

STEP Teacher Takes Step Toward Understanding Control of Teleoperated Vehicles



CARLA ULIBARRI-SMITH, a math and computer science teacher at Valley High School and a participant in the STEP Program, demonstrates the experimental work station used by subjects — all Sandia volunteers — who participated in a three-month study she conducted this summer. The purpose of Carla's study, designed by Dwight Miller (7223) and Doug McGovern (5267), was to evaluate how color and foreground texture affect people's ability to judge distance and size while viewing a scene on a video monitor — information that's important when designing video systems for teleoperated vehicles.

Pop quiz time:

- 1) Could you drive your car safely along a familiar street if, instead of viewing the street through your windshield, you had to view it remotely on a video monitor?
- 2) Or, how about using the picture on the monitor to steer your car through unfamiliar, off-the-road terrain?
- 3) Without the usual visual cues such as lane markers and familiar features of the landscape to help you, how accurately could you judge the size and distance of obstacles in front of your car — or the distance between two obstacles — especially if those obstacles were objects unfamiliar to you, and you had no clues to their actual size?
- 4) Would the particular *type* of terrain shown on the monitor (a desert mesa, a field of grass, or an expanse of sand, for example) affect your perception of distance and size? Would viewing the terrain in color (instead of black and white) make a difference?

Important Questions

These are some of the questions — important to the study of teleoperated vehicles — that Valley High School teacher Carla Ulibarri-Smith attempted to answer in a three-month study she conducted this summer. The study was designed by Dwight Miller (Statistics, Computing, and Human Factors Div. 7223) and Doug McGovern (Advanced Technology Div. 5267).

Carla, who teaches math and computer science at Valley High School, was a participant this year in the Summer Teacher Enrichment Program (STEP) — a program originated by Senator Pete Domenici to help middle school and high school teachers upgrade their knowledge and skills through work in their fields of expertise and through exposure to the Labs' programs and projects.

"Carla's study was particularly appropriate — and useful to us — because we're currently working with the US Army Missile Command to develop a teleoperated vehicle for surveillance and rescue

(Continued on Page Five)



LAB NEWS

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Attention, State Fair-Goers!

Sandia Exhibit Features Tech Transfer

• The Labs' greatest hits in technology transfer, the oldies but goodies;

• Recent Sandia developments and inventions that may be the hits of the future; and

• A chance for Sandians to share with their families their pride in the valuable technologies their company has developed.

Those attractions await visitors to Sandia's first exhibit at the New Mexico State Fair since 1984. The last exhibit, located in a relatively small building dedicated to science and engineering, was viewed by some 150,000 Fair-goers.

"This year, with our exhibit in the big Manuel Lujan Jr. Exhibit Hall, we expect at least several hundred thousand people," says Sandy Borgrink. Her Community Relations Div. 3163 worked with Technology Transfer and Management Dept. 4030 to create Sandia's exhibit.

The fair opened today and continues through Sept. 25; hours are 9 a.m. to 9 p.m. each day.

The exhibit theme was suggested by President Welber. Sandia was a leader in technology transfer long before the 1980 Stevenson-Wydler Act mandated that government-funded organizations devote part of their resources to this mission.

For example, the laminar air-flow clean room,

(Continued on Page Seven)



Sandia National Laboratories, with about 7,200 employees in Albuquerque and about 1,000 at other locations, is one of the nation's largest research and development

FULL-SCALE TEST of Sandia's first State Fair exhibit since 1984 proved its feasibility as a communication device. Starting today, fair visitors will find the exhibit, which features technology transfer, in the Manuel Lujan Jr. Exhibit Hall (on the northeast corner of Main and 5th Streets). Among the Sandians who worked on the project and/or who are now staffing the exhibit are Joe Laval (3163, foreground) and Mike Clough (7473).

See C/PIP, Page Six

Antojitos



A Bit of History -- and Tribute
Felix Padilla was for 30 years an office-machine repairman at Sandia. But he had other skills as well. One was cartooning. After he won a contest to name the (then) new Coronado Club in 1950, he drew this cartoon to show his reaction to his prize -- six months free membership. His cartoons, most with a safety theme, graced LAB NEWS pages until he retired in 1979.



He was also a serious landscape artist who received some recognition before he died in 1986. His work is now getting wider acclamation -- for example, a "Felix Padilla Retrospective" of his New Mexico landscapes and illustrations. It's at UNM's Art Education Gallery Sept. 18 through Oct. 7 (with a reception on Sept. 18 from 1 to 3 p.m.).

* * *

Equal Time for Pro-Cyclists -- That's the request of Jim Chavez (6226), who feels I've leaned a bit heavily on bicyclists lately.

Well, can't do that -- bike commuting is good exercise, it saves fuel, it reduces pollution and the number of cars on the road, and it's fun. I've promoted the custom in the LAB NEWS for some 15 years (and, in the mid-70s, was the "psycho-cyclist," who showed how not to ride safely).

But I don't consider bikers as above reproach, and I've used this space for two anti-biker letters lately. One, from the slow-riding cyclist who feared side-swipe by the speeders, I sympathized with. The other letter, from the driver who planned to "totally ignore their [cyclists'] rights because they totally ignore mine," I deplored.

Writes Jim, "I won't disagree that there are some 'asinine bikers' out there who are unsafe and don't follow all traffic rules -- but that doesn't mean we're all like that. There are also a lot of 'asinine drivers' out there who are unsafe and don't obey all traffic rules, but I don't lump all drivers in the 'asinine' category (some of my best friends drive cars).

"Cyclists are the Rodney Dangerfields of commuting -- we don't get no respect," Jim continues. "Do you believe [the drivers represented by the second letter] will respect my rights, even if I'm not being asinine? Heck, no! They've already made up their minds when it comes to cyclists -- 'ignore their rights and feel no sympathy when they're run over.' It's hard to act like a car when you're on a 25-lb. bike. Why should the driver of a 2000-lb. car be concerned about an 'idiot' on a bike? Most drivers are ignorant of the fact that cyclists, like any slow-moving vehicle, have a right to the road.

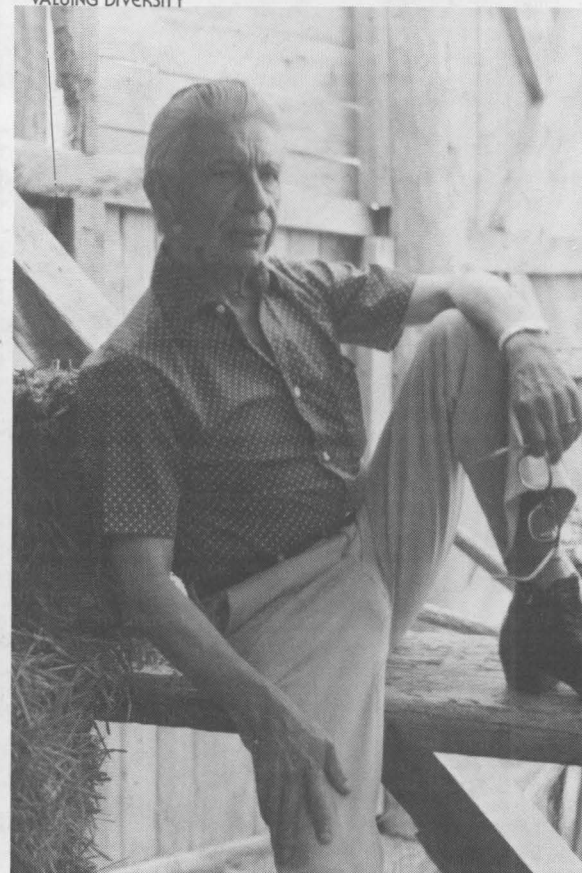
"I agree that cyclists really need to make the effort to act more like vehicles, respect the rights of the driver, and follow the rules of the road. But I also believe that [the LAB NEWS editor] should be trying to better the situation between cyclists and drivers, not make it worse."

Believe me, Jim, I'm not trying to make it worse; in fact, I'm trying not to make it worse! Yes, there are some asinine drivers -- and bikers, fast or slow (and pedestrians -- see last issue). And they all use the same streets at least part of the time. And, yes, the biker has much more to fear from the car than the opposite. (And the pedestrian has to beware of both.)

You suggest that it's time to revive a City-KAFB-Sandia Biking Committee that would push for safer bike routes "and educate both riders and drivers of the rights of each to the road," and that you'd be happy to help out. Good idea. Those willing to be part of same, send name, org., and phone number to Jim. ●BH

* * *

But Could He Have Read Antojitos? "Your manuscript is both good and original; but the part that is good is not original, and the part that is original is not good." --Samuel Johnson



PROF. SABINE ULIBARRI

Cultural Diversity Colloquia

Epic Sense of Life, Tragic Sense of Life

In New Mexico, there are mountains, mesas, deserts, forests, farmland, and river valleys -- a diversity of nature that's matched by the diversity of people who occupy this state.

Equal Employment Opportunity and Affirmative Action Dept. 3510 has revived its cultural colloquia series under the name Cultural Diversity Colloquia. "The idea is to help people new to New Mexico -- as well as those who've been here a while -- appreciate and understand the diversity of cultures here," says Maureen Baca, manager of Dept. 3510.

Sabine Ulibarri, UNM professor of modern and classical languages, Spanish and Spanish-American language, literatures, and civilization, will speak on "Differences and Similarities between the Hispanic and the Anglo-American Cultures" at 10 a.m. on Sept. 14 at the Technology Transfer Center.

"New Mexico is a most successful human laboratory for conducting experiments in the science of learning to live together," says Prof. Ulibarri. "New Mexicans have learned to value and respect the differences that separate us and have learned to grow from these differences." According to Prof. Ulibarri, there is a major difference in world views between Hispano- and Anglo-Americans: "The Anglo-American has an epic sense of life. The Hispano-American has a tragic sense of life."

Cultural colloquia will be held every other month. Don Devoti and Julia Gabaldon (both 3510) are the colloquia coordinators. ●JW



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

Retirement Planning

Guy Trujillo of Financial Network Investment Corp. will present "Asset Allocation," a high-technology approach to developing a portfolio consistent with your needs and changing economic conditions, at 5 p.m. on Sept. 14 at the FNIC office at One Executive Center, 8500 Menaul NE, Suite A-301. RSVP to Guy at 291-8585.

Plasma X-ray Source Promising Tool in Competitiveness

A new plasma X-ray source may prove to be a useful weapon in a skirmish the US is currently losing to Japan.

That skirmish is being fought on a miniature battlefield called a semiconductor, or a computer chip. Winning the conflict means finding ways to make computer chips smaller, yet hold millions of electronic elements — features — per chip.

That means making feature sizes smaller. And that, in turn, is part of an experimental program under way in Surface Science and Chemical Physics Div. 8343.

Glenn Kubiak (8343) and Tim Tooman (now in 8474) have developed a laser-produced plasma X-ray source useful in both fundamental and applied research related to X-ray photolithographic technologies for computer chip applications.

The original work began some three or four years ago when Tim put together an X-ray source for some SDI research. About the same time, Glenn set up a parallel experiment — one aimed at overcoming the technical hurdles that prevent the use of X-ray-based lithography techniques in imprinting features on “very highly integrated” (containing millions of discrete components) circuit chips.

Glenn has now incorporated the hardware from Tim’s earlier efforts into new equipment that he’s using to research the fundamental responses of X-ray resists (materials that undergo chemical transformation when exposed to X-rays). When used with exposure masks that are opaque to X-rays in the patterned regions chosen, intricate structural arrays can be “printed” into the resist layer. Nothing new in the concept . . .

From 1 to 0.2 Micron

What’s new — at Sandia at least — is the recent development of the laser-plasma device as an X-ray source. The equipment should allow minimum feature sizes to be reduced from the present 1 micron to less than 0.2 micron.

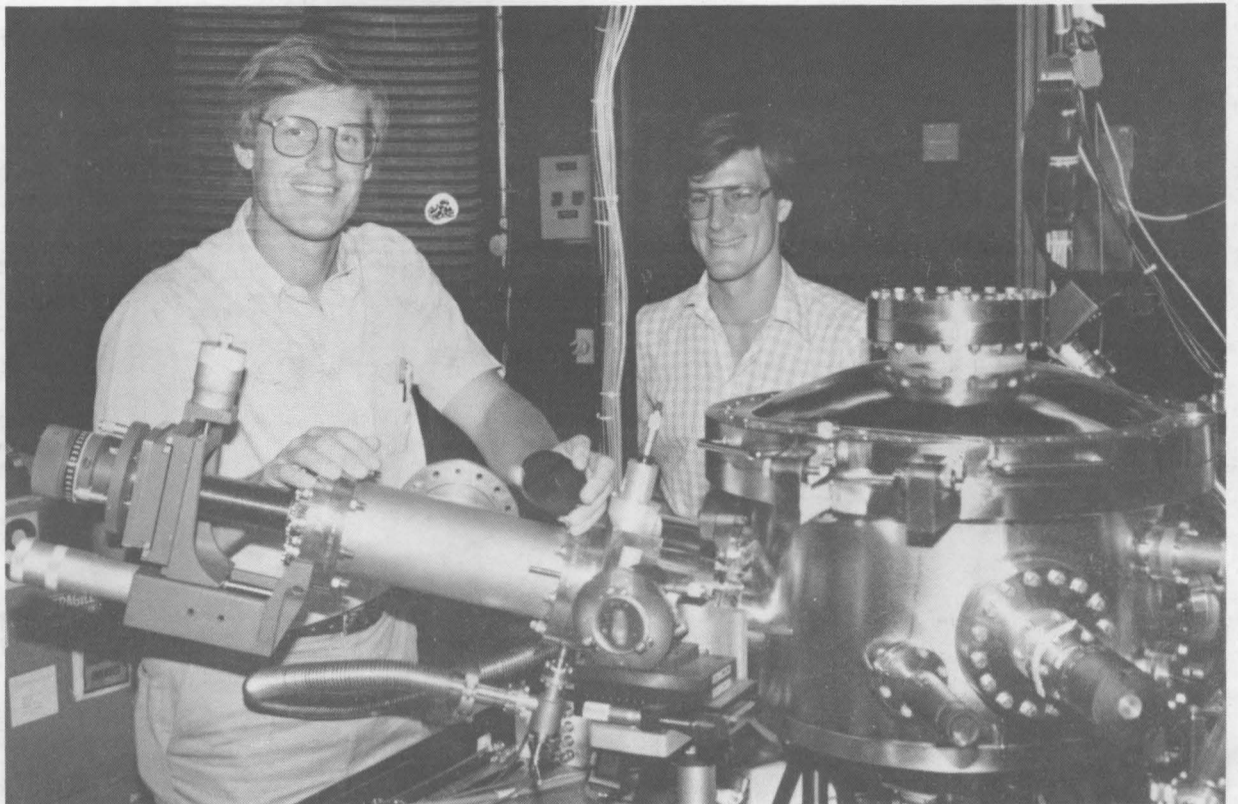
But there’s a catch — for a laser plasma source to achieve widespread commercial use in X-ray lithography at this ultimate resolution, resists must be made more sensitive to the exposing X-rays.

Toward this goal, the Sandia X-ray source incorporates a high power Excimer laser that puts out a 0.7-joule, 30-nanosecond (billionths of a second) pulse. By focusing this beam onto a gold target, Glenn causes a small amount of the material to reach temperatures above a million degrees Kelvin. During this process, the gold heats up, evaporates, and becomes ionized. The result is a plasma that emits radiation through most of the high-frequency regions of the electromagnetic spectrum — from the infrared all the way up to the X-ray.

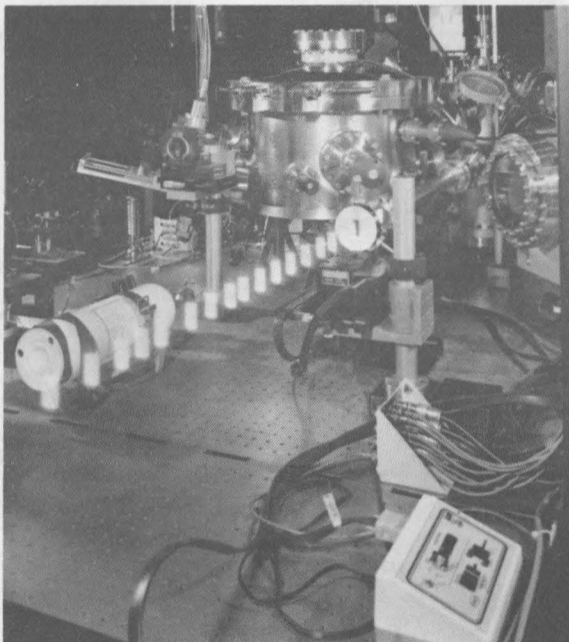
Using the X-rays emitted from the plasma makes it possible to study the fundamental properties of candidate X-ray-resist materials. “By measuring such things as the energies of electrons emitted after the material absorbs an X-ray photon, we can look at the properties of many materials. In this way, we can better understand how electrons are organized into bonds within the resist, and, with that understanding, we can infer why some resists are more sensitive than others. In other words, we’re using our new X-ray source as a highly efficient spectroscopic tool in characterizing the performance of resists.”

A special monochromator is a critical component in these experiments. “This device, designed for us at LBL’s [Lawrence Berkeley Laboratory] Center for X-ray Optics, is optimally matched to the spectrum of the plasma X-ray source,” says Glenn. “It allows us to extract various photon energies from the source’s spectrum but retain very high X-ray intensities in the monochromatized X-ray beam.”

The ultimate goal of the resists study is to use the new X-ray lithographic technology to print something on the surface of a material, in this case microchips. “To achieve ‘giant scale’ circuit integration while maintaining reasonable total chip size, you have to make these features very, very small — from the



SANDIA RESEARCHER Glenn Kubiak (left) and technician Kurt Berger (both 8343) stand behind the plasma X-ray source apparatus, which includes the monochromator (right) and manipulator and exposure chamber (left) for exposing the wafers to the X-ray beam. Glenn holds a wafer (a substrate coated with a film of polysilane or other resists) exposed inside the chamber.



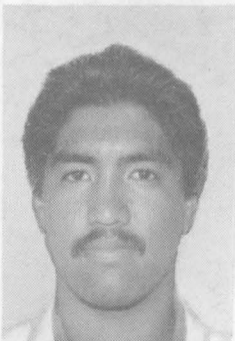
PULSED BEAM from Excimer laser heads to target chamber in Bldg. 916 lab. Beam creates heat (in gold target) that results in a plasma that emits X-rays. These X-rays permit study of properties of candidate X-ray-resist materials. (Photo by Cary Chin, 8285)

current 1 micron down to a quarter micron,” Glenn adds. “Computers that now fill up racks could then be packed into chips the size of a dime.”

1812 Overture

Glenn is also currently working with John Zeigler’s Physical Chemistry and Mechanical Properties of Polymers Div. 1812. That division has

Death



Cecil Bonzo of Inorganic and Physical Chemistry Div. 8313 was killed in a water-skiing accident Aug. 23 near Stockton.

He was 31 years old.

Cecil had been a technical aide at Sandia since 1982.

Survivors include his wife and three children.

Sympathy

To Roy Pearson (8165) on the death of his mother in Spokane, Wash., Aug. 6.

synthesized a silicon-based polymer material — polysilane — and is suggesting that it may be useful in the mid-ultraviolet region of the spectrum. Glenn is using polysilane as a resist to characterize its exposure sensitivity in the X-ray region of the spectrum. “The ultimate goal is to find a resist that is sensitive below the 10-millijoules-per-square-centimetre level, and that simultaneously has the properties of self-development and ion-etch resistance.”

According to Glenn, there are several impediments to successful X-ray lithography, but success in reducing feature sizes is necessary to compete and survive in the worldwide semiconductor battle, in which Japan has a decisive advantage. “If the laser-plasma source is to become a practical exposure tool, we’ve got to design resists that reach much higher sensitivities than we can achieve now.

“At present, X-ray lithography is in the developmental stage at very large and expensive synchrotron radiation facilities around the country,” Glenn continues. “Most private industries cannot afford the \$30 million needed to purchase such devices. This alternate X-ray source, which is being developed at Sandia and elsewhere (including Japan), could provide the answer at greatly reduced cost, and be a commercially attractive method of exposing resists for the semiconductor industry.”

Glenn anticipates two to three more years of research on this project. His estimate is based, in part, on a mandate discussed at a national SEMATECH workshop he recently attended. The mandate: to pursue development of X-ray lithography within the consortium (government and 14 major labs and companies involved in semiconductor manufacture).



Congratulations

To Gloria (8316) and Randy Christensen, a daughter, Robyn Courtney, April 26.

To Terry (8151) and Mark (8165) Higuera, a daughter, Rachel Mary, Aug. 7.

To Rose Ketchum (8235) and Richard Schubert, married in Livermore, Aug. 20.

To Barry Bolden (8161) and Bobbie Wynn, married in Davis, Aug. 20.

PA Helps Suzi and Sons

Getting her three- and five-year-old sons to bed was a nightmare for Suzi Montano (1822). A nightly round of fetching glasses of water, telling them to be quiet, and settling disputes literally brought Suzi to her knees.

After one evening's bedroom battles, she sank to the floor of the boys' bedroom and sobbed. She resented her children, then felt guilty about that. She didn't know what she was going to do. It had to be something other than hitting the boys, but working and child-rearing as a single parent created stresses that she couldn't handle alone.

Suzi's answer was Parents Anonymous (PA), a group sponsored by All Faiths Receiving Home (a United Way agency). "I'd gotten to the point where I knew I needed help, but couldn't afford professional services," she says.

"I was given immediate support. The feedback was positive. I was told that I hadn't hit the kids — yet — and that I should look at what I was doing right. You know, we often can't see it ourselves."

Parents Help Themselves

When she attended her first meeting, she found that PA emphasizes what parents can do for themselves. For example, Suzi learned she couldn't change everything at once, so she concentrated on bedtime first. Her sons are in bed before 8:30 p.m., and Suzi now has time for herself. "Bedtime used to depend on Mommy's mood. Now, consistency is the key for us at bedtime," she says. "The boys have a snack at 8, brush their teeth at 8:15 and are in bed by 8:30."

PA provides continued support and nurturing through regular meetings. "We learn anger management and stress management," Suzi continues. "It's really important for parents to know that they don't need to beat their kids before they seek help from PA."

ECP Helps People We Know

Suzi's been a PA member for a year and a half, and became group chair after a year. "PA is growing and needs more groups. There's a waiting list now, but new groups are forming," Suzi says. PA has been in Albuquerque since 1979. Interested parents should call the PA Hotline on 344-7727 for more information.

Sandia's 1988 Employee Contribution Plan Campaign kicks off Oct. 10. Our giving to ECP helps our friends, neighbors, and co-workers — people like Suzi and her sons. ●JW



MORE SMILES THAN TEARS these days for Suzi Montano (1822) since she joined Parents Anonymous. She shares a moment on the playground with sons — five-year-old Dustin and three-year-old Gary.

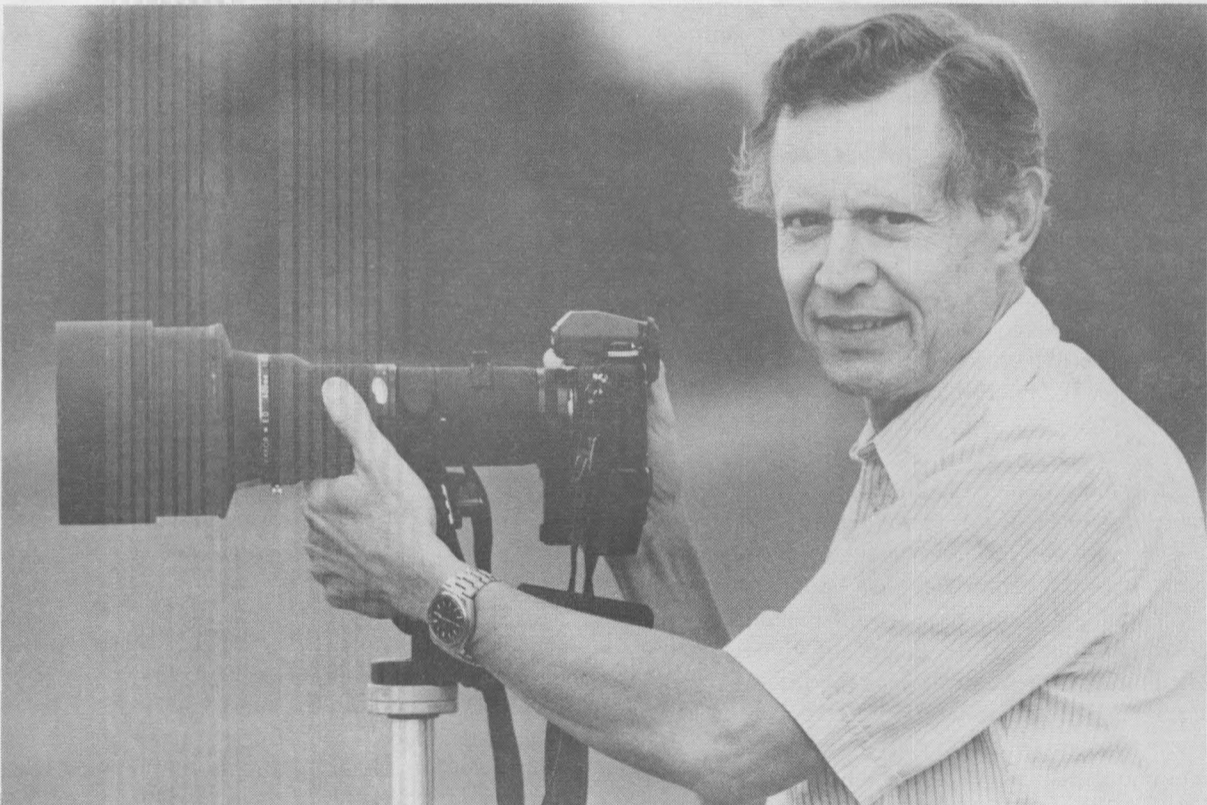


PHOTO-A-DAY desk calendar for 1989 contains four color photos taken by Fred James (9132) at the Rio Grande Zoo. He used his 400mm, f3.5, telephoto lens (above) for most of the shots, such as this one of a macaw (left). Published by Epoch, the calendar also includes his photos of a cheetah, a lioness, and a flamingo.

Congratulations

To Debbie and Richard (6212) Kottenstette, a son, Jonathan, Aug. 24.

Welcome

- Georgia
 - David Cason (5238)
 - David Craft (1124)
- Minnesota
 - Vincent Heitala (1141)
- New Mexico
 - Louis Aguirre (2626)
 - Brian Behling (3722)
 - Randall Smith (5142)
- New York
 - Robert Glass, Jr. (6315)
- Oklahoma
 - Gregory Conrad (2621)
- Utah
 - Brett Remund (2345)



IF YOU'VE MOVED, changed your name, or grown disenchanted with your political party (and you're a Bernalillo County resident), you can solve the problem at the voter registration station in the Bldg. 800 hallway on Oct. 20 from 11 a.m. to 1:30 p.m. Operated by the Albuquerque/Bernalillo County League of Women Voters, the station is part of a Base-wide voter registration drive (same time, same date) that includes a station at DOE/AL. Here, Diane Goldfarb of the League practices her registration skills on Ruth Kinney (2622), who recently moved to Albuquerque from Colorado.



Teacher

missions at or behind enemy lines," says Doug.

"We need to know if people can successfully operate the vehicles — and that requires reasonably accurate estimates of distances — while using a video monitor to view the terrain the vehicle will traverse. So we're doing mobility testing out here (at the Robotic Vehicle Range) to study the human factors involved in their operation. One of the things we've been looking at recently is how the judgment of operators might be affected by things such as the location of the camera on the vehicle, the degree of video resolution, the use of multiple cameras, and the use of color as opposed to black-and-white monitors."

Is Color Really Better?

"For this particular study, we asked Carla to re-examine some puzzling results we'd gotten previously in a larger study of how people perceive distance and clearance [the distance between two objects] while viewing a scene on a video monitor," says Dwight.

That study asked subjects to make distance and clearance estimates based on their observations of a videotape that showed two columns placed at different distances and spacings in a desert landscape.

The results of that study indicated that people looking at a video-taped desert scene consistently overestimated distance, clearance, and size — and that when they viewed the scene in color, as opposed to black and white, their overestimates tended to be even greater.

"This was a really curious result," continues Dwight, "particularly in view of the almost universal assumption that a colored video picture will help operators make more accurate judgments of distance and clearance because it gives them a better view of the terrain — one that more closely approximates what they would see in the field."

"We hoped Carla's study would replicate the results of our previous study and provide some insights into how color affects people's judgments about distance and clearance."

Carla's Study

For Carla's study, 10 volunteer subjects viewed videotapes showing two columns placed at various distances. As in the previous study, subjects were not told the actual size of the columns. Then, while viewing the tapes, they were asked to estimate distance to the columns in car lengths and to judge whether a particular vehicle could pass through the columns.

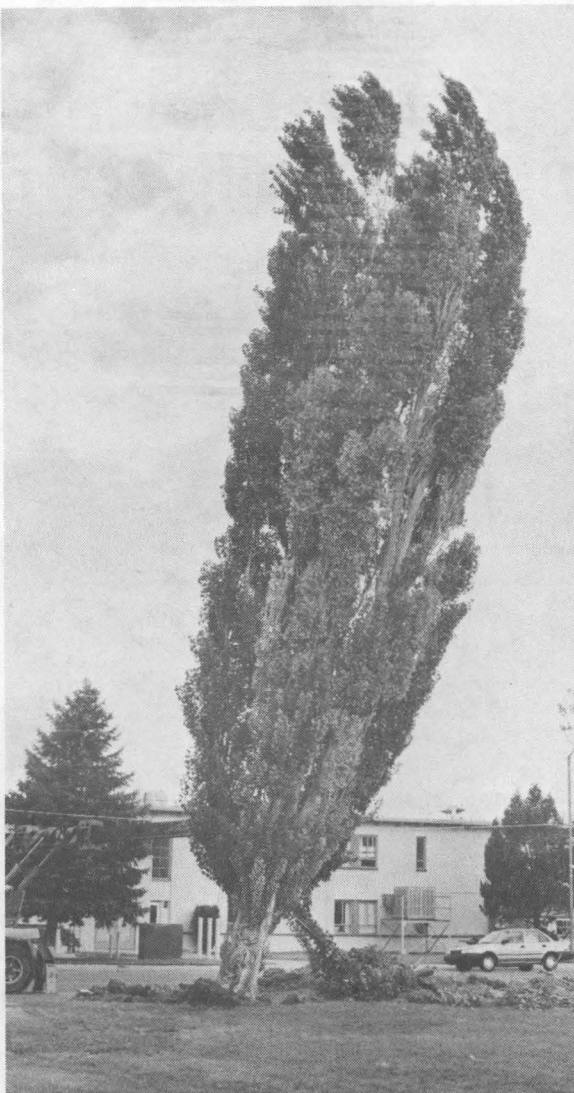
"To test the hypothesis that color enhances the visual texture of the terrain, giving the images more apparent depth, we had the subjects view identical scenes in color and in black-and-white," notes Carla.

"We also wanted to see if the foreground texture of the terrain, as it appeared on the video screen, affected subjects' estimates of distance. So in addition to the desert terrain used in the previous study, we showed the columns in a grassy field and in a sandy construction site. That gave us three different textures: the mixed vegetation of the desert, fine textured grass, and sand.

"This approach also allowed us to test the hypothesis that subjects in the previous study had overestimated distances because [according to validated studies] the human eye perceives the color green as being more distant than some other colors."

Implications

"I think it surprised us all when the results of my study showed that color was not a strong influential factor in estimating distances and that the texture of the terrain did not radically alter the subjects' perceptions of distances," continues Carla. "As in the previous study, subjects in my study tended to slightly overestimate distances while viewing colored videos of the desert terrain, but the overestimates were not great enough to be statistically significant."



TIMBER-R-R-R! This tree, the last of the parade ground poplars, hit the ground at 9:35 a.m. on Aug. 11. New trees and shrubs and other changes will mark the transformation of the parade ground into Hardin Field.

"The results of both studies raise some questions about the benefits of using color video systems on teleoperated vehicles," says Doug.

"Certainly from the perspective of the specific tasks considered in these studies, the use of color video systems can't be justified. But operators must perform a broad range of complicated tasks. We're addressing the essential elements of those tasks individually, taking advantage of simulation technology and isolating measurable responses."

"The results of Carla's study and that of the previous one have to be viewed in the context of the entire repertoire of visual tasks necessary to vehicle teleoperation," adds Dwight. "For example, we found in another study last summer that color provides an essentially insignificant advantage of only nine feet in assisting remote drivers to detect obstacles in the path of the vehicle. But we haven't eliminated color — it may prove to have some important benefits that we don't yet know about.

"And neither of the current studies," he notes, "attempts to address the psychological issue — most people, including users and video-system designers, prefer color. This preference may have a greater impact than the results of controlled experimental studies on decisions to use color in teleoperated vehicle designs. But Carla's study adds another important piece of information to a subject that only recently has begun to receive attention."

Mutual Benefits

Dick Prairie, manager of Reliability Department 7220, echoes Dwight's and Doug's appreciation of Carla's work and the STEP Program: "The STEP Program made it possible for us to initiate and complete — over the summer — an important project. Without Carla's help, we would not have been able to complete the project nearly as quickly. Ours was a case where there was a significant mutual benefit to the Labs and to the STEP participant."

And Carla agrees: "I especially appreciate the experience in the practical application of statistics this project gave me. APS has just this year added a statistics component to its curriculum — after my experience this summer, I'll be better able to help students see the practical value of studying statistical methods." ●DR

Fun & Games

Horseshoes — Ringing, clanking, thudding — and, it's hoped, laughter — will be heard at Los Altos Park (near the tennis courts) Oct. 1 when horseshoe players begin tossing iron at 9 a.m. at the SNLA Annual Horseshoe Tournament. Classes include retirees', women's, singles, and doubles. For more information, contact Tom Towne (5152) on 4-8801, Wayne Sly (2854) on 4-7345, Lupe Massoth (2631) on 4-5976, or Leo Bressan (ret.) on 268-5367.

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Boating — The Coast Guard Auxiliary regularly offers boating safety courses in both power- and sailboating. Both courses will be held on Wednesdays for approximately 13 weeks starting Sept. 14 at the Armed Forces Reserve Center (400 Wyoming NE) at 7 p.m. Instruction is free, but \$10 is charged to the first member of a family for the course text and materials. Additional family members pay \$3 for course work sheets. To preregister, call Ben Gardiner (7411) on 298-0116, Earl Livingston on 298-5926, or Ed Williams on 821-2060.

* * *

Golf — A 36-hole, two-day SGA Cup Golf Tournament was held Aug. 13 and 14 at NM Tech Golf Course in Socorro and at UNM South Golf Course. Format was individual basis. There were two flights and the winners in each are as follows: A Flight — Leon Chapman (ret.), low gross and longest drive at both Socorro and UNM South; Mark Calvin (3532), low net. B Flight — James Cordova (7412), low gross; John Garcia (7482), low net; Mike Sjulín (7265), longest drive at Socorro; and Howard Cilke (9212), longest drive at UNM South.

* * *

Running — A "Run for the Kids" fun run will be held Sept. 18 beginning at Tiguex Park to benefit Carrie Tingley Hospital Foundation. Entry forms are available at Gil's Runners Shoe World and Carrie Tingley Hospital. For more information about events and starting time, call 268-6300.

Take Note

Roger Zimmerman (6313) was recently named treasurer of the Albuquerque Chapter of the New Mexico Society of Professional Engineers.

* * *

Robert Eagan (2140) has been appointed national treasurer of the American Ceramics Society.

* * *

Jim Larson (3432) helped develop a program that provides mentors from the business community for 60 ninth-grade students from Rio Grande, Valley, Del Norte, and Highland high schools. Called the Job Mentor Program, it offers guidance and job-readiness training to youngsters who have career potential but who need extra incentive to earn a high school diploma. Mentors work at least four hours a month with students, coaching and assisting them in exploring career opportunities. Students follow their mentors through their normal business routines to find out firsthand what to expect in the business world. The program was set up and funded by local businesses, and is administered by the Albuquerque Business/Education Compact.

* * *

The next NM Chapter of the American Vacuum Society Short Course Program is set for Oct. 17-20 at the Holiday Inn Pyramid. Five short courses are offered: basic vacuum technology; vacuum calculations; partial-pressure analyzers, analysis and applications; surface preparation for thin-film deposition; and plasma etching and reactive-ion etching. Bill Rogers (1134) and Warren Taylor (former Sandian) are instructors in the basic vacuum technology course. Class sizes are limited, so early registration is recommended. A course information booklet and registration forms are available in the LAB NEWS office in Bldg. 814.

Corporate and Personal Integrity Program: An Emphasis on Quality, Honesty, Accuracy

NEW CODE OF CONDUCT and Corporate and Personal Integrity Program project was led by Personnel Specialist Mike Robertson (3533, right). The "ombudsperson" mentioned in the C/PIP is Marv Torneby (left), manager of Personnel Dept. 3530. He will be available to all Sandians who cannot, for whatever reason, use normal channels to resolve C/PIP-related problems.



Sometime during the next few weeks, all employees will get their personal copies of the Labs' Code of Conduct and a new Sandia initiative — the Corporate and Personal Integrity Program (C/PIP).

C/PIP complements the Labs' current Code of Conduct — a statement on basic standards of expected behavior related to specific work habits. The new program goes beyond that, addressing areas such as product and service quality and safety; compliance with statutory, regulatory, and contractual requirements; and management of government assets (see "Some Things Old" article).

Highest Ethical Standards

"Basically, C/PIP is aimed toward ensuring that our work activities and dealings with outsiders — our customers and suppliers — reflect the highest ethical standards," says Marv Torneby, manager of Personnel Dept. 3530. "In effect, the program is a formal vehicle for reminding employees of appropriate ways to deal with certain situations — an awareness-heightener of sorts.

"The program shouldn't be interpreted as an implication that employees' integrity is not what it should be; Sandia's outstanding reputation for excellence over many years is, in large part, due to the quality, performance, and integrity of its employees.

"C/PIP is a reaffirmation of what's always been expected in terms of business conduct and accountability," Marv continues. "With very few exceptions,

those expectations have been detailed elsewhere — SLIs, office instructions, and so on. A booklet combining the Code of Conduct and C/PIP, to be distributed to all Sandians, brings them together in one core document for the first time."

Mike Robertson (3533), who's been working on a Labs C/PIP statement for some time, says that many other companies have instituted similar programs during the last three or four years. "The driving force behind the establishment of written ethics statements at many companies," says Mike, "was a report published by a blue-ribbon commission appointed by the President to investigate alleged overcharges by the defense industry.

"The report — called the 'Defense Industry Initiative' — affected DoD contractors and covered a lot of ground: cautions on overcharges, warnings about substituting inferior products for specified material, prohibitions against kickbacks — and, in general, the need for continuing education of employees on ethical business standards. The report's primary recommendation was that defense-related companies should police themselves — through establishment of a written code of business ethics and conduct."

'Free and Open Atmosphere'

"Another requirement of the Defense Industry Initiative," Mike continues, "was that companies should create a free and open atmosphere in which employees are allowed — and encouraged — to report

perceived violations of the ethics code without fear of retribution."

AT&T was an original signatory to the Defense Industry Initiative, and has had a C/PIP in place for about two years at AT&T Federal Systems, Bell Labs, and other entities. Though Sandia's program is similar to that of AT&T, it's been modified to fit the Labs' culture and contractual arrangements, according to Marv Torneby.

"Sandia is voluntarily initiating C/PIP," says Marv. "Management believes the program reflects our commitment, established long ago, to the highest standards of integrity and quality." (See "Top Management Comments" article.)

New Communication Channel

C/PIP opens up a new channel of communication to employees who perceive a problem that falls under the program's purview. A Corporate Ombudsperson — accessible by anyone at any level — will be available to receive and investigate reports of suspected violations of Sandia policy. Management has appointed Marv to fill the ombudsperson role.

"The concept of a Corporate Ombudsperson is relatively new," says Mike Robertson. "However, a number of major companies — including AT&T — are implementing the concept. The ombudsperson can serve a valuable function, as long as employees remember that there are many other channels — which may be more appropriate — to report problems that need attention. Ideally, the ombudsperson should be contacted only when those other channels have been exhausted, or don't seem to work, but he's available whatever the circumstances."

At Sandia, those alternate channels are many: one's immediate supervision (and supervision on up the line); a supervisor — at any level — in another organization; personnel representatives; the Feedback program; and specialized organizations that can help with financial, medical, security, and personnel problems.

What C/PIP Is Not

Mike cautions that C/PIP is *not* a program to air personal likes and dislikes, and concerns of a petty nature. "For the program to work as it should work, it's important that only truly legitimate problems be referred to the Corporate Ombudsperson," he says. "By truly legitimate problems, I mean significant problems that cannot, for whatever reason, be handled elsewhere — for instance, failure to do tests required in a program."

As Corporate Ombudsperson, Marv may be contacted by Sandians at any location — SNLA, SNLL, TTR, Pantex, and others. The contacts may be in person (Bldg. 832/Rm. 80), by phone (844-2965), or by mail (Dept. 3530). "To help me determine the need for investigation of a problem," Marv says, "I'll need as much specific information as possible — the more detailed, the better. Only then can I decide if it's a problem I should investigate, or if it can more appropriately be handled somewhere else. Also, employees can be assured that — to the fullest extent possible — I'll protect the anonymity of anyone who reports a problem."

Marv sees feedback to the employee as one of his significant responsibilities. "It's important that a person reporting a problem know that it's under investigation and that appropriate action is being taken," says Marv. "I'll make sure that happens." He also points out that, in some circumstances, more than one Labs organization may be involved in C/PIP investigations; that means resolution will take longer.

C/PIP investigation results will be reviewed by the Corporate and Personal Standards Review Committee (formerly the Conflict of Interest Committee). Committee members are Bob Kestenbaum (4000), Bob Peurifoy (7000), Everet Beckner (5000), John Crawford (8000), Paul Stanford (100), and Ralph

Reflects Current Policies

Some Things Old, Some Things New

A booklet that combines Sandia's Code of Conduct and the new Corporate and Personal Integrity Program (C/PIP) will be distributed to employees within the next few weeks.

Sandians will recognize some changes in the Code of Conduct that reflect current practices and policies at the Labs; modified sections include those on personal conduct, drugs and intoxicants, theft and fraud, smoking policy, and ES&H (environment, safety, and health).

Other topics in the previous Code of Conduct have been moved to the C/PIP section: government property, safeguarding information and records, conflicts of interest, and company funds and negotiable documents.

C/PIP also contains reaffirmations and

expanded guidelines on expected behavior related to a number of other areas: product and service quality assurance and safety; gifts, gratuities, and kickbacks; acquisition of materials or services; and contractor relationships.

C/PIP standards emphasize quality and accuracy — from products to cost-charging to delivery of good and services. Also emphasized is a requirement that Sandia's consultants and contractors conform to the same standards of conduct required of Labs employees.

Sandians, regardless of level, are expected to read, understand, and comply with C/PIP provisions. That applies to new hires as well; they will receive C/PIP training as part of their orientation.

Top Management Comments

The Corporate and Personal Integrity Program pulls together — in one document — longstanding Labs practices and expected standards of ethical behavior covered in a variety of places: SLIs, office instructions, and so on. Top management comments on the program:

President Irwin Welber — “Our Corporate and Personal Integrity Program is an attempt to articulate what I hope each of us does in our daily activities at Sandia. It is not meant to be a detailed recipe for behavior, but rather a guide and a reminder of the importance — especially in today’s environment — of ethical behavior.”

EVP Orval Jones (20) — “We at Sandia have been given a very special public trust regarding the integrity of our products. I believe we are fulfilling that trust. But, to maintain it, we must carry that sense of integrity into every aspect of our activities. The new Code of Conduct and Corporate and Personal Integrity Program serve as important reminders and guides to our responsibilities. I encourage every employee to read and consider them carefully and to

apply them in everyday activities, both large and small.”

EVP Lee Bray (30) — “Our integrity, both individually and collectively, is the cornerstone of our success. It’s the one quality without which we cannot possibly succeed. While our technical capabilities are substantial and are essential for successful achievement of our mission, they will be sufficient only if it is well understood by all that they are founded upon the controlling principles of honesty and trustworthiness.

“I believe that, for the most part, we already have in place the primary ingredient of a successful C/PIP — namely an open and highly participatory management environment. However, as a safety measure, I believe it is important to go a step further and provide an alternate channel through which individuals who might not otherwise express their concerns will feel not only free, but compelled, to do so. I view C/PIP as an additional layer of protection that we have self-initiated to help us safeguard those qualities and characteristics that so importantly define our integrity.”

Bonner (3500). After reviewing investigation results, the committee will make appropriate recommendations to Sandia management and to governmental agencies, and monitor the implementation of corrective action.

‘Anywhere and Anytime’

“C/PIP is a Labs-wide program,” says Marv. “It affects all employees, anywhere and anytime. We hope it will encourage an environment of openness, where the early recognition of potential problems — and their prompt correction — is accepted and expected.

“Understanding C/PIP provisions is an impor-

tant first step in the process, so employees need to review the new Code of Conduct/Corporate and Personal Integrity Program booklet and discuss with their management any parts of the program that aren’t clear.

“Compliance with C/PIP standards is an obligation of every Sandian,” Marv concludes. “As the new booklet puts it, C/PIP ‘principles are essential to the way we define and conduct ourselves as individuals and as a company. Nothing is more important. No budget overrun, contract schedule, or personal reward is worth risking the consequences of deviating from these standards of honesty.’ ” ●PW



THEY GAVE THEIR REGARDS TO BRAUDAWAY — The people at the National Conference of Standards Laboratories chose Dave Braudaway (DMTS) of Electrical Standards Div. 7242 to receive the Conference’s highest award. Called the William A. Wildhack Award, the annual award “honors outstanding contributions to the measurement community.” Dave was recognized “for his technical accomplishments in improving standards measurements, his contributions in bringing recognition and respect to the Sandia Primary Standards Lab, his contributions in enhancing the standards program of the DOE, his extensive service on or as an official of national and international organizations devoted to establishing standards; for service to his country; for service to his community.” Dave has worked at Sandia since 1956; he was on loan to the National Bureau of Standards in Gaithersburg, Md., in 1971-72. The award is a silver medallion.

(Continued from Page One)

Exhibit

developed in the early 60s by Willis Whitfield (ret.) and featured in the exhibit, represents what is probably Sandia’s most valuable example of transferred technology. Worldwide construction sales are expected to reach \$3.7 billion this year.

The hot air solder leveler, invented in the early 70s by T. A. Allen and Bob Sylvester (both ret.), has become the standard device for leveling solder on a printed circuit board. Since the first commercial unit appeared in 1974, machines conservatively valued at several hundred million dollars have been built throughout the world.

“The scope of Sandia’s contributions to private-sector technology through the years is often underestimated,” says Glenn Kuswa, 4030 manager. “This exhibit clearly explains that our contributions add hundreds of millions of dollars to the US economy annually. New developments, just emerging, are likely to continue this trend.

“But we should remember that technology transfer seldom is easy to accomplish,” he adds. “Often much additional labor and capital are required to make knowledge developed at the Labs for a specific purpose useful on a wider scale. We also need patience, because new technologies frequently emerge before there is a developed demand in the marketplace.”

Other New and Old Programs

The exhibit also details contributions to the oil, gas, and drilling industries that grew out of Sandia’s energy R&D program started during the Middle Eastern oil embargo of the 70s. These include various improvements in synthetic diamond drill bits and, more recently, a downhole seismic source, anelastic strain recovery measurement, and identification of the steam refluxing problem.

And there are examples of more recent work — joint Sandia/UNM Medical School research into such diverse items as polymer foams and radiation-sensing field-effect transistors (RADFETs) — that may yield widely used products of the 90s and beyond.

Polymer foams may be suitable as artificial skin, veins, arteries, or bones. RADFETs have been used to provide the first direct-dose measurements at the actual site of tumors in cancer patients being treated with radiation.

Visitors will also see PLZT flashblindness lenses at work, a scale-model bridge crane that can avoid objects in its path, and a magnet that levitates over a Sandia-made superconducting wafer — a potential contribution to future technology transfer.

Other exhibit elements include the SANDAC embedded computer, semiconductor bridge detonator, vacuum arc remelt controller, and a system of using commercially available solar cell panels to power a water disinfecter.

For this exhibit, coordinator Joe Laval (3163) reused much of the structural material from the 1984 display. Parts of the exhibit were originally designed for use in the Technology Transfer Center and will be relocated there after the fair. Portions also will be available for use at various locations throughout the community and state in support of the Labs’ continuing technology transfer efforts.

The exhibit is staffed by employees and retirees who were identified through Div. 3163’s Volunteers in Action program and employees from line organizations represented in the exhibit.

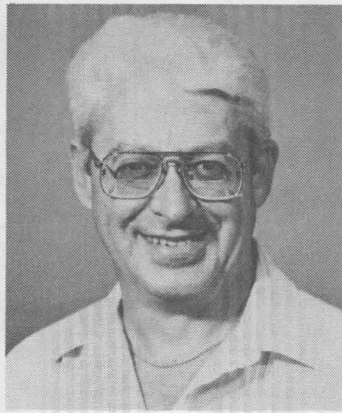
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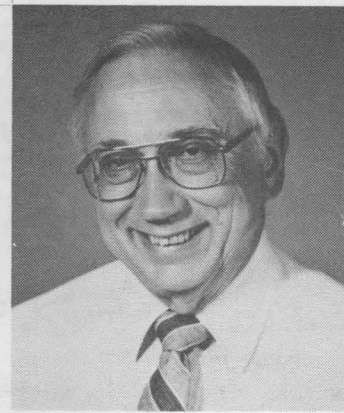
MILEPOSTS

LAB NEWS

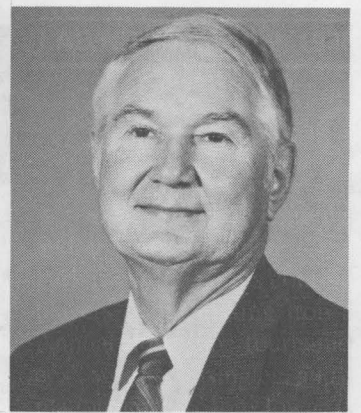
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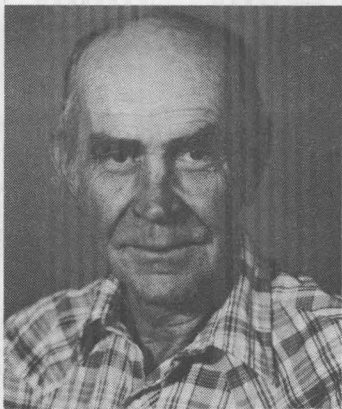
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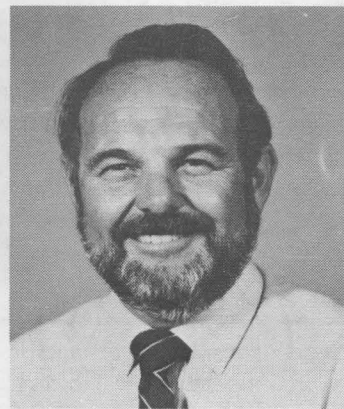
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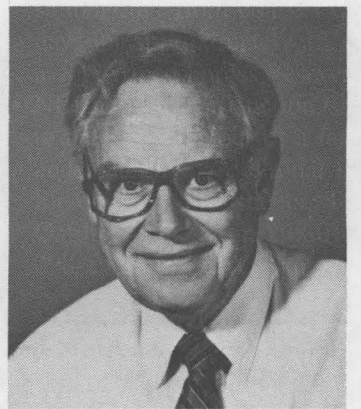
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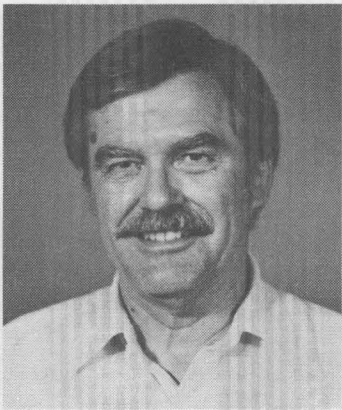
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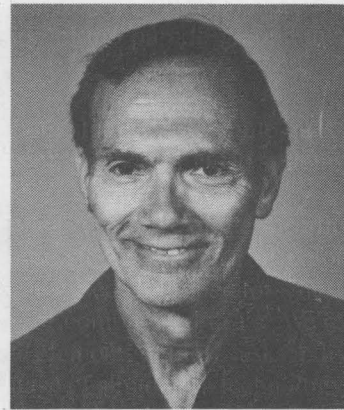
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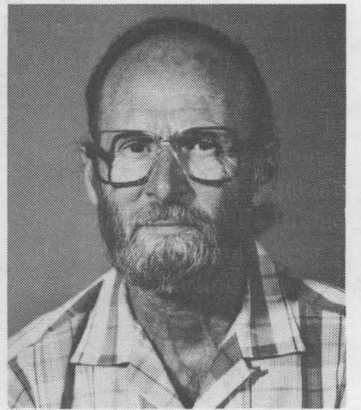
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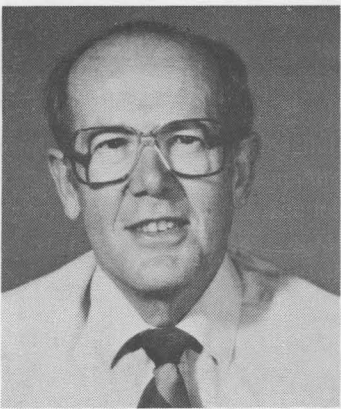
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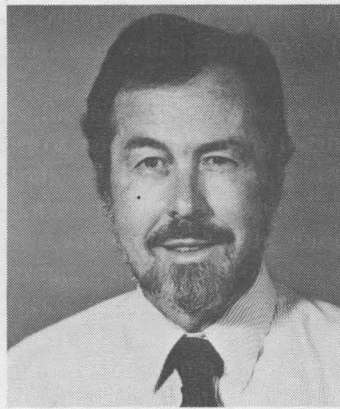
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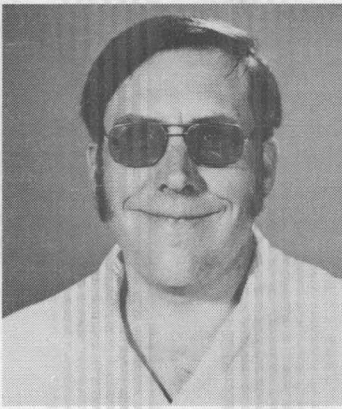
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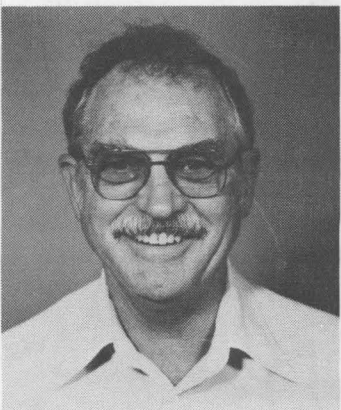
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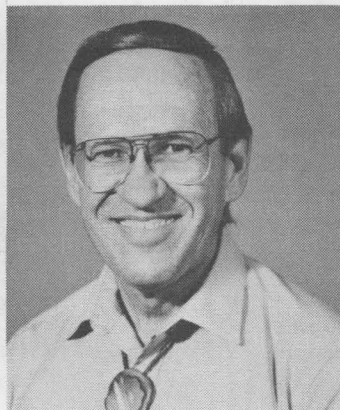
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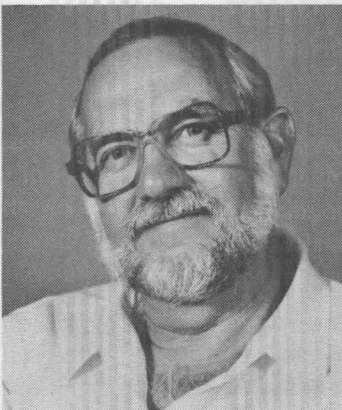
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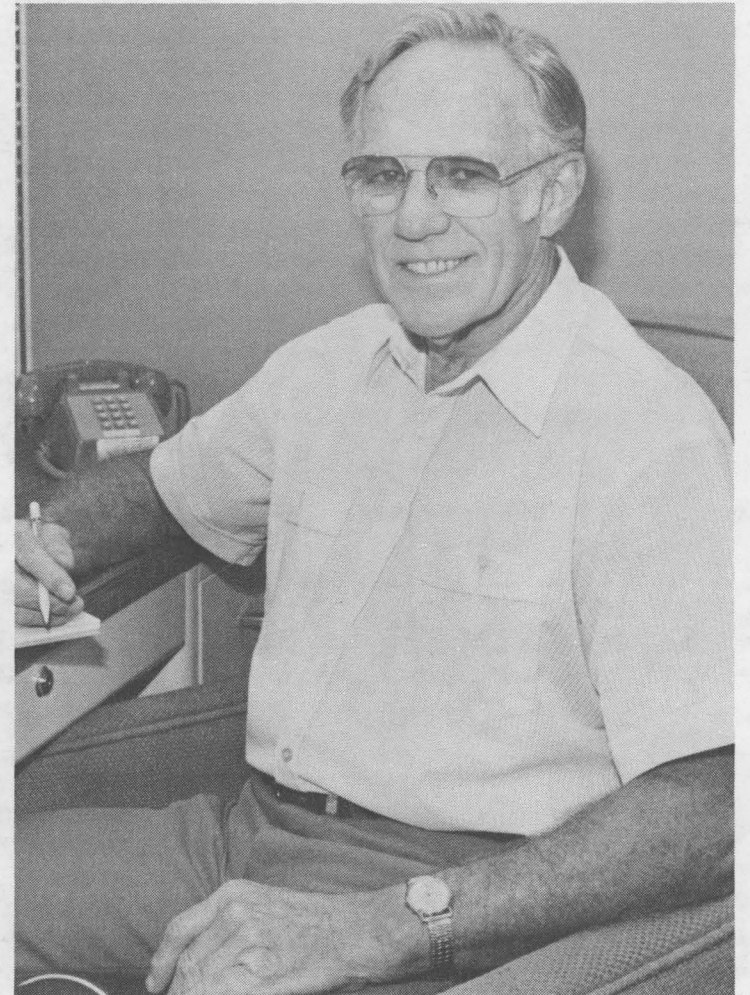
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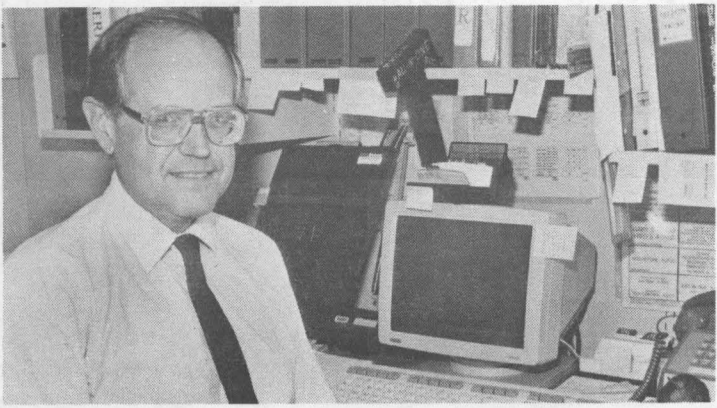
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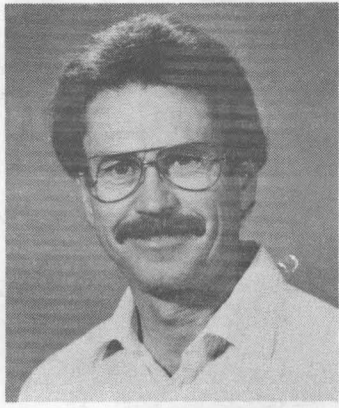


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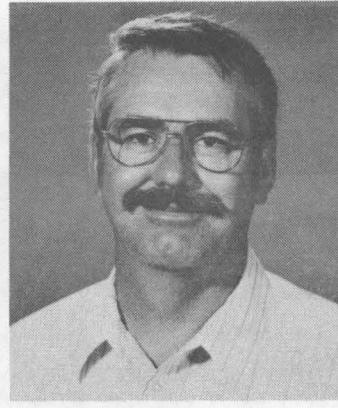
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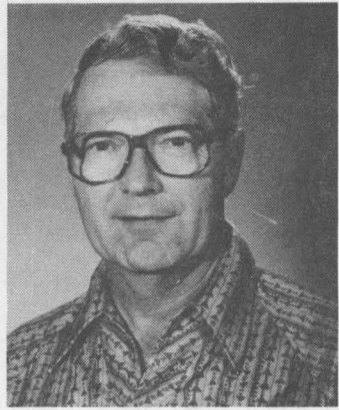
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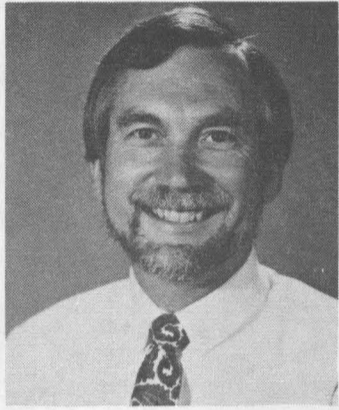
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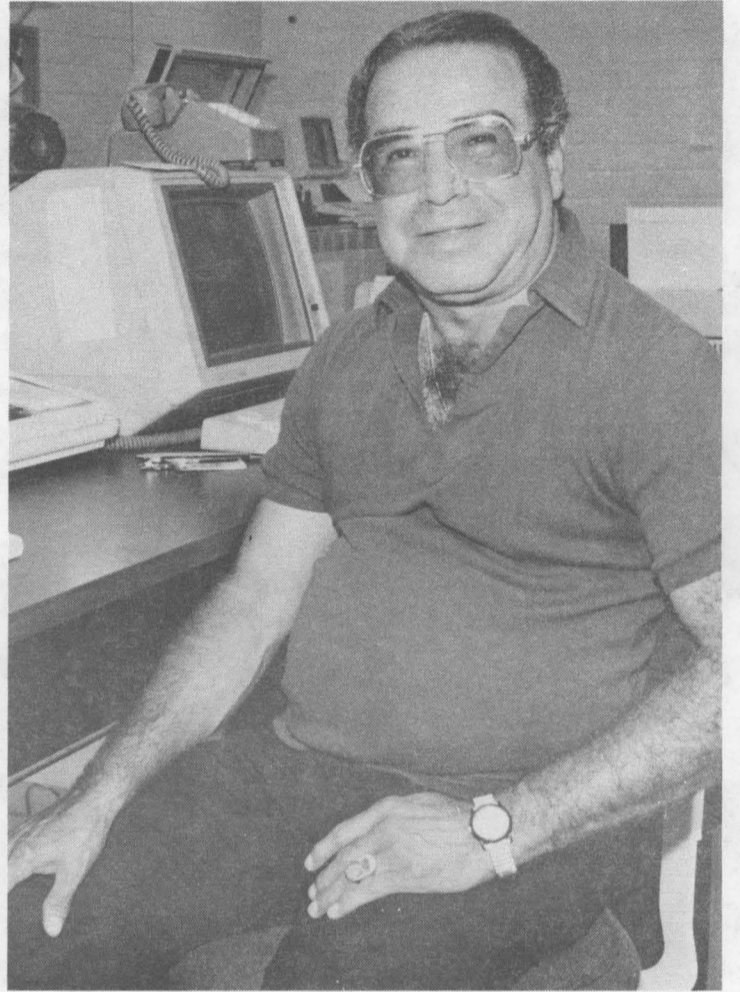
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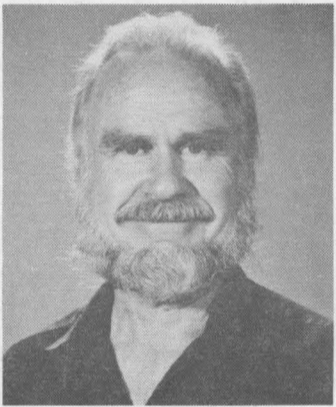
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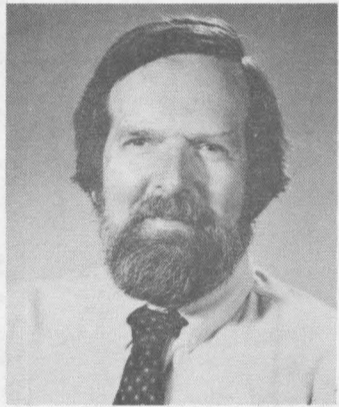
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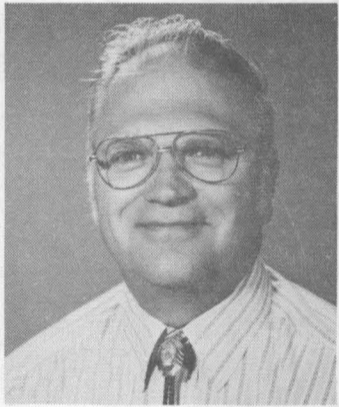
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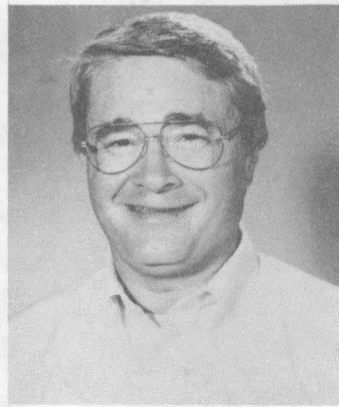
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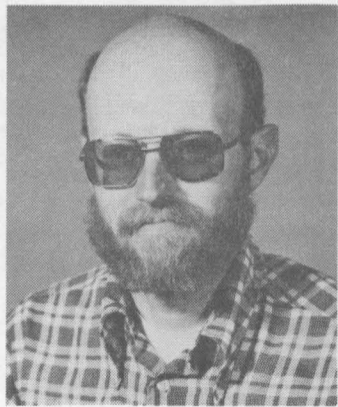
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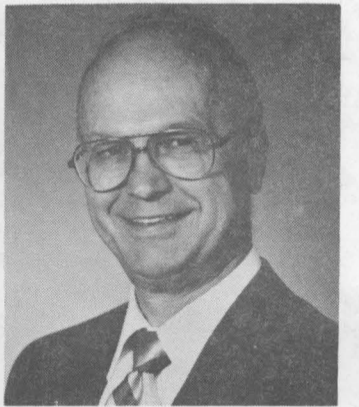
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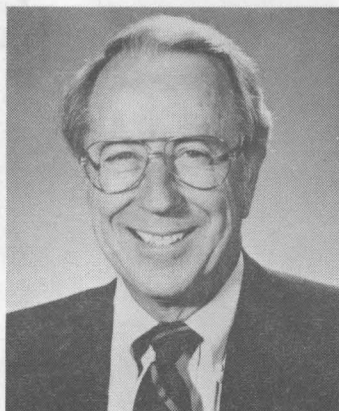
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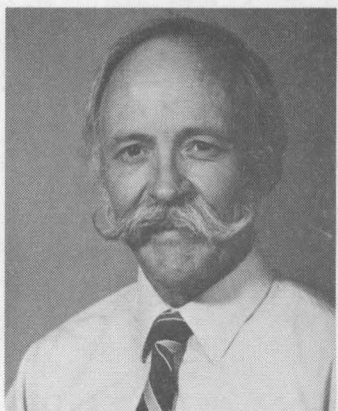
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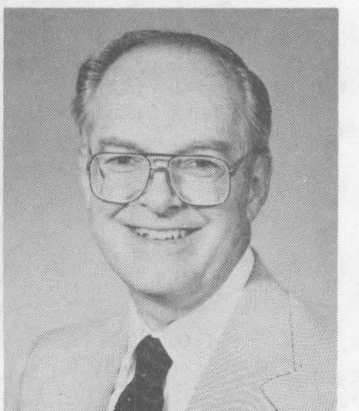
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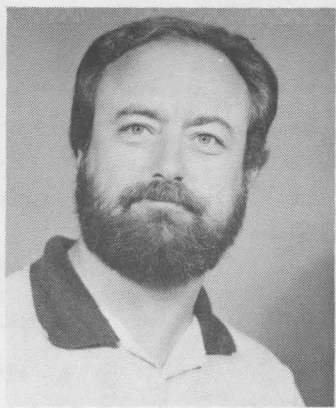
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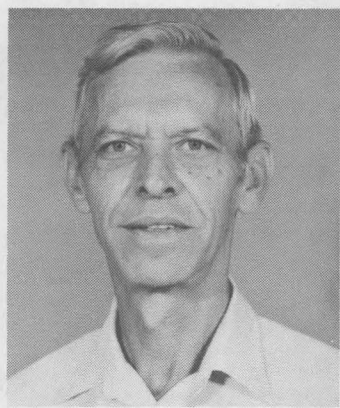
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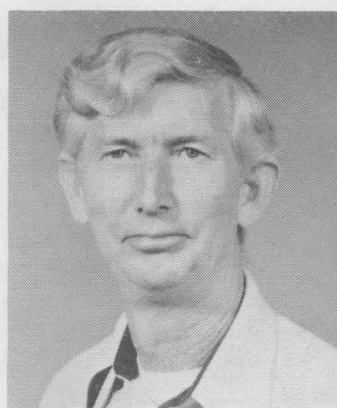
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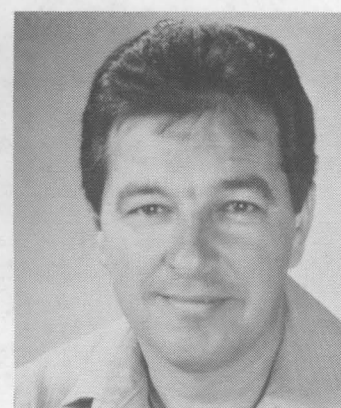
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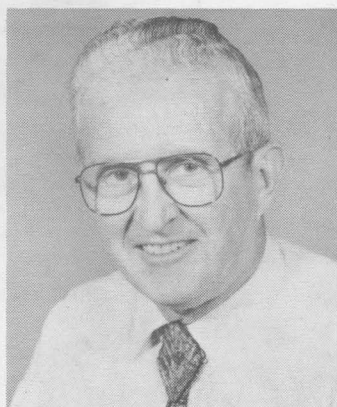
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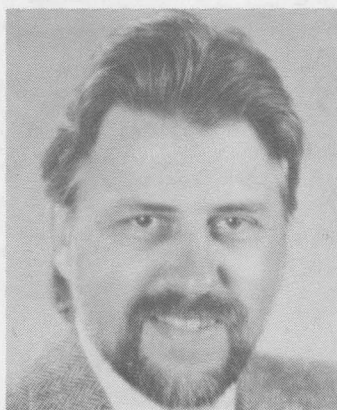
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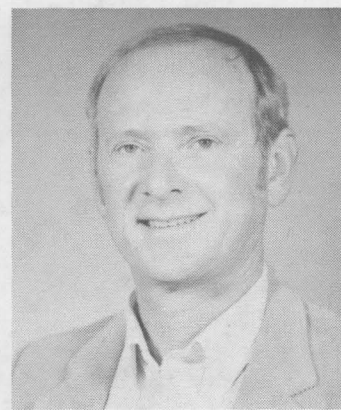
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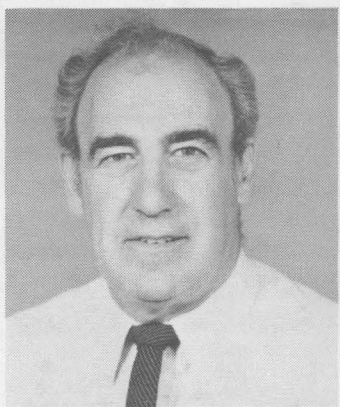
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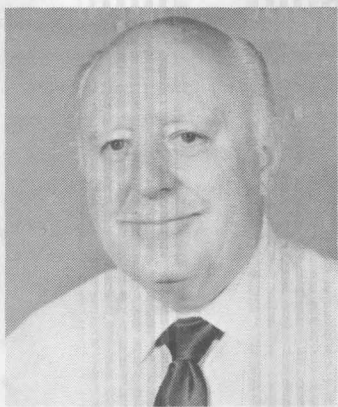
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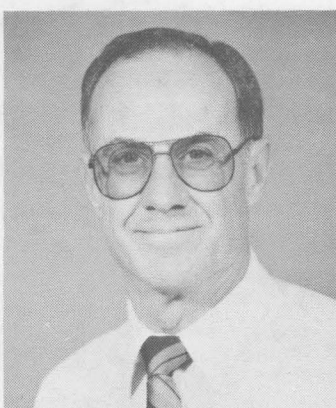
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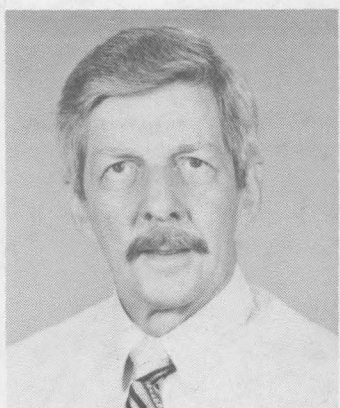
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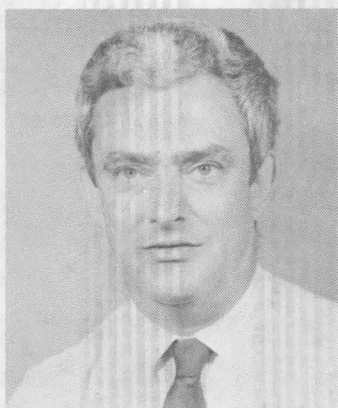
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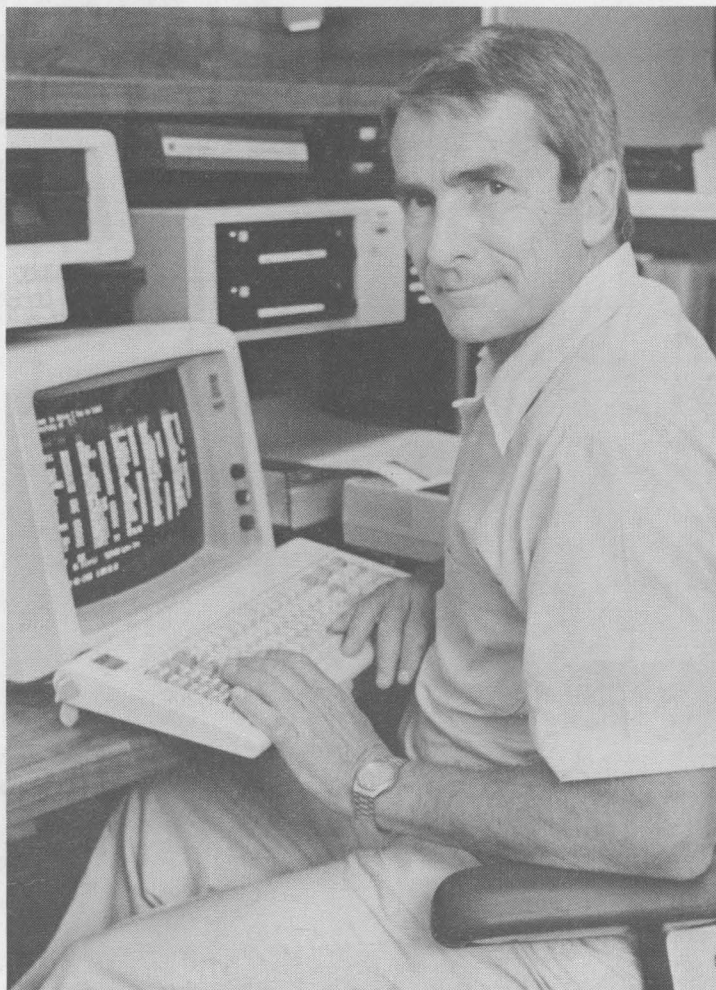
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Jim Borders (1823)

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Gene Shipley (2834)

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UNCLASSIFIED ADVERTISEMENTS • UNCLASSIFIED ADVERTISEMENTS • UNCLASSIFIED ADVERTISEMENTS • UNCLASSIFIED ADVERTISEMENTS

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

Ad Rules

1. Limit 20 words, including last name and home phone.
2. Include organization and full name with each ad submission.
3. Submit each ad in writing. No phone-ins.
4. Use 8½ 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.

MISCELLANEOUS

WROUGHT-IRON ENTRY LIGHT, \$15; 8-piece Junior Girl Scout uniform, accessories, size 8-10, \$20. Bradley, 293-9586.

QUEEN-SIZE SOFA BED, \$125; electric typewriter, \$25; toy loom, \$10; 2 pairs woman's Italian shoes, size 6, \$30/both. Thomas, 268-1532.

AUTOMOBILE RAMPS, 12", \$10/set; oscillating fan, 16", 3-sp., 34" high, \$18; regulation-size pool table w/balls, cues, cover, \$225; 5-1/2-cu.-ft. cement mixer, \$200. Bray, 292-2410.

GM INFANT CAR SEAT, GM and Strollee child car seats, \$25/ea. Bauer, 266-8480.

RADIO-CONTROLLED CAR, Kyoso Pegasus, extras, no electronics, \$55 OBO. Miller, 281-4397 after 6.

SHOP MANUAL FOR '84 FORD BRONCO II and '83 Ford Ranger, cost \$50, sell for \$20. Barr, 821-5870.

PUPPIES: Labrador/cocker mix, 4 male and 1 female, black or brown, \$10/ea. Hail, 298-3962.

CAB-OVER CAMPER, 8' to 9', refrigerator (gas and electric), stove, heater, optional restroom. Jones, 281-3617 after 5:30.

AKC-REGISTERED SIBERIAN HUSKY PUPPIES: red and white, black and white, \$125. Puccini, 281-3438 or 255-0568.

AKC-REGISTERED PUPPIES: white German shepherd, 6 weeks old; cinnamon chow, 8 weeks old. Mathes, 1-832-6676.

NAUTILUS ABDOMINAL EXERCISE MACHINE, \$300; Singer treadle sewing machine, \$100. Jones, 281-3762.

RETRACTABLE CASTERS, fit all Sears power tools, cost \$55, sell for \$20 OBO; drafting table, 36" x 60", \$100. Davie, 296-3950.

BLACK MALE CAT, has shots, free. Cropp, 296-1877.

SALTWATER AQUARIUM, 35-gal., tank stand, under-gravel filter, pumps, lighted hood, coral, chemicals, sea anemone, \$120. Haycraft, 821-3816.

STEREO, Panasonic, AM/FM, cassette, turntable, speakers, \$100; F. Loree wooden oboe; Signet student oboe. Blottner, 292-6058.

ELECTRIC RASCAL, built-in battery charger, \$2000 OBO. Merriken, 293-9095.

TELESCOPE, refractor 400x, 800mm, 5 lenses, tripod, \$75. Hogan, 292-5591.

SCULPTURED CARPET: light gold, 14' x 15' and 6' x 10', \$75; Berber light beige, 20' x 20', \$150. Chorley, 296-1454.

ELECTRIC LAWN MOWER, w/cord, \$40; queen-size foam mattress, \$25; Sears porta-potti, \$15; Atari 2600, w/games, \$25; all OBO. Garcia, 293-3937.

REEL-TYPE LAWN MOWER, Briggs & Stratton, heavy-duty, \$85 or make offer; new lawn spreader, \$20. Chaves, 892-9765.

GARAGE AND BAKE SALE, multi-family, Sept. 11, 8 a.m., 442 Ash NE. Barger, 247-9114.

VCR CART, w/casters and storage space; foam sheets, 38" W x 77" L, 4" thick; pharmacy lamp, tent shade, adjustable, polished brass finish. Pitti, 256-1629.

FULL-SIZE VIOLIN, Anton Becker, w/bows and case, \$400. Lee, 296-3317.

GLASS SCREEN DOOR, 32" x 80", \$20; wooden screen door, 36" x 80", \$20; wooden door, 28" x 80", \$20; pocket doors, 64" x 80", \$50; all OBO. Montoya, 881-6898.

FOUR TIRES, w/rims, for '80 Ford Mustang, \$65 OBO. Chavez, 842-6374.

LAWN MOWER, Jacobsen, \$45. Carter, 293-6750.

AKC-REGISTERED SAMOYED PUPPIES, white, born July 25, 5 males, 3 females, \$195/ea. Schindwolf, 281-9859.

MOVING BOXES, 4 wardrobe, 14 dish-pack, 79 (sizes 1.5 cu. ft. to 4.5 cu. ft.), .50¢ ea. or \$35/all. Frear, 293-2791.

SANYO COMPACT REFRIGERATOR, 2.5 cu. ft., used one year, \$80. Gerwin, 881-0028.

FULL-SIZE MATTRESS, box spring, frame, \$75; Class 2 trailer hitch, \$25; adjustable inside gate, \$5. Zubersky, 821-1774.

WICKER FURNITURE: 6' sofa, 2 chairs, ottoman, 2 end tables w/glass tops, \$225/all. Roherty-Osmun, 293-8127.

SERVICE MANUAL for '79 Datsun 810, issued August 1978, \$10. Garner, 292-3859, leave message.

ALMOND BATHTUB, 5' x 4', w/step, \$125; Fisher-Price car seat, \$50. Cibicki, 877-7098.

WOOD STOVE, Vermont Castings Resolute, never used, cost \$1000, sell for \$800. Rosales, 243-0789.

TELESCOPE, B&L 4000 Pro Kit w/drive, surveyor's tripod, case, Yashica camera mount, extras, \$550. Furry, 281-2548.

YOUTH'S CROSS-COUNTRY SKI OUTFIT: 170cm Trak no-wax skis, 110cm poles, size 39 boots, \$40/all. Anderson, 294-8451.

DINING ROOM TABLE, 66" x 42", wood top, wrought-iron base, 6 chairs, \$150 OBO. Austin, 831-2511.

ANTIQUITY SEWING MACHINE, \$75; antique typewriter, \$45; maple dining table w/6 chairs, \$120. McMillen, 889-3849.

100-AMP POWER POLE, 6x6 mesh (1/2 roll +), 2 electric hot-water heaters, dehydrator, 250-gal. oil storage tank. James, 292-1606.

DP WEIGHT SET AND BENCH, \$130; full-length Yamaha keyboard/synthesizer, \$200. Homer, 836-5043.

'78 CAMARO RIMS, set, \$80; sheepskin seat covers, \$70. Smith, 275-8185 after 5.

'86 COACHMAN TRAVEL TRAILER, 26', tandem axle, sleeps 6, full kitchen and bath, AM/FM stereo, awning. Taylor, 296-6657.

BASSETT CRIB w/mattress, \$110; Nod-A-Way crib w/new mattress, \$85; twin-size brass headboard, \$35; 38" trampoline, \$15. Morton, 296-6108.

GARAGE SALE: clothes, furniture, misc., 3425 Britt NE, Sept. 10 & 11, 8 a.m. to 4 p.m. Klamers, 299-5235.

HARDWOOD TABLE w/4 upholstered chairs, game height, \$300; Panasonic stereo, AM/FM, phono, tape, \$50; 60 yds. carpet, \$100; 3/4-cord ash & pine cut firewood, \$65. Mitchell, 884-4219.

TWO SNOW TIRES, 78x14, w/rims, \$50. Carson, 892-9895.

TWIN-SIZE BOX SPRING, extra-firm, never used, \$65 OBO; 3 bar stools, \$36", used 6 months, \$3/ea. Miller, 275-3942.

GARAGE SALE: man's 10-sp., hand-painted dinosaur T-shirts, 6-1/2" sofa, woman's ski jacket, fall clothing, Sept. 16 & 17, 9:30 a.m. to 4 p.m., 9504 Spain NE. Fleetwood, 822-0026.

TWO BARREL CHAIRS, 4 chandeliers, misc. light fixtures, picture window drapes, traverse rods, reel lawn mower. Church, 299-2175.

YAMAHA ALTO SAXOPHONE, \$300. Koehler, 293-7017.

CAMPER BOX for long, narrow or wide, full-size pickup, \$125; refrigerator,

\$45; LPG range, \$25; freezer, needs compressor, free; M1 Garand rifle, w/1000 rounds of ammo, \$800. Foster, 281-3975.

ANTIQUITY BEDROOM SET: chest, dresser w/mirror, headboard, footboard, \$350; electric washer and dryer, avocado, \$175 OBO. Starr, 293-3931.

WASHER, General Electric, 6-cycle, heavy-duty, w/mini-basket. Walla, 299-2209.

WET SUIT & TUNIC, Parkway, never used, fits 5'11" 165-lb. man, \$135. Seamons, 292-2679.

QUEEN-SIZE WATER BED, Hibernation Premium series, waveless, \$200. Widman, 293-7279.

SHOTGUN, Mossberg 500 combo, 12-ga., 28" and 18-1/2" barrels, pistol-grip kit, shoots 2-3/4" and 3" shells, \$230. Smith, 823-9521.

POP-UP TENT TRAILER, sleeps 8, w/stove, icebox, sink, new faucet, \$500 OBO. Alexander, 291-8028.

GOLF DRIVERS: Taylor-Made, metal, \$65; Cobra Long Tom, all graphite, \$125; Golf Smith Deep Face, metal, \$30. Adams, 823-1845.

MICROWAVE, \$50; vacuum, \$25; Weed Eater, \$10; ironing board; small appliances. Bertram, 292-8584 until 8.

AKC-REGISTERED CHOW PUPPIES, 3 males, 2 females, black, red, cream, born Aug. 24. Reimholz, 296-9178 after 4:30.

FREEZER, \$125; Maytag electric dryer, \$200; canopy bed, \$50; typewriter, \$50. Baker, 294-3334.

BEDROOM SET, white French provincial, full-size canopy bed, 2-drawer nightstands, powder table, chair, 9-drawer dresser, mirror. Swier, 298-8435.

OAK COMPUTER HUTCH; vacuum cleaner; TI58-C prog. calculator; toaster oven; dart board. Boccabella, 298-0461.

DISHWASHER, Frigidaire, Custom Imperial, 5-level, rebuilt motor, inside door needs spot coating, \$25. Foster, 299-6240.

KING 3B TROMBONE, w/F attachment, stand, straight mute, extra mouthpiece, assorted accessories, music, \$600. Magnuson, 821-5330.

SWINGS, single hamster cage, aluminum screen door. Maestas, 831-4072.

"SNOOPY" TELEPHONE, rotary, \$50; woman's suede blazer, lined, size 10-12, \$35. Cook, 888-2928.

CANNING JARS, \$1/doz. Kelly, 293-2475.

RADIO SHACK "ROBIE JUNIOR," radio-controlled robot, \$55; Kenmore refrigerator, 15 cu. ft., \$125. Boyes, 296-0654.

AIREDALE CROSS DOG, spayed, shots, free; lida banjo, \$200; 1-1/2-hp air compressor, \$100; 25" color TV, \$60. Seager, 281-5045.

FREEZER, 31 cu. ft., Kenmore, \$150. Eckelmeyer, 296-2148.

GARAGE SALE: game/bumper-pool table, girl's bedroom set, Sept. 9-10, 9 a.m. to 5 p.m., 2617 LaCharles NE, signs at Menaul and Candelaria at Chelwood. Hatch, 296-2773.

CAMPER SHELL for LWB, insulated, lights, wood paneling, curtains, cabinets. Crass, 281-3889.

DOORS: hollow and solid core, various widths, not prehung. Moss, 298-2643.

ENGLISH SPRINGER SPANIEL PUPPIES, liver and white, long tails, purebred, no papers, \$65/ea. Newman, 266-9418.

HOLOGRAPHY SETUP, Class II 5.0mw laser, mirrors, lens, splitter, supplies, 30" x 48" tension sand table, \$595. Garberson, 292-0078.

COMPUTER DESK, oak rolltop, 3 years old, cost \$1500, sell for \$700. Cabe, 293-6895.

ROWING MACHINE, \$75; bookcase, 12" x 24" x 6", \$30. White, 293-2219.

FRENCH HORN, Conn single F, w/case, \$400. Olman, 884-4663.

TRANSPORTATION

'77 AMC HORNET AMX, 52K miles, red w/black interior, 6-cyl., AT, \$200 OBO; '80 VW Rabbit, white w/blue interior, Recaro driver's seat, new

Michelins, \$975 OBO. West, 242-2561.

'82 CULTRASS SUPREME, 4-dr., new paint, V-6, AT, PB, PS, AC, cruise, tilt, tint, \$2800. Mathews, 881-7368.

'80 CHEV. LUV PICKUP, 4-WD, \$2950. Madsen, 294-3235.

'84 KAWASAKI NINJA 900cc, 9.1K miles, one owner, \$2500. Roth, 344-7060 or 877-8489.

'86 KAWASAKI 80 DIRT BIKE, \$600. Olbin, 275-2681.

BOY'S SCHWINN BIKE, \$55. Thomas, 268-1532.

'72 MERCEDES 280SE 4.5, 4-dr., 8-cyl., 86K miles, service records, \$7500. Van Den Ayyvyle, 898-6474.

'74 HONDA MOTORCYCLE, \$175. Carter, 293-6750.

'70 FORD BRONCO, 4-WD, rebuilt 302 V-8 engine, 3-sp., new paint, AM/FM cassette, CB, dual tanks, locking hubs, \$3900 OBO. Romero, 1-864-6254.

'70 HONDA TR90 TRAIL BIKE, engine overhauled, new chain, sprockets, seat, battery, and cables, \$250. Murphy, 881-1520.

'84 CHEV. MARK III CUSTOM CONVERSION VAN, 3/4-ton, 22K miles, extras, cost \$24,000, sell for \$13,900 OBO. Sepulveda, 299-2805.

'80 MERCEDES BENZ 240D, white, AM/FM cassette, \$9000. Cibicki, 877-7098.

'76 VW DASHER, \$800. Smith, 275-8185 after 5.

'84 DODGE DAYTONA TURBO Z, 5-sp., loaded, under book. Tabet, 865-6558 or 864-6361.

'85 HONDA SCOOTER 150 ELITE, 6.7K miles, \$650. Homer, 836-5043.

GIRL'S 26" 3-SPD. BICYCLE, \$45; girl's 20" high-rise bicycle, \$35. Morton, 296-6108.

'67 VW SQUAREBACK, rebuilt engine, \$1100. Strasburg, 291-9212.

'85 HONDA ACCORD, 4-dr. sedan, AC, PB, PS, tilt, AM/FM cassette, rear defrost, 47K miles, \$6600. Sargent, 865-3227.

'80 CHEV. LUV PICKUP, 4x4, fiberglass shell, AC, loaded, \$2650. Roseth, 296-8842.

BICYCLE, Schwinn Pixie, 16", \$50. Behr, 292-0549.

'69 BMW R60 MOTORCYCLE, 46K miles, \$2000. Tipping, 296-3492.

19' BOAT, Ebko, 190-hp motor, tandem trailer w/brakes, \$6600. Clingan, 292-6643.

'70 DATSUN 510 SW, 4-sp., 140K miles, \$300 OBO. Hlava, 265-4178.

'67 DATSUN 1600 SPORTS CAR, red, winter/summer tops, 2 sets of wheels, \$3000 negotiable. Starr, 293-3931.

'85 CADILLAC COUPE DeVILLE, loaded, 2-year warranty, \$11,000. Hill, 821-2771.

'70 DATSUN 240Z, \$2000 OBO; '76 Chev. Malibu, AC, 86K miles, 350 V-8. Finley, 293-7947.

'72 CHRYSLER NEWPORT, 69K miles, \$500 OBO. Clark, 298-8254.

'86 DODGE COLT VISTA SW, 4-WD, AC, AM/FM, 27K miles, 5-sp., \$7995 negotiable. Field, 268-0025.

'85 JEEP CJ-7, 21K miles, hardtop, 6-cyl., silver, price negotiable from book value. Garcia, 299-7803.

'67 CHEV. IMPALA, 327, hardtop, radio, AC, AT, engine needs work, \$800. Zurawski, 884-3862.

'82 FIAT SPIDER 2000 CONVERTIBLE, 75K miles, extras, \$5900. Hollister, 296-8055.

'49 CHEV. PICKUP, \$900 or trade for 5-window; '66 Ford pickup, new brakes, fuel pump, battery, needs paint, \$1100. Packwood, 265-7333.

'71 CHEV. SS CHEVELLE, balanced 454 V-8, new Turbo 400 transmission, 4.11 gears w/Positrac, new Imron polyurethane paint, \$4500 OBO. Smith, 298-9588.

'84 KAWASAKI 1100 LTD CRUISER, shaft drive, adult owner, self-cancel turn signals, other features. Norwood, 292-0072.

10-SPD. BICYCLES: woman's Schwinn World Sport, \$75; boy's 24" Free Spirit, \$60. Owyong, 294-1884.

BOY'S 13" BIKE. Maestas, 831-4072.

WOMAN'S 10-SPD. BICYCLE, \$90. Cook, 888-2928.

'78 SUBARU BRAT, AM/FM, AC, \$950 OBO. Stichman, 293-6096.

'74 SUBARU GL, alloy wheels, new battery, water pump, and CV joints, 20K

miles on rebuilt engine, \$850 OBO. Rexroth, 293-6025.

BICYCLES: boy's 20" BMX Schwinn, blue; girl's 20" Schwinn, pink, w/basket. Hatch, 296-2773.

'85 TOYOTA SUPRA, fully loaded, leather seats, power sunroof, 5-sp., 26K miles, silver. Soo Hoo, 294-0268.

REAL ESTATE

SE HEIGHTS FOURPLEX, fully rented, assume mortgage, no qualifying, will trade equity for vehicle, split closing costs, \$88,000. Cook, 255-7396.

FOUR HILLS LOT, 100' x 160', on Soplo, borders KAFB. Hudson, 298-3935.

MOUNTAIN LAND, approx. 8 acres, below Sandia Ski Area, views, trees, \$6000/acre. Clement, 299-2324.

2-BDR. MOBILE HOME, enlarged living/dining area, 1-1/4 baths, paneling, carpet, custom drapes, storm windows, appliances, appraised at \$10,900, will negotiate. Gorsline, 299-8571.

3-BDR. HOME, Ladera/N. Coors, 1-3/4 baths, LR w/FP, den w/FP, 1780 sq. ft., landscaped front and back, 8% assumable, \$79,900. Atencio, 831-7196.

3-BDR. HOME, UNM area, 1-3/4 baths, new carpeting, linoleum, and mini-blinds, refrigerator and washing machine included, 1510 sq. ft., \$78,400. McMillen, 889-3849.

3-BDR. TOWNHOUSE, FP, 1-3/4 baths, greenhouse, fenced, landscaped, near Chaparral School and Ladera Shopping Center, Freeway via Coors or Unser, \$68,500. Bertram, 415-829-0832.

3-BDR. HOME, Rio Rancho, 2 baths, 1414 sq. ft., sprinkler system, \$2500 down, assume 7.8%, payments \$418/mo. Gerry, 891-0423.

3-BDR. HOME, 11304 Hannett NE, 1 bath, carpet, drapes, range, patio, deck, shed, fresh-air filtering system, \$65,000. Nielson, 294-1281.

3-BDR. HOLIDAY PARK HOME, 1680 sq. ft., 75' x 150' lot, den w/FP, 2-car garage, shade and evergreen trees. Bowman, 299-5799.

WANTED

HOUSEMATE, mature male working graveyard shift needs to share furnished home w/responsible, clean, nonsmoking male or female, \$200/mo. maximum. Cook, 298-8661.

LOBO BASKETBALL SEASON TICKETS. Maxam, 898-2435.

HOUSEMATE to share 3-bdr. house near Base, \$325 plus 1/2 utilities. Luke, 294-3316.

BOLO TIE WITH SNL INSIGNIA, formerly used as 15-year award. Shephard, 298-4879.

OPTICAL OR SCIENTIFIC INSTRUMENTS, working or repairable, e.g., sextant, microscope, balances. Hughes, 299-6674.

HARD DISK FOR NEC APC-III w/controller, any size, any condition. Humphreys, 298-6446, leave message.

ENGLISH IVY CUTTINGS and/or trumpet vine seedlings. Cibicki, 877-7098.

FEMALE HOUSEMATE, nonsmoker, 3-bdr. home in vicinity of Wyoming and Indian School Rd., \$300/mo. and 1/2 utilities. Beeler, 275-7340.

LARGE CAR-TOP CARRIER, enclosed. Allan, 299-4163.

TRAVEL TRAILER, 18' to 22', self-contained. Baker, 294-3334.

GIRL'S BEDROOM SET: dresser, bureau, vanity, table, desk and/or nightstand, prefer white color. Kelly, 293-2475.

WEIGHT BENCH w/leg-curl attachment. Boyes, 296-0654.

HOUSEMATE, mother of one wishes to share NE 3-bdr., 2-bath home with another working woman. Byers, 889-8065 between 6 and 10 p.m.

SKIS, 175-180s, K2s or equivalent; bindings, poles, in good condition. Moreno, 294-4268.

Tonight on the Patio — Savor Some Seafood Specialties

SEAFOOD LOVERS ARE SALIVATING, as they think of the magnificent maritime menu available on the patio this evening. Watch the chef cook your favorite; select from lobster, crab, halibut, salmon or scallops. After the fish fling, it's dancing under the stars to the smooth sounds of the Bob Banks Trio from 7 to 11 p.m.

THERE'S STILL TIME TO VOTE for seven C-Club Board members between now and the annual meeting on Monday (Sept. 12). Cast your ballot at the Club at midday (11:30 a.m.-1 p.m.) today or Monday, this evening (6-8), or from 4:30 to 6 during the meeting, which officially gets started at 5 p.m. in the patio area. Enjoy free refreshments afterwards while the votes are being tallied.

THINK SNOW IN SEPTEMBER: That's the word from the Coronado Ski Club, as the savvy schussboomers launch the 1988-89 season with Ski Fair XI on Sept. 20 in the patio area, starting at 5 p.m. This annual blast features the latest in Alpine attire, information on what's new at your favorite ski area, and a chance to sign up for the terrific trips planned by CSC this winter. You needn't be a member to get in on the fun, but you can sign up right then and there if you want to; by so doing, you'll also be eligible for the fabulous door prizes — merchandise, lift tickets, and weekend trips. Don't sweat the supper chores, because that famous patio food will be available throughout the evening.

IT'S MEXICAN FIESTA TIME next Friday night (Sept. 16) on the patio. Start out with a bountiful buffet offering some good hot stuff: enchiladas (chicken and beef), tacos, tamales, chile rellenos, posole, green chile stew, and the usual accompaniments — beans, rice, and sopapillas. Sonny & Co. furnishes the dance music from 7 to 11 p.m., with a half-hour break between 8 and 8:30 for a sizzling Latin variety show by the Frances Bustamante group.

THOSE RETIRED — BUT UNRETIRING — Thunderbirds are going to be *very* busy this month. The T-Bird annual meeting on Sunday, Sept. 18, at 3 p.m. in the patio area features an old-time, rip-roarin' band concert by the Albuquerque Concert Band (3:30 p.m.); listening distractions are nil, since the Club shuts down the pool and snack bar that day at 3 p.m. When the Sousa stops, head for the meeting (covered area), where you'll help elect officers who'll try to keep the group in check during the coming year — admittedly, an impossible task. The day's topped off by an ice-cream social. Admission's free from 3 o'clock on.

T-Bird card sharks are back in action Sept. 22



JACKIE PFARNER (6412), shown schussing the slopes at Steamboat ski area (Colo.) during a Coronado Ski Club trip last January, invites everyone to attend Ski Fair XI at 5 p.m. on Sept. 20 in the C-Club patio area.

at 10 a.m. As usual, all kinds of fun and games, plus free refreshments and door prizes.

More T-Bird news: The rubber hits the road again as the Roadrunner RVers journey to Sumner Lake (south of Santa Rosa) Sept. 27-29. More info from wagon masters Duane Laymon (822-1749), Tom Brooks (344-5855), or Joe Shelby (292-4605).

LUNCH-LINE BLUES? Languish no more — the Club's lunch-line area is back in business as of next Monday (Sept. 12). Head on over during your noontime break, and get a gander at the "new look."

UP, UP, AND AWAY is the motto of the Coronado Wolfpack as that intrepid group heads for Colorado Springs Sept. 30-Oct. 2 to watch the UNM Lobos take on (and, it's hoped, trounce) the Air Force Academy Falcons. The trip tab of \$99/person (double) covers two nights' lodging, continental breakfast Saturday and Sunday, RT bus fare (and refreshments on the bus), and a game ticket. Full payment's due by Sept. 10 — that's tomorrow, in case you haven't consulted a calendar lately. More info from George Horne on 292-2471.

Buddy, Can You Spare a Dime?



Flight attendants on Canadian Airlines International Ltd. will be asking travelers on international flights for unused foreign money to help the Canadian charity Help the Aged. Bank of America will waive its fee to change the money into Canadian currency.

Wall Street Journal



IS IT THAT TIME of year already? Sandia Livermore nurse Mary Gould (8526) does a double take in the hallway of Bldg. 911 as Santa, aka Bob Czapsinski (8443), comes out of the Personnel Division office on a hot August day. Bob was on his way back to work after giving a talk on American traditions to a group of young Japanese summer exchange students and decided to leave on his "show and tell" outfit until he returned. And besides, he admitted, it was fun watching the other motorists do a double take as they drove by him.

Events Calendar

Sept. 9 — June Music Festival Benefit Concert: violinist Leonard Felberg and pianist Arlette Felberg performing works by Brahms, Beethoven, Fauré, Bartók, and de Falla-Kochanski; 8:15 p.m., Keller Hall (UNM), 881-0844.

Sept. 9-10 — "Dance and Film," performance combining contemporary dance, music, theatre, and film, sponsored by the New York Dance Theatre's National Performance Network; 8 p.m., KiMo Theatre, 848-1370 or 842-5758.

Sept. 9-10 — "Three Plays Full," Theatre-in-the-Making (education program of New Mexico Repertory Theatre) presents three one-act plays: "Strawberry Envy" by Kitty Johnson, "Out at Sea" by Vladmir Mrzoczek, and "In Fireworks Lie Secret Codes" by John Guare; 8 p.m. Fri. & Sat., Rep East (3211 Central NE), 260-0331.

Sept. 9-18 — Exhibit, "Garó Z. Antreasian, A

Retrospective"; 9 a.m.-4 p.m. Tues.-Fri., 5-9 p.m. Tues., 1-4 p.m. Sun.; UNM Art Museum, 277-4001.

Sept. 9-21 — "Dinosaurs in Action," exhibit of four mechanical dinosaurs: adult and juvenile triceratops, brontosaurus, and tyrannosaurus; 9 a.m.-5 p.m., NM Museum of Natural History, 841-8837.

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

Sept. 16-Oct. 2 — "Lives of the Neo-Modern Fang People," Albuquerque's own soap opera by Grubb Graebner; 8 p.m. Fri. & Sat., 6 p.m. Sun.; Vortex Theatre, 247-8600.