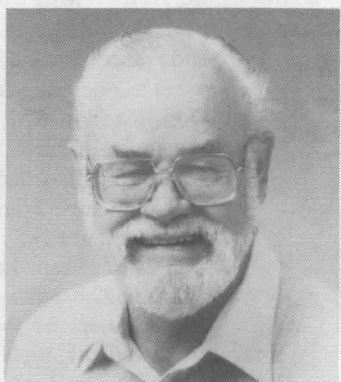
Bob Simpson
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Marvin Moss
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Dolores Grumblatt
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Bob Cranfill
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Richard Westfall
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Feed Back

Q: The "W" on our badges permits wearers to receive weapon information, which I thought was a requirement. Sandia/California people tell us in Albuquerque that they do not need the "W" to receive weapon data at Livermore.

Why is there a difference in this security requirement for Sandia/California and Sandia/New Mexico? Are we in Albuquerque in violation when we give weapon data to our Livermore counterparts while they are in Albuquerque?

We are always told we are the same company, but there seems to be a difference in the application of rules.

A: Historically the "W" badge designator was initiated at Sandia to assist in controlling access to weapon data in the Technical Library. This procedure is still adhered to in New Mexico, but is no longer required at Sandia/California. The "Q" clearance authorizes access to weapon data, Sigmas 1 through 11, and Critical Nuclear Weapon

Design Information.

A person may receive this data as long as he or she possesses a "Q" clearance and badge, and the need-to-know requirement is followed. The "W" acts as a facilitator for accessing weapon data, but it is not a substitute for need-to-know.

We are studying the feasibility of eliminating the "W" altogether and relying on the "Q" badge and need-to-know for accessing weapon data.

J.D. Martin (7400)

UNCLASSIFIED ADVERTISEMENTS • UNCLASSIFIED ADVERTISEMENTS • UNCLASSIFIED ADVERTISEMENTS • UNCLASSIFIED ADVERTISEMENTS

Deadline: Friday noon before week of publication unless changed by holiday. Mail to Dept. 7162.

Ad Rules

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

MISCELLANEOUS

- SUN LOUVERS, for '79-'82 Mustang hatchback, black, no drilling, \$50. Weber, 275-3719 after 5:30 p.m.
- COUCH, nice earth tone, good condition, \$125. Marshall, 298-1699.
- STAIR STEPPER, heavy-duty, very stable, gym quality, \$250; heart-rate monitor, \$40; sit-up seat, \$10. Paul, 299-6387.
- SKI JACKET & BIB, woman's ANBA, X-small, gray, \$30; woman's Grandoe down-leather mittens, \$15, like new. Pitts, 293-5481.
- TYPEWRITER, Canon ES3, electronic, new, \$60. Graham, 865-9427.
- PICCOLO, Gemeinhardt Silver Head, excellent condition, new price \$465, asking \$300 OBO. Thompson, 292-2877.
- RECLINER, gold fabric, \$50. Gregory, 275-3855.
- SKI RACKS, Barrecrefter SR-72 & Barrecrefter SR-53, for 6 pr. skis, locking, \$50. Brammer, 266-5158.
- PENNZOIL 10W-40, \$15/case; film, 35mm Ektachrome ASA200, 36 exposure, \$7/roll. George, 292-5368.
- SKI CARRIER, Barrecrefter, roof top, \$50 OBO; tire cable chains, never used, \$30 OBO. Wienecke, 292-5368.
- CALCULATOR, HP41CX, Math Pac, \$100; studio microphone, AKG C525EB, \$100; Sony stereo receiver, STR-AV290, \$60; all like new. Hueller, 296-0976.
- COMPUTER, Packard Bell VX88, XT-clone, 640 kb RAM, 40 mB hard drive, color monitor, 5-1/4 360 kB, 3.5 720 kB floppies, \$425. Carroll, 296-0256.
- MAGNAVOX COLOR TV, 5-in., AC/DC, brand new, in original box, never been used, retail \$180, sell for \$100. Richards, 296-2272.
- SAMOYED PUPPIES, AKC, a great gift, like white cotton balls, \$150. Puccini, 255-0568.
- SKI BOOTS, Lange, XLR, size 11-1/2, \$75; Kenmore washer, needs work, \$20. Szklarz, 292-3995.
- BEDROOM SET, girl's, 4-piece, white w/gold trim, twin bed, dresser, chest, desk, \$250; infant car seat, \$20; baby's intercom set, \$25. Adams, 821-9079.

- SKI RACK, Barrecrefter MD, lockable, holds 4 pr. skis, fits any vehicle w/rain gutters, \$50. Letz, 293-4525.
- COCKER SPANIEL, female, 3 yrs. old, wants home w/small children, is house broken & has all shots. Radigan, 299-8345.
- HAM RADIO EQUIPMENT: Kenwood TS-520SE, \$350; MC-50, \$50; Yaesu FC-901, \$135; Icom IC-2AT, IC-HM9, battery pack, \$175. Bielek, 828-2180.
- AXO BOOTS, size 12; HCL helmet. Girard, 292-3708.
- TYPEWRITER, IBM Selectric II, wide carriage, \$50; typewriter stand w/wheels, \$15; Sharp color TV, 20-in., remote, cable ready, approx. 8 yrs. old. Homer, 836-5043.
- PORTABLE ELECTRIC TYPEWRITER, Smith-Corona Model Elektra-XT, \$60; exercycle, recliner style, ultra-light, \$30. Patrick, 265-4569.
- SOFTWARE, Quicken finances package for DOS, never used, registration material included, cost \$50, sell for \$30. Caskey, 294-3218.
- HYDRAULIC PRESS, 12-ton, \$175; Solid Ox welder, never used, \$10; Barrecrefter ski rack, \$50; DP 300 Multigym, \$70. Murata, 881-8459.
- ELECTRIC STOVE, Dacor, 30-in., self-standing, self-cleaning oven, w/4 interchangeable burners, \$275 OBO. Lucero, 265-4824.
- FREEZER, horizontal, J.C. Penney model, 10.07 cu. ft., \$200. Jogi, 275-0610.
- SPOKE WHEELS, chrome, 15-in., fit Toyota 4x4, \$100 OBO. Miller, 281-4397.
- MODEL TRAIN, HO scale, 3 engines, 14 cars, 4 electric switches, 2 levels mounted on 4' x 8' platform, \$99. Zutavern, 298-6523.
- NINTENDO ENTERTAINMENT SYSTEM, 4 controllers, 15 games, power pad & Zapper Light Gun, \$300 OBO. Thompson, 281-0924.
- COUCH, chair, coffee/end table, soft mixed color fabric, good condition, \$170; child's training potty, Fisher Price, \$15. Wilcoxon, 296-8295.
- MAGAZINES: *Cruising World and Sailing*, free, you haul. Horton, 883-7504.
- BINOCULARS, Swarovski, 7x42; Antonio Zoli muzzleloader, .50-cal., w/accessories. Jimenez, 296-9256.
- STAMP COLLECTION, unused plate blocks w/some singles, includes many extras at no additional cost, 1992 book value of \$1,600. Swanson, 821-6041.
- CRIB, Simmons, solid maple, natural finish, w/mattress, mint condition, \$225; rocking chair, \$20; color TV, 19-in., \$75. Klavetter, 299-4299.
- WATERBED, king-size, lots of extras, great price, \$200 OBO; Bassett crib w/mattress, \$50; cartop carrier, canvas, \$25. Cocain, 275-9505.
- GUUITAR, Martin D-28, w/hardcase, \$500; JVC karaoke player w/CDs, \$500. Cochrell, 298-2068.
- REFRIGERATOR, 17-cu.-ft., \$195; Mustang car cover, \$50; wall cabinets, \$10; hand vacuum, \$10; evaporative cooler covers, \$10. Baca, 271-2962.
- ORGAN, plays different background instruments, sounds like a band, excellent condition, \$499. Haynes, 293-9208.
- REFRIGERATOR, Sears Coldspot, \$75; Baldwin studio piano, ebony, \$800. Harris, 299-4559.
- TRAIN SET, HO-scale, mounted on 5' x 8' plywood, multiple engines, cars, tracks, switches, model buildings, 3 transformers, \$200. Young, 884-7836.

- CHOW, male, neutered, blonde fur, 18 mos. old, loves people, hates cats, housebroken but prefers being outside, free. Irwin, 242-7742.
- SKIS, World Cup, size 140, w/Tyrolia bindings & 42-in. poles; Heierling Firebird boots, size 4, excellent condition. Wagner, 823-9323.
- RIFLES: Remington BDL, .17-cal., new, still in box, \$325; Winchester 77, .22-cal., automatic, \$125. Krenz, 298-0619.
- UNITED AIRLINES TICKETS, round trip to SFO, departs Dec. 23, returns Dec. 30, \$214. Sprunger, 260-1301.
- TYPEWRITER, Royal, portable, do word processing w/out electricity, \$30. Shapnek, 281-5913.
- BATTERY CHARGER, Nicad, for AAA, AA, C, & D, batteries included, \$15; baby swing seat & other infant items. Liguori, 256-3613.
- JACUZZI TUB, new, 42" x 73", cultured marble, retails for almost \$1,500, will take \$800, delivered. McKeever, 299-4050.
- DESK-SHELF COMBO, Danish teak, base has shelf w/doors, desk folds into top shelving unit, 54"H x 43"W x 38"D w/ desk out, \$400. Louden, 256-3684.

Deadline Change

The next LAB NEWS will be published Jan. 8. Deadline for ads and other submissions is 4 p.m. Thursday, Dec. 24.

- CHAINS, cable type, ACCO-Weed Model 1014, fits 145R12 thru 145R14 tires, never used, \$30. Kellogg, 299-3737.
- KEYBOARD AMPLIFIER, Peavey 100 watt; PA speakers, 400 watt; Casio mini keyboard; photographic slide viewer; all in perfect condition. Peter, 828-9873.
- ROLLERBLADES, Lightnings, 2 pr., size 8 & 8-1/2, low mileage trade-ins, \$75/ea. Orear, 897-0567.
- COMPUTER PRINTER, DMP Gorilla Banana Centronics, parallel input tractor feed, \$50 OBO. Rudolph, 298-0941.
- COMPUTER CENTER, 6 mos. old, \$50 OBO; sewing machine stand, \$30. Parson, 291-8394.
- PUPPIES, Cocker Spaniel-Golden Retriever cross, will be 6 wks. old on Dec. 24, free. Ernest, 293-1757.
- CHRISTMAS TREE SKIRT, hand made, quilted, reversible, Christmas colors & prints, 40-in. diameter, \$40. McMullen, 298-2801.
- SKIS, K2, 190cm; Reflex poles; Solomon boots, 5 x 62; Tyrolia bindings. Otts, 884-5072.
- WHIRLPOOL WASHING MACHINE, LT5550XT, white, large-capacity, heavy-duty, new, manufacturer's warranty, \$299; Enhanced 101 computer keyboard, new, \$22. Wickesberg, 294-8334.
- WATERBED, queen-size, waveless, w/heater, dark wood frame & headboard w/shelves, \$110 complete; brass headboards, twin-size, \$15/pr. Thornberg, 897-3785.
- CUISINART FOOD PROCESSOR, DLC10 Plus, w/6 blades & cover, used once, \$70. Hietala, 867-9577.
- STANDARD OFFICE DESKS (2), \$40 & \$60; sofa, 7-ft., cotton print, good condition, \$50; amplifier & speakers, Pioneer, \$50 OBO. Spiller, 884-8757.
- CHRISTMAS TREE STAND, auto side-view mirrors, unused lavatory faucet, wood doors, ceramic tiles. Moss, 298-2643.

TRANSPORTATION

- '81 OLDS OMEGA. Sanchez, 873-2157.
- '85 DODGE RV, 1-ton, 65K miles, AM/FM cassette, stove, hot water heater, refrigerator, toilet, shower, tub, CB, cruise, \$12,900. Duffy, 275-2857.
- '86 FORD RANGER PICKUP, 26K miles, rebuilt engine, 5-spd. Jimenez, 296-9256.
- '76 FORD PICKUP, 3/4-ton, 150K miles, rebuilt engine, new radiator, clutch, brakes, & U-joints. Knight, 275-3669.
- '88 TOYOTA SUPRA, fully loaded, Targa top, spoiler, leather interior, low miles, mint condition, must sell. Helgesen, 293-4430.
- '86 CHEV. S-10 BLAZER, excellent condition, new tires & battery. Beck, 299-4786.
- '91 TOYOTA COROLLA LE, fully loaded, power windows, mirrors, & doors, AT, AC, still under warranty, 20K miles, \$10,500. Hwang, 857-9765.
- '80 VW SCIROCCO, white, 5-spd., new front tires, runs well, could use some work, \$900 OBO. Lobitz, 821-1509.
- '78 OLDS DELTA 88, diesel conversion to 350 c.i., runs well, could use some minor work, \$800. Szklarz, 292-3995.
- '76 MERCEDES 300, diesel, rebuilt engine, sunroof, leather seats, complete service records, ivory, good condition, \$5,000 OBO. Harris, 296-0676.
- '91 HONDA XR 200, off road, bought new 3/92, excellent condition, \$1,700. Girard, 292-3708.
- '92 DODGE VOYAGER, 6-cyl., AT, AC, PS, extra seat, AM/FM cassette, cruise, electric locks, below book, \$14,500. Tobyas, 877-0354.
- '79 DODGE COLT, front wheel drive, 110K miles, 4-spd., 1.6 L, \$900. Calloway, 292-2429.
- '85 FORD MUSTANG LX, 4-spd., 4-cyl., AM/FM, cruise control, 58K miles, excellent condition, \$2,800. Chavez, 823-1431 after 6 p.m.
- BOY'S BICYCLE, 16-in., \$40; child's push scooter, \$35; both in good condition. Wilcoxon, 296-8295.
- '65 CHEV. IMPALA, 4-dr., parting out or buy whole car for \$300 OBO. Armijo, 255-1985.
- '83 BUICK REGAL, 69K miles, AT, PS, PB, AC, AM/FM, looks good, runs great, original owner (almost), \$2,500. French, 294-3099.
- '87 NISSAN MAXIMA GXE, white, 51K miles, moonroof, AC, AT, excellent condition, \$6,400. Heck, 294-1904.
- '89 FORD TEMPO, AC, AT, PS, cruise, 63K, white. Keener, 255-8482.
- '83 VOLVO DL WAGON, AT, AC, cruise, power locks, AM/FM cassette, 95K miles, good condition, \$3,500. Hass, 299-3506.
- '85 JEEP CJ7, 4x4, rebuilt 6-cyl. engine, 5-spd., transfer case, new paint & tires, moving, must sell, asking \$5,490 OBO. Pompeo, 255-3230.
- '84 SUBARU GL, station wagon, 4-WD, 1 owner, very good condition, runs great, \$1,200. Rieden, 281-9491.
- '71 CHEV. NOVA, 2-dr., 307 V-8, AT, 1 owner, \$999 OBO. Kellogg, 299-3737.
- REPOS: '84 Chev. Utility Blazer, approx. 73,115 miles, 4-spd., 4-WD, 8-cyl.; '88 Chev. pickup, approx. 40,625 miles, 4-spd., 6-cyl., AM radio; bids accepted through Dec. 22; we reserve the right to refuse all bids; subject to prior sale. Sandia Lab FCU, 293-0500, ext. 344.

'67 GTO CONVERTIBLE, his & hers auto, Rll wheels, original owner, no restoration or modification, appraised at \$13,500, will take \$12,900. Lenz, 884-4835.

REAL ESTATE

- 3-BDR. MOBILE HOME, '91 Spirit, 14 x 80, 2 baths, fireplace, assumable loan w/qualification, move to your site. Trussell, 343-0022.
- 2-BDR. MOBILE HOME, Marlett, 12 x 65, large living room, dining room, refrigerator, stove, washer & dryer, fenced shaded lawn, relocatable, excellent condition. Fisher, 881-8611.
- 3-BDR. HOME, Hoffman, double-garage, all brick house, corner lot, near Wyoming & Menaul. Marchi, 291-9681.
- 3-BDR. HOME, 1-3/4 baths, 1,460 sq. ft., 2-car garage, living & dining rooms, den w/fireplace, sprinklers, quiet neighborhood, assumable, no qualifying, \$79,500, \$640 PITI. Babb, 292-3120.
- 4-BDR. HOME, former model in Heritage East, 2,400+ sq. ft., 3 baths, 2 living rooms, dining room, 3-car garage, spa, security, decks, \$188,900. Roper, 828-0955.
- 3-BDR. HOME, 2 baths, Nor Este, professionally landscaped, backs to greenway, landscaped atrium, tile roof, large patio & kitchen, sale or rent. Young, (703) 415-3461.
- 5-BDR. HOME, Foothills, all brick, custom, 5,300 + sq. ft., .7 acre, views, tennis court, incredible buy, \$291,500. Blankenship, 294-4332.
- RESIDENTIAL LOTS, all city utilities, South Valley area, 2 blocks north of Rio Grande High School on Bartolo, \$19,500. Romero, 299-3296.

WANTED

- COMPUTER PRINTER USERS' MANUAL, Brother HR-15 or HR-15XL, buy or borrow. Weber, 275-3719 after 5:30 p.m.
- HOMES: for bearded collie-cross, neutered, all shots, housebroken, loves people; also for yellow Lab-cross, cream colored, 30 lbs., 6 mos. old, spayed, all shots, housebroken, loves kids & cats. Rex, 764-9655.
- ROOMMATE, to share nice 3-bdr., 2-bath house in NE Heights, non-smoking female preferred, \$310/mo. + 1/2 utilities. Gaddy, 275-7802, leave message.
- TABLE & CHAIRS, wooden, toddler sized, in good condition. Denaple, 298-2778.
- AIRPLANE PARTNER, 1/4 interest in '65 Mooney M20C, will be based at Sandia Airpark in Edgewood, \$6,750. Shapnek, 281-5913.
- LASER OR DESK-JET PRINTER, at reasonable price; clean sand for child's sandbox. Cocain, 275-9505.
- ELECTRIC BASS GUITAR and Yamaha "Virago," 1985 or newer, 750cc, either must be in good shape. Kureczko, 281-8206.
- LENSES, for 35mm Minolta camera, 50mm, wide angle and/or telephoto. Miner, 298-4779.
- BAND INSTRUMENTS, donated or inexpensive, for elementary school band program for students who cannot afford them. Kellogg, 299-3737.

Coronado Club Activities**Party with the Poorboys Tonight**

NOT ONLY is it the last Friday night dinner/dance for 1992, tonight (Dec. 18) is also the annual Christmas party for members. The Isleta Poorboys will play the best of country and western tunes from 7 to 11 p.m. to help you make merry. The kitchen elves are whipping up T-bone steak (\$11.95), scallops mornay (\$11.95), and all the wonderful dishes featured on the all-you-can-eat buffet — including chicken breast and baron of beef, and still just \$6.95. If you haven't already made your reservations, call now (265-6791).

SUNDAY BRUNCH — The Club's popular Sunday champagne brunch returns Dec. 20, with a great lineup of delectable eatables offered from 10 a.m. to 1 p.m. After the brunch, from 1 p.m. until 4 p.m., Bob Weiler and Los Gatos play for the tea dance. Cost is \$6.95/members, \$7.95/non-member guests. Reservations required (265-6791).

CLOSE THE CLUB — but only for the holidays. On Thursday, Dec. 24, you're sure to enjoy the holiday close-down party, featuring a free buffet and drink specials. It starts in the afternoon and continues until closing time — and who knows when that might be? So come on out and let the Club staff help you shift gears from work to holiday relaxation. Good company and good cheer will abound. See you there!

NEW YEAR'S REMINDER — The annual New Year's Eve celebration is coming up. If tickets are still available (no guarantees as we go to press), they'll only be sold until Dec. 23. Why not call 265-6791 right now and get in on the fun?

SEE YOU NEXT YEAR! And just to start it off right, mark your calendar for a Sunday Brunch and Tea Dance on Jan. 3, and a dinner/dance with the Isleta Poorboys on Friday, Jan. 8. Have a great holiday break!

Events Calendar

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

Dec. 18-23 — "Muttonman Discovers Columbus," exhibition investigates Native American humor through cartoons drawn by Navajo artist Vincent Craig; 9 a.m.-4 p.m. Tues.-Fri., 5-9 p.m. Tues.; UNM Jonson Gallery, 277-4967.

Dec. 18-23 — Exhibit, "Rio Grande Blankets/Frazadas del Rio Grande: Late Nineteenth Century Textiles in Transition," illustrates history and recent revival of Hispanic weaving; 9 a.m.-4 p.m. Tues.-Fri., 5-9 p.m. Tues., 1-4 p.m. Sun.; UNM Art Museum, 277-4001.

Dec. 18-Jan. 10 — Exhibit, "Bernadette Vigil and Luis Tapia: A Selection of Paintings and Sculptures," work of both native New Mexicans transcends the genre of folk art dealing with traditional Hispanic subject matter; 9 a.m.-5 p.m. Tues.-Sun., Albuquerque Museum, 243-7255.

Dec. 18-Jan. 13 — Exhibit, "Dinosaurs, Penguins, and Whales: The Wildlife of Antarctica"; 9 a.m.-5 p.m., free admission Dec. 24, New Mexico Museum of Natural History, 841-8837.

Dec. 18-Feb. 7 — Exhibit, "Route 66: The Real Road," photo history of the famous highway in Albuquerque from 1926 to the present, features diners, tourist courts, gas stations, and a look at the old National Trails Highway; 9 a.m.-5 p.m. Tues.-Sun., Albuquerque Museum, 243-7255.

Dec. 18-Feb. 14 — Exhibit, "Then/Now: 1492/1992," prints by art students from Cibola and Rio Grande high schools inspired by the history of New Mexico and its relationships to their identities; 9 a.m.-5 p.m. Tues.-Sun., Albuquerque Museum, 243-7255.

Dec. 18-Feb. 21 — Exhibit, "An Albuquerque Album: Photos of a Changing City," more than 300 photographs of Albuquerque taken between 1883 and the 1960s, contrasted with 1992 photos of the same subjects; 9 a.m.-5 p.m. Tues.-Sun., Albuquerque Museum, 243-7255.

Dec. 18-March 1 — Exhibit, "Nora Naranjo-Morse: Earning Her Place Under the Willow," Santa Clara Pueblo artist exhibit featuring sculptural pieces in bronze, wood, and clay; 9 a.m.-4 p.m. Mon.-Fri., 10 a.m.-4 p.m. Sat., noon-4 p.m. Sun.; Maxwell Museum of Anthropology, 277-4405.

Dec. 18-May 21 — Exhibit, "Heritage of the Andes: Peoples and Cultures of Tropical South America," museum collection of South American art and artifacts depicting lifeways of the indigenous peoples of the region; 9 a.m.-4 p.m. Mon.-Fri., 10 a.m.-4 p.m. Sat., noon-4 p.m. Sun.; Maxwell Museum of Anthropology, 277-4405.

Dec. 19 — Christmas Concert, New Mexico Symphony Orchestra's annual free concert, donations of non-perishable food accepted for the St. Vincent de Paul charities, performance includes Christmas song sing-along, medleys of famous carols, and favorites such as Leroy Anderson's "Sleigh Ride," music from Menotti's "Amahl and the Night Visitors," and Schubert's "Ave Maria"; 2, 3:30, 6:30, and 8 p.m.; Winrock Shopping Center (west entrance), 843-7657.

Fun & Games

Running — Run, walk, or roll in University Hospital's second annual "Resolution Run" on Dec. 31 at the NM State Fairgrounds Youth Hall from 6 to 9 p.m. Proceeds benefit special programs and services at University Hospital. Special family activities will include dancing, music, clowns, face painting, and a prize drawing. Luminarias will light the way of the 5K run/walk and wheelchair-roll event. Advance registration fees (by Dec. 19) are \$20 for the run, food, and festivities, and \$15 for the run only. Fees for the food and festivities are \$10 for adults and \$5 for children 14 and under (free for children under 5). Registration forms are available at all Wendy's locations and retail sports stores. To receive one by mail, call Annie Oteon on 843-2656.

Skiing — The snows in the Sandias have been great, and the ski season is off to a good start. On Saturday, Jan. 9, if you take novice-level cross-country ski lessons with veteran instructor John Shunny (ret.), he will donate your fee — \$16 for an all-day group lesson — to his favorite charity, the South 14 Village Project (which also gets the "profits" from sales of Sandia T-shirts, caps, cups, and knives). John needs six students or more for the lesson. Call him on 265-1620 (mornings are best) to reserve a slot in this class.

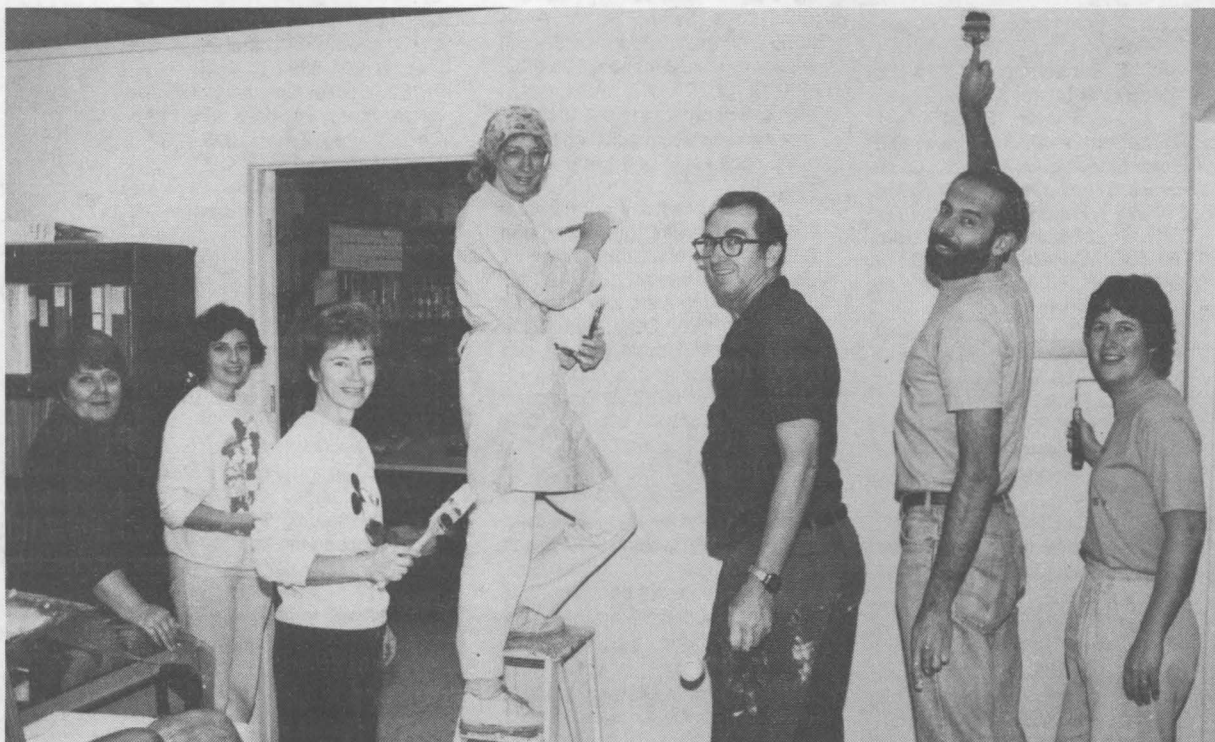
Square Dancing — The Rio Grande Squares Square Dance Club is offering beginning square-dance classes starting in January. Anyone interested in learning to square dance can receive the first three lessons free. Free lessons will be available Jan. 10, 17, and 24 at 2915 Hawkins Drive NE. For more information, call 892-9830 or 292-4441.

Take Note

A Holiday Outreach Project sponsored by the *Albuquerque Tribune* needs clothing and toys for needy families. Recipients will be identified by Albuquerque Public Schools principals from among families at their schools who need assistance. Donated clothing and toys will be distributed Dec. 19 from 10 a.m. to 6 p.m. at God's House Church (2100 Arno SE). Cash donations to purchase clothing and toys are also being accepted. If you would like to donate to the outreach project, please call Edith Dunn on 897-9253 or 823-3653.

The third annual luminaria tour of Las Maravillas Subdivision in Los Lunas will be held Dec. 24 from 5 p.m. to midnight. Non-perishable food donations will be accepted for Valencia Children's Residential Services. Las Maravillas is located two miles east of the UNM-Valencia campus. The tour is sponsored by the Valley Improvement Association. For more information, call 865-9033 or 865-6067.

Retiring and not shown in LAB NEWS photos: Dave Shank (5701).



CORPORATE VOLUNTEERS from Sandia/California took part in the second annual National Day of Volunteering on a recent Saturday by painting the offices of the Family Crisis Center in Livermore. The volunteers are (from left) Cindy English (8522), Deanna Taylor (contractor), Joan Bersie (8200), Joanne Lombardi (8271), John Totten (8746), and Neil and Rene (8116) Bierbaum.