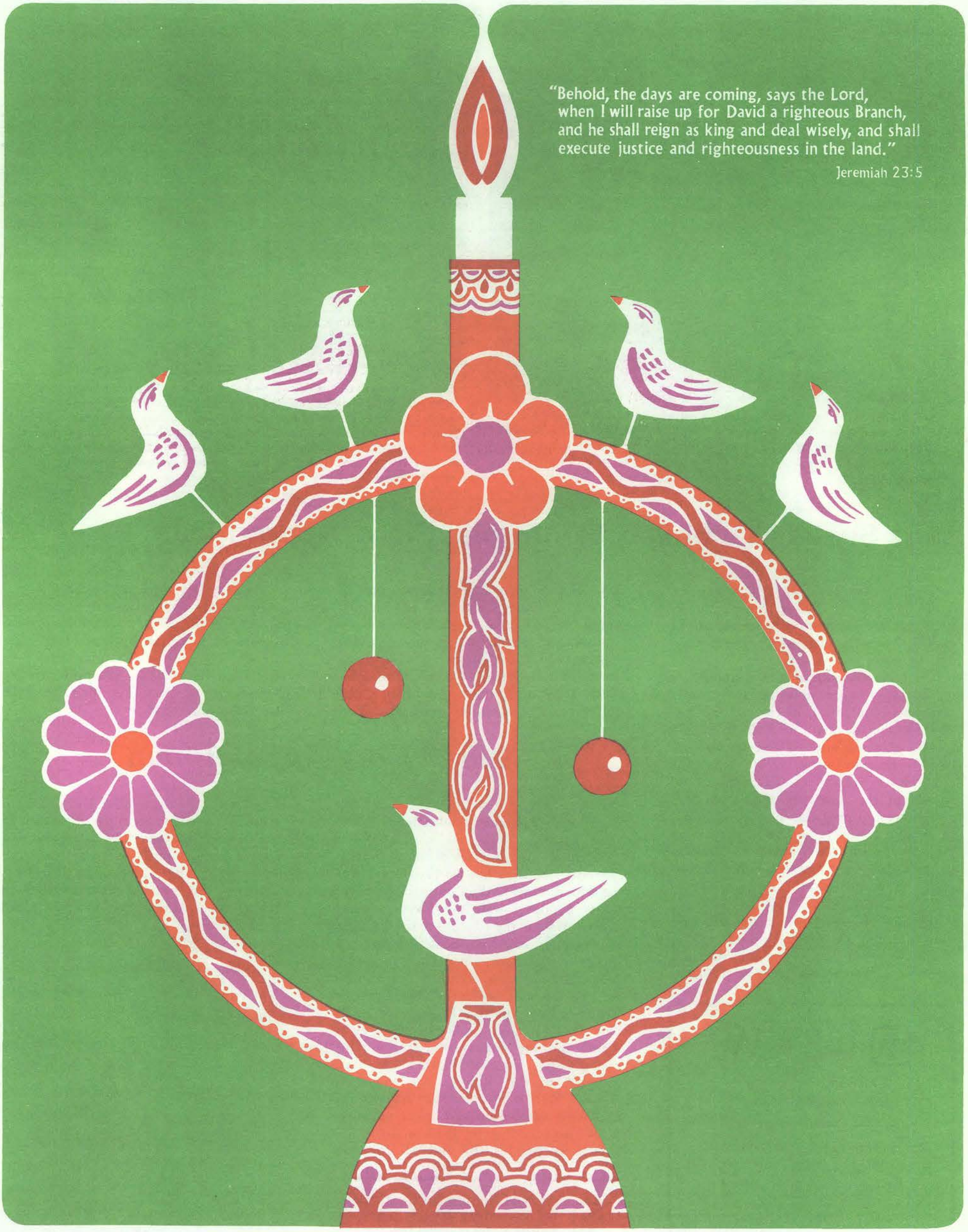
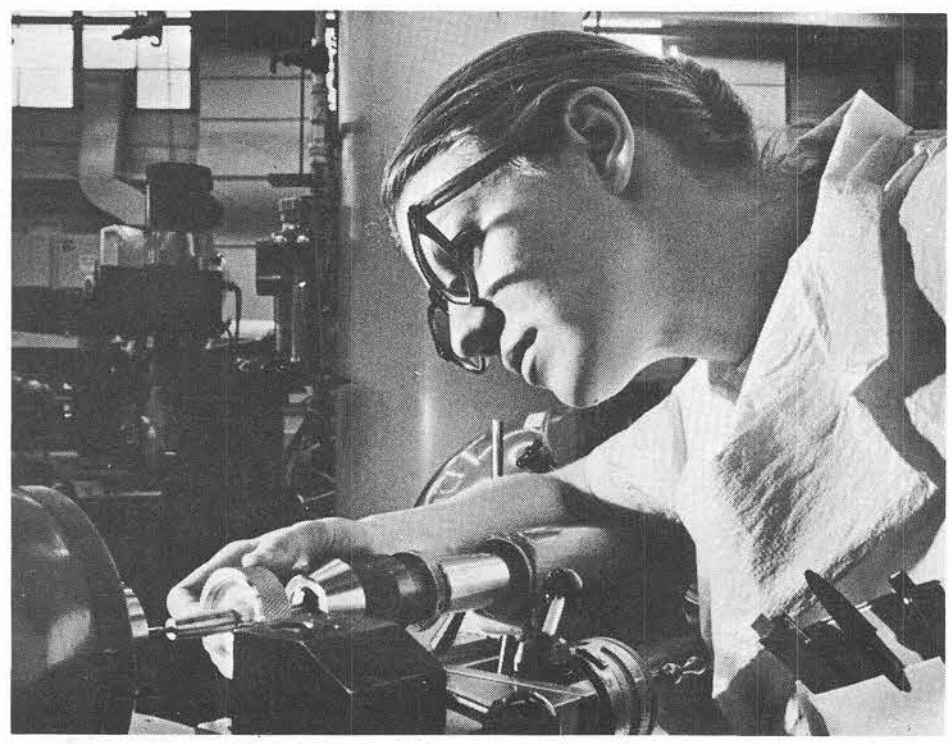
"Behold, the days are coming, says the Lord,
when I will raise up for David a righteous Branch,
and he shall reign as king and deal wisely, and shall
execute justice and righteousness in the land."

Jeremiah 23:5



HAPPY HOLIDAYS

WILLY DOYETO, a plant technician (electrical) apprentice in Remote Areas Maintenance Division 3618, checks out circuit on machine tool. A Kiowa Indian from Oklahoma, Willy has been in the Labs' apprentice program for nearly three years. The program lasts five years, calls for on-the-job and classroom training.



SIX YEARS out of high school, Ruth Bargman (1481) is a machinist apprentice who is finding the work "challenging but fun." Ruth had worked in an auto parts store and realized there that she enjoyed things mechanical and had a knack with them. Her next project, off the job, calls for dropping the engine from her VW and rebuilding it. Women in the skilled trades are increasingly evident at the Labs; currently there are four women journeymen and 18 women apprentices.

Labs Seeks Machinist, Electronic, Plant Apprentices

Under the heading, "Apprentice Training—Sandia Laboratories," advertisements are currently appearing in the classified sections of newspapers throughout the state.

The Labs is seeking qualified applicants to fill apprentice slots in five trades programs—machinist, electronics fabrication technician, plant technician (structural), plant technician (electrical) and plant technician (mechanical).

Employees are urged to tell relatives and friends of the opportunities in Sandia's apprenticeship program. Successful applicants will complete a five-year training program leading to a Craftsman II position at the Labs. They receive on-the-job and out-of-hours instruction in all practical and theoretical aspects of the trade.

Qualified Indians, women, blacks and handicapped people are particularly sought, according to Personnel Department 3530. The trades areas at the Labs have already seen a gradual infusion of persons in these categories, and Sandia would like to increase their number.

Applicants should be high school graduates between 18 and 30 with good learning ability and electrical or mechanical aptitude. They must meet the physical requirements of the job and undergo a DOE security investigation.

All outside applications must be made through a New Mexico Employment Services Dept. Office by Jan. 11. Persons already on roll at Sandia may get additional information or apply through Don Duran, personnel rep for Orgs. 1000 and 3000, on 4-6348.

LAB NEWS

Published every other Friday

SANDIA LABORATORIES

An Equal Opportunity Employer

ALBUQUERQUE, NEW MEXICO
LIVERMORE, CALIFORNIA
TONOPAH, NEVADA
Editorial offices in Albuquerque, N.M.
Area 505 264-1053
FTS 475-1053
ZIP 87185
In Livermore Area 415 422-2447
FTS 532-2447

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aided by gerse martinez

barry schrader & lorena schneider report livermore.

Supervisory Appointment

DICK ANDES to manager of Accounting Department 3250, effective Dec. 16.

Since joining the Labs as an auditor in March 1958, Dick has worked in each of the departments in the Comptroller Directorate 3200, as well as in systems and procedures and the education and training departments. He has held section and division supervisory positions in these organizations. Dick completed a temporary assignment with the Management Training Program at WE headquarters in New York City and was one of the original members of the Management Staff organization (400). Since 1972, Dick has been assigned to the Business Systems and Applied Math department as supervisor of its Personnel Division and, more recenlty, of its Financial Systems Division 2625.

Dick received his BBA and MBA degrees in accounting from the University of Oklahoma. He devotes much of his time to church and scout activities, is an amateur radio operator, and ejoys camping and photography. Dick and his wife Joyce have a son in college and a daughter in high school. The Andes live in NE Albuquerque.

DICK ANDES (3250)

When all the votes are in, it may be the podiatrists and the orthopedic surgeons who reap the real rewards from the current disco dancing craze. The Temple University's Center for Sports Medicine recently reported a new disease called "disco foot." Their study shows that bouncing about in those pointy-toed, high-heeled shoes can cause bunions and blisters and damage both the arch and the knee. "Some people," says their report, "even break both their spikes and their ankles at the same time."

The MC-727 Explosive Motor

Twenty Years and Still Going Strong

Hardly anything stays the same in the nuclear weapons business. New designs, new concepts, new requirements, new materials result in a steady stream of improved components, circuits and systems. That's what makes the MC-727 explosive motor something of a novelty.

The first MC-727s were produced in 1958 and 1959 and used in the B28 bomb to open a port and expose a baroswitch to the atmosphere. Many of those original motors are still in stockpile and still as reliable as ever—and the original design of the MC-727 is still in production. Now, however, these explosive motors (which drive a piston five-sixteenth of an inch in milliseconds) are used primarily to start timers and operate safe/arm switches.

When the first MC-727s were produced, the requirement for nuclear weapon stockpile was 10-15 years. To achieve such longevity, it has been common practice to replace short-lived components and systems periodically and to retrofit stockpile weapons with longer-lived components as they became available. That's never been necessary with the MC-727—and it's still no problem, even though the stockpile life requirement for nuclear weapons has been increased to 25 years. Last August, 24 stockpile units made in 1958-59 were tested with 100 percent satisfactory results—a kind of living testament to the fact that Sandia designers, working partly from faith leavened with experience, had earlier speculated accurately about the potential shelf life of components that included organic materials.

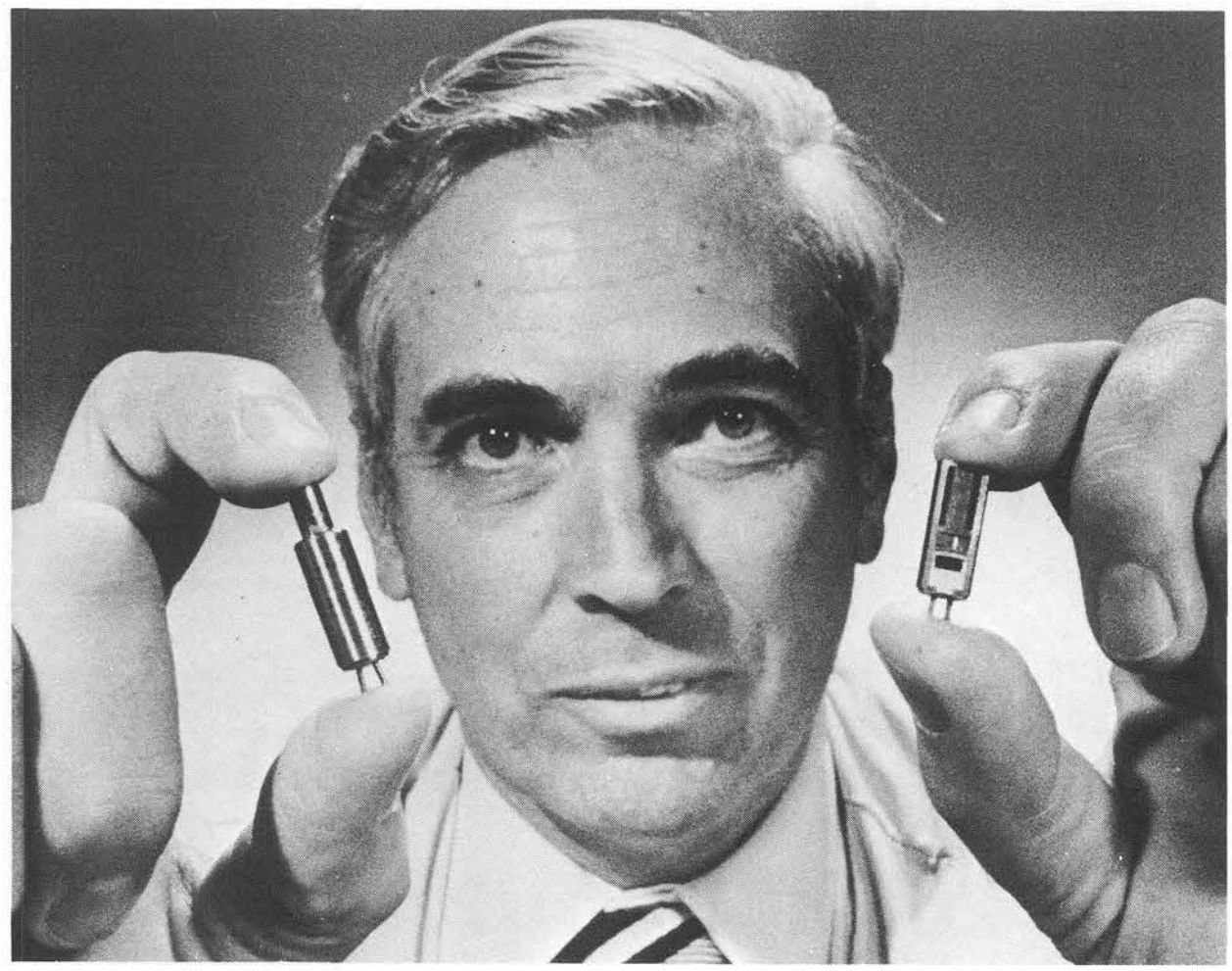
Twenty years may not seem like such a long time, but let's put it in perspective. In 1958:

- Sandia Livermore was only two years old;
- In Albuquerque, the finishing touches were being put on the Van de Graaff Lab; the contract had not yet been let for Sandia's engineering test reactor (the SERF); and
- Nick DeLollis (5813), the man who put us on to this story, had worked for Sandia for just one year.

In the 20-some years since that Nick has worked in the Materials and Processes Directorate, he has specialized in adhesives and sealants. Now that he's planning to retire in January, he's pulling together the information he's kept on file over the years—information on what he calls "real-time" aging.

"In the 1950s," Nick told us, "we could only speculate on the ability of organic materials to survive long shelf life. And the MC-727 is loaded with organics."

Nick ticked them off: the preformed packing for the top seal and the piston seal on the MC-727 is silicone rubber—and the lubricant for both is silicone grease. The bond for the contact pins in the insulator plug is epoxy hardened with polyamide and the bond between the insulator plug, the metal case and the external top seal is epoxy cured with diethylene triamine. The external seal across the piston and case is polysulfide, and the explosive used to drive the piston is lead mononitroresorcinate.



IN 1958, BOB BURNETT (2513) shepherded the MC-727 explosive motor through final development and production. Back then it was used to open a port on the B28 bomb and expose a baroswitch. Now it's used principally to start timers and operate safe/arm switches. Cut-away at photo right shows bridgewire explosive. Gas produced by explosion drives piston (photo left) five-sixteenths of an inch in milliseconds. After more than 20 years, 24 stockpile units from the first production run were tested last August. They were 100 percent satisfactory.

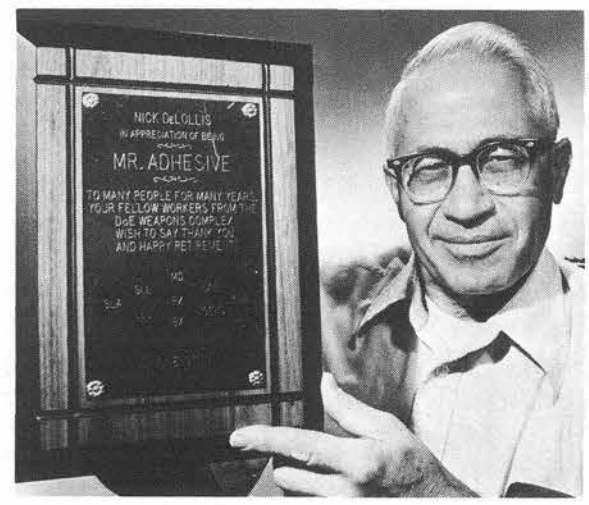
The key question in 1958 was whether all this organic material could survive the extensive environmental exposure specified for the B28. "The Phase I outline," Nick points out, "called for tests involving, among others, exposure to shock, vibration, humidity, thermal cycling, rain, salt, dust and sand. At the time, we were reasonably certain the organic materials would meet a shelf life requirement of 15 years. Now we're sure."

Nick is reviewing all the records he's compiled since he came to Sandia (not just those on the MC-727) and is preparing reports pinpointing the "real-life" performance of a great many adhesives and bonding agents in a wide variety of applications. His conclusions are reassuring.

"We have enough experience now," Nick told us, "to assure 20 to 30 years of successful stockpile life for most components. Knowing we can meet the 25-year requirement no longer involves speculation. We've verified our capabilities."

When we talked with Bob Burnett in Detonating Components Division 2513 (who took over as project engineer on the MC-727 explosive motor project in 1958 and shepherded it through final development and production), we asked if he had any thoughts about the MC-727's outstanding reliability.

"There was one difference between the MC-727 and the explosive motors which preceded it," Bob recalls. "We welded the bridgewire instead of soldering it—and welding is much less vulnerable to deterioration."



FOR OVER 20 YEARS, Nick DeLollis (5813) has specialized in adhesives and sealants, earning him the title of "Mr. Adhesive" among his friends and co-workers. As he approaches retirement (target month is January 1980), Nick is writing a series of reports on "real-time" aging that confirms the ability of organic materials to survive long shelf life—25 years and more. During his career at Sandia (commemorated by the recent presentation of the plaque he holds), Nick worked on a variety of programs and kept data on many others. The story of the MC-727 explosive motor is one of the more dramatic and reassuring of the weapon-related stories uncovered by Nick.

"In 1958," Bob reflected, "we were still learning how to weld dissimilar materials like the nickel chromium birdgewire and the copper electrodes. We worked closely with the supplier to develop the techniques required for microwelding these small components. That production technique may be one of the reasons the MC-727 has held up so well."

Not to mention good design and superb quality control.

WHERE ITS HAPPENING. Lee Hollingsworth, Director of Computing 2600 (standing, left) and Kelly Montoya, head of Computer Operations Department 2630, look on as Systems Analyst Ruthe Jones (2641) debugs a new program on a control console in the Scientific Computing area of Building 880. The Cyber 76 and CDC 7600 computers are controlled from this area. Tapes in foreground are working tapes that contain auxiliary programs and data needed to meet over-the-counter and remote terminal requests. Computer operators Fil Tenorio and Mary Couch (both 2631) load tapes in background.

The Directorates

2600: Computing

In the next five years, computer users at Sandia are in for some wide-ranging changes, both in equipment and in the way that equipment is used. According to Lee Hollingsworth, Director of Computing 2600, acquisition of two major computers is planned during that period. So, too, is a network of mini- and super-mini-computers and a digital switching system to insure the fullest possible use of Sandia's computing equipment.

Keeping up with the computing needs of the Labs is a large job. A Computing Committee composed of representatives from each VP organization and headed by Gene Reed, VP 2000, determines how much and what kind of computing capability is required for the total laboratory. Computing Directorate 2600 then acquires the Albuquerque equipment and makes sure that needed services are available at SLA.

Based on user surveys and a study of historical data, Org. 2600 estimates the amount of computing the Labs will need in the years to come, then recommends purchases which are approved by both the Computing Committee and Small Staff before they are submitted to DOE's Military Applications Division.

"To acquire a new major computer is a two-year project," says Lee. "Headquarters DOE, the Executive Office of Management and Budget and Congress all have to approve. Then we release the specifications and solicit bids. Our next major scientific computer procurement will be for a Class 6 computer which is capable of 4 to 5 times the computer power of one of our present Class 4 computers."

There are changes in store on the administrative side of the house, too. After a two-year study of administrative computing needs at Sandia, an ad hoc study committee recommended that Sandia switch from over-the-counter batch type computing (cards and tapes) to on-line data base computing. Small Staff approval resulted in acquiring a Univac 1100/82 to replace the Univac 1108 now in use.

"We're already two years into the redevelopment of our administrative software programs," Lee explains. "Right now we've got a combination of batch and time-shared programs which access tape-oriented files. The objective is to put administrative information into on-line disc-oriented data bases. Instead of turning in punched cards for a once-a-month report, users will be able to query the computer in English-like language and get answers in a minute or two to questions like, 'How much has been spent to date in Case 1001.10?'"

As revolutionary as the Univac 1100/82 will be administratively, even bigger changes are in store for scientific users. In the next five years, mini- and super-mini-computers will be installed throughout Sandia at locations selected by the Computer Committee—and they'll have the capability of being interconnected with interactive graphic and image enhancement stations.

"The super-mini-distributed system will help us on a couple of levels," Lee Hollingsworth told us. "More and more small and medium sized jobs can be run locally. This will free the central computers for the big number-crunching jobs, the kind that now require two to ten hours turnaround time. These jobs now are often run on weekends out of necessity. Once the super-minis take on some of the smaller to medium size jobs, turnaround time at both the local and central computers will be significantly reduced."

The super-mini system will allow users to develop and execute either small programs in their entirety or long-running ones in blocks which can be tested, then sent into storage in the central computers. When the program is completed, it can then be run by the large computer and the results returned to the local computer.

Two other key elements in the computer system-to-be are light-pipe digital data transmission system with a bandwidth hundreds of times greater than the copper wire system now in use, and a digital-switching control system which, on request, will connect a user to any requested computer located in the network.

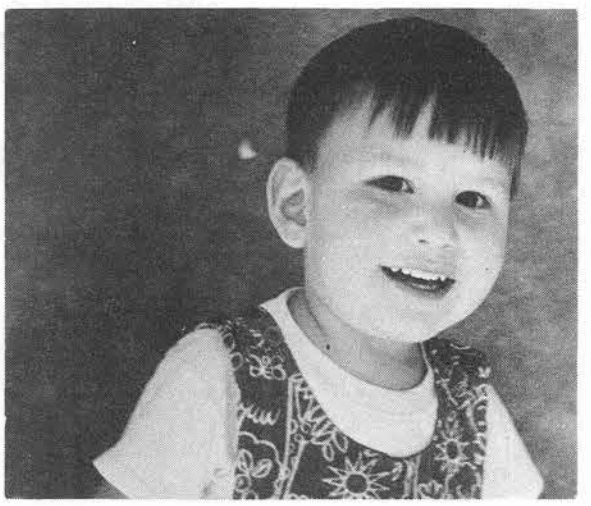
Once these two systems are operating, such innovations as electronic mail and digital storage and retrieval of documents and visual aids will become real possibilities. So, too, will shared used of word processing and text editing systems, thus reducing the total number of such systems needed by the Labs.

MEL McCUTCHAN, supervisor of Community Relations Division 3163, was recently awarded this Presidential Commendation "in recognition of exceptional service to others . . ." Working with the local office of the National Alliance of Businessmen, Mel, over the past few years, has succeeded in getting jobs for many people sometimes considered unemployable—ex-cons, Vietnamese refugees and others down on their luck. The award was presented to Mel by Moses Sanchez, NAB's Regional Coordinator.

ON SOUTH HIGHWAY 14, it's sometimes touch-and-go delivering Christmas goodies to needy families who may live miles off the main road. The South Hwy. 14 Village Project, now in its 15th year, helps poor people in the villages of Escabosa, Chilili, Tajique, Torreon, Manzano and Punta. From its file on some 90 families, the Project each year randomly selects one-third for assistance (the budget won't stretch over all 90). Cash is raised through sale of used books and donations, but principal source this year was sale of Sandia Labs caps. People in Orgs. 3510 and 3162 handle this project.

Christmas Projects at the Labs

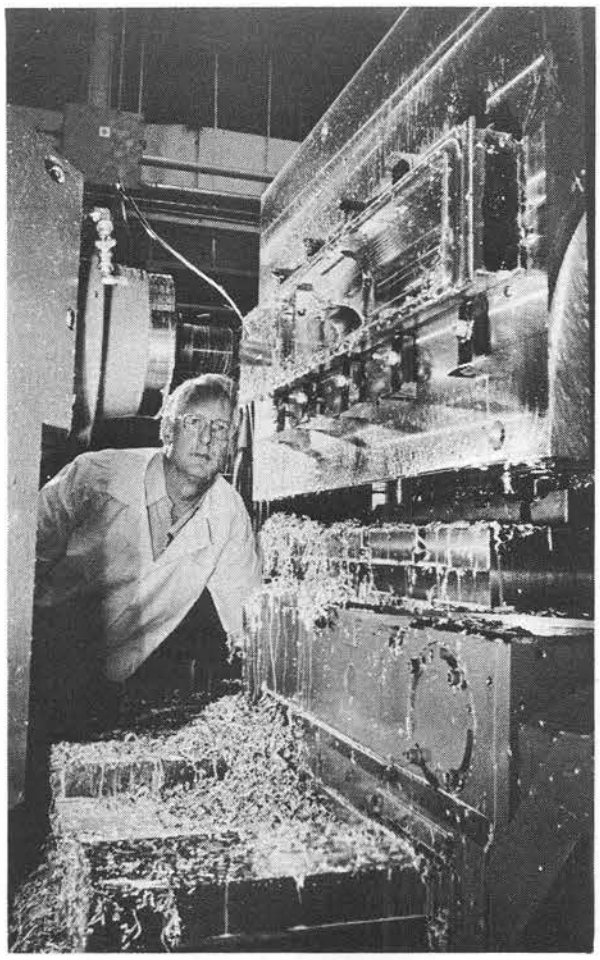
SANDIA remembers its 1800-plus retirees during the holidays with a greeting card and a retireee directory/calendar. Eleanor Kelly, Betty Gatto and Doris Mason of Benefits Administration and Employee Services Division 3543 prepare to get the mailing underway. The greeting card and LAB NEWS Christmas cover share the same art by Janet Jenkins.

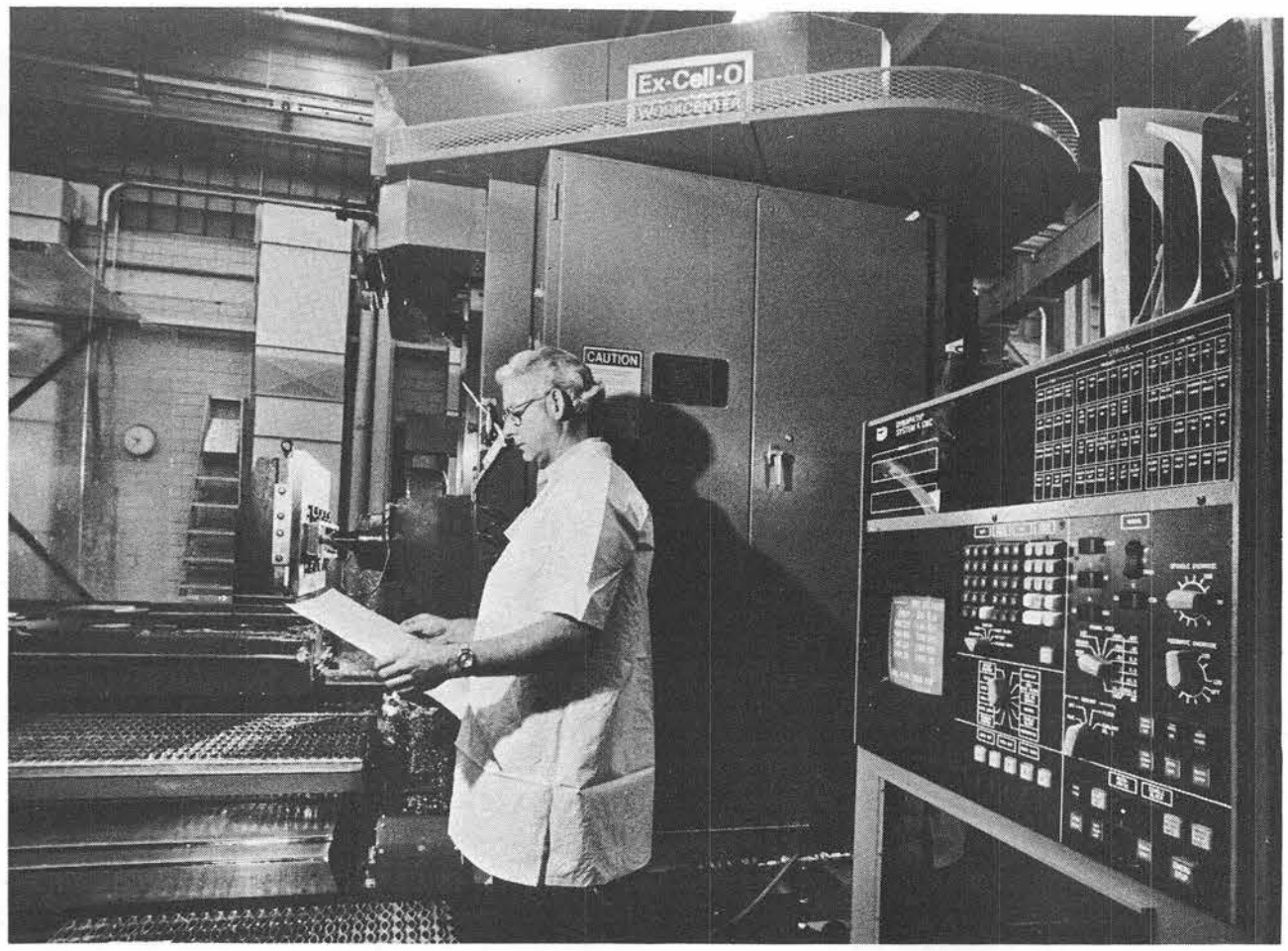


A YOUNG FAMILY MEMBER outside the village of Chilili turns on the charm. Christmas packages in South Hwy. 14 Project are composed chiefly of food. Most families get food stamps, but diets remain marginal.

KINNEY'S SHOES on Central and Organization 1200 have worked together for many years on the Shoes for Kids Program. This year's chairman, Hank Guttmann (1223), reports that enough donations were received to purchase shoes for 110 children. The store grants a discount to this Christmas project.

PHYLLIS SANCHEZ (3533), Dorothy Garcia (3531) and Liz Lujan (3533) created some pretty packages for the 20 children at the Albuquerque Christian Children's Home who, for various reasons, are unable to be in their own homes this Christmas. Contributions from Departments 3510 and 3530 supported this new Labs' Christmas project. The committee also purchased 15 games for group-play for the Youth Diagnostic Center. Committee members not pictured include Nina Chapman (3533), Lorella Salazar (3510), Fran Paulos (3531) and Dolores Ulibarri (3533).





LATEST ADDITION in Tom Cleveland's Automated & Heavy Machining Section 1483-1 is this numerically controlled machine, called by its maker — Ex-Cell-O — a "work center." Machinist Kyle Williams, shown here, calls it the XLO-208 and reports that XLO-208 can perform machining operations along five axes. Kyle directs machine from console panel at right. If you plan to ask Santa for one for your home workshop, tell him he'd better have about $400k in his jeans when he goes shopping.

Fit Is Better

Running in Ft. Worth, Santa Monica, Las Vegas & Alexandria

Earlier we asked Sandia runners to send us descriptions of good running courses in the many cities that Sandians have occasion to visit. Cities of particular interest are: Washington, Amarillo, Las Vegas, Kansas City, Livermore, San Francisco, Los Angeles, Santa Barbara, Santa Maria, Tampa/St. Pete., Seattle, Pasco, Philadelphia, Hartford, Boston, Providence, San Diego, Dallas and St. Louis. Thus far we've carried items on running courses in Seattle and St. Petersburg.

* * *

Ft. Worth/Larry Johnson [4323]—"This city has created an excellent bike route/running trail that starts just west of downtown and parallels the Clear Fork of the Trinity River, ending at the bridge under Southwest Loop (Spur 820). The trail goes under all road bridges so that there is absolutely no traffic problem. Since it is constructed on the bank of the river, it is essentially flat with your choice of either dirt and some grass or blacktop. The trail runs through Trinity Park and a quite pleasant wooded section across the river from the Colonial Country Club.

"Best access by car is at Trinity Park, just north on University Drive off I-20. The back door of the Holiday Inn-Midtown is close to the trail. Other downtown hotels and motels are only a few blocks from the start of the northeast end of this trail."

* * *

Santa Monica/Ed Neidel [2166]—"My favorite running course here is along the coast south of the Santa Monica Pier. It's very convenient when I stay at the Royal Inn or Holiday Inn along nearby Ocean Ave.

"When the tide cooperates, I usually find a strip of damp but firm sand, ideal for running, between the water line and the soft beach sand. Once in a while, though, it may be necessary to outrun the surf.

"When the tide doesn't cooperate, I use a combination of bicycle path and vehicle-free beach frontage road which is parallel to the shore. There's no smog here. Just cool, damp ocean air that make a mile-high jogger feel like a gazelle.

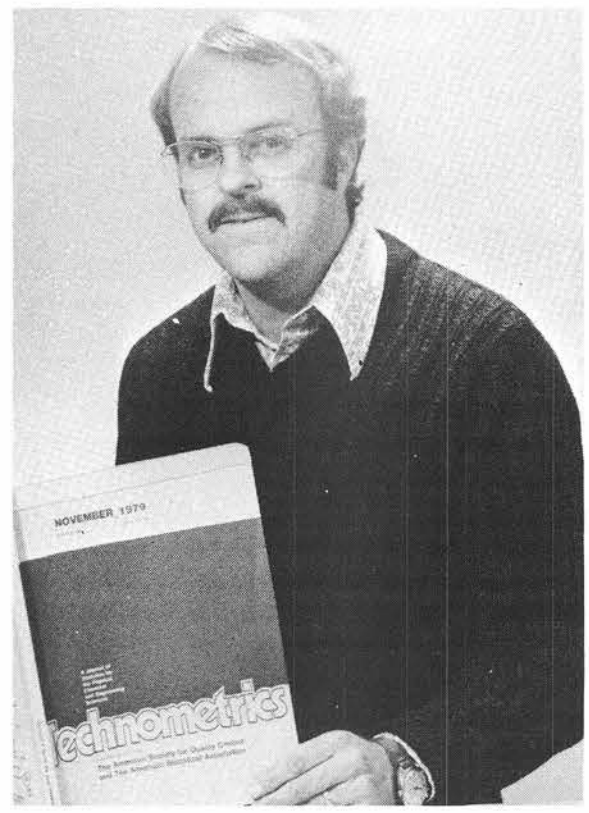
Some one-way distances from the Pier south are 2.3 miles to Venice Blvd., 2.7 to Washington St. and 3.8 to the Marina del Rey inlet. Haven't gotten up early enough for that last one yet, but one of these trips..."

* * *

Las Vegas/Carl Smith [1112]—Carl has sent up a sketch showing a 3.1 mile loop which starts at the El Morocco Hotel. As you step out of the hotel onto Las Vegas Blvd., run south (right) to Riviera Blvd. where you turn west until Paradise Rd. Running north on Paradise you encounter a golf course. Carl reports that he has run inside the wall on and around the golf course with minimum flak but, like everything else in LV, you take your chances. Turn east at Sands Blvd., return to Las Vegas Blvd. and complete the loop back to the hotel.

* * *

Alexandria/Springfield/Paul Heppner [8111]—"If you're in Virginia in this area southeast of Washington, I recommend a run along the Potomac on the biking/hiking/running trail which begins at Mt. Vernon and follows the west side of the river all the way to the capital. The trail has an excellent running surface (half asphalt, half cinder/sand/gravel) and leads you through miles of scenic, park-like wooded areas. You can pick up the trail at the Mt. Vernon parking lot or at any number of parking areas along the Mt. Vernon Memorial Parkway."



BOB EASTERLING (1223) becomes editor of *Technometrics*, quarterly technical journal of the American Statistical Association and American Society for Quality Control, next month. He has been an associate editor since 1974. Bob joined Sandia in 1967, has worked as a statistician in the Reliability Department since then except for a leave of absence to teach at the University of Wisconsin for a semester and a two-year assignment with the Nuclear Regulatory Commission. His specialities are statistical data analysis and the applications of statistical techniques to reliability assessment.

SUSAN DEWITT, coordinator of the Historic Landmarks Survey, looks out on this scene each day. Appropriately, the offices of the Landmark Survey are located in the Kimo Theater at 5th and Central.

Our Town

Preserving the Past: The Historic Landmark Survey

Preservation of historic sites and buildings requries planning unless decay or demolition is to move in. Albuquerque's Historical Landmark Survey is the work of a number of people and organizations who share that opinion. Organized in 1973 as a subcommittee on the City's Fine Arts Board, the Historic Landmark Survey continues its work today under the guidance of Susan Dewitt and her staff of five people.

The Survey is jointly funded by grants from the state and the city. Results of the group's early work, "Historic Albuquerque Today," was published last year and includes a sampling of historic buildings and districts of Albuquerque.

In the book's introduction, Susan writes: "Historic preservation is a visual affair, a matter of keeping alive the buildings, streets, neighborhoods that link us with the past."

Despite loss of some of the city's finest landmarks—the Alvarado and Franciscan Hotels, Huning Castle and others—much of what Susan calls "visible history" remains—old adobes, chapels, and schools, and the barrios and Victorian neighborhoods. And the aim of the Historic Landmark Survey, including "Historic Albuquerque Today" and its continuing projects, is to document that visible history and to provide planning for preservation. (With no funds available for reprinting, the book is in short supply. We found copies, $8.50 ea., at the UNM bookstore and the White Oak Bookshop in the Galleria and Corrales Shopping Center).

Current project of the Survey is the systematic house-to-house inventory, within and close to the downtown core, of all buildings constructed before 1945. "Most of us are in the field several hours each week," Susan says. "I particularly like this phase of the work because of the contact with so many interesting people. Once we explain what we're doing, most homeowners are gracious and help us with information known only to family members. It's sometimes like solving a puzzle. Little bits of information help us get under the layer after layer of remodeling until we can see the basic architecture. Perhaps someone remembers that grandfather had a porch on his Victorian house enclosed, covering up some fine window detail or carved roof supports. Or another recalls that an uncle didn't care for the exposed beams in the old adobe, so had a false ceiling installed. And in some of our barrios, which at one time were individual villages, residents have retained many of their traditions and can help us visualize what the village looked like 50, 100, even 200 years ago."

So, gradually, a registry of information is being compiled. Consisting of descriptions of the architectural style of a building plus other details, and a brief history of the building, its district and residents, the documentation will help homeowners, neighborhood planning groups and others to know where it all began. "The listing of a building on the register," Susan says, "in no way affects the legal status of the building or the rights of its owners. Most of the buildings registered are not open to the public and can be seen only from the street.

"People have been generous with other information," Susan adds. "We've had access to private papers and manuscripts, and many people have supplied us with old photographs. It's a fascinating job. We know we are truly helping to preserve the past." •*nt*

Seminar Aims at Technology Transfer

Tony Veneruso, supervisor of Geothermal Technology Division 4742, chaired a seminar recently in Houston to stimulate exploration and development of geothermal and high temperature fossil energy resources.

The seminar was co-sponsored through Sandia by DOE's Division of Geothermal Energy, Division of Fossil Fuel Extraction, IEEE, and the University of Houston's EE Department.

Subject of the seminar was "High Temperature Electronics and Instrumentation." A capacity audience of over 300 people, representing the petroleum and well-logging service industries, electronics and instrument manufacturers, and universities and government agencies, attended.

"Our division has a two-fold mission," Tony says. "One is to develop hardware and technology for use in geothermal energy exploration and the second is to transfer those developments to private industry. The goal of the DOE-sponsored program is to boost the nation's production of electricity from geothermal resources from its present 660 megawatts to at least 20,000 megawatts over the next 20 years. That means an annual increase of about 20 percent. To achieve this, we must drill and log something like 9200 additional geothermal wells.

"Logging instruments—the devices that measure in-situ conditions like temperature, pressure, and fluid production in wells as deep as 5000 meters—are vital in geothermal exploration and development. As in the case of the oil and gas industry, logging data provide the basis for investment of risk capital.

"Currently, no commercial logging instrument performs reliably at temperatures above 150°C unless protected by thermal insulation that limits performance. In geothermal exploration, temperatures are typically above 150°C and range as high as 350°C. At Sandia, we're developing instruments to do the job, and a few already exist that can function to 275°C in pressure up to 7000 psi. These instruments have passed field tests, and their technology is now being transferred to industry."

Sandia papers presented at the two-day conference included Tony's overview presentation; "Hybrid Circuit Development," Dave Plamer (2151); "Silicon Device Behavior," Bruce Draper (2151); "High Temperature Electronics," Dick Heckman (2151); "Monoconductor Cables and Cableheads," Joe Coquat (4742); "Upgrading Mechanical Tools," Bruce Major (4742); "Quartz Resonator Pressure Transducers," Tom McConnell (4742); and "Corrosion Resistant Alloys for High Temperature," Dave Douglass (5831).

Congratulations

Mr. and Mrs. Bernie Vigil (2451), a daughter, Bernadette Renee, Nov. 12.

LIVERMORE NEWS

VOL. 31, NO. 25 LIVERMORE LABORATORIES DECEMBER 21, 1979

Ancient Customs, New Technology

Spencer Tours Chinese Electronics Facilities

"One of the most interesting things I've done."

This is how Bill Spencer, head of Systems Development Directorate 8100, describes his recent three-week visit to the People's Republic of China. Bill, accompanied by his wife Joan, was the deputy leader of an IEEE delegation that toured Chinese electronic facilities this fall as guests of the Chinese Institute of Electronics.

The 17-person group of IEEE members and wives left San Francisco in mid-September. After a non-stop, 14-hour flight to Hong Kong, they proceeded to Canton. ("Former President Nixon was on our train and stayed at our hotel in Canton," Bill reports, "which tended to reassure us about the quality of our accommodations.") From there they flew to Hangchow, went by train to Shanghai and Nanking, flew to Sian in the interior where they spent five days, then flew to Peking where they stayed for eight days before emplaning for Tokyo and the U.S.

On a typical day after breakfast, the members of the delegation and their Chinese guides would spend the morning at a research institute. Lunch, usually followed by a nap, preceded another site tour or sightseeing.

"The format of each plant visit was identical," Bill says. "Tea first, followed by introductions, gifts, and short talks. Almost without exception, the talks were in Chinese, translated in English. Our response in English then had to be translated, so communication was slow. After the tour, the group reassembled, and we were asked for our frank opinions and assessments, and then we'd answer questions about similar work in the United States.

Emphasis during the visit was on integrated circuits work, although the group also toured facilities devoted to microwave devices, computers, and communications. Chinese IC-processing capabilities are now comparable to those of the mid-1960's in the United States, Bill reports, although the Chinese are aware of current technology and have plans to improve as fast as possible.

As one example of current capabilities, Bill described a fairly typical Chinese-built computer used in universities and research institutes: 16-bit word length, transistor-transistor logic circuitry made with discrete transistors or small-scale integrated circuits, 16-32K bytes of core memory supplemented by rotating drum storage, and several teletype keyboards. Programming is in Basic or Fortran, and programs are written in English because the teletype keys and input/output software require it. The Chinese also use computers imported from other countries.

Factory work—in fact, most work—is very labor-intensive. Bill reports visiting a silk factory where, despite the use of computers in schools and institutes, no computers were in use in the factory, and each operation depended simply on the industry of many individuals. "When you consider that China has 900 million people living in a relatively small arable area, it's not surprising that labor is abundant," Bill notes.

Trip highlights? There were many, Bill reports. For example, there was the state dinner in Peking on Sept. 30, the eve of National Liberation Day. The Americans—and 5000 others—were guests at the event which featured many courses, toasts, and a talk by Premier Hua. Many guests were impressive in their native costumes.

Another highlight was an hour-long visit with Vice Premier Huang Tsun, devoted to discussion of technical exchanges between China and the U.S. And a side trip to the Great Wall ("How did they ever get food to the workmen—it's 6000 kilometers long!"), and a visit to the Peking Opera, performing in Nanking ("Delightful. At the end of the performance, the audience was silent, and the performers applauded.").

The traveler to China comes away with an array of impressions. Some of Bill's:

—Everyone has a bicycle, and everything can be transported on one. "I saw livestock, household goods, coal, even people being carried to the hospital, all on bikes." (In Peking, there are 8 million people and 2 million bikes. A bicycle costs about two month's wages.)

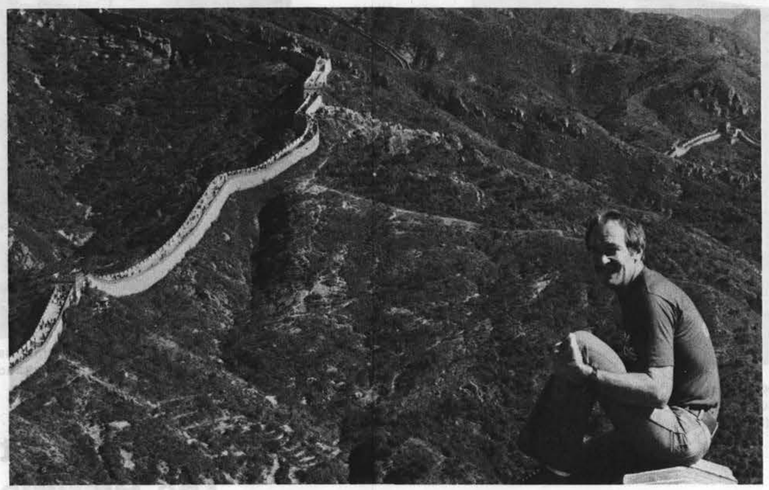
—The army has been integrated into civilian life to a surprising extent. "Their use of the army is imaginative, innovative," Bill says. "I saw military vehicles used for produce and construction, and military people used in farming, maintenance, and a variety of civilian activities." He estimates as much as five percent of the population is in uniform.

—Children appear to be well taken care of. They're well fed, well treated, and one seldom hears a cross word directed at a child. Nurseries in connection with factories and research institutes take care of workers' children during the day. At one integrated circuit factory, employing about 1000 people, there were 25 women caring for 75 children.

—Because there is no refrigeration, people buy, transport, and cook food for each meal separately. Food is cooked over soft coal fires, either inside the house or outside.

"I'm much impressed with the Chinese," Bill says. "And our hosts were most gracious." Ten of the host Chinese visited the U.S. in October and again met members of the American delegation.

Any words of advice for prospective China travelers? "Yes," grins Bill. "The food is excellent, but you mustn't eat everything on your plate. If you do, you're guaranteed to get more—and if it's some exotic side dish like stomach or duck webbing, once may be enough!"



CONTEMPLATING a different kind of solid state artifact, Bill Spencer views portion of the Great Wall of China.

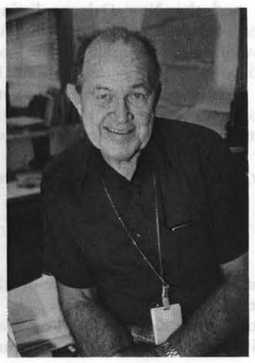
TO CHINA—Bill Spencer (8100) presents a gift to his Chinese hosts—a solar cell made in Sandia's Semiconductor Development Lab, the back of which (note inset) bears the Sandia T-bird, the IEEE emblem and Chinese characters saying "solar photovoltaic cell."

TOYS FOR NEEDY KIDS—Sandians at Livermore are helping to make Christmas brighter for children of less fortunate families this year by donating new and used toys. Looking over the contributions are Chris Imler (8261), Gayela Phillips and Gertrude Williams (both 8212).

Retiring

Ralph Jaeger (8265)

Bess Roach (8266)



Rocky Roach (8423)

Supervisory Appointments

ANTON WEST to supervisor of Materials Development Division II 8314, effective Dec. 1.

Anton joined Sandia Livermore's experimental mechanics organization in 1972 and later transferred to the materials group. There he performed materials studies, with emphasis on the effects of hydrogen on mechanical properties and on the long-term behavior of materials. In his new position, he will direct both fundamental and engineering research studies in hydrogen effects on materials.

Before he came to Sandia, Anton worked for a semiconductor firm and, earlier, was a research associate at Stanford University. He has a BS in ME from Worcester Polytechnic Institute and MS and PhD in materials science from Stanford.

Off the job, he plays and coaches soccer, enjoys long-distance running, and skis. He lives on Wimbledon Lane in Livermore with his two young children.

* * *

PETE DEAN to supervisor of Publications Division 8265, effective Dec. 1.

Joining Sandia Livermore in 1964 in the engineering procedures division, Pete transferred a year later to the technical writing group, turning out R&D and weapon development program reports. More recently, he has been writing for SLL's solar energy programs (minutes, brochures, displays) and working to develop computer graphics.

Pete holds a bachelor's degree in EE and an MS in technical writing, both from Rensselaer Polytechnic Institute, and is a member of the national Society of Technical Communication. Off the job, he enjoys sailing, baseball and home construction. Over the past five years he has built two houses—both with passive solar energy sources—a residence in Brentwood where he and his wife Joanne live with their six-year-old son, and a resort home in the nearby delta area.

Authors

Bill Winters (8453) and H. Merte (U. of Mich.), "Experiments and Nonequilibrium Analysis of Pipe Blowdown," NUCLEAR SCIENCE AND ENGINEERING, Vol. 69, No. 3, pp. 411-429.

Arnie Andrade (8424), "Data Acquistion Systems Applied to Printed Wiring Board Measurements," INSULATION/CIRCUITS, Apr. 1979, pp. 73-76.

Jack Dini and Rudy Johnson (both 8312), "Electrodeposition of Zinc-Nickel Alloy Coatings," METAL FINISHING, Vol. 77, p. 31, Aug. 1979, and Vol. 77, p. 53, Sept. 1979.

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Q. Several good mathematical libraries [MATHLIB, NAG, IMSL] are available for use with the large CDC computers. However, an increasing number of organizations are acquiring mini-computers, and there is a strong need for a quality math library for use with these machines. Are there any plans to develop a math library specifically for mini-computers?

A. The Applied Mathematics Division, 2623, has the responsibility for the development and maintenance of mathematical subroutine libraries. Currently, Division 2623 is in the process of making major revisions to MATHLIB which will represent a single precision version for the new 32-bit VAX 11/780. Most of the routines require a different algorithm for machines with different wordlengths. The new version of MATHLIB should be available in late December. A double precision version for the VAX will be available in the Spring.

The commercial libraries, such as NAG and IMSL, present administrative problems. The packages are proprietary so that the source code must be protected. In addition, Sandia is currently charged for each machine on which the library is used. We are currently in the process of negotiating with both NAG and IMSL for a flat fee contract so anyone desiring the libraries may have them available on their machine.

The Subcommittee on Stand-Alone Computers, chaired by T. L. Pace, 1120, and the Applied Mathematics Division are currently surveying the mini-computer users regarding their current and future needs in the area of mathematical subroutines.

Division 2623 always welcomes your comments and suggestions concerning any of the mathematical libraries. If you have any special requirements, they will try to fill those needs by developing special routines or seeing if they are commercially available.

L. E. Hollingsworth—2600

Q. A new base regulation requires the operators of motorcycles to have in their possession their safety course completion card. Does this apply to Sandia employees as well?

A. Paragraphs 18 and 19 of the summary of revisions to the KAFB Traffic Code stipulate that certain motorcycle operators complete a special course of instruction within 30 days following the registration of their privately owned motorcycles with the KAFB Security Police. These motorcyclists are further required to carry, and exhibit on demand, evidence of completion of the KAFB-sponsored motorcycle defensive driving course.

However, we are advised by KAFB Security and Safety officials that these requirements apply only to active duty military and DOD civil service personnel and that Sandians are exempt.

D. S. Tarbox—3400

THE MISSISSIPPI QUEEN (left) with her two-story paddlewheel is the largest and most luxurious steamboat ever seen on the Mississippi and Ohio Rivers. Commissioned in 1976, she rises more than 80 feet out of the water, pouring forth riverboat tunes from her giant calliope. Her sister ship, the 53-year-old Delta Queen, carries on the riverboat tradition with an antique decor (brass and mahogany) and the sounds of bluegrass, blues, ragtime and Dixieland. In the 1800s, more than a hundred paddlewheelers operated out of New Orleans.

Unusual Vacations

'Rollin' Down the River'

[Ed. Note: Have you taken an unusual vacation? Tell us about it—call 4-1053.]

Before he retired five years ago, J. J. Miller accumulated many miles of travel for Sandia, first as a field tester and, later, in connection with numerous rocket tests.

"I figured out, once," J. J. notes, "that in my 20 years at Sandia, I actually lived in Hawaii for 18 months! But I enjoy traveling and, luckily, so does my wife Lorena."

The Millers, who reside in Albuquerque, have visited South America, the Orient, made two trips to Europe and two trips to the South Pacific, including New Zealand and Australia. And they've traveled widely in this country.

Their most recent vacation, in New Orleans, included a steamboat cruise on the Mississippi River. "We've visited New Orleans many times," J. J. says, "but never during Mardi Gras. Lorena and I agreed on Mardi Gras in New Orleans for a 10-day vacation and I began to make the arrangements. This was the previous November and there were no accommodations to be had in the city for Mardi Gras—late February and early March 1979.

"Then I came across an ad for a cruise on the Mississippi Queen, a paddlewheel steamboat. A number of years ago we had taken a trip on her sister ship, the Delta Queen, from Cincinnati to Pittsburgh on the Ohio River. The ships are unique and we had enjoyed the experience. People who take cruises have one thing in common—all are aboard because that's where they want to be; this produces an air of festivity and pleasure shared by passengers and crew members."

The three-night, two-day river cruise fitted nicely with the Miller's plans so J. J. made their reservations.

"Going aboard the Mississippi Queen is like stepping back into Mark Twain's *Life on the Mississippi,*" J. J. says, "with one exception: not only do you get the romantic aura of days gone by but you can also dream about those days while enjoying all the modern conveniences."

The Millers boarded the Mississippi Queen in New Orleans on Friday evening. They cruised about 120 miles downstream through the delta and bayou country with a stop at Fort Jackson. Constructed in 1822, the fort, with a moat and drawbridge, has been restored and opened to the public. The paddlewheeler returned upstream to a point about 90 miles north of New Orleans with a stop at an antebellum home along the way. "These mansions represent pre-Civil War plantation life," J. J. says. "It must have been a great life—for the owners." The cruise ended on Monday morning at New Orleans harbor.

"Our stateroom was very comfortable, the food was excellent and there's lots of entertainment. Each cruise has a Dixieland group but also features the big band. Woody Herman and his orchestra were performing on our trip, and one of my most enjoyable encounters was meeting him and talking music. We arrived back in New Orleans in time for Mardi Gras only to find that the city police were on strike and most of the activities had been transferred to the suburbs. So we just visited an adjoining parish and enjoyed two days of festivities. We spent another week in New Orleans, thoroughly enjoying the French Quarter cuisine."

* * *

Logistics—J. J. made his own travel arrangments, but suggests that anyone not familiar with the area should deal with a travel agent. He also suggests making reservations for a cruise months in advance. A steamboat cruise is expensive to very expensive, depending upon the length (from 3 nights to 14 nights) and the class of accommodations. J. J. estimates the cost of their cruise at $125 per person per day. Fares include steamboat passage, accommodations, meals and on-board entertainment; they do not include tips, wine and bar purchases, tours or on-board purchases. Prices in New Orleans vary widely. J. J. recommends the *Mobil Travel Guide* for travel within this country. Separate guides are published for different segments of the U.S. We looked at J. J.'s copy and the New Orleans listing contained information about hotels and restaurants—from one-star to four-star ranking—tours, activities, famous homes, etc. Planning a trip several months in advance also gives you the option of selecting (and pre-paying, thus avoiding later fare increases) one of the many "super saver" or special "economy" air fares.

Sympathy

To Ed Cassidy (3542) on the death of his father-in-law, Dec. 6.

To Andrew Kersey (3618) on the death of his father-in-law in Albuquerque, Dec. 3.

PE Cram Course Offered

Two written exams must be passed for registration as a Professional Engineer, and Sandia will be offering a review course for the first of these beginning Jan. 8. Open to Sandians and non-Sandians (on a space available basis), arrangements for this out-of-hours course were made by the local chapter of ASME.

The spring engineer-in-training exam is scheduled for April 19, and the review class, meeting Tuesdays and Thursdays from 4:45-5:30 p.m. in Room B-5 of the Coronado Club, will run through Thursday, April 10. Registrations should be in by Jan. 4. Sandians use out-of-hours class cards available from Ruth Brooks (3521). Non-Sandians register with the instructor, Joe Abbin, at 264-8590. The cost of materials for non-Sandians is approximately $16.

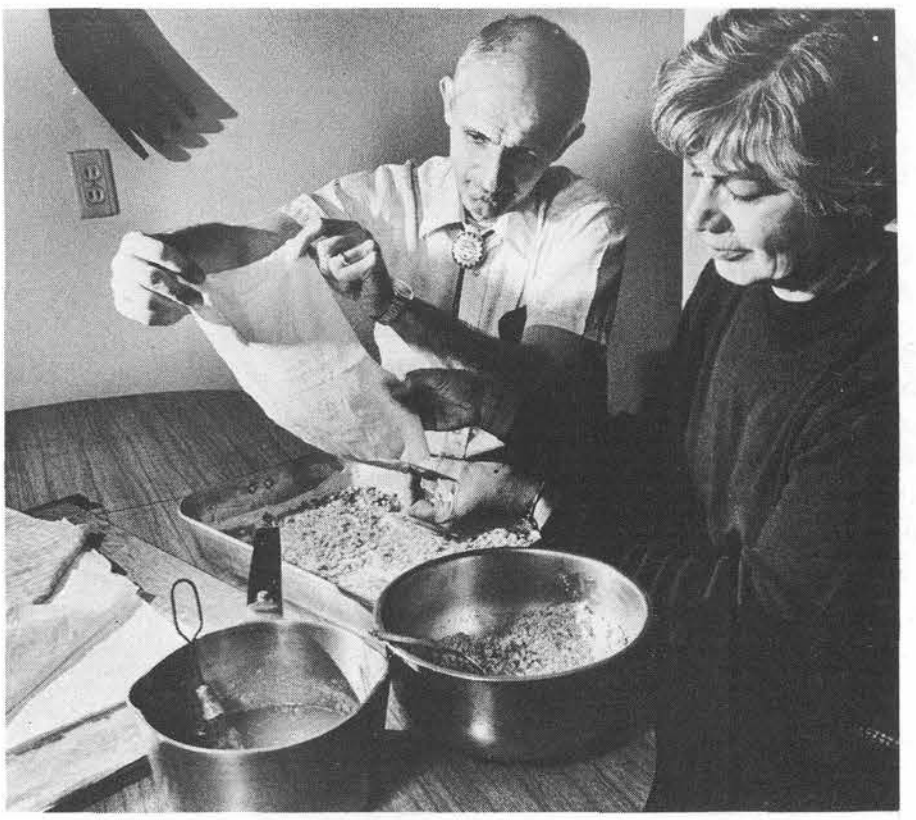
The 20 half-hour video tapes and coordinated problem sets used in the review were created at Iowa State University and cover algebra, trigonometry and analytic geometry, differential and integral calculus, first-order differential equations, statics, particle dynamics, rigid-body dynamics, materials, strength of materials, beams, chemistry, fluid mechanics, fundamentals and advanced thermodynamic concepts, DC and AC circuits, engineering economics, probability and statistics, control systems and FORTRAN programming. Approximately six hours per week will be required to complete assigned problems.

Fun & Games

Running—A bunch of Sandians took part in Phoenix's Fiesta Bowl Marathon on Dec. 1. They are Henry Dodd (4716) with a 2:44, Jim Harrison (4311) - 2:49, Alan Spencer (3611) - 2:53, Terry Bisbee (2654) - 2:55, Mark Percival (4536) - 2:56, Al Alvarado (2653) - 2:57, Bill Hendrick (3643) - 2:58, Bob Nellums (4715) - 3:03, and Earl Gruer (3652) - 3:07. On the same weekend Larry Johnson (4323) was running in the Dallas White Rock Marathon. His time of 3:39 gave him position 833 in the field of 2100.

Skiing—Dave Saylors (5531) is leading a ski tour into San Gregorio Lake area (outside of Cuba) on Dec. 29. It's a NM Ski Touring Club trip and, if you're interested, show up at 7 a.m. at Goodwill (5000 San Mateo NE) where the group assembles to arrange transportation. If moonlight skiing is your thing, a Sandia Crest moonlight tour is set for Jan. 4, meeting at Western Skies at 7 p.m. Call the trip leader, Betty Jan Lassen on 255-1954, if you plan to go.

The Ski Touring Club is having its first weekend bus trip over Jan. 25 to 27, with skiing offered at Wolf Creek Pass and Pagosa Springs. Kathie Hiebert (5642) is honcho for the trip and needs commitments before Jan. 1. She's on 4-3538 or, after 5, on 299-5392. The package deal includes lodging at the Pagosa Lodge.



AL AND MARGE HACHIGIAN prepare a pan of Armenian pakhlava, consisting of layers of filo—they're holding up one sheet to show its thinness—butter, and a mixture of nuts, sugar and cinnamon.

Pakhlava; Fun to Say, Better To Eat

[Ed. Note: If you have a family-favorite recipe that you'd like to share, call us on 4-7841.]

Want to try an elegant holiday dessert? Al Hachigian (1213) and his wife Marge showed us how to prepare pakhlava (pakh'-la-va) and after sampling this confection, we can recommend their recipe.

Al, of Armenian ancestry, explained that pakhlava is not a traditional holiday recipe. "We prepare pakhlava and the other Armenian foods whenever we want them. Marge isn't Armenian but knows how to make all my favorite dishes—derevi sarma (stuffed grape leaves); lahmajoon (similar to a tortilla spread with meat); shish kabab; rice and egg-noodle pilaf; and many pastries.

"All of these dishes are common to the mid-Mediterranean countries," Al says, "with slight variations in spelling as well as in ingredients."

The basis for many Mediterranean pastries is filo dough made from salt, water and flour; it's rolled and then hand-stretched to tissue-thin sheets. "I can remember my mother spending all day making filo," Al says, "but commercial filo is good and much easier on the cook!"

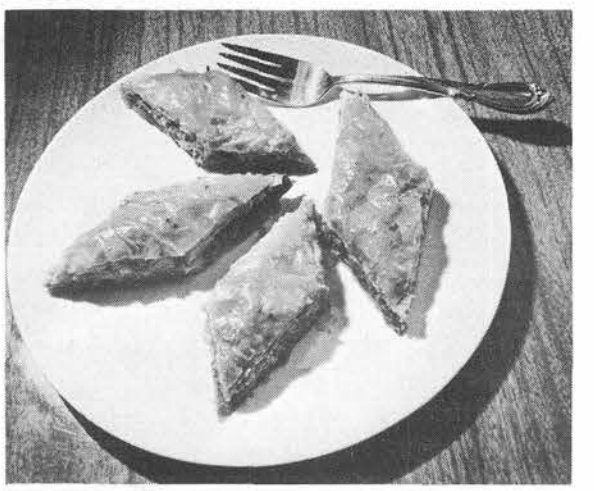
Locally, commercial filo is available from specialty bakeries and food stores. Labeled as filo, fillo, phylo or phyllo, the dough is frozen in one pound packages that usually consist of 12x7" sheets. The filo sheets are so thin that they rapidly dry out, so while the dough is exposed to air it should be covered with a damp cloth.

* * *

PAKHLAVA

1 pkg. filo dough
1 lb. walnuts (chopped fine—use blender)
⅓ cup sugar
2 tsp. cinnamon
¾ lb. unsalted butter, melted

Syrup
1 cup sugar
¾ cup water
1 cup honey
1 tsp. lemon juice



THE COOLED PAKHLAVA tastes as good as it looks.

Combine sugar, honey & water from syrup recipe. Cook over moderate heat for about 10 mins. Add lemon juice. Cool.

Combine nuts, sugar & cinnamon.

Use defrosted pkg. filo sheets while still cool. Stack package of filo sheets on waxed paper. Place an 11"x14" baking pan on stack; with sharp knife outline bottom of pan; remove pan & carefully cut through dough. Count five layers of dough & place in buttered pan; brush with melted butter. Count five more layers & place over buttered layers, brush with melted butter. Sprinkle ⅓ of nut mixture evenly over dough. Make a layer of five sheets from pieces left over from cutting pan-size filo & butter. Continue buttering every fifth layer & sprinkling nuts every 10th layer. End with filo dough on top.

Before baking, cut dough into 2" strips, then cut again diagonally into parallelograms. Bake at 350° for 15 minutes. Heat butter left from layers; remove pan from oven & pour butter over surface. Return to oven and bake for about 15 minutes more until evenly browned.

Remove from oven & tilt pan to drain butter to a corner after removing a corner piece of pakhlava. Leave in this position for about 15 minutes, removing excess butter draining into the corner. Pour cooled syrup evenly over each portion (about 1 T./piece). Allow pakhlavă to cool before serving.

Bill McKinney Gives 15 Gallons

Bill McKinney (2552) called LAB NEWS this week to report that he reached the 15-gallon mark in blood donations recently. That's 120 pints! We ran his picture a couple of years ago when he reached 14 gallons, but he declined the offer this time. If you would like to join the 500 Sandians who regularly contribute to United Blood Services, the Bloodmobile is at Medical Bldg. 831 on Tuesdays between 8 and 3:30.

Take Note

Our Christmas cover is the work of artist Janet Jenkins of Tech Art Division 3155. Janet patterned the cover after a ceramic tree of life made in the area of Guadalajara, Mexico. She reports that some of these "trees" can be three feet in height and may include several religious elements —the Garden of Eden, Eve and Adam, the nativity of Jesus—other decorative images, and multiple candle holders. Examples of this craft are currently on exhibit at the Museum of Albuquerque.

* * *

Ed Machin (2151) of the Albuquerque Wildlife Federation reports that AWF is sponsoring the Wally Taber show "Bucks & Gogglers" and "Less Time Between Bites" on Friday, Jan. 4, at 8 p.m., Woodward Hall on the UNM campus. Wally Taber himself will be there to narrate the show. Advance tickets, $2.75 for adults and $2 for students, are available at Charlie's Sporting Goods, Cook's Winrock and Gardenswartz Sportz. Tickets will also be available at the door, 50 cents higher.

* * *

Visitors to Tonopah Test Range last week included Duane Sewell, DOE's Asst. Secretary for Defense Programs, who was accompanied by Maj. Gen. William Hoover, Director of Military Application, Herm Roser, Manager of DOE/ALO, Mahlon Gates, Manager of DOE/NVO and his deputy, Troy Wade. Range Manager Sam Moore and Ron Bentley briefed the visitors on range operations and the group then toured the new operations control building.

* * *

Next issue of LAB NEWS is Jan. 11. Ad deadline for that issue is noon, Jan. 4.

* * *

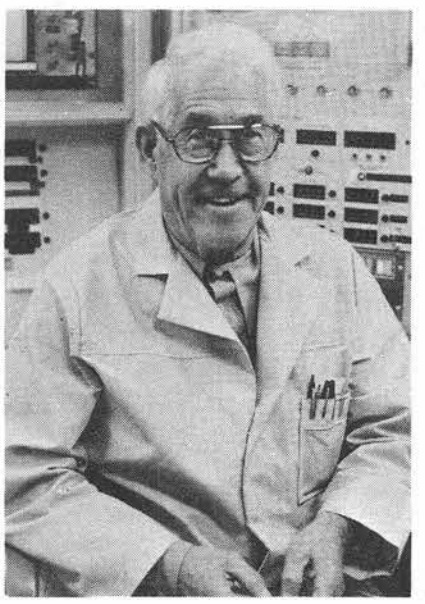
Medical's next program in the *Go for Health* series is entitled "Brush Up on Dental Care," and it will be held Tuesday, Jan. 8, in Bldg. 815 from 12 to 12:30. Concerning dental problems, Medical Director Dr. Paul Mossman notes, "We see a number of employees during routine physical exams with periodontal disease and others returning to work after major gum surgery. These dental problems are completely preventable." The proper care of teeth and gums will be covered by Mary Ann Atkinson, state dental health consultant, who will demonstrate flossing and brushing techniques. Carolyn Romero of Sandia Benefits 3543 will also be on hand to explain features of Sandia's dental insurance plan that are designed to help people prevent common dental problems.

* * *

If you're one of the thousand or so who asked us for a color print of the Tech Area, please be patient. We're still getting quotes from various color printers. It will probably be a couple of months before the printing job is actually done and the prints mailed to requestors.

Retiring

Dorothy Brink (3253)



J. C. Conant (4451)

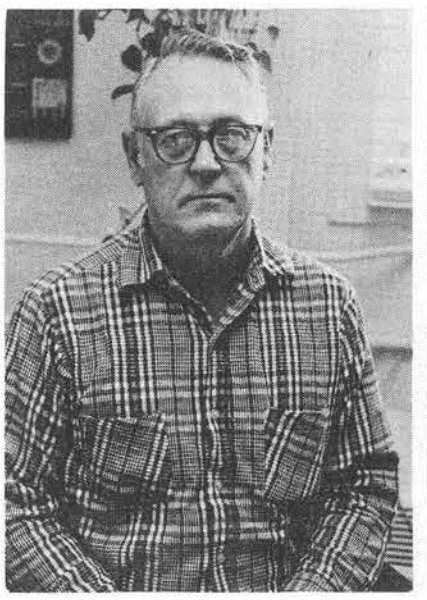
Helen Watkins (3721)

Polly Horne (3254)

Adela Bowen (3254)

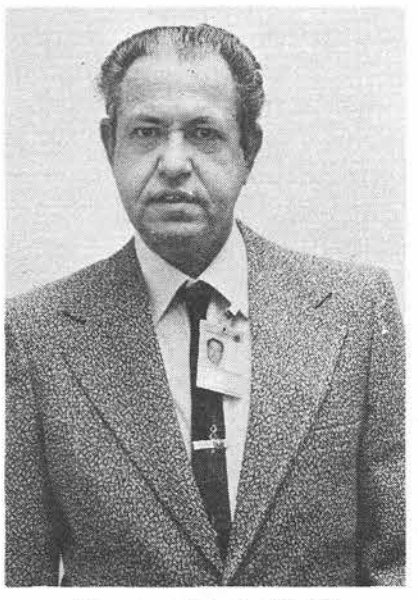
Howard Stump (400)

Helen Melancon (3252)



Ray Wilkinson (1541)

Linus Phillips (1212)



Clarence Young (1581)

Chuck Martin (1123)

Doris Willard (3253)

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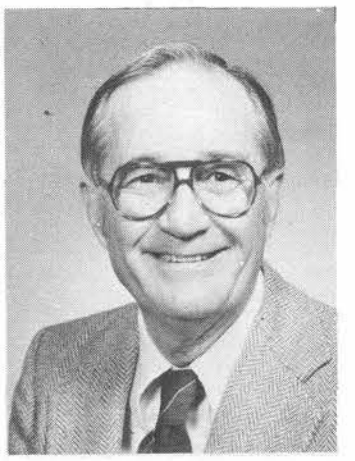
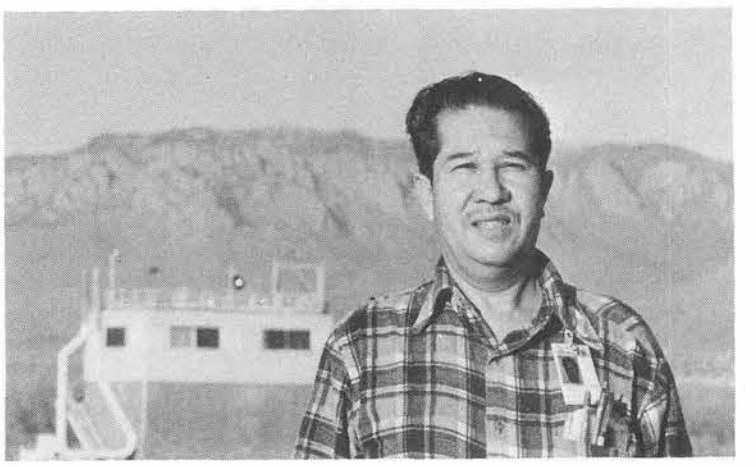
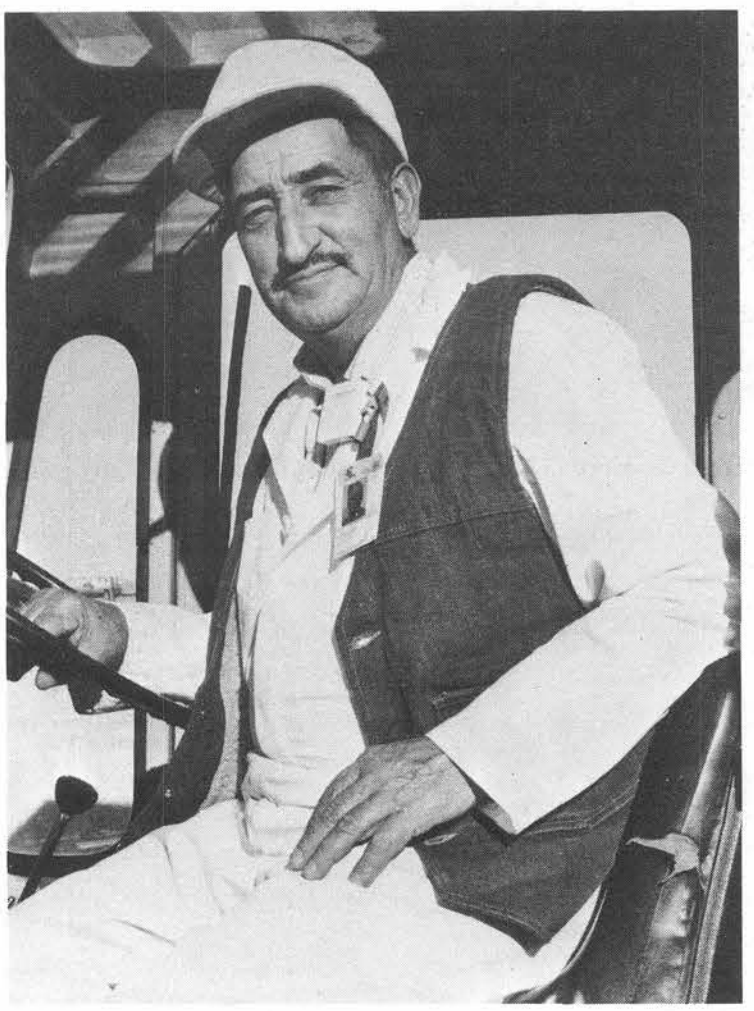


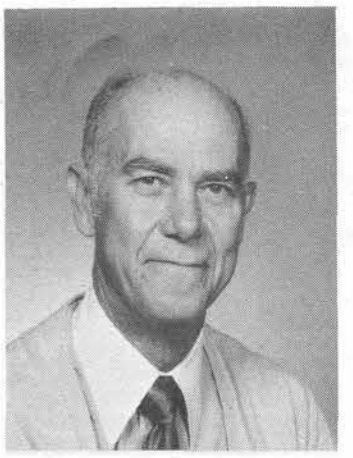
Bob Hawk - 2436 30



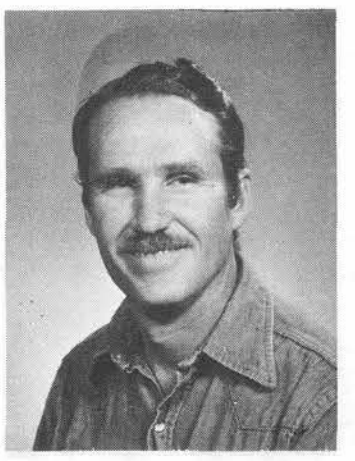
Jacob Bernal - 3417 25



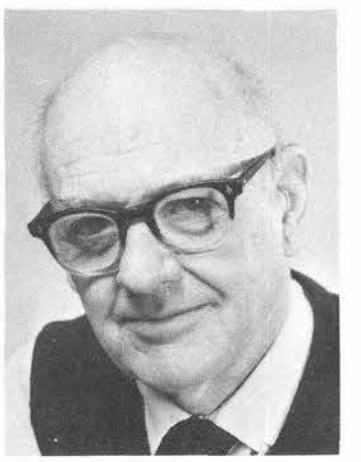
Julian Silva - 3618 30



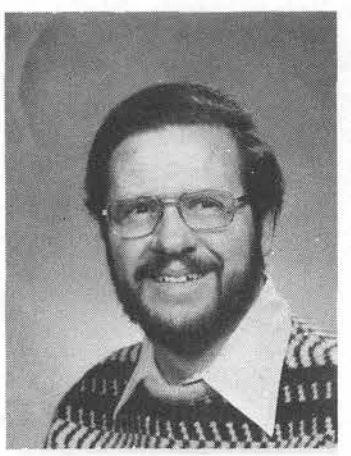
John Barnum - 4362 25



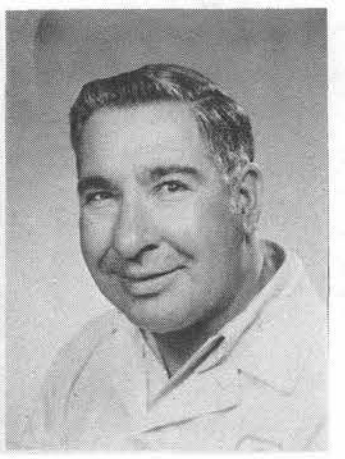
Robert Hardy - 5534 10



Ron Wishart - 8329 20

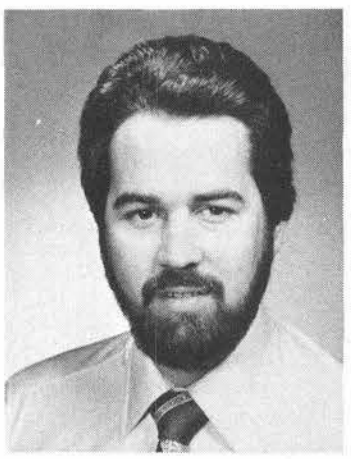


Bill Boverie - 1254 10

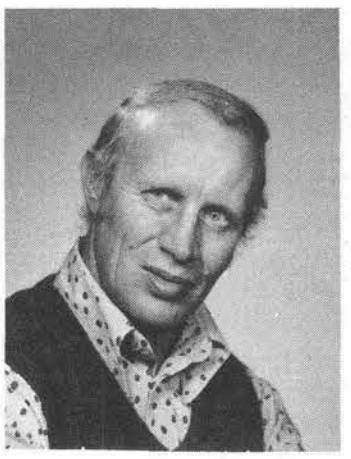


Ermelindo Marquez - 3618 10

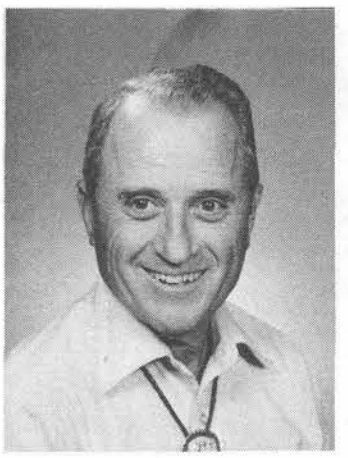
Bonnie Roudabush - 1223 10



Michael Finley - 2632 10

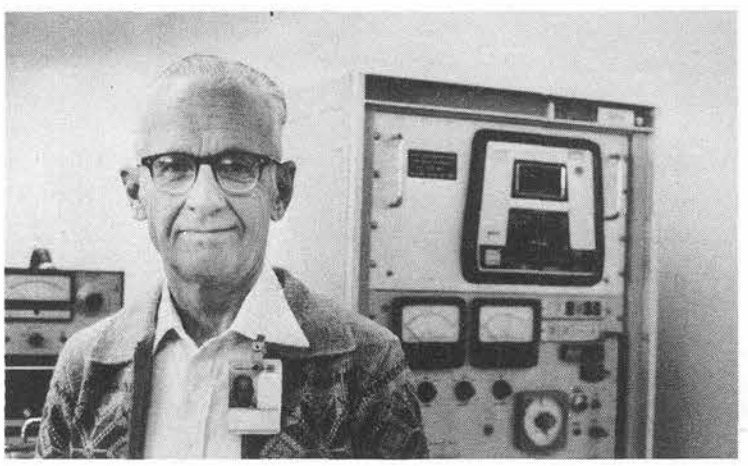


Gordon Worthen - 1761 20

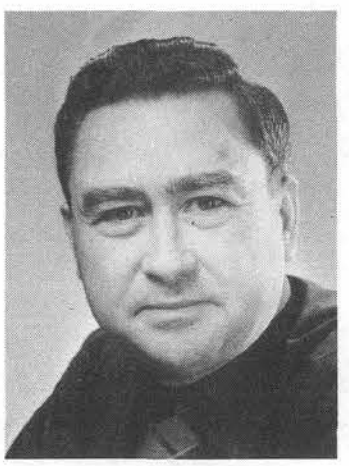


Leo White - 2327 30

Edward Buksa - 1542 20

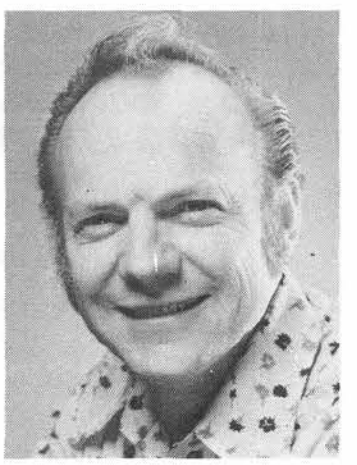


Ralph Hampy - 2354 25

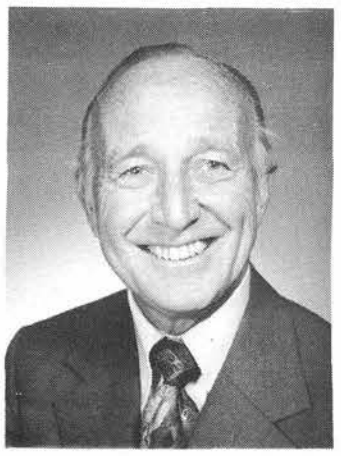


Bob Marmon - 8412 20

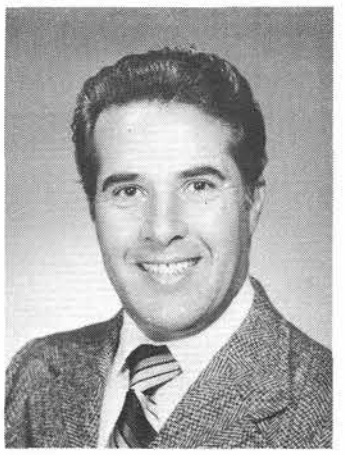
Hazel Minter - 1100 25



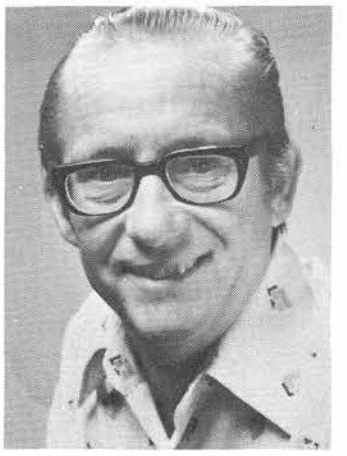
Don Stoner - 8463 20



Earl Wangerin - 3223 20



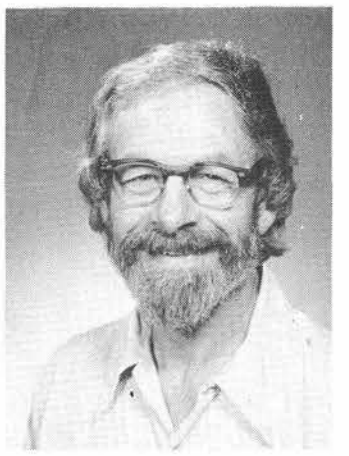
Ray Chavez - 3155 20



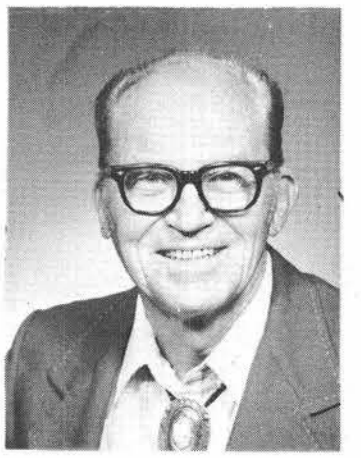
Marv Loll - 8152 15

Mary Hauer - 4452 20

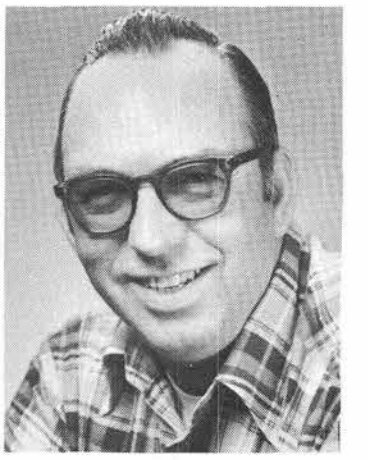
Bob Banks - 5000 20



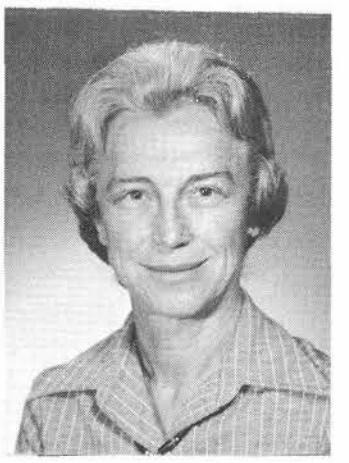
Phillip Higgins - 1533 25



Harold Goddard - 1222 30



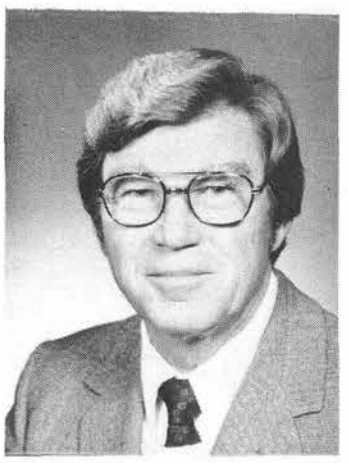
Rudy Grund - 8257 20



Dolores Carlson - 1400 25

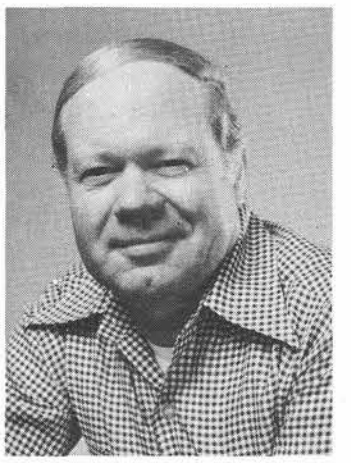
Betty Hogan - 8261 15

Irene Lasky - 3411 10

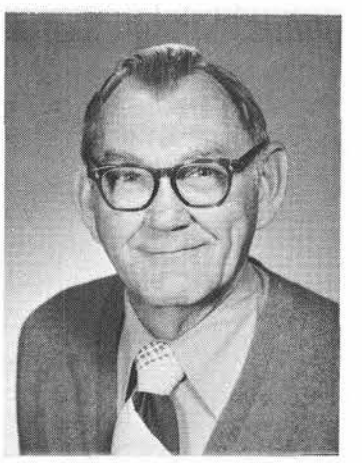


Homer McIlroy - 3741 25

Bob Strout - 8466 20

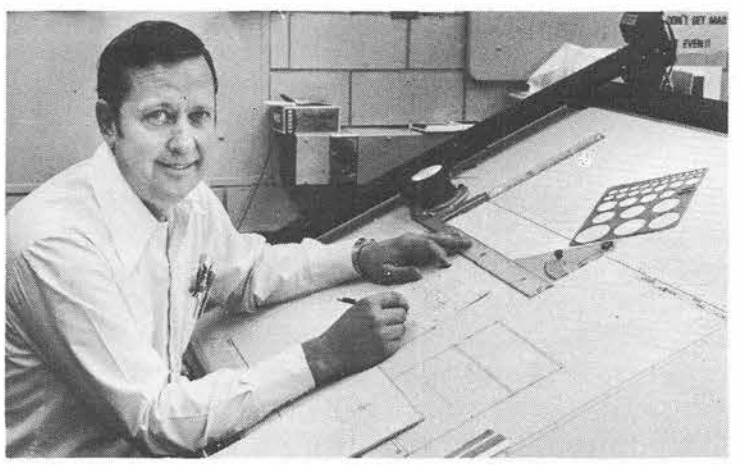


Gordon Kibby - 8424 20



Roger Buehler - 2343 25

Jim Kane - 1556 30



Cecil Tucker - 2455 20

Val Cowan - 8400 20

Dave Timmer - 8412 20

Pat Leary - 8331 10

LAB NEWS has a new home. It's just a few steps east of our old one (Bldg. 814). That's Bldg. 800 in the background, to the south. *Plant Engineering* tells us a funny little guy in a red outfit wheeled in with the trailer this week, mumbling something like "ho, ho, ho." Hmmm. Wishing you a Merry Christmas and all the other good things is the LAB NEWS staff: Gerse Martinez, Don Graham, Norma Taylor, John Shunny, Chuck Cockelreas and Bill Laskar.

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

CLASSIFIED ADVERTISING

Deadline: Friday noon prior to week of publication unless changed by holiday. Mail to: Div. 3162 (814/6).

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 & organization.
9. Housing listed here for rent or sale is available for occupancy without regard to race, creed, color, or national origin.

MISCELLANEOUS

INDIAN RUGS: 7 of various colors & patterns, sizes to 30x60", prices from $65 to $200. Rohwein, 298-8391.

FOAM MATTRESS, 34"x72"x5", will fit corner group, $20 ea. or 2 for $35. Anastasio, 821-4245.

LUDOWICI Spanish ceramic roof tile, Deladon Co., Chicago, retail at $1.50 ea., approx. 500 pcs., plus trim, u-haul, $475. Miller, 344-7725.

SKIS, Head 195mm w/Spademan bindings & poles; $60. Hesch, 881-9874.

CROSSMAN 14" chain saw w/6 ea. 8-oz. cans of oil for fuel mix, $90. Csinnjinni, 299-1249.

TIRE CHAINS, Sears best, V-bar reinforced, fit 8.50x14 to 215-R15, never used, $22.50. Finger, 345-6865.

OVATION Glen Campbell artist 6-string guitar & case, $400. Downs, 294-5283 or 293-9320.

TV game: "Adversary," $24.95 or best offer. Nuttall, 821-2895.

BABY FURNITURE: crib, high chair, potti chair, carrying seat. Waymire, 299-9612.

FREE landscaping rocks, larger size, come by & haul away. Halpin, 299-7710.

COUCH, 86" long, avocado, 3 loose back & seat cushions, 2 matching pillows, 2 matching ottomans, 31" x 16", $200. Paul, 299-6387.

ORGAN, electronic, Hammond Piper, cost $1100, sell $700. Jones, 298-8492.

QUANTUM JR. speakers & matching bases, Maxell UDXL/reel tape, Grace 714 arm, Zerostat, D3 fluid, Watts dust bug. Norris, 877-6415.

FIREPLACE glass doors, $50; 10-spd. bicycle, $55. Davie, 296-3950.

SCOTT 348, 120 watt stereo FM receiver, $75. Martin, 255-8030.

BAR w/4 black wrought iron stools, white naugahyde w/brown veneer top, $400. Nogales, 247-1178.

SONY Betamax model SL-7200A, 1 hr. w/tapes & stacker. Tafoya, 883-6090.

KENMORE zig-zag sewing machine, model 1301, w/cabinet, $50. Aeschliman, 281-1227.

FREE flight kit, 1/2A size, w/.049 engine, timer, props, accessories, $20; brass fp screen, $15. Laskar, 299-1024.

HP DESK TOP programmable calculator, model HP 67. Judd, 881-8804.

SWIMMING POOL items: half price, Stingy, Stick & Burn-out, 2 floating lounge chairs, 14x38 solar blanket, alum. pole. Leenhouts, 299-7856.

SKITTLE pool game, $9; wood frame, 36" screen door, $14. Horton, 883-7504.

DBL. BED headboard, footboard, mattress, box springs, rails, $50; '70 VW wheel. Simons, 821-9343.

CALCULATOR, T.I. SR-50 w/battery pack, charger & case, $20; digital watch, T.I., L.E.D., make offer. Roeske, 296-3946.

REALISTIC police scanner, 8 channel w/crystals, APD, State Police, Sheriff, $120. Gendreau, 268-3436.

TOY FOX TERRIER puppy, black & white male, reg., $125 will hold until Christmas. Miller, 299-6067.

AMERICAN official shuffleboard, laminated top, $125; Philco refrig., upper freezer, coppertone, needs thermostat, $25; brown herculon loveseat, $50. Bell, 821-7148.

MAGNAVOX AM/FM stereo phono, walnut contemporary console cabinet, make offer. Barbier, 299-1305.

10" SEARS Craftsman radial arm saw w/stand & extras, $230. Wintersberger, 294-1289.

REFRIGERATOR, Gibson 16 cu. ft., no freezer, $75. Whalen, 298-1330.

RADIOS, Kenwood, 599R & T, Swan 100 MX, Swan 350, Swan 400. Hansen, 898-3251.

SLIDING GLASS patio door set, std. size, single glazed, opens l-r, $50. Kipp, 296-6530.

THANKS to the Sandia Samaritan who helped me when my wheel fell off Dec. 11; now I owe someone. Underhill, 294-5774.

IRISH SETTER puppies, AKC reg., $125, 8 wks. old. Romme, 299-8765.

GRANDFATHER CLOCK, solid cherrywood, 72" high, $390. Baczek, 255-3429.

TIRE CHAINS, V-bar, never used, $25, will fit 760, 845-855/14, 15 & 204R, 215R/14, 15 tires. Auerbach, 296-1489.

COLOR TV, rebuilt & guaranteed, $75; chess playing computer, $40. McConnell, 255-2488.

CANARIES, Rollers, Borders, singers, $30-40, hens $15-20, pairs $45; cocktiel; cages, $5-$20. Riggan, 268-1961.

SINGER Touch & Sew, sewing machine, $150; hood type table top hair dryer, new, $20. Wrobel, 255-3062.

'77 CAMPING TRAILER, Taurus, 17', self-contained, new tires, sleeps 6, many extras, $3500 firm. Marquez, 873-1127.

VIOLA, German Bitterer w/case. Gregory, 268-2022.

SINGLE BED mattress & box spring, less than 7 mos. old, $125. Korak, 296-1165 after 6.

TRANSPORTATION

'66 JEEP Wagoneer, rebuilt engine, trans., AT, PS, $1000. Apodaca, 298-7792.

'77 JEEP Honcho pickup, PS, AT, w/quadratrac & low range HD adj. shocks, tool box, AM-FM radio, $5000, 26,000 miles. Sanchez, 296-6286.

'77 YAMAHA Enduro 100, 1400 miles, $500. Christensen, 293-0914.

'65 OLDSMOBILE Jetstar, 4-dr., AC, AT, new tires, new battery, 18 mpg, $600 or best offer. Shipley, 298-2433.

'79 GMC ½-ton 4x4, 350V8, AT, PS, PB, Positraction, cruise control, skid plates, tow plates, hooks, 6500 miles, $6800 or take older truck in trade. Rechner, 881-2990.

'72 DATSUN 510 SW, AM-FM, AC, AT, steel Aramid radials, recent valve job, trans. under warranty. Atkins, 298-5762.

'71 JEEP Wagoneer, 4-wd, AC, Warn hubs, 61,000 miles, new paint, make offer. Allen, 299-9075.

HONDA CL 70, 6600 miles, $100; 20" girl's bicycle, $25. Miller, 299-6067.

4-DOOR CHEVYS: 1946 restored, $1300; 1956 partially restored, $800; 1957 show car, gold plating, mags, $6000, all negotiable. Bell, 821-7148.

'70 FORD Country sedan stn. wgn., 73,000 miles, PS, PB, AC, $700. Drozdick, 298-9244.

'72 VOLVO, 144, std. trans., radials, $2000. Madsen, 294-3235.

10-SPD. RACING BICYCLES, 1 24" whls, 17" frame, another 24" whls, 19" frame. Drumheller, 821-9527.

'79 CHEVY LUV pickup, w/camper shell, 23mpg city, 30 hwy., $5200 or best offer. Wilcoxen, 296-8295.

'76 GRANADA 3-spd., 6-cyl., radio, AC, 4-dr., Ghia, $2700. Whalen, 298-1330.

'75 YAMAHA 400 Enduro, low mileage, $800; high compression Ford 302 engine, 12,000 miles, complete, make offer. Souder, 821-2089.

BICYCLE, men/boys 26" 3-spd., AMF, $45. Adams, 256-7265.

'78 CAMARO V8, LT, bucket seats, console, loaded. Hay, 836-4173.

'30 FORD Cabriolet, unrestored, driven daily, 99% complete, Calif. car, $6500. Boehmke, Livermore, 415-447-6670.

'66 CADILLAC, $600 or best offer. Bump, 299-8960.

REAL ESTATE

ARROYO DEL OSO Mossman, 3-bdr., 16x34 pool w/solar elec. cover, whirlpool, heated workshop, side access, microwave, energy efficient, $93,250. Shane, 884-7925.

5 ACRES near airstrip, approx. 4 miles east of Los Lunas. Farnsworth, 865-6160.

RECENTLY refurbished 1550 sq. ft. frame stucco house, 3-bdr., 1¾ bath, den & dining area, corner lot, Coronado Center area. Newton, 884-4953.

FOR RENT

2-BDR. apt. in triplex, east of Tramway, view, fp, skylights, $290/mo. Davis, 294-7026.

CABIN, Red River Ski Area. Manley, 268-4754.

2-BDR. apt., base walking distance, 517/521 Charleston SE, drapes, carpeting, appliances, laundry on premises, storage, off-st. parking, $190/mo., $100 DD. White, 255-2909.

3-BDR. HOUSE, 1¾ bath, refrig., dishwasher, elec. range, fp, washer, dryer, carpet, N. 14, $375. Ehrman, 281-3976.

LG. 2-bdr. APT., private individual unit, washer/dryer, CTV, 12917 Lomas NE. Key, 296-4168 or 292-5770.

3-BDR., 1¾ bath house in NE, avail. for 1-yr. lease starting Feb. 1, $395/mo., 1st, last & DD. Bergeron, 292-1739 after 5.

1-BDR. APT., near Sandia, spacious, modern, $175 plus gas & elec., no pets. Boverie, 255-1071.

WANTED

BICYCLE-type exerciser; cabinet from stero system, need space for amplifier, turntable & record storage. Stuart, 299-9190.

CHRISTMAS VACATION WORK, any kind of work while home on Christmas break, Dec. 16-Jan. 6. Nelson, 881-0148.

RIDE to Los Angeles area any time during Christmas shutdown, share gas & driving. Christopher, 296-1259.

SHERIDAN AIR RIFLE. Watterberg, 294-6759.

WWII surplus GI single burner gasoline stove, Coleman model 530. Elliott, 299-2782.

GARDEN TRACTOR of 1 H Cub or Cub Cadet size in good condition. Leenhouts, 299-7856.

CREATIVE PLAYTHINGS, children's indoor gym w/slide; Nov. 1979 issue of IEEE *Spectrum*. Bennett, 298-1142.

GO-CART, condition not important. Braasch, 268-8416.

WORK BENCH, w or wo/vise, min. size 24"x48", will consider work bench top wo/base. Allen, 296-6453.

FEMALE roommate, nonsmoker, to share furnished 3-bdr. home in NE hts., $150/mo., utilities except telephone included. Plein, 884-3749.

DONATE your deer & elk antlers to blind veteran, any condition, will pick up. Manley, 293-1293.

CHILDCARE by mother of two, in my home, near Base, any age, $25/wk. Wrobel. 255-3062.

COLLEGE student can do carpentry, remodleing, sheet rock, major/minor jobs. Have truck and equipment. Keith, 242-2173 after Jan. 2.

LOST AND FOUND

LOST—Man's maroon ski hat, LH black glove, gray wool mitten, red address book, 4 keys on leather strip, blue jacket w/hood.

FOUND—Gold choker, LH brown glove, silver key (Curtis), silver-rim Rx glasses in black case, bicycle safety light w/reflector. LOST AND FOUND, Bldg. 832, 264-1657.

Party Early, Stay Late Tonight

TONIGHT at Happy Hour in the main lounge, guitarist/singer Gary Waters entertains starting early and staying late. No buffet is scheduled but green chili stew and posole will abound in the bar.

THE CLUB CLOSES for the holidays Dec. 22 but opens the evening of Dec. 31 for the New Year's blast, then is quiet the next day. It's business as usual starting Wednesday, Jan. 2.

HAPPY HOUR buffets begin again on Friday, Jan. 4, with a barbeque spare rib spectacular. The Country Showmen play for dancing. Call the Club office, 265-6791, by midweek to reserve buffet tickets. On Friday, Jan. 11, pepper steak is the buffet feature; Youngblood is on the bandstand.

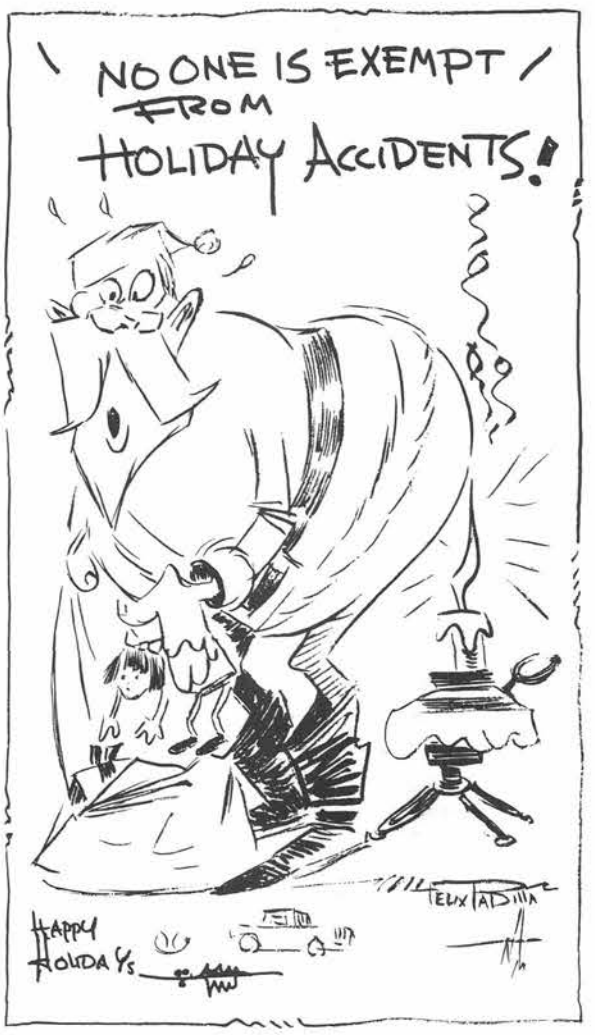
SINGLES MINGLE on Friday, Jan. 4, in the Eldorado Room. Music and munchables are on the agenda.

VARIETY NIGHT on Saturday, Jan. 5, features a tumbling troupe from the Albuquerque Boys Club and a movie, "Festival of Folk Heroes." Super sandwiches are available at 6, entertainment starts at 7. Admission is free to members.

SANADO WOMEN meet for a luncheon Tuesday, Jan. 8. Speaker is Ed Perkins who will discuss "The Apache Indians." For reservations, call Donna Urish, 299-1456. Also, the Sanado Art Group hangs a show at Lovelace-Bataan Clinic Jan. 11-Feb. 1.

SQUARE DANCE lessons start at the Club Monday, Jan. 7, in the main ballroom. The first couple of sessions are free for anyone who would like to try it and find out what great fun square dancing is. Sign up for the 15-week course and then join the Coronado Grand Squares.

HAPPY NEW YEAR—Lisa and Pres Herrington (1758), president of the C-Club Board, and Virginia (3163) and Pro Padilla (3743), Board VP and entertainment chairman, toast 1980, auld lang syne and all that. To join the C-Club's New Year's celebration, call the office, 265-6791, *right now* to find out if any tickets are left.



GUADALAJARA is a brand new trip announced this week by Travel Director Frank Biggs. Leave Jan. 16, spend four nights at the luxurious El Tapa Tio Hotel, and return Sunday afternoon, Jan. 20. Cost is $250. See Frank in the lobby tonight for more details.

Frank also has tours to Hawaii, Europe and Mexico. Talk to him about your private travel plans—he listens and he can help.

In the meantime, if you're planning a trip to Disneyland in California or Disney-World in Florida, the Club has memberships available in the Magic Kingdom Club that can save you money.

Events Calendar

Dec. 21—Albuquerque Civic Chorus, Christmas carols concert at airport, upper lobby, 6:30 p.m., public invited to sing along.

Dec. 21-23—"Lola's Last Dance," play produced by El Compania de Teatro de Albuquerque, 8 p.m., KiMo Theater.

Dec. 22—Pueblo Children's Christmas: winter and Christmas dances by children, 1 p.m.; *Dec. 23*—winter dances of Pueblo people, 12, 2, & 4 p.m., Indian Pueblo Cultural Center, 12th & Menaul.

Dec. 22-23—Los Pastores, Old Town, 7 p.m.

Dec. 23—"Christmas Carols Around the World," 1st United Presbyterian Church, 9 and 11 a.m., 215 Locust NE.

Dec. 24—Christmas Eve luminaria tour, city buses, $3, 5 p.m.

Dec. 24-29—Pueblo Dances: day-long (Acoma); all-day Spanish dance/drama "Los Matachines" (Picuris, San Juan); dusk pine-torch processions (San Juan, Taos); early and late evening masses at all of these Pueblos. *Dec. 25-29*—"Los Matachines" (Picuris, San Ildefonso, San Juan, Santa Clara); turtle dance, (San Juan, Taos). Dancing at most Pueblos. Contact Pueblos for times.

Dec. 26-Jan. 6—ACLOA, "My Fair Lady," matinees 2:15 p.m. Dec. 20 & Jan. 6; evening performances at 8:15 p.m., Popejoy.

Dec. 27—"Love & the Piano Player," ragtime & popular songs from 20s, 30s, & 40s. 8 p.m., KiMo Theater.

Dec. 29—NM Territorial Volunteers, "Civil War History Encampment," Old Town, 9 a.m.-4 p.m.

Jan. 1—Cochiti, Laguna, Picuris, San Felipe, Santa Ana, Santa Clara, Santo Domingo & Taos Pueblos: annual New Year's Day celebrations—Comanche, deer, turtle & other dances; *Jan. 6*—Annual Three Kings Day celebrations; election, installation of tribal governors, council members; afternoon buffalo, eagle & elk dances. Contact Pueblos for times.

Through Jan. 5—Raton, N.M.—34th Annual City of Bethlehem Christmas Exhibit, mile-long lighted display of nativity/life of Christ, plus Disney cartoon characters, free, day & night.

Jan. 7—Audubon Wildlife Film, "Wildlife Safari to Ethiopia," 7:30 p.m., Popejoy.

Jan. 8—Chamber Orchestra of Albuquerque: Moore's Chamber Symphony, Berg's Not Waving but Drowning, and Schubel's Punch & Judy featuring McCormick's Match Box Circus, Keller Hall, UNM, 8:15 p.m.