



LAB NEWS

VOL. 36, NO. 9

APRIL 27, 1984



DETOUR — Lots of Sandia streets getting resurfaced these days. That's good. Lots of Sandia employees scaling the barricades, crossing the warning flag ropes, and making their way through the heavy equipment. That's bad. As

Safety and Security put it — Don't Cross; Go Around. Many Sandians are concerned about physical fitness — and the rest ought to be; the detours should be seen as a chance for a little exercise, not as a challenge to ingenuity.

'Out of Hand'

Health Care Costs Under Scrutiny

Since last December, a new union-management committee at Sandia has been studying a subject currently garnering headlines in the national press: the high cost to industry of employee health care plans. Nationally, more companies are taking a direct hand in evaluating medical treatment, insisting on selected second medical opinions, questioning hospital charges, and encouraging (through incentive plans) shorter hospital stays and outpatient surgery.

The Sandia Joint Health Care Cost Containment Committee was formed last December as a result of contract negotiations. Similar committees were organized in most AT&T locations to study the problem before the next contract negotiation period.

"There's no question in my mind about health care costs," says Marv Coon, supervisor of Benefits Division 3545 and co-chairman of the joint committee. "They're out of hand."

He bases his comment on statistics such as these: The 1984 monthly premium for single coverage in the Basic Medical Plan (Equitable) is \$85.70; the monthly premium for family coverage is \$220.74. Just nine years ago, in 1975, the health care

premiums were \$18.53 for singles and \$47.32 for families.

Annual health care costs for each Sandia employee and retiree have increased from \$557 in 1975 to \$2157 in 1983. The cost of medical benefits for all employees and retirees in 1975 was \$4.4 million. In 1983, the total was \$22.5 million, an increase of 407 percent.

"Inflation usually gets the blame for cost increases," Marv says. "But inflation can't take the whole rap. During those eight years that our health care costs increased by 407 percent, the consumer price index went up only 84 percent."

Marv points instead to other factors influencing health care costs — advancements in medical technology (most of them expensive), an aging population, rising hospital capital costs, and defensive medicine (overly cautious and possibly unnecessary testing — much of it, admittedly, brought about by the rise in malpractice lawsuits). Care for the indigent and for Medicare patients has brought about cost shifting — hospitals shift costs to patients covered by employer-sponsored group health plans.

Added to these factors are also such variables as individual life styles (many of

them unhealthy ones) and lack of competition. Increased costs are a natural result. In addition, there is little incentive on the part of the patient to contain costs because of the third party payor system — no one questions the amount of services rendered or the cost of the services; employees simply turn their medical bills over to an insurance representative and the bills get paid almost automatically.

"We, as consumers, are in the best position to question and challenge costs and services," Marv says, "especially charges for services not rendered that frequently appear on hospital bills."

The mission of the Joint Health Care Cost Containment Committee is to:

- examine the major factors influencing health care costs, particularly those that affect the company and employees;
- recommend cost containment measures as may be appropriate;
- examine cost-sharing as a means of slowing the escalation of medical insurance costs;
- participate in health care action-oriented coalitions and other organizations concerned with the quality and cost of health care;

(Continued on Page Four)

Antojitos

The COTERIE Syndrome (Coterie: "an intimate and often exclusive group of persons with a unifying common interest or purpose") For the second time in 19 years, I recently filled out DOE "Request for Access" Form 277. I succeeded in learning what responses were to go where only with the help of a most sympathetic and knowledgeable Cathy Benavidez in the Badge Office. The experience reminded me once again of the COTERIE (Clear Only to Those Earlier Reached, Initiated, and Enlightened) syndrome. What happened with that form, it appears to me, is that the folks who work constantly with access to classified locations made up the form. And they are totally out of touch with the people who have to use it only once a decade or two. There is no way short of divine inspiration that the uninitiated could know what is meant by most of the questions asked. That's COTERIE.

But form-makers are far from the only COTERIE practitioners. Many of the signs on the streets leading to the freeways tell you, for example, "I-40 Right Lane." What they don't tell you is whether that's eastbound and westbound or just eastbound. Of course, it's perfectly clear to those of us who use the interchanges regularly. But we don't need a sign at all—we're the initiated. The ones who really need to know are the ones the signs don't tell. (They're the ones careening across three lanes of traffic because they weren't told early enough that westbound traffic at this interchange has to be in the left lane—everybody knows that!)

COTERIE can also characterize some of the experts we work with on technical stories. They may know that, say, wogdgets work well for widgjets when the weather is warm as well as they know that the sun sets in the west. But they can't be expected to tell an interviewer either one of those obvious (to them) truisms. And if we don't master the material well enough to ask the right questions, we end up with a tech story that makes sense only to the experts we're not writing for.

I'm not advocating the "dumb it down" philosophy. But I am asking the communicators to field test their creations on reasonably intelligent—but non-knowledgeable—target audiences before going to print. Anytime you find yourself saying "Everybody knows . . . whatever," you're probably heading into the twilight zone of COTERIE. After all, if everyone knows it, you don't need a form, or a sign, or a story at all. ●BH

* * *

A man with one watch knows what time it is. A man with two watches is never sure.

Livermore News



"YOUR HORIZONS are only this big?" — Beth Fuchs (foreground) and Noreen Gilbertson (both 8123) spent a recent Saturday at Chabot College Valley Campus as a part of the sixth annual "Expanding Your Horizons in Science and Math" career day. Sandia and LLNL co-sponsor the event with the Math/Science Network of Mills College. Beth and Noreen demonstrated computer graphics and how holograms are made and used in engineering applications. Other Sandians taking part that day were Judy Knorr (8414), Susan Gancas (8466), Kathleen Stimmell (8466), Lynda Hadley (8416), Glenda Muir (8466), Kit Marino (8414), and Sally Antonchuk (8271).

Bond Chairman



NAMED CHAIRMAN of the Sandia Livermore annual U.S. Savings Bond drive is Bob Johnson (8254) who kicked off the 1984 campaign this week. All employees will be contacted by division solicitors.

Sympathy

To Jay Jost (8414) on the death of his sister in Tacoma, Wash., March 20.

Congratulations

Dixie and Tom Prast (8351), a daughter, Stacia Kathleen, March 28.

Angel and Gracie Miranda (8251), a son, Luis Eliesel, April 15.

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MEMBERS OF THE VALLEY Study Group attended a briefing by Dick Claassen (8000) recently and then toured the Tritium Research Facility. Some 60 people were taken in groups through the TRL, which recently added a 4400-square-foot office wing to allow more laboratory space in the main building. Pat Gildea (8443) is shown explaining the safety systems to a part of the tour group.

Icebergs Up Close

Ready, Willing, And Able — — And Wet

WANTED: Daring adventurers ready to raft down near-freezing Alaskan rivers for 13 days (11 of them in drenching rains), willing to dodge icebergs, and able to navigate in blinding fog. Apply to Marcus Libkind (8348).

That's not exactly how Marcus put it to his friends at Sandia, but that's how it turned out for the 10 who joined him last August on this adventurous trek along the border between the Yukon and Alaska.

Actually, despite the inclement weather and forbidding country, the group came back thrilled by the experience — exhausted but thrilled. "And not one of us even caught a cold," Marcus claims.

They flew to Juneau and took a ferry to Haines where they met their outfitter who provided three large metal-framed rubber rafts. They then drove north to the Kluane Game Sanctuary on the Tatsenshini River and began their raft trip. They got their only taste of whitewater rafting on that first day.

The highlight of the trip, according to Taz Bramlette (8362) and Bill Flower (8351), was the group's arrival at the confluence of the Tatshenshini and Alsek rivers on the fifth day out. The weather had cleared so that from that location the travelers could see 30 glaciers by turning 360 degrees. "The sight was breathtaking," says Bill. "It was easily the most photographed scenery of the trip."

Near that point Taz suffered the group's only mishap. He was paddling an air mattress across a small glacier stream to begin a hike and slipped off the mattress into the icy stream. "Coldest shock of my life," he reports. But after drying out on shore, he joined Gary Clark (8233), Bob Kee (8231), and Tom Manteuffel (LANL, former Sandian) for some climbing. "In retrospect, the dip wasn't so bad," Taz says. "At least I got a bath. That's one more than anyone else on the trip took!"



LIVERMORE RETIREES (left to right): Ken (8251) and Lillian (8273) Bennett, Bill Little (8240), Don Spencer (8265), and Joey Davis (8273). Also retiring and not shown are: Maria Jesse (8250) and Dick Myers (8412).



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A few days later the group spent a day exploring the Walker Glacier. "It was the first time on a glacier for most of the group," says Marcus, "so leaping across crevasses and jumping over the little streams were pretty exciting activities."

The most unnerving experience of the whole trip was the journey to the next stop, Alsek Bay. The fog was so thick the rafters couldn't see a boat 50 yards away or tell how close they were to the banks of the river.

But once they had reached the two-mile-wide bay, the weather again cleared, and they rowed across it to get a close-up view of an enormous glacier. "It was calving [masses of glacier were falling off into the bay to become icebergs] at the time," reports Marcus. "We were lucky — none of the 80-foot-high ice masses broke off while we were next to the glacier. The waves could have swamped or capsized our little rafts. Another danger is that the underside of an iceberg can melt so the whole gigantic mass becomes top-heavy and flips over. You wouldn't want to be very close to one of those."

"The whole time we were in the calving area we were reminded of the awesome masses and forces involved — creaks, groans, and a noise like continuous thunder

as the glacier breaks up when it's pushed into the bay."

The last day could have been The Last Day. The fog closed in again so no one could see land's end where the bay became the Pacific; they overshot their takeout point by two miles. Some of the rafters had to hike several miles back to the Dry Bay Fish Co. and convince the people there to lend them a truck to haul the rafts and equipment back to a landing site where the planes they had chartered earlier would meet them.

"Despite the northern locale, some places we saw looked so lush and green that they reminded me of Hawaii," says Taz. "But the presence of game certainly left no doubt of our location. We never saw any grizzlies up close, but we did find bear, moose, and wolf tracks near most of our campsites."

Before the trip Marcus and Bill bought \$460 worth of groceries — "Pretty fancy eating," reports Bill. "We each carried our personal gear in duffel bags, and we had Coleman stoves for cooking and tents for camping."

Other participants were Gary's wife Lynn (a former Sandian), Tom Jefferson (8235), Bob Dibble (8351), and Clara Yen.



RAFTERS row near shore of Alsek Bay with the Walker Glacier in background.



DURING A BREAK IN THE RAIN the Alaska travelers posed for this photo by Marcus Libkind (8348). From left are Taz Bramlette (8362), Gary Clark (8233), Bob Dibble (8351), Clara Yen, Lynn Minkler Clark, Tom Jefferson (8235), Bill Flower (8351), Bob Kee (8231), and Tom Manteuffel of LANL.

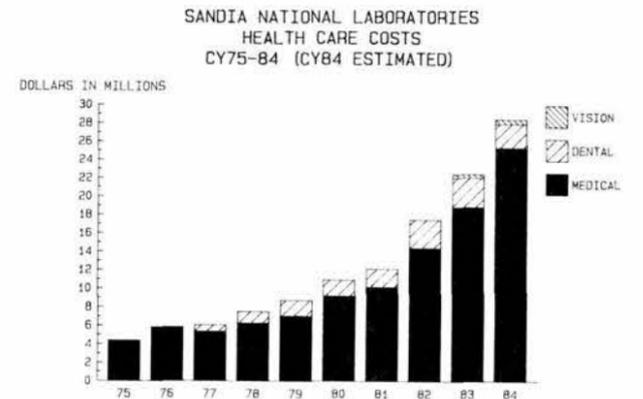
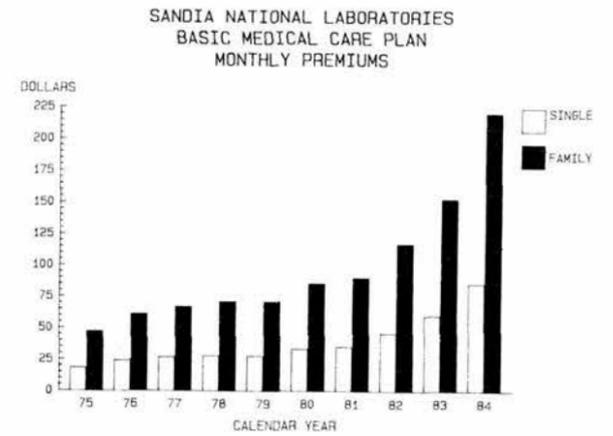
FEATURED SPEAKER at the recent kick-off luncheon for the U.S. Savings Bond drive in Albuquerque was Senator Jeff Bingaman, left. He was introduced by Ray Powell (3000), Albuquerque Savings Bond chairman. Senator Bingaman discussed the current federal deficits and the importance of buying bonds. Sandia's bond drive is currently at the mid-way point; goal is to enroll 95 percent of employees in the payroll deduction program for U.S. Savings Bonds. The drive ends next week, and results will be reported in the LAB NEWS shortly thereafter.



NEW MEXICO HANDICAPPED EMPLOYER OF YEAR award went to Sandia for the second year in a row. Rose Gonzales (3511), who received the award during the state's presentation in Las Cruces, passes it along to Ray Powell (3000). Next issue of LAB NEWS will cover Sandia's winning of the National Handicapped Employer of the Year award in Washington.



LABOR RELATIONS conference series is currently underway. Its purpose is to define supervisors' roles in labor relations, to help supervisors develop a more positive and open attitude toward Sandia's unions, and to gather input for the 1984 negotiation sessions. In addition to presentations by members of Large Staff and Labor Relations Department 3450, several outside experts are assisting in each two-day program. Shown here with Charles Brumfield (3400, left) is John Knight, a commissioner of the Federal Mediation and Conciliation Service, who also addresses the conference participants. Remaining conferences will be held on Tuesdays and Wednesdays: May 1-2, 15-16, 22-23, 29-30, June 5-6, and 12-13. For more information, call Don Stone (3451).



Continued from Page One

Health Care Costs Under Scrutiny

— promote employee awareness in the areas of preventive health care, fitness, efficient use of our medical insurance plan, and the high cost of health care.

In recent weeks committee members have visited local hospitals and have talked with administrators, physicians, and surgeons (including Sandia medical staff).

"No one expects immediate results such as, suddenly, medical people and hospitals start charging less," Marv says. "but as the national horror stories accumulate (and we all know a few involving individual bankruptcy as a result of medical bills), then as a nation, we must take action. Medicare has already changed the rules — a fixed rate schedule (called DRG — diagnosis related groups) now limits fees that will be paid. There is an incentive part to this plan also. If the hospital can provide the service for less than the designated fee, the fee will be paid anyway."

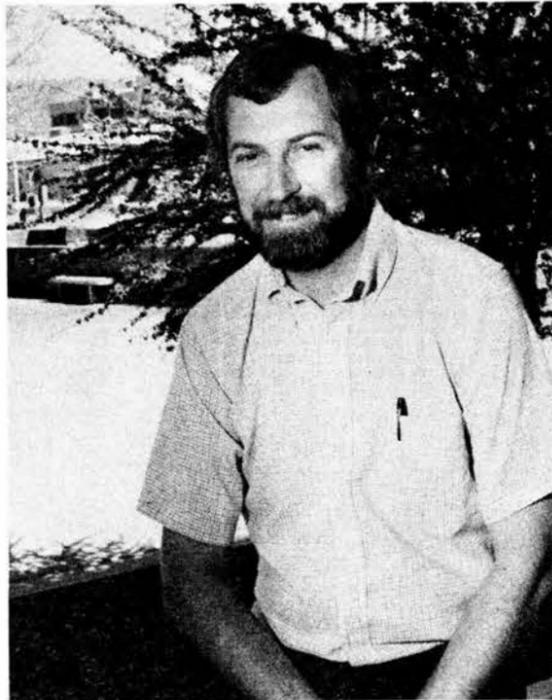
Marv points out that, counter to the national trend, Sandia's health care plan has recently increased its share of covered costs (*Sandia Bulletin*, Sept. 30, 1983). For instance, Sandia now pays 90 percent (increased from 80 percent) of inpatient hospital and surgical charges and 100 percent of charges for medical treatment in a hospital, hospital outpatient department, or ambulatory surgical facility when administered within 72 hours of an accident. There are several other improvements in which no deductible provisions are required.

"Other industries are increasing employee costs for participation in health care plans," Marv says. "Sandia is not — as yet — but we are certainly concerned. In 1983, health care comprised 40 percent of Sandia's entire benefits package.

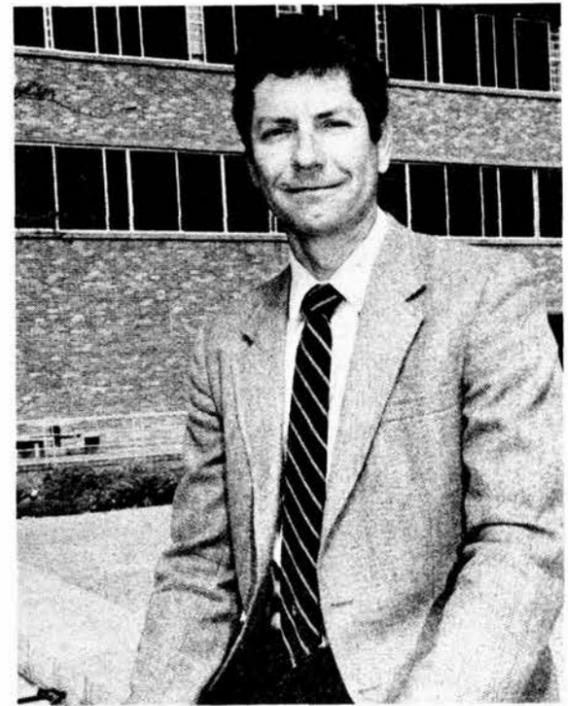
"It's a valuable benefit. Use it but don't abuse it."



ROBERT CRANWELL (6431)



ART VERARDO (2313)



WALT WILLIAMSON (1654)

Supervisory Appointments

ROBERT CRANWELL to supervisor of Waste Management Systems Division 6431, effective April 9.

Since joining the Labs six years ago, Robert has worked in his current division on the development of methods to assess the feasibility of deep geological formations as radioactive waste repositories.

Robert received his BS and MS in math from the University of Nebraska and his PhD, also in math, from Arizona State University. He is a member of the American Mathematical Association. He enjoys skiing, golf, and weight lifting. Robert and his wife Debra live in NE Albuquerque.

* * *

ART VERARDO to supervisor of Digital Subsystems Test Equipment Division 2313, effective April 9.

Art has been an engineer with Electronic Subsystems Department 2310 since joining Sandia in 1977. He worked on the design of an instrumentation system for the photovoltaic advanced systems test facility, on the design of a battery evaluation laboratory, and on component design and support for Advanced Mechanical Systems Division 5163.

He received a BS and MS in EE from UNM. Art enjoys skiing, backpacking, and woodworking; he also coaches a soccer team. He and his wife Suzanne have two children. They live in the NE heights.

* * *

WALT WILLIAMSON to supervisor of Advanced Systems Division III 1654, effective April 9.

Joining the Labs in 1974, Walt worked for seven years in the aerodynamics department in support of both ballistic and maneuvering reentry vehicles. He then transferred to his current division where he has been program director for the SWERVE and BIM programs.

Walt received his BS in ME from Stanford University, and his MS and PhD, both in aerospace engineering, from the University of Texas. He is a member of the American Institute for Aeronautics and Astronautics. Walt enjoys skiing and backpacking. He and his wife Judy have two children. They live in the SE heights.

Retirees Too

Fitness Day 84

The grand prize is a free balloon ride. The MC is Larry Ahrens of KOB-AM. The featured demonstration is Kajasho® karate.

The event is the fourth annual Fitness Day sponsored by the Sandia Labs Friends of Health. As in the past, Fitness Day includes a 1-1/2 mile walk/jog/run, a 3-mile bike tour, and aerobic exercise for men and women (all optional), plus music by Ron Cummings and the Beaver Smith Band, yoga and clogging demonstrations, free juice and fruit, \$1 sandwiches for the first 400 hungry folks, drawings for Friends of Health T-Shirts, and more.

Fitness Day 84 is on May 11 from noon to one on the Parade Ground; retirees, dependents, and spouses are welcome. Both participants and spectators are eligible for the drawings. Winner of the grand prize will have to claim the balloon ride at a later date.

Fun & Games

Running — A recreation run honoring National Transportation Week is set for Sunday, May 13, at 8 a.m. at UNM North Campus. Sponsored by RIDEPOOL, the three-mile run (or one-mile walk) offers prizes and recognition. Entry fee is \$5 before the run, \$8 the day of the event. LAB NEWS (Bldg. 814) has entry forms.

* * *

Bicycling — A three-day bicycling event called the Double Eagle Bicycle Classic with a \$4000 purse to be split among several events and categories is scheduled in Albuquerque May 11-13. Stage one is a 27-mile Sandia Crest climb, stage two is a 44-mile mountain road race from Madrid to Albuquerque (for women, juniors, veterans, and class IV racers), and stage three is 1.1-mile race around the Uptown center in Albuquerque. There's also a 62-mile race from Santa Fe to Albuquerque for senior men, class I, II, and III, on May 12.

Entry fees vary depending on your racing class and event entered. Entry forms and additional information available from Gardenswartz Sportz.

* * *

Squash — The Albuquerque Squash Racquets Association is sponsoring a D/Novice tournament on May 4-6. The event is intended to promote the game of squash in Albuquerque.

Beginners and first-time players are encouraged to participate. Loaner rackets will be provided. If interested, call Dave McTigue (1511), tournament director, 256-1752.

* * *

Golf — Winners of SEGA's recent Rusty Swing tournament at Los Altos were Ron Andreas (1622) and Ken Flynn (5138), A flight; Reynold Tamashiro (1474) and Tom Cordova (3463), B flight; Robert Martinez (7472) and Don Drummond (313), C flight. The next SEGA tournament event is the "Southern Classic" scheduled in Socorro on May 19. Contact Kevin Linker (6227) for information.

Keep Your Boat Afloat

If you'd like to get your boat and its safety equipment inspected in the privacy of your own garage by the Coast Guard Auxiliary, check out the display in the lobby of Bldg. 802 from May 1 through May 31. The display tells boaters what safety equipment they should have and how to arrange for the free inspection.

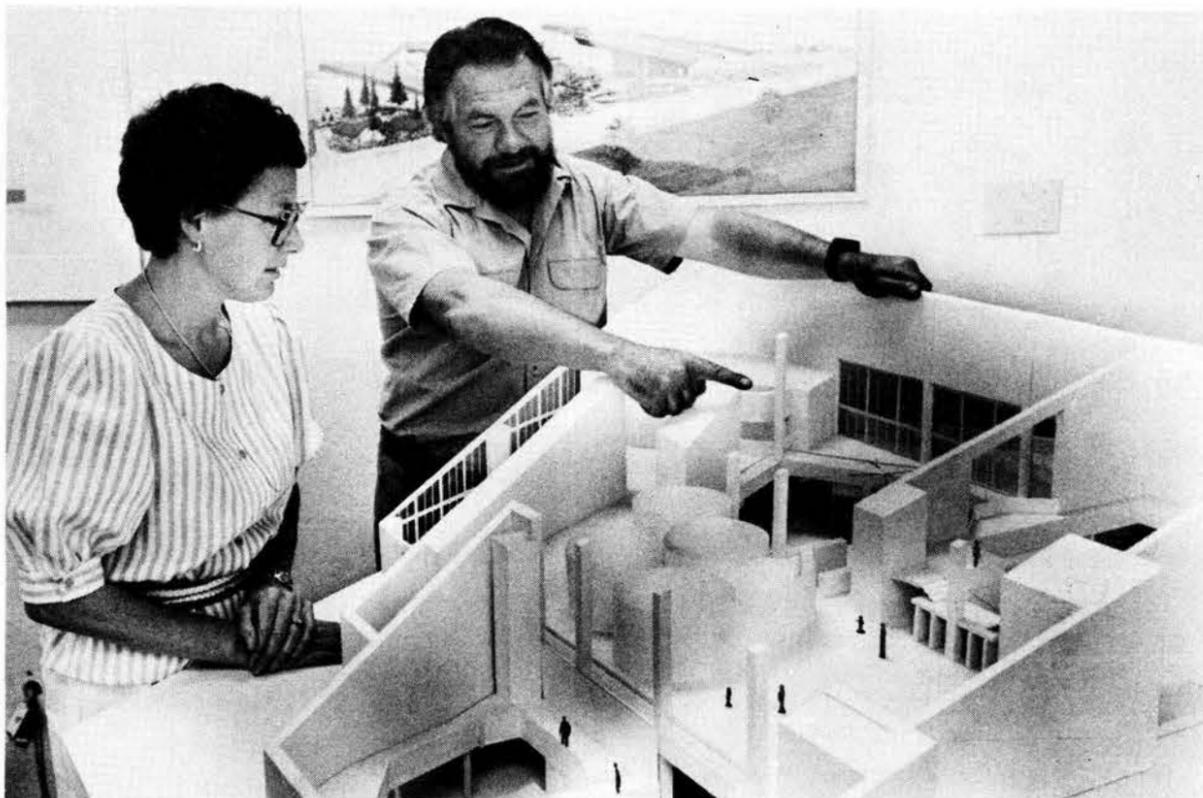
Let's Do It Again, Volunteers

Success leads to fame. Fame leads to requests for repeat performances. And that's just what has happened in the world of museum displays.

Flashback (spring 82): Sandia volunteers replicate sections of walls of the Anasazi ruins in Chaco Canyon. UNM's Maxwell Museum of Anthropology benefits.

Real time (spring 84): Sandia volunteers are sought to replicate a dozen "conglomerate sandwiches" — contiguous geological strata — for permanent display on a wall in the NM Museum of Natural History currently under construction in Old Town.

Hank Willis (3100), who headed up the Chaco chore two years ago, has agreed to spearhead this year's effort as well. He and



THAT'S THE WALL of the new Natural History Museum on which some replicas of segments of NM geological strata will be permanently placed. Geologist Greg LaChapelle will serve as technical consultant for the Sandia volunteer project. The wall totals some 70 feet and will have a dozen or so replicas mounted on it. Karen Shane (3163), coordinator of Sandia's Volunteers In Action program, and Hank Willis (3100) will lead the effort during May.

home, but it will mean that we'll be spread out over a dozen or so sites. So we do need new volunteers to fill out the various teams."

Most of the sites are within 60 miles of the city — Hagan and San Cristobal, near Galisteo, for example — and can have a mold created during a day trip; the only current exception is a site at Ghost Ranch some 120 miles north. "We'll need folks who can spend a weekend up there," Karen

reports.

"I think most of us who took part in the Chaco work really enjoyed it," says Hank. "This year's work should be just as much fun, and it will allow us as Sandians and as New Mexicans to make a permanent contribution to the Museum. Then too, it's a chance to bring portions of a few of New Mexico's unique geological features to the attention of museum-goers."

Volunteers Will Meet At Noon April 30 In Bldg. 815

trusty assistant Karen Shane (3163) are looking for some repeat performers who remember their Chaco "latex-perience" and could lead small teams, each team heading for one of a dozen unique geological outcroppings and features, and making a latex and scrimcloth mold of it. From each mold will come a full-size representation of the segments for display at the Museum.

"We're looking for new volunteers too," says Hank. "Last year we all went to Chaco for a weekend or two. This year's task should be less complicated and closer to

Ralls Becomes a 'Man Friday'



A FEW MONTHS AGO Mack Ralls, retired Sandia engineer, received an award from Presbyterian Hospital for serving 1000 hours as a volunteer. Mack enjoys his work as receptionist at Pickard Convalescent Hospital and will soon become a 2000-hour volunteer.

Retired Sandian Mack Ralls is still working full-time. In fact, he puts in a 40+-hour week. But he receives no pay — he's a volunteer at Pickard Convalescent Hospital.

"We've never had a volunteer who's accomplished what Mack has in so short a time," says Millie McClure, head of the volunteer department for Presbyterian Hospital (with which Pickard is affiliated). "He's put in more than 1500 hours since he started work at Pickard."

When Mack retired in January 1976, he and his wife kept busy with craftwork and shows. "Actually, I had less leisure time after I retired than I did when I was working," Mack says.

But then, following several months of illness, Mack's wife died in July 1982. The Hospice group helped to care for her at home, and his daughter, impressed with the organization, became a volunteer with Hospice. Mack endured several lonely months before his daughter convinced him that he too should become a volunteer. In June 1983 he became the "receptionist" at the newly opened Pickard Convalescent Hospital.

"Receptionist" here means a sort of "Man Friday." In addition to handling the incoming phone calls, Mack answers ques-

tions for visitors coming into the hospital, sorts the mail, and prepares statistical data for use by the administrative staff. He arrives at his desk at 7 a.m. and leaves around 4:30 or 5 p.m., five days a week.

"I enjoy what I'm doing, and it's good for me," Mack explains. "The hospital needed a receptionist, and I needed to keep busy."

Mack adds that if others are interested



in volunteer work — it doesn't have to be full-time, just two or three hours once or twice a week — Pickard could certainly use some help. Volunteers are needed for the following tasks: visiting lonely patients, wheeling patients to therapy sessions, helping to feed those who need assistance, staffing the gift shop, helping with activities and arts and crafts. If you're interested, call 822-6000. You'll probably get Mack.

Experimental Photovoltaic Module Setting Performance Records

In Sandia's Photovoltaic Test Facility is "the world's best" silicon solar cell module. It was developed by a team headed by Dan Arvizu of Photovoltaic Concentrator Research Division 6224 with participating support from 10 other Sandia organizations.

"It's a 'state of the art' module, just what we intended to create when we started the project," Dan says. The concentrator module's peak solar-to-electric efficiency has been measured at 17 percent. This means that 17 percent of the solar energy falling on the module is converted directly to electricity, a record for silicon solar cell technology. Previously, the best performance was just over 15 percent.

"As we approach the theoretical efficiency limit of conventional silicon cells and photovoltaic devices (which is about 23 percent), it's necessary to establish the current state-of-the-art for module efficiency," Dan continues, "and zero in on those areas to attack to achieve those final few percentage points of efficiency."

Performance Penalties

"In this case, our module consists of 12 interconnected silicon cells each mounted under a Fresnel lens on heat sink. Past experience indicated that certain steps in module assembly were reducing performance. This penalty is attributed to high temperature processing during soldering, interconnect and wiring losses, and various manufacturing tolerance errors during assembly. The new module design therefore incorporates several features that allow assessment of various performance loss mechanisms. These features include individual lens-cell positioning control and precise cell temperature control using a liquid cooling system."

The team began the project by analyzing the characteristics of a single crystal silicon cell for use in a concentrator module. The module was designed to maximize efficiency. Several analytical models addressing device physics, interconnecting schemes, and optical performance were used.

Analytical Models

"The cell physics models [supported by Division 2146] provided the data to determine cell size, cell thickness, and cell contacting configuration," Dan says. "We selected doping densities, junction depth, texturing, and AR (anti-reflective) coatings based on the best technology available in industry." Applied Solar Energy Corporation fabricated the cell under a research and development contract.

The team used another analytical model, this one covering optics and supported by Division 6224, to develop an optimized concentrator Fresnel lens. The resulting lens, 12.5 cm on a side, has a lens-area to cell-area ratio of 200 and, like a magnifying glass, concentrates the available solar energy 200 times onto a 1-cm-diameter silicon cell. The acrylic lenses were compression molded by Fresnel Optics Corporation.

A silver-coated brass reflecting cone, also designed with the optical codes,

catches the small light spillage from the lens and redirects it to the active area of the silicon cell. To protect the silver, a thin transparent coating of magnesium fluoride was applied. This reflective surface was developed by Organization 7471-2. The cones were environmentally tested in Division 7543 under a regimen of temperature stress cycling (-20° to 54°C) for a period of about six weeks. The optical performance was measured before and after cycling by Division 1824 and showed only a slight degradation in optical quality.

AR Coating

Work is still underway on techniques to apply an anti-reflective coating to lenses. One promising approach is to bond an AR-treated Pyrex glass sheet to the lens. The AR coating was produced on Pyrex by a process (developed in Organization 7472-3) of elevated temperature compositional phase separation with subsequent etching to produce a "textured," or minutely irregular, surface that reduces reflectance losses. Although lenses bonded to the Pyrex superstrate have superior optical performance, long-term reliability of the bond still remains a problem.

In the final fabrication of the 12 series-connected cells that comprise the experimental module, a vapor phase soldering process, incorporating a Freon vapor bath at 210°C , was successfully used. This method allowed simultaneous soldering of cell to substrate, to interconnects, and to a heat exchanger under isothermal conditions. The cell assemblies were soldered by Organization 7471-1.

"As a result of this work," Dan says, "we can tell people in industry that they can use vapor phase soldering during cell assembly without sacrificing performance. This was not clear before. Vapor phase soldering is helpful in mass production, but it has often been falsely blamed for poor cell performance."

Diverse Resources

The module mechanical design and construction were supported in Division 7652 and Section 7473-5, and testing of various components were performed by Divisions 6221, 6224, and 7550 — a demonstration of how Sandia's diverse research and development capabilities can be applied effectively to systems that eventually will reach the commercial market.

"Results of this project have provided valuable insight for the design and development of concentrator photovoltaic modules," Dan says. "It has now been demonstrated that with proper design, module efficiency is primarily the product of two parameters — the cell efficiency and the optical efficiency." This finding means that other loss mechanisms (including effects of cell mounting, short circuit current mismatch, and interconnections) can be essentially eliminated. Data from this module will provide future designers with information on the expected influence on performance of such variables as heat sink design, optical parameters, and lens-to-cell misalignment tolerances. A commercial



DAN ARVIZU, project leader for an experimental silicon solar cell module, checks the unit's performance at Sandia's Photovoltaic Test Facility. The state-of-the-art module tests at 17 percent efficiency — 17 percent of the solar energy falling on the module is converted directly to electricity.

silicon module with 17 percent peak efficiency should be attainable with current technology.

"If — and these are big ifs — industry could incorporate our improvements and if mass production — something around 10 megawatts per year — could be achieved, then present costs could be reduced by a factor of five," Dan concludes. "It now costs about \$10 per watt for an installed photovoltaic system. The DOE goal for the photovoltaic program is to reduce that cost to \$2 per watt in the near future. Our module design is a big step toward that goal."

Deaths



George Bradley, Jr., of Components and Systems Reliability Division 7222, died April 19 after a long illness. He was 60.

He had worked at the Labs since June 1954.

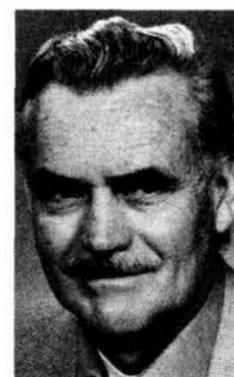
Survivors include his wife, four daughters, and a son.



Frank Neilson, manager of Testing Technology Department 7550, died suddenly April 15. He was 60.

He had worked at the Labs since September 1954.

He is survived by his wife, a son, and a daughter.



Tom Heaphy, manager of Technical Information Department 3150, died April 11 after a long illness. He was 62.

He had worked at the Labs since February 1952.

Survivors include his wife, two daughters, and four sons.

Gen. Hoover Presents Weapons Program Recognition Awards to 20 Sandians



MAJ. GEN. BILL HOOVER, DOE's Director of Military Application, presented Weapons Program Recognition Awards to all of the Sandians shown on this page. Here he officially congratulates this group for their work on a radiation-hardened microcircuit chip set: (back row) Jim

Jorgensen, Wayne Corbett (both 2115), Fred Sexton (2142); (front row) Rich Anderson (2142), Tom Mnich (2115), Doug Weaver, and Ron Light (both 2141). Not shown are Won Kim (2144), Keith Treece (2115; DMTS), and Terry Nordstrom (was 2142).



FRANK NEILSON (7550), now deceased, developed an electronic "crowbarring" system to extract large amounts of energy from capacitors in a short period of time and thus simulate lightning.



VIC ROH (1621; DMTS) defined the cause of an infrequent but significant performance anomaly in a major weapon system.



PETER RAND (1813) developed a unique class of foams.



BILL SUNDT (7222; DMTS) developed several major reliability programs.



RUSS MILLER (8131), Curt Franklin (8153), and Ed Williams (8153; DMTS) solved problems associated with B83 and B84 development.



JIM SEARCY, Arlen Baldwin (both 2523), and Rod Quinn (1846) developed an electrochemical power source for thermal batteries used in weapon systems.

Take Note

A public meeting on the proposed Mesa del Sol development, the area roughly bordered by the Albuquerque Airport to the north, KAFB (and Sandia's Area III) to the east, Isleta Indian Reservation to the south, and I-25 to the west, is scheduled Wednesday, May 2, at 7:30 p.m. in the Convention Center's Acoma-Zuni rooms.

The property, which is held in trust for UNM, is administered as State Trust Lands by the State Land Office headed by Jim Baca, Land Commissioner. Several firms have been contracted to develop a master plan for the area, which Commissioner Baca visualizes as a "new town" for commercial, recreational, and residential development. Details of the plan will be presented at the meeting.

The public is invited to attend the meeting and comment on the plan.

Sandia President George Dacey serves as a member of Mesa del Sol's advisory committee.

Anthony Baca (3632) is co-author of a technical paper presented recently at the 1984 IEEE Region 5 conference in Wichita, Kans. Title is "Distribution Transformer Loss Mechanisms and Testing," written with Howard Smolleck (NMSU).

Here's a new athletic event; the First Annual Pit Climb for Cystic Fibrosis. The idea is to climb out of the pit — University Basketball Arena, affectionately called "the pit."

The event will be held Saturday, May 5, from 10 a.m. to 2 p.m. Entrants need a sponsor who will donate 25 cents for each round trip up and down the steps. The money raised helps research a cure for the disease.

Co-sponsors include Western Airlines, Aladdin Travel, Gatorade, Academy Printers, and the Cystic Fibrosis Foundation. There's prizes, drawings, T-shirts, and a grand prize trip to Disneyland. More information and entry blanks from 255-7507.

The Albuquerque Friendship Force is sponsoring an exchange with Wellington, New Zealand. Departure date is Aug. 26. Participants will stay in Wellington homes for one week with options to travel to other parts of New Zealand or to Sydney, Australia. The hosts in Wellington will visit New Mexico in October. Cost of the program is \$1395. Applications and further information are available from the Friendship Force office, 243-6916.

Retiring this month and not shown in LAB NEWS photos are Mack McHarney (3155) and Bertha Trollinger (3417).

"Robotics and Artificial Intelligence" is the theme of the 24th annual ASME (American Society of Mechanical Engineers) Symposium sponsored by the NM Section on May 22-23 at the Hilton Inn. Registration information is available from Rod May (1523). New officers for the coming year include Kathleen McCaughey (313), chair-

man; Charlie Adams (1521) secretary, and Tony Trennel (400), treasurer.

Several Sandians are members of a users' group addicted to Hewlett-Packard desktop computers; new members are invited. The group meets at the H-P offices (11300 Lomas NE). Call Adrian on 292-1330 for more information.



Here are some current volunteer opportunities for employees, retirees, and family members. If you would like more information, call Karen Shane (4-3268).

NATIONAL FITNESS TESTING WEEK is May 7-11. Volunteers are needed to test KAFB participants during lunch and after work. Specific times are flexible.

OFFICE OF SENIOR AFFAIRS needs volunteers to escort elderly clients to the grocery store or doctor's office. Mileage will be paid.

Retiring



Bob Boyd (3612)



Frank Sanchez (7471)



Lee Hollingsworth (2600)



Clyde Laffoon (3417)



Sanford Erickson (1821)



Janice Sharp (3661)



Wayne Miller (5121)



Ed Marsh (5213)



George Dyckes (5256)



Dick Dillon (3180), Ed Vavro (7472), Ed Zurawski (6516)



Ben Bright (3425)



Darrell Dykes (7543)



John Christopher (3417)

Events Calendar

- April 27 — NM Folk Music Society presents "Touchstone" in concert — folk music in a variety of styles, especially Celtic (Scottish, Irish, English), 7:30 p.m., First Methodist Church, 4th & Lead, 255-7230.
- April 28 — Albuquerque Boy Choir Benefit, 7:30 p.m., KiMo.
- April 28-29 — Cactus & Succulent Society Show & Sale, Albuquerque Garden Center, 8 a.m.-6 p.m., 296-6020.
- April 29 — NM Sinfonietta dance concert, "Music and Movement," 7:30 p.m., First Methodist Church, 4th & Lead.
- May 1 — Lecture: "Watercolor and Its Diversity," by Rebecca Johnson, 3 p.m., auditorium, Albuquerque Museum.
- May 1 — "MayFirst, MayFest" celebration planned to dedicate "Crossroads," the new pedestrianway on 4th St. between Central and Tijeras; variety of entertainment, begins at 11:30 a.m.
- May 1 — San Felipe Pueblo Annual Feast Day; corn dance, hundreds of dancers; information: 1-867-3381.
- May 4-6 — Albuquerque Opera presents "Regina" (based on the play, "The Little Foxes"), 8:15 p.m., *2:15 p.m., KiMo; Reservations: 243-0591.
- May 5 — "Fiestas de Albuquerque" — Mariachi contest, chili cook-off, art display, 7K race, food & beverage; starts 10 a.m., Spanish Village, State Fairgrounds.
- May 5 — Fiesta: dancing — Miguel Caro Dancers, dancercise demonstration, teenage dancers (breaking & popping) — music, and other entertainment, food booths, 1-11 p.m., South Broadway Cultural Center, 1025 Broadway SE.
- May 5-6 — 12th Annual El Rancho de las Golondrinas Spring Festival: traditional Spanish Colonial crafts, food, entertainment, old-fashioned farming demonstrations; sketching & photography encouraged. Route 2 off I-40 (about 12 miles south of Santa Fe).
- May 6 — "Jeff Warner in Concert," KiMo Guitar Series; American folk songs and ballads, 7:30 p.m., KiMo.
- May 6 — Robert Cundick, organist for the Mormon Tabernacle in Salt Lake City; 8:15 p.m., Keller Hall, UNM.
- May 6, 11-13 — Classics Theatre Company, "Becket," 8 p.m., *2 p.m., KiMo.

Congratulations

- Scott (7531) and Cathy Taylor, a son, Philip Scott, Feb. 5.
- Gila Yaniv (2601) and Doyle Caton married in Albuquerque, April 8.
- Kim Williams (3742) and Bill Sims married in Albuquerque, April 16.
- Tommy (7655) and Kimberly Teague, a daughter, Stacy Lynn, April 10.
- Jeff (7655) and Kelly Bobbe, a daughter, Nicole Lynn, April 13.
- Fran (6313) and Carol Nimick, a daughter, Sarah Christine, April 17.
- Bob (6314) and Elaine Williams, a son, Aaron Spencer, April 15.
- Brett Bedeaux (7474) and Linda James married in Albuquerque, April 20.
- Barbara and Dan Wahl (7521), a daughter, Amber Nicole, March 27.

'Typit'

The Thing Makes Music

An advertisement appeared in the old pulp magazines for more than 20 years. The headline read, "They laughed when I sat down at the piano."

I couldn't conceal my smile when Lars Roose (1235) unbuttoned a small bag and pulled out his Typit.

"It's a musical instrument," Lars said.

"Yeah? Well, how come it looks like a puny typewriter?"

"Can you type?" Lars asked.

"Yeah," I said. "I work for the LAB NEWS and we have these fancy new word processors. I type good."

"So type these letters," he said and handed me a scrap of paper with ";;HM-JF;;JKHMJ;;" written on it.

I humored him. Sonofagun! I'm playing "America the Beautiful" and the tone is terrific. Here comes the part "amber waves of grain..." I get carried away, I push the keys with a flourish, add a little volume, pause dramatically. Hey, I'm a musician.

"That's the beauty of Typit," Lars said. "Anyone who can type — even you — can also make music with this instrument. No lessons, no practicing, no problem."

Well now, tell us about this thing.

So Lars recalled how he was taking a CMOS (complementary metal oxide semiconductor) class at tech school and the semester project was to build a device using CMOS technology. He was thinking about an electronic tone generator with a digital memory. He wanted to control it with a standard piano keyboard, but time was running out, and he couldn't find a suitable keyboard. To meet the class deadline, he connected the tone generator through a CMOS circuit into a typewriter keyboard. "It was cheap and primitive," Lars says, "but it worked."

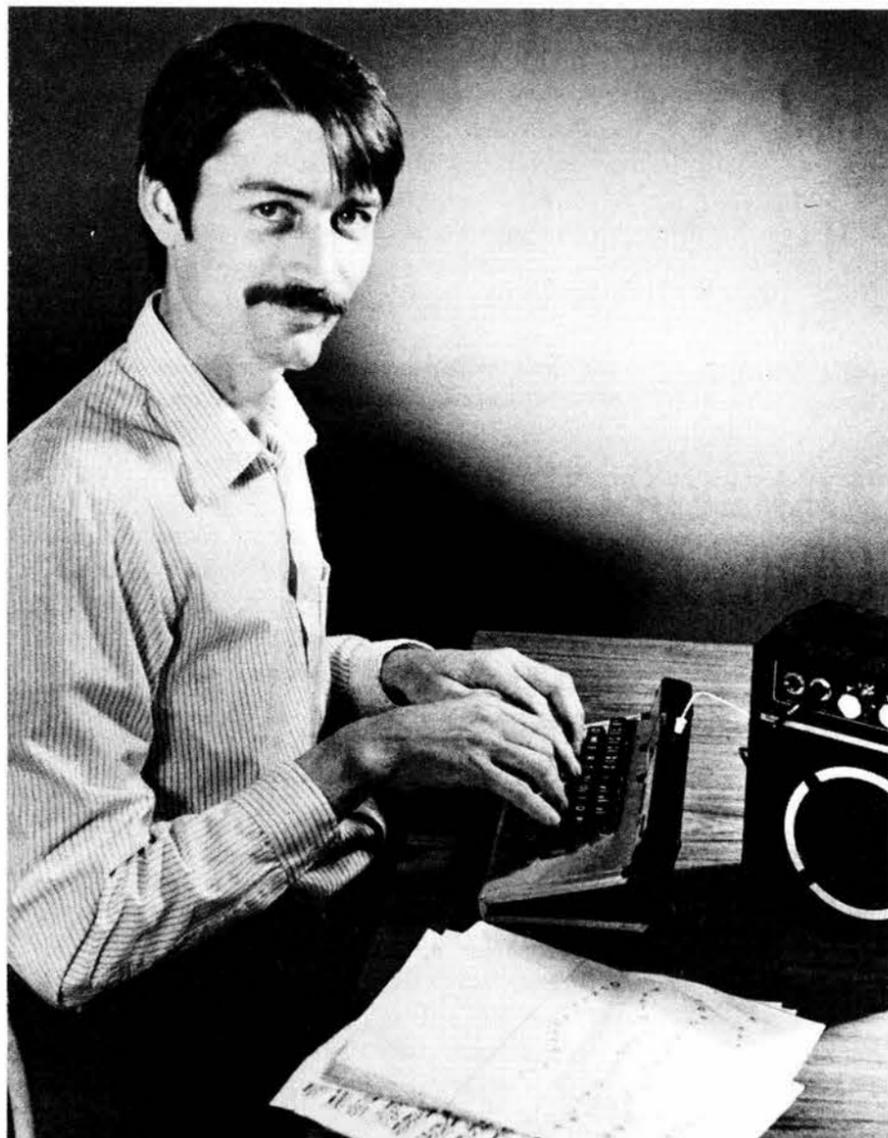
Lars graduated, worked at Los Alamos

Medical Corner

Recreation or Re-creation?

The next lecture in Medical's "Let's Talk About Aging" series is on aging and recreation. The speaker is Catherine Stewart-Roache, who holds a doctorate of ministry and is the current chaplain at the Lovelace Medical Center. Before coming to Lovelace, Chaplain Stewart-Roache worked in the field of aging in a community mental health setting for 10 years. This work led to

her interest in recreation and retirement. Chaplain Stewart-Roache states that she helps people remember or develop new skills in playing and recreation (or re-creation). The talk will be held in Bldg. 815 on May 2 from 12-12:30 p.m. (outside the tech area). Spouses are welcome. For further information, call Arlene Price at 6-0021.



LARS ROOSE (1235) displays his Typit musical instrument, built from an electronic tone generator, CMOS technology, and a standard typewriter keyboard. At right is an amplifier. The devices are powered with flashlight batteries. Lars plans to market the instrument.

for a while, and then joined Sandia last year. He never gave up on the musical device. He realized that the typewriter keyboard held an inherent appeal to musically untrained people. He rebuilt the machine several times, and he says it is now perfected.

"I grew up taking violin lessons, part of a musical family," Lars says. "My mother teaches piano, two brothers are members of the New Mexico Woodwind Quintet, a sister is a professional musician touring in Europe. My dad — Water Roose (3144) — encouraged us and paid for the lessons.

"Music is a big part of our lives. My kids are taking piano lessons. Maybe my Typit will give some people who never studied music the opportunity to play an instrument. It is fun, you know. I'm working on plans to market it. I'll provide 'music' in the form of letters to type on the keyboard."

• DG

Introducing the Burros of the Bike World

You're into liking biking, but you're a bit bored with bikes that demand only paved surfaces. You're ready for [trumpet fanfare] *Mountain Biking!*

Yes, you too can now buy a bike that will take you to the wilds — and back — surely, safely, comfortably. But before you dash to your dealer, head instead to a colloquium sponsored by the Sandia Bicycle Association and featuring Tom Mayer (5313),

master of mobile mountaineering (see LAB NEWS, Jan. 6, 1984).

The colloquium, "Introduction to Mountain Biking," will cover capabilities of the bikes, where you can ride, and what types of equipment you'll need for various terrain. In addition, a slide presentation will lure you with scenes of grandeur reachable on one of these bicycle-burros. Video clips will show you the different styles of riding

necessary for different types of terrain and amaze you with what these bikes can do in the hands of an expert.

The colloquium is in Bldg. 815 (outside the area) from noon to 1 on May 1. If you already have a mountain bike, ride it to work that day and park it outside the theatre before the colloquium to give others some idea of the equipment available.

UNCLASSIFIED ADVERTISEMENTS • UNCLASSIFIED ADVERTISEMENTS • UNCLASSIFIED ADVERTISEMENTS • UNCLASSIFIED ADVERTISEMENTS

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

RULES

1. Limit 20 words.
2. One ad per issue per category.
3. Submit in writing. No phone-ins.
4. Use home telephone numbers.
5. For active and retired Sandians and DOE employees.
6. No commercial ads, please.
7. No more than two insertions of same ad.
8. Include name and organization.
9. Housing listed here for sale is available for occupancy without regard to race, creed, color, or national origin.

MISCELLANEOUS

- WATERBED frame, queen size, w/6 dwrs., headboard, padding, liner, heater, box springs & mattress, \$275. Rodriguez, 296-3277.
- COLOR TV, Curtis Mathes 25" console, \$350. Thompson, 884-4883.
- FIXTURES used in dancing school for stereo, records, etc., \$150; lg. maple coffee table, \$75. Puhara, 255-7447.
- AQUARIUM, salt water, 55-gal., w/stand, gravel, lights, filters, etc., \$200 OBO. Roginski, 296-6494.
- QUEEN Size bed, platform or pedestal, Lady Englander mattress. Gasser, 299-2199.
- WILSON 1200LT golf club irons, 2-9 + SW (9 irons), stiff shaft, D2 SWT., 1980 model, \$105. Stang, 299-8688.
- COUCH, brown & beige velvet print, loose cushions, modern style, \$249; GE B&W TV, 13", 1 yr. old, \$40. Paul, 299-6387.
- RECLINER, gold velvet, WallaWay, \$120. Sanchez, 821-6391.
- 2 STROLEE car seats, \$20 & \$25; Gerry front-pack, \$6; Sears bicycle seat for toddler, \$10; misc. baby toys. Rochrig, 281-2695.
- SEARS bumper pool table, rectangular 35"x50", 30 1/2" high, \$75. Hart, 255-2133.
- CAMPER SHELL, short wide bed, lighted, 74"x80"x25 1/2" ht., \$180. Cordova, 268-6496 after 5.
- NEW SBR tire, ER78-14 w/4-hole rim, never used. Chavez, 831-9591.
- COMPOUND bow, Jennings Forked Lightning, variable draw & weight, \$100; black powder rifle, CVA 45 cal., Kentucky, \$130. Patterson, 243-6591.
- EXERCYCLE, \$50 OBO. Johnston, 294-4574.
- VIDEO analyzer, Sencore VA48, \$800. Garcia, 255-2337.
- FREEZER, 6 cu. ft. Coldspot, \$85; Lazy-Boy recliner, green tweed, \$25. Dieter, 255-8056.
- SEWING machine, Singer Stylist, needs some repairs, best offer over \$30. Borgman, 299-6010.
- APHA 2-yr.-old gelding, show quality AQHA fillys; alum. boat; camper trailer. Jolly, Canjilon, NM, 87515, 1-684-2430.
- BARREL furniture: game table w/4 chairs, couch, 2 end tables. Brumfield, 881-7559.

- LANDSCAPING rocks, free, granite, 3-5-inch diam., you pick up. Almqvist, 294-4723.
- FREEZER, Sears 15.3 cu. ft., \$80; red Ethan Allen recliner, \$60. Keener, 294-0856.
- MATTRESS, box springs, & frame, full-size, \$135. Noack, 821-4494.
- HVM 14' sailboat, Finn class day sailer w/trailer, \$1400. Wentz, 881-7125.
- '67-'69 BARRACUDA parts: hood, rear glass, grill, 3-spd. std. trans.; set of 2G70-15 & 2N70-15 Firestone Super Sport tires & Turbo wheels to fit GM products. Prevender, 299-5253.
- PICKUP tool box, \$25; Scotts fertilizer spreader, \$20. Bosworth, 869-6736.
- CON-TIKI heavy-duty folding chair, dark accented pine grain, \$39. Dalphin, 265-4029.

- DESK, all wood, lg. top work area (over 15 sq. ft.), \$295. Price, 294-4743.
- MAPLE bunk beds w/mattresses & mattress boards, \$150 complete. Jones, 299-9032.
- COLT, government model .45, blue, new in box, \$375. Turner, 293-8938.
- GIRL'S canopy dbl. bed, \$100; dresser, desk & chair, \$100. Worrell, 299-0381.
- PATIO cover, 10'x20', white alum. w/3 wrought iron posts; you disassemble, \$200 firm. Shannon, 821-6017.
- UNUSED 21" rear bagger lawn mower, fully assembled, gas & oil, \$198. Loomis, 255-9470.
- WURLITZER organ, '76 model, \$1000 OBO. Rael, 299-0343.
- SEARS gas clothes dryer, \$100. Carr, 281-1632.
- '74 STARCRAFT Camper trailer, sleeps 6, fully equipped, dual tanks, wardrobe, \$2200. Konnick, 298-1422.
- MULTI-FAMILY yard sale: antiques, collectibles, arts & crafts, old & new items, junk, April 28-29 at 11621 Mountain Rd. NE. Baker.
- BICYCLE, men's 24", AMF 10-spd., \$25; BBQ grill, \$5; rear truck bumper, steel w/hitch, \$5. Martinez, 296-2762.
- STEREO equipment: Harmon-Kardon 330-C receiver, \$35; Heathkit AR1219 receiver, \$30; Utler 8000 reel-to-reel recorder, \$45. Guilford, 255-6294.
- WINDOW air conditioner, 6000 BTU, \$75; Goodyear Polysteel tires, BR78-14, \$30; four white Datsun truck rims, never used, \$75. Miller, 281-3655.
- PRINTER, Commodore 1525 Graphics, 80 column, for VIC, C-64, \$130; amplifier, Pioneer stereo, 20w/chan., bass/treble/loudness, \$35. Barham, 298-7304.
- GOLF clubs, 3 woods, 7 irons, bag, cart, \$65. DeLollis, 299-5384.
- SEARS drafting table w/cabinet, 24"x36" table, adjustable height & angle, \$20. Moyer, 881-3879.
- STEREO, Panasonic Model SE-2510, AM/FM, cassette, play/record, auto. turntable, speakers, cost \$350, sell \$175. Newton, 296-2335 after 5.
- SLEEPER sofa, queen size, Herculon earth tone stripe, \$150; Sears reel-type mower, \$40. Bradley, 293-9586.
- Book of Knowledge encyclopedia, 1979 edition, 20 vol. plus index,

- \$150. Sharp, 243-1498
- YOUTH bed, \$75. Weber, 293-7522.
- CAMPING trailer, Starcraft fold-down, sleeps 6, stove, ice box, heater, lots of storage space. Rexroth, 293-6025.
- NAKAMICHI 480Z cassette tape deck w/Dolby C & remote control, black front, \$325. Harrell, 294-3456.
- SWINGSSET: 2 swings, slide, seesaw, \$40. Graham, 293-7302.
- KINGSIZE bed w/simulated brass & wood headboard, \$200. Johnson, 821-6303.
- CANOE, 15', Sears, alum., w/paddles; 3 child's vests; HD water softner; assorted rabbit cages. Harris, 344-6640.
- MOTORCYCLE rear tire, new Dunlop K127, 16" RWL, \$35. Brock, 865-4055.

TRANSPORTATION

- '82 HONDA Night Hawk 650, Windstar fairing, caseguards, luggage carrier, \$1750. Demaree, 294-7019.
- ELECTRIC Cars: converted '71 Vega hatchback, \$1150; converted '67 Renault, \$450, both complete w/chargers. Bassett, 898-1840.
- '71 LARSON IO 350 Chevy, OMC out-drive, full canvas, depth finder, CB, tandem trailer, \$4500. Tobyas, 877-0354 after 6.
- '74 BMW, 750cc, white, Vetter bags, \$2000; '71 Honda 450, needs work, \$200; '67 MG Midget, \$1800. Wentz, 881-7125.
- '73 VW bug, new tires, new brakes, one owner, low mileage. Sanchez, 294-0271.
- GIRL'S 20" Raleigh bicycle w/training wheels, blue, \$65. Ottinger, 242-7935 after 5.
- BIKE: 15 spd. Raphael Giamiani, 27" wheels, Mixte frame, w/pump & extras, \$125. Walston, 296-0372.
- '76 HUSQVARNA, 360cc, street legal dirt bike, motor never bored, extra lg. gas tank plus enduro light, \$485. Kelsey, 292-4768.
- '70 COUGAR V8 351, Cleveland engine, AT, PS, PB, sbr tires, cassette. Stang, 299-8688.
- '80 YAMAHA SR250G, Exciter I elec. start, low miles, \$695. Hoke, 298-6619.
- '66 MUSTANG, completely restored, 6-cyl., 3-spd., AM/FM cassette, \$3200. Martin, 869-2049.
- '77 TOYOTA Chinook poptop, 51K miles, AC, refrig., aux. battery, furnace, bunk arrangements for sleeping 2 or 4. Rainhart, 821-3690.
- BOAT, Baja open bow w/Johnson 115 power trim, less than 150 hours on engine, \$7200. Johnson, 293-9485.
- '67 BMW R69S, touring tank, saddle bags, \$1100 OBO. Gwinn, 299-7167.
- '77 FORD 1-ton pickup for camper & trailer, HD hitch & cooling system, AT, PS, PB, 56K miles, \$3900. Smith, 255-5662.
- 1940 BUICK Special, straight 8 engine, new battery, \$2950 OBO. Chavez, 831-9591.
- '80 SUZUKI GS750, equipped for sport touring, Plexifairing, bags, rack w/driver backrest, Koni shocks, 11K miles, \$1875. Stephenson, 299-3914.
- BICYCLE, men's, 3-spd., Sears, 21" frame, caliper brakes, fenders, kickstand, chainguards, rat-trap pedals,

- new tires, \$50. Joseph, 299-6989.
- '71 4 x 4 SCOUT Commanche, 304, V8, AT, 70-15 Sun Valley tires, \$1595. Norris, 299-4717.
- '74 CHEVY 1/2 ton, 4-spd., LWB, 350 engine, dual tank, 56K miles, \$1990; luggage rack w/small car cover, \$45. Garcia, 888-4735.
- '80 HONDA XL 185S street/trail motorcycle. Fisher, 881-8072.
- '81 SUZUKI GS1100, \$2495 OBO. Prevender, 299-5253.
- '76 MERCURY Bobcat, AM/FM cass. stereo, 4-spd., \$1900 OBO. Meyer-Hagen, 262-0496.
- '78 SUZUKI TS-100 Enduro, 4400 miles, \$450; acoustic 6-string guitar, Honda 2, \$60. Baker, 294-3334.
- '79 KAWASAKI KZ750B, sissy bar, windjammer V, custom seat, 15K adult miles, \$1590 OBO. Harwood, 299-1326 or 881-1649.
- '76 FIAT X-19, low mileage, priced below book value. Hoffman, 296-3799 after 6.
- '72 FORD stn. wgn., 105K miles, radio, AC, PS, PB, \$1200 OBO. Holmes, 292-0898.
- '81 SUZUKI PE 250 Enduro/motocross, never raced, \$750. Turner, 293-8938.
- '80 SUBARU DL1600, metallic brown, AT, AC, AM/FM cass., 40K miles, \$3900. Christopher, 299-5712.
- '78 FORD Ranger F150, low miles, 4-spd., AC, PS, dual tanks, \$4300 OBO. Sena, 865-7750.
- BICYCLE, 20" dirt bike, black w/chrome frame, freewheel & hand brakes, knobby thorn proof tires, \$40. Connor, 268-9497.
- '80 TOYOTA Supra, 5-spd., air, sunroof, sunshade, extended warranty, AM/FM/cass., \$6200. Rogers, 293-5726.
- '71 BUICK Skylark, 80K miles, 350 engine, \$800. Campbell, 292-1421.
- '74 FORD Maverick, white, 2-dr. w/manual trans., new battery, sbr tires, \$1200 cash, firm. Hymmer, 293-6029.
- '78 PONTIAC LeMans 4-dr. sedan, V6, PS, PB, AT, AM/FM; new tires, muffler, battery, \$2500. Wengert, 294-5373.
- '83 DODGE Colt, AC, AM/FM cass. stereo, tinted windows, \$4800. Vargas, 242-7097 after 6.
- '74 VOLVO 4-dr. sedan, AC, 4-spd. trans., AM/FM radio, \$1750. Mueller, 299-8074.
- '82 SUZUKI GS1100E, 2700 miles, many extras, \$2995. Gunckel, 255-4325.
- '77 SCOUT, 4-wd, 42K miles, 345 V8, AT, AC, PS, PB, cruise control, auto. hubs, \$3700. Lukens, 299-1271.
- '80 MAZDA RX-7, black, AM/FM/cass., 5-spd., AC, back & side louvers, 35K miles, \$7000. Moody, 294-0482 or 298-1776 after 5.
- '81 TOYOTA Tercel lift back w/alloy wheels, 29K miles, white w/blue interior, \$3800. Woody, 831-6321.
- YAMAHA Enduro, 400cc, street legal. Brock, 865-4055.
- '78 SUBARU 4-wd wagon, new radial tires. Sanchez, 242-2256.
- '81 KAWASAKI GPZ-550, 2500 miles, heated grips, owner warranty. Ritchey, 268-7620.
- '76 DODGE Aspen coupe, V8, AT, new paint. Barton, 268-7349.

REAL ESTATE

- 10 ACRES off South 217, water, power & phone nearby, near National Forest. Hands, 836-5919.
- 1 ACRE, heavily wooded, overlooks valley, located on South 217. Sanchez, 294-0271.
- HOUSE in Academy Acres, 4-bdr., 1 1/2 baths, LR, DR, FR, \$88,700. Davis, 821-1572.
- 1 ACRE, w/converted MH, 2-car garage; commercial gas, elect., & water plus irrigation water, 11 miles from Taos Ski Area, \$65K. Esquibel, Livermore 776-8227.
- LOTS, 2 R-1, Hilton & Parsifal, utilities in place, \$13 & \$15K. Hawk, 265-2228.
- 5.2 ACRES S-14 just past Oak Flats, water system membership, utilities, wooded, \$35K, assume \$16K REC, terms on bal. negotiable. Swahlan, 294-2126.
- NE Heights near Base, 3-bdr., 1 bath, landscaped, sprinklers, many decor touches, 1000 sq. ft., refinance \$58K. Sturgeon, 299-3523.
- 3-BDR., 2 bath, fp, landscaped, 4 yrs. old, West side, 7 3/4% assumable. Smith, 836-1676 after 5.
- 40 ACRES, 1300' on 344, 4 miles east of N14; trees, telephone, elct., 20-yr. REC, negotiable terms. Curtis, 281-3519.
- MOSSMAN townhouse, 2 master bdrms., 2 bath, clerestories, skylites, 1623 sq. ft., dbl. garage, by Arroyo del Oso Golf Course. Reynolds, 884-5148.
- 4-BDR. house, 1200 sq. ft., 10.5% assumable mortgage, \$4K & take over \$540 monthly payment. Woody, 831-6321.
- NE near UNM, 2-bdrm., pitched roof, new carpet/linoleum, lg. corner lot, new refrig & stove, \$62K. Sanchez, 242-2256.

WANTED

- LESSONS wanted for MT68 Casio keyboard (musical instrument), vicinity Eldorado HS. Riley, 293-5868.
- AIRLINE dog crate, largest size. Shipley, 298-2433.
- AMC Spirit; engine for Ford Fiesta. Baxter, 344-7601.
- STEPLADDER, 8'; port. elec. type-writer. Moss, 298-2643.
- ONE/two women to share NE Heights house. Adams, 296-2455.
- 35 TO 50 HP elec. start boat motor, will buy or trade for 25 HP elec. start Johnson. Worrell, 299-0381.
- STEERING wheel for 1971 Datsun pickup, will pay cash or trade Datsun 510 parts. Miller, 281-3655.
- CRANK-UP or fold-over tower for ham antenna, 35-45 ft. Moore, 294-5646.
- ROOMMATE, 3-bdr., 1 1/2 bath house, \$250 + 1/3 utilities. Brewer, 831-5031.
- 15" TIRES, radials preferred, set of 4, good condition only. Brock, 865-4055.
- GIRL'S 16" bicycle, good condition, preferably w/training wheels. Gregory, 821-1429.

LOST & FOUND

- EXCHANGED by mistake, West gym, after Sandia BB game, navy blue warmup top w/rainbow stripe on sleeves. Quinlan, 296-1852.

Happy Hour, Shrimp Peel Tonight

HAPPY HOUR TONIGHT has a number of good things going for it — number one is the buffet, a Coronado Club shrimp peel. Number two is the band, Together, one of the best variety bands in the city. Number three is Jim Trost, piano player extraordinaire who will perform dining room background music. In addition to all of this, the Club's special Happy Hour prices will be in effect from 4:30 until 8:30. And, if peeling shrimp isn't your style, the Club's standard menu is available.

A TRAVEL PROGRAM on Bermuda is set for Monday, April 30, starting at 7 p.m. in the ballroom. There'll be some pretty pictures to see and travel agency reps to hear. They will have the word on travel to places Caribbean.

FRESH SEAFOOD, flown in every Thursday, is a special treat at the Coronado Club. Club Manager Mitch Griffin early in the week calls his old hometown contacts in New England, finds out how the catch is go-

ing, makes his selection, then prepares several special treats for your consideration for Thursday evening dining. Mitch knows about seafood. There are about 75 regulars who join Mitch each Thursday. There's room for more. You are cordially invited.

NEXT FRIDAY, May 4, sees one of the Club's favorite bands, the Isleta Poor Boys, playing dance music for the sagebrush shufflers. The buffet features an outstanding spread of Rio Grande Mexican food as well as selections from the regular menu. Karen Edwards instructs free western dance lessons from 7:30 until 8:30.

VARIETY NIGHT on Saturday, May 5, is a special treat for the little ones. Three of Walt Disney's classic animated films will be shown: *Winnie the Pooh*, *The Ugly Duckling*, and *Mickey Mouse — Fun and Fancy Free*. Super sandwiches are available at 5; the cartoons start at 6. Door prizes will be given away. Admission is free to members and their families.

MOTHER'S DAY comes soon now, so you might plan a brunch for Mom and the family at the Club on Sunday, May 13, from 11 a.m. to 3 p.m.

SWIM SEASON starts this month — quietly on Friday, May 25, for recreational swimming at 11 a.m., then loudly at the grand opening party on Memorial Day, May 28. Season tickets are on sale at the Club office now. You must have these before enrolling youngsters in the Club's swim instruction program. A number of classes, various sessions, and for several skill levels are available. Enrollment for swim lessons is set for Saturday, May 5, from 9 until noon.

TRAVEL PACKAGES available through the Club include New Orleans International Exposition, May 25-29, \$562; Fiji Islands, nine days starting June 30, \$825; and the Greek Islands, one week on a cruise ship with island land tours and several dinners ashore starting Oct. 18, \$2188.

Take Note

The New Mexico Arts and Crafts Fair will be held June 22-24 at the State Fairgrounds. Volunteers are needed to man the sales, information, and drawing booths, and to work as ticket takers and cashiers. Shifts will run for two to three hours from 10 a.m. to 10 p.m. on Friday and Saturday and from 10 to 6 on Sunday. Anyone interested should call Laurel Braa (294-4094) or Tammy Mitchell (888-4908).

The KAFB Arts and Crafts Center (Bldg. 954) offers the following instructional programs:

Jewelry and Silversmithing — begins May 2

Enameling — begins May 3

Acrylic Painting and Design — begins May 1

The classes meet one or two nights a week for four weeks; class fees vary. For more information call 4-0222 or 4-0425.

The New Mexico Jazz Workshop presents four Sunday concerts in Madrid, NM, each summer. This year's schedule: June 3 — Blues Day; July 22 — Mainstream Day; Aug. 5 — Composer's Orchestra; and Aug. 19 — Straight Ahead Jazz Day. Volunteers are needed to help in all aspects of the Madrid concert production from parking and security to concession sales and stage work. If you're interested, call Charlotte Smith (293-4853) or the Workshop office (842-6659).

The NM Museum of Natural History is offering two natural science field camps this summer. Sessions for students ages 9-11 and ages 12-14 will be held on a "day camp" and combination "day camp and overnight camp" basis. Sites of the camps are the Albuquerque volcanoes and bosque, and the

Sandia and Jemez Mountains. Activities include mapping of beaver activity along the bosque, a survey of Rio Grande fishes, studies of microscopic aquatic animals and plants, fossil and rock-collecting/geology studies, learning to identify native plants and birds, hiking, swimming, and astronomy activities. A limited number of scholarships are available. For more information, call 841-8838 or 841-8840.

The NM Symphony Orchestra's 14th Annual Mother's Day Concert at the Zoo will begin at 2 p.m. on May 13. The concert is free, but regular zoo admission is charged: age 3-11, \$1.50; 12-64, \$3; 65 and over, \$1.50; 2 and under, free. Parking Co. of America is offering a free shuttle bus service from their lot on 5th St. between Lead and Coal. A snack bar for food and beverages will be open. Advance tickets will be on sale after May 1 at the Zoo.

Parentcraft has opened registration for new parent groups beginning in May. The programs include "The Creative Process of Parenting," "Parents of Infants from Birth to One Year," "Parents of Toddlers 12-18 Months of Age," and "Single Parents Support Group." For more information, call Parentcraft, 256-1191.

The Que Pasa Recreation Center has opened A Ticket and Tour Office. Current tours include Santa Fe Downs, Rio Grande Zoo, an overnight trip to Carlsbad Caverns, and a trip to Hawaii. The ticket office is an outlet for Giant Tickets, the firm that handles ticket sales for most local events — Ice Capades, Waylon and Willie, Wayne Newton, etc. For prices and more information, call 846-2924. The office (Bldg. 20155) is open from 9-5, Monday through Friday.

Sympathy

To Ken Goin (6257) on the death of his father in Oklahoma, April 9.

To Celso Sanchez (3618) on the death of his brother in Albuquerque, April 6.

To Mary Rodriguez (3412) on the death of her grandmother, April 6.

To Nels Magnuson (7222) on the death of his father in Bottineau County, N.D., April 14.

