

GROUNDBREAKING ceremonies for Sandia's new \$8.6 million Systems Research and Development Laboratory (Bldg. 823) took place early this week with President Sparks and Wilfred Sanchez (3613) manning the jack hammer. The new four-story building with 144,000 sq. ft. of office and lab space will house groups of the 2000 organization. It will be located east of and connected to the new Bldg. 821 and 822 complex, now about to be occupied by the 1700 organization. Entry into the complex will be through Bldg. 822 with a Tech Area gate similar to that in Bldg. 802. Construction will start this month on the new building, with completion scheduled for December 1981. John Snowdon (3643) is Plant Engineering's project engineer.



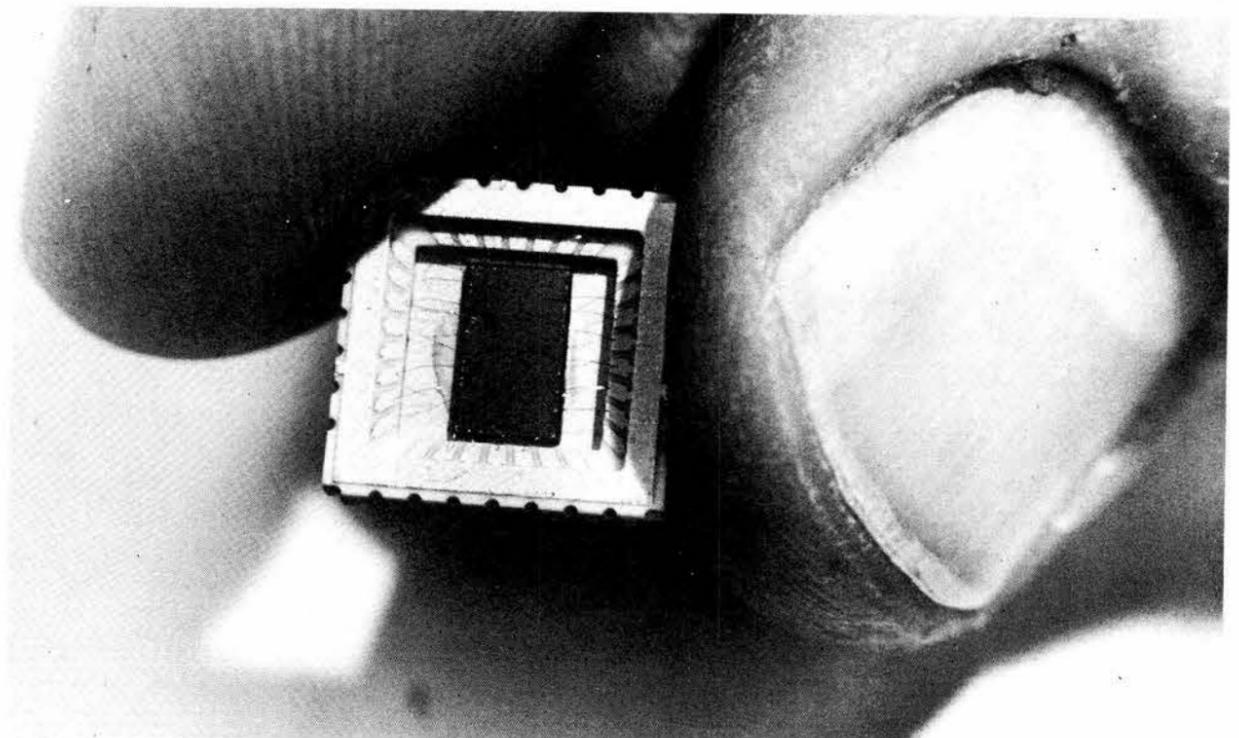
**Savings Bonds
Signup Begins
Monday. Page 4**

LAB NEWS

VOL. 32, NO. 8

APRIL 18, 1980

SANDIA NATIONAL LABORATORIES • ALBUQUERQUE NM • LIVERMORE CALIF • TONOPAH NEV



SANDIA WILL PRODUCE 11,000 RADIATION-HARDENED microprocessors, memories and custom-integrated circuits for use in NASA's upcoming Galileo and Solar Polar space programs. The package is approximately half an inch square with a silicon gate memory that can store up to 1000 bits of information. (See story on Page 5.)

Supervisory Appointments



FRANK MASON to supervisor of Data Processing Systems Design Division 2636, effective April 1. Frank received BS and MS degrees in mathematics from East Texas State University in 1964 and '65. Following graduation, he remained at the university to become assistant director of the computer center and an instructor in computer science. Since joining Sandia in 1968, Frank has worked in the computing directorate and, except for his initial months at the Labs, has been with the division he now supervises.

Frank is a member of IEEE. His leisure interests include photography, bicycling and church activities. He and his wife Betty have two children and live in the NE heights.

* * *



JIM CHANG to supervisor of Diagnostics Division 4243, effective April 1. Jim joined the Labs' plasma physics group in September 1971. Later, he transferred to the particle beam fusion research group where his most recent work has been in Target Experiments Division 4242. Jim earned his BS, MS and PhD in physics from the University of Illinois. He is a member of the American Physical Society.

Off the job, Jim has a number of interests: he likes to cook—one of the incentives for opening his Chinese restaurant; he teaches a Chinese language course in Sandia's out-of-hours program; he coaches a soccer team; and he enjoys painting watercolors. Jim and his wife Mickie and their two children live in NE Albuquerque.

* * *



DICK ZALUGA to supervisor of Battery Processing and Fabrication Section 2522-1, effective April 16. Since coming to the Labs in 1952, Dick has had assignments in electrical assembly and electronics inspection areas; later, he worked with electrochemical power supplies and, for the past 15 years, he has worked in the thermal battery organization.

Dick was an aviation radioman in the Navy during WW II. Following discharge, he continued his electronics training at the Greer Industrial School and Chicago Technical College.

He is a gun collector and enjoys hunting and fishing. Much of his leisure time is spent visiting Indian reservations with his wife Shirley, a government-licensed buyer of Indian goods. The Zalugas have two children and live in the NW valley.

Events Calendar

- April 19-20*—Annual show and sale of the N.M. Cactus & Succulent Society, Albuquerque Garden Center, 19th—1:30-5:30; 20th—10-5, 344-4214.
- April 20*—Music Vespers Series: Sallyanne Werner Bachman, mezzo-soprano, First Methodist Church, 4th & Lead SW, 4 p.m.
- April 20*—Jocuri: Israeli Folkdance Concert, fountain area at First Plaza Galleria, 1 p.m.
- April 20*—N.M. Symphony Orchestra presents an afternoon spring symphony, 2:30 p.m., Kimo Theater, 842-8265.
- April 25*—Travel-Adventure Film Series, "Portugal," 7:30 p.m., Popejoy.
- April 25-26, May 1-3*—"Springtimespace," a new work by UNM student/faculty dancers and choreographers, 8 p.m., Rodey Theatre, 8 p.m.
- April 25-May 10*—"On Borrowed Time," Albuquerque Little Theatre, 224 San Pasqualte SW; Tues.-Fri., 8 p.m.; Sat., 6 & 9 p.m.; Sun., 2 & 8 p.m., 242-4750.
- April 26*—"Those Good Old Barbershop Days," Barbershop singers, 8:15 p.m., Popejoy.
- April 27*—Multi-media art show through May 4; performance of Brahms Liebeslieder waltzes and show tunes by The Company, 4 p.m., 1st United Presbyterian Church, 215 Locust NE.
- April 27*—April Iris Society Show, Albuquerque Garden Center, 2-6 p.m., 296-6020.
- April 27*—Concert by Albuquerque Civic Chorus, Haydn's "Creation," with Albuquerque Philharmonic Orchestra, Sanctuary, First Methodist Church, 4 p.m.
- May 1*—Annual San Felipe Pueblo Feast Day, celebration, corn dance.
- May 2*—"Anna K.," dramatization of Tolstoy's Anna Karenina, Stage One, U of A Fine Arts Learning Center, St. Joseph's Place, 8 p.m.

Biking . . .

More Fun Than Driving

It must be spring—we're getting lots of questions about biking, especially since Pat Kailer's Sunday feature in the *Journal*. This article will be a primer on the subject.

Equipment: a 3-speed or a 10-speed? If you haven't had too much experience and will be biking five miles or less, a 3-speed is satisfactory. Get a 10-speed for longer distances or if you're serious about bike touring. A 10-speed is quicker but trickier, and shifting gears takes some technique. Also, some riders just don't care for the so-called racing handlebars on 10-speeds.

Go for quality when you buy—spend, say, \$100 on a good quality used bike rather than \$79.95 on the widely advertised special that weighs in at 40 pounds but which, mercifully, will shortly fall apart. Quality in a new bike means at least \$175, and it should weigh less than 30 pounds. If you and biking don't take to each other, you'll be able to sell your quality bike readily and without much loss.

Most good bikes are of European or Japanese make, and these are chiefly sold in bicycle shops. I'd recommend the shops because the people in them are knowledgeable about bikes and bike riders and know, for instance, which size bike is right for you. (Bike frames come in half a dozen sizes.)

For biking efficiency, avoid rotating weight. That's another way of saying don't get thornproof tubes. They add weight at the worst possible location and you can get the same measure of flat prevention with "sticker flickers"—a device costing about a dollar that attaches to the frame, front and rear, to sweep off any goatheads your tires may have picked up.

Adjust the seat so that your leg is straight and almost locked at the knee when the ball of your foot is on the pedal—the correct cycling position. "But I can't reach the street when I'm up that high and come to a traffic signal." That's right, you can't. Get off the seat and straddle the bar when you have to stop.

Practice riding around the neighborhood until the braking and gear-changing maneuvers become second-nature. If you'd like to ride into Sandia with someone who knows the best routes from here to there, then call LAB NEWS (4-1053) for a copy of our list of Bike Guides—veteran bikers who have volunteered to guide the novice over optimum routes.

Finally, join the Sandia Bicycle Association. Now in its eighth year, SBA is not a touring or racing association but, rather, simply a group promoting biking to work and the improvement of cycling conditions. Ron Malpass (1761) is president of SBA, which has about 450 members. Besides a newsletter, SBA has a collection of bike tools that members can borrow, and a library of bike magazines. Emergency tire tube repair kits are also available at several Labs locations. To join SBA, send your name, E-number, organization and phone number to Lyle Wentz (4323). Include a dollar if you wish to help defray expense of the above items. • js

LAB NEWS

Published every other Friday

SANDIA NATIONAL LABORATORIES

An Equal Opportunity Employer

ALBUQUERQUE, NEW MEXICO
LIVERMORE, CALIFORNIA
TONOPAH, NEVADA
Editorial offices in Albuquerque, N.M.

Area 505 844-1053

FTS 844-1053

ZIP 87185

In Livermore Area 415 422-2447

FTS 532-2447

john shunny is editor

&

don graham ass't. editor

chuck cockelrears & norma taylor write

louis erne does picture work

aided by gerse martinez

barry schrader & lorena schneider report livermore.

LIVERMORE NEWS

VOL. 32, NO. 8

LIVERMORE LABORATORIES

APRIL 18, 1980



Mike Dyer (8352)

Paper Earns Award

A research paper on engine combustion has earned Mike Dyer (8352) the Horning Memorial Award for 1979. The Society of Automotive Engineers is presenting the award.

Mike, a staff member in Combustion Applications Division since 1975, was selected for his "outstanding accomplishment and contributions through research and development to the better mutual adaptation of fuels and internal combustion engines." The award is named after SAE past president Harry Horning.

The winning paper, "Characteristics of One- and Two-Dimensional Homogenous Combustion Phenomena in a Constant Volume Bomb," was presented at the 1979 SAE Congress. The award will be presented in October at the Society meeting in Baltimore.

The 32-year-old Georgia native earned his Bachelor's degree in aerospace engineering at George Tech and his PhD at Princeton. He and his wife live with their two young sons in Pleasanton.



COMBUSTION RESEARCH FACILITY—Construction is now 75% complete on this four-building complex. Two buildings will be ready for equipping in June, and it is hoped that CRF will be fully operational by October. The \$10.3 million DOE facility will be the national center for combustion studies by researchers from industry and universities as well as from Sandia and other national labs.

Take Note

Allan Scott (8168) is the newly-installed 21st Exalted Ruler of the Livermore-Pleasanton Elks Lodge. On hand as the installing officer for the occasion was former Sandian Al Alford, now executive director of the California-Hawaii Elks organization. Allan is the fifth Sandian to head the local Elks Lodge. The others were George Mincks (8257), Ken Bennett (8261-1), Bud Pearson (retired) and Al Alford.

Three Chabot College Valley Campus students received Sandia Labs scholarships this spring to help them continue their education in the physical sciences. They are Steve Carpenter, Johnna Thompson and Barry Culpepper. The three will also have summer employment with Sandia, Steve working in the Plant Engineering Department, Johnna in the Exploratory Chemistry Division and Barry in the Combustion Sciences Department. This is the fifth year Sandia has offered these scholarships, each with a value of \$275.

* * *

Sandians Bob Carling (8453), Monte Nichols (8313) and Bob Schmieder (8351) were among those who served as judges in the recent Bay Area Science Fair held in San Francisco for high school students. Some 300 entries were on view, and winners in the various categories will represent the Bay Area in the International Science and Engineering Fair to be held later this year.

Sympathy

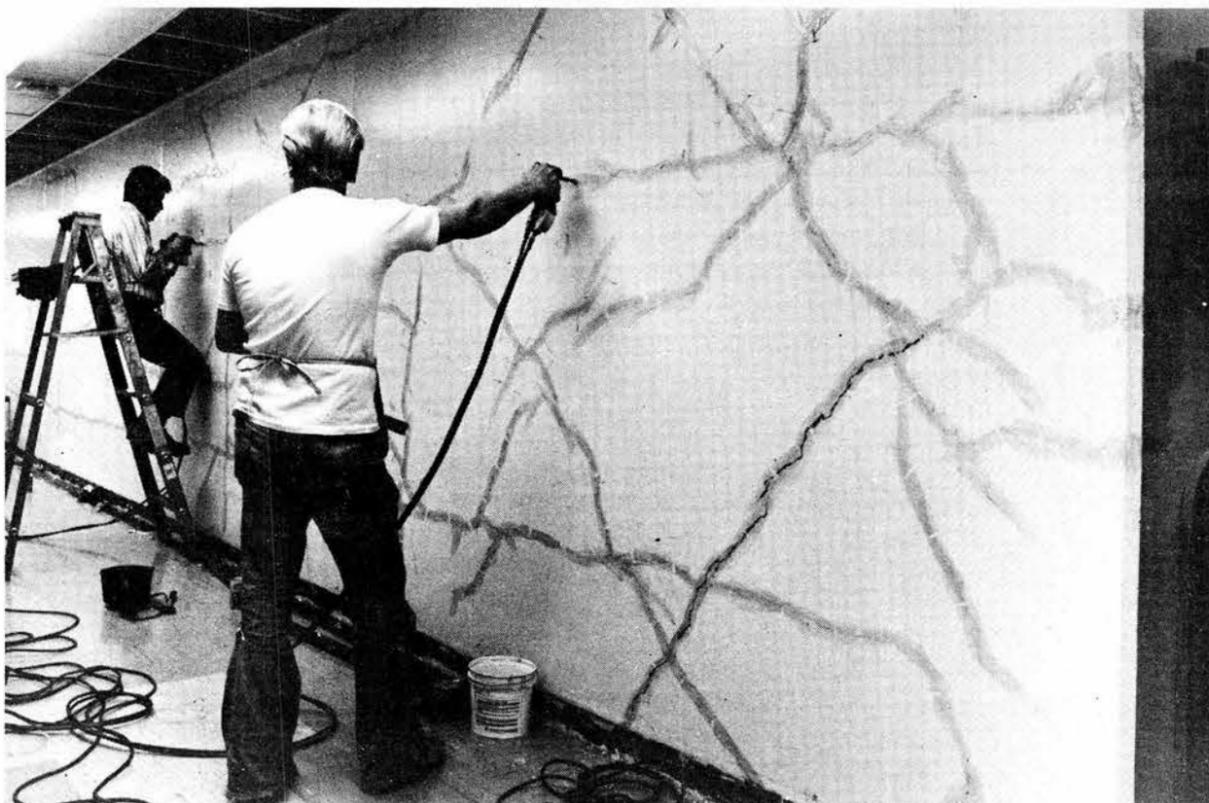
To Bob Tockey (8461) on the death of his father in Boelus, Neb., Feb. 29.

To Marlin Pound (8214) on the death of his mother in Albuquerque, March 18.

To Merle Snyder (8412) on the death of his brother in Weaverville, March 6.

To Dick Gorman (8444) on the death of his wife in Livermore, March 3.

To Marilyn Lane (8444) on the death of her sister in Marin County, March 18.



REPAIRING DAMAGE to corridor walls in Bldg. 912 are workmen from the Adhesive Engineering Co. Cracks created by the January earthquake are filled with epoxy from pressure gun. Quake damage was greatest in Bldgs. 912 and 911. This is the first phase of a Labs-wide rejuvenation, estimated to cost about \$400,000.

Signup for New Series EE Bonds Begins Monday

Editor's Note: Sandia's annual savings bonds drive begins April 21. So radically have savings bonds changed this year—their initial cost, their time to maturity, their interest rate—each Sandian will be asked to sign a new pledge card. Which makes this a good time to survey the whole plan, to put U.S. Savings Bonds in their proper perspective as part of an overall money management program. Following is a Q&A interview with this year's campaign chairman, Dick Schwoebel [5110].

Q. Let's begin with the changes in the bonds themselves.

A. First off, there are no more \$25 bonds. The denominations now are \$50, \$75, \$100, \$200, \$500, \$1000, \$5000 and \$10,000. Instead of buying at 3/4ths the face value as you did with the old Series E bonds, the new EE bonds are purchased at half the face value—\$25 for a \$50 bond, \$37.50 for a \$75 bond, etc. The term to maturity has changed, too. The new EE bonds mature in 11 years and pay a full 7 percent interest if you hold them to maturity.

Q. With so many opportunities available to invest money at higher interest rates, why should people buy bonds?

A. For Sandians, there are a lot of reasons, some financial, some not. One strong reason for buying bonds is that you can systematically save a specified amount of money by having it automatically deducted from your paycheck, month after month, year after year. Thanks to increased rates, bonds—if held to maturity—now earn more than regular passbook saving plans. And even though you can get your money out of bonds as easily as out of passbook accounts (after the initial six months holding period), most people are reluctant to cash bonds. The net result is systematic savings—and you'd be surprised how few wage earners, other than those who buy bonds, actually have a savings plan—any savings plan.

Q. That still doesn't address the question of investments that pay higher interest.

A. Many people either aren't in a position to make investments with a larger



return—or they just don't do it. Bonds, on the other hand, are within the reach of everyone. They may not pay the highest interest rates, but they do earn a guaranteed interest. And seven percent of something is obviously better than 14 or 15 percent of nothing.

Q. Are there tax advantages to bonds that tend to increase their effective yield?

A. Sure. The interest isn't taxable by state or local governments, only by the federal government. And you can defer cashing bonds until you retire and your income—and your tax rate—are both lower. And people with children to educate can put bonds in the child's name. If the child uses the money to go to college, there's usually no tax to pay at all. All those add up to increases in the effective yield of bonds.

Q. Any additional thoughts on why Sandians should buy bonds?

A. This may be considered old

fashioned, but buying bonds is a patriotic gesture. And in a practical sense, if the government didn't have seven percent money available, they'd have to pay the going market rate of 15 percent or more—and that burden, of course, is directly or indirectly borne by the taxpayer.

One thing more: as a government prime contractor, Sandia is well known for its role in the nation's defense and energy programs. Locally, we're looked to for leadership—and with good cause. We're one of the largest employers in the state, and Sandians are active at every level in the social, civic and cultural life of the community. Now that the government is asking all Americans to buy bonds, we think it's important for Sandians to provide leadership for the community in this way, too.

Sandra Chavez Helps With 'Healthy Babies'

"A network of teen-age educators is the goal of the 'Healthy Babies: Chance or Choice?' project of Future Homemakers of America," says Sandra Chavez (5152).

Future Homemakers of America, a national organization of high school home economics students, is interested in improving the quality of family life. Sandra, a chemical technician at Sandia, was active in FHA in high school and, since then, has kept in touch.

Co-sponsor with FHA of the healthy babies project is the March of Dimes, a volunteer health group whose purpose is the prevention of birth defects. Sandra also has close ties with the March of Dimes—as a youngster she contracted polio and was a March of Dimes "poster girl" in Bernalillo County. At the request of both agencies, Sandra serves on the planning committee for the healthy babies project.

"About one of every five births in this country is to a teen-age mother," explains Sandra, "and many young adults are poorly prepared to become parents. Informed, healthy parents are more likely to have physically and emotionally healthy children."

The operating basis of the project is peer education: teams of trained students and advisors teach other students. Local schools cooperate by scheduling open forums and showing films relating to pregnancy and having healthy babies. Trained students conduct seminars and make themselves available to give talks on the subject to interested groups.

These young educators emphasize risks to the unborn—risks their listeners can avoid or, at least, minimize: teen-age pregnancy; poor nutrition; alcohol, tobacco and other drug abuse; infectious diseases such as rubella (German measles) and those that are sexually transmitted.

"Although these young people aren't authorities on the subject," Sandra says, "they are able to present factual information and share educational material, including March of Dimes publications, with any interested group."

Sandia Has Vital Role in Galileo & Solar Polar

To meet fast-approaching deadlines for Galileo and Solar Polar—the next two major NASA space programs—Sandia has agreed to produce all 11,000 radiation-hardened microprocessors, memories and custom-integrated circuits needed in both programs between now and the third quarter of calendar 1981. This represents a tenfold increase in Sandia's participation in both programs.

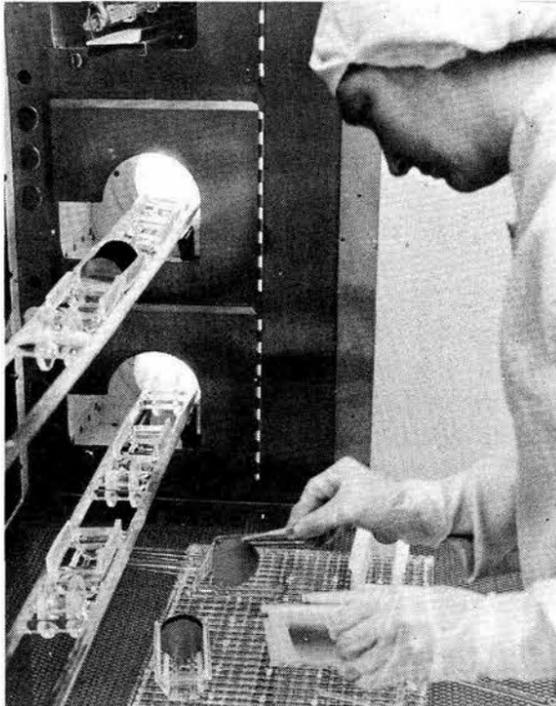
"Originally," Bob Gregory, Manager of Microelectronics Technology Department 2140, told us, "we had agreed only to develop production techniques and produce limited quantities of components in our Semiconductor Development Lab. Then we planned to transfer technology on radiation hardening to a commercial producer. For a number of reasons, that has proved impossible in the required time scales, so now we've agreed to do the entire job ourselves."

The first of the two space projects is Solar Polar, scheduled for launch in February 1983. This is an international project with components and systems being supplied by the United States and several European countries. Solar Polar will circle Jupiter, using that planet's gravitational deflection to put it into an orbit in which it will circumnavigate both poles of the sun.

Project Galileo, aimed specifically at Jupiter, is considerably different from the two previous shots involving Jupiter, Voyager I and II. "Instead of making a single rapid flyby," Bob explains, "Galileo will orbit Jupiter and its moons at least 11 times during its 20 months in orbit."

During those 20 months, Sandia's radiation-hardened components must function perfectly, since they are the heart of the system that measures, correlates, analyzes and transmits data on the surface of Jupiter and its satellites, their magnetic and gravitational fields, their atmospheres and the interaction between the satellites and the magnetosphere. The same functional requirements apply during Solar Polar's orbits around the poles of the sun.

Jet Propulsion Laboratory, NASA's project manager for both Galileo and Solar Polar, established radiation hardness requirements for both projects. The environment near Jupiter is the primary radiation source in both instances. "Jet



SILICON WAFERS containing 65 integrated circuit dies are loaded into quartz boats by Jean Green (2141) for high temperature processing. After processing, the dies are cut apart for assembly.

Propulsion asked for hardness to withstand two-tenths of a megarad," Bob told us, "and we're delivering components based on our experience in the weapon, missile and satellite programs."

Department 2140's ability to support NASA is a natural outgrowth of its weapon and weapon-related work. Microprocessors and memories used in these programs required hardening against the effects of radiation produced by nuclear detonations.

The same is true of nuclear burst detectors like the ones developed by Department 1240 for the Global Positioning System satellites. Twenty-four of these satellites will be in orbit by 1984 providing continuous and highly accurate three-dimensional navigational fixes for any place on earth.

At the time weapon and satellite system designers approached Department 2140 about developing radiation-hardened microprocessors, that organization had only the capability of providing custom integrated circuits. Time constraints then made it seem more logical to harden commercially available processors and memories rather than to design and develop new ones. After a thorough study, a commercially available unit was selected and, in a joint development program, the producer furnished photographic artwork and description of the logic functions and production processes.

Project Engineer Rich Anderson (2144) and other staff in 2140 ran a series of investigations to develop fabrication processes for the microprocessor which were optimized for radiation hardness. In all, over 90 process variations were studied, with the end result that highly reliable, radiation-hardened microprocessors and memories can now be routinely produced in quantity in the Semiconductor Development Lab.

"Since the Galileo and Solar Polar programs require large quantities of

radiation-hardened components," Bob Gregory told us, "our intent was to transfer technology back to the commercial producer in time to meet NASA's requirements. Now that that's not possible, we'll produce the required components in-house. We'll be using part of our Semiconductor Development Lab as a production facility through the third quarter of calendar 1981."

Does this mean Sandia and other DOE customers will have to look elsewhere for radiation-hardened development components for their programs?

"Make it perfectly clear," Bob said, "that project people at Sandia get first preference. The Semiconductor Development Lab has the capacity to satisfy their requirements and to deliver the parts to NASA."

Any personal reactions to the project? "Everyone is very excited about making a major contribution to such important and visible NASA programs," Bob said, "and those of us who are around in 1987 will be glued to our TV sets when the encounter with Jupiter occurs." • cec

Secretaries Week Coming Up

Secretaries Week, April 20-26, will be marked by a number of events sponsored by the National Secretaries Association. On Secretaries Day, April 23, an open house will be held for prospective members at 7 p.m. in the hospitality room of the First National Bank Building at Central and San Mateo. Any secretary interested in learning more about NSA and its activities is encouraged to attend.

To start Secretaries Week activities, a breakfast for NSA members and their executives will be held on Monday morning, the 21st. Also, an information booth will be maintained through the week at Montgomery Plaza, lower level; the booth will display brochures about NSA activities.

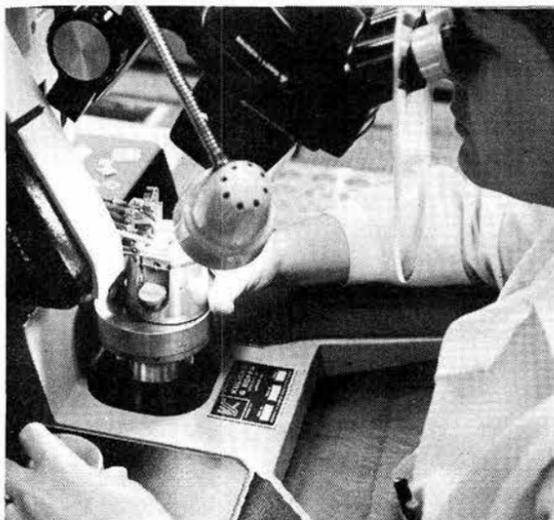
Sandia Labs recognizes Secretaries Week by sponsoring one-day, in-house seminars for interested secretaries. Those who wish to attend a seminar should contact their secretarial coordinator. Barbara Champion (3543) is chairman of the NSA Secretaries Week.

Death

Benjamin Garcia, a computer facility operator in Division 2631, died suddenly April 10. He was 46.

He had worked at the Labs almost 23 years.

Survivors include two sons.



TECHNICIAN Mary Ellen Puckett (2141) attaches 1 mil aluminum wires to a silicon IC die and ceramic package. A microscope is required to position the wires which are ultrasonically bonded.

Computer Codes Predict Oil Shale Fragmentation

Preliminary computer codes describing how oil shale behaves when fractured by high explosives detonated in boreholes have been developed at Sandia Laboratories as part of a project to improve methods of preparing oil shale for underground retorting.

Basically, the codes predict what will happen in a field test if any of the numerous variables in a detonation—quantities and types of explosives, positioning and timing of the detonation—is changed.

The in situ process requires that boreholes be drilled into the shale and filled with explosives which are then detonated to break the shale into small pieces. Air is pumped into the fracture zone and the shale ignited, releasing the oil which trickles to the bottom of the retort area as the combustion front progresses downward. The oil is then pumped to the surface through other boreholes.

If fracturing, or rubblizing, is done improperly, little oil is freed because combustion is hampered for lack of enough air-filled voids in the rubble.

"Field tests have shown that we can rubblize rock using a variety of techniques," says Dennis Grady of Geomechanics Division 5532. "We also know what size rubble is preferred. Now we need to develop enough understanding of the explosive event and the behavior of the shale so that we can regularly produce the optimum rubble bed. These new computer codes are helping to provide that understanding."

Development of the computer codes began with a series of laboratory tests in which small samples of shale were sub-

Available to Sandians



THE ROCK THAT BURNS — Dennis Grady (5532) and Marlin Kipp (5531) check out a sample of oil shale. The two researchers have been developing computer codes that describe behavior of oil shale when fractured by high explosives.

jected to strong, controlled stresses simulating loading rates delivered by high explosives.

Next, prescribed amounts of explosive were detonated in shale blocks measuring about three feet on a side. The blocks were then sawed in two, revealing the fracture patterns for comparison against results predicted by the codes.

"The codes have performed well on these tests and are now being applied to larger-scale field tests," says Marlin Kipp of Computational Physics and Mechanics Division 5531.

"In one study, code predictions are being compared with actual rubble produced by single- and multiple-borehole blasts," Kipp says. Tests of this type are valuable in scaling up blasting configurations to full-size retorts.

Two types of in situ retorting are under consideration. For true in situ retorting, access to the oil shale formation is limited to small boreholes; modified in situ retorting allows removal of about 20 percent of the shale by conventional mining methods prior to fracturing and retorting the remaining shale. True in situ retorting has environmental advantages but has been less successful than modified in situ because the increased void space caused by mining enhances combustion.

Sandia's oil shale program has been underway for several years. Sponsored by DOE, it includes laboratory and field experimentation as well as theoretical analyses of rock mass and rubble pile stability, process chemistry, and instrumentation technology.

Base Library Well Stacked

This week LAB NEWS visited the Base Library, continuing our series about Base recreational facilities available to Sandians.

We talked with librarian Robert Mathews, who told us that the collection of 50,000 books has an adult, general interest orientation. There is an extensive group of military reference books, most dealing with historical battles and campaigns. In addition, there is a section on the Southwest, a seasonal section that now features materials on gardening, plus a music section with recordings in both disk and cassette form.

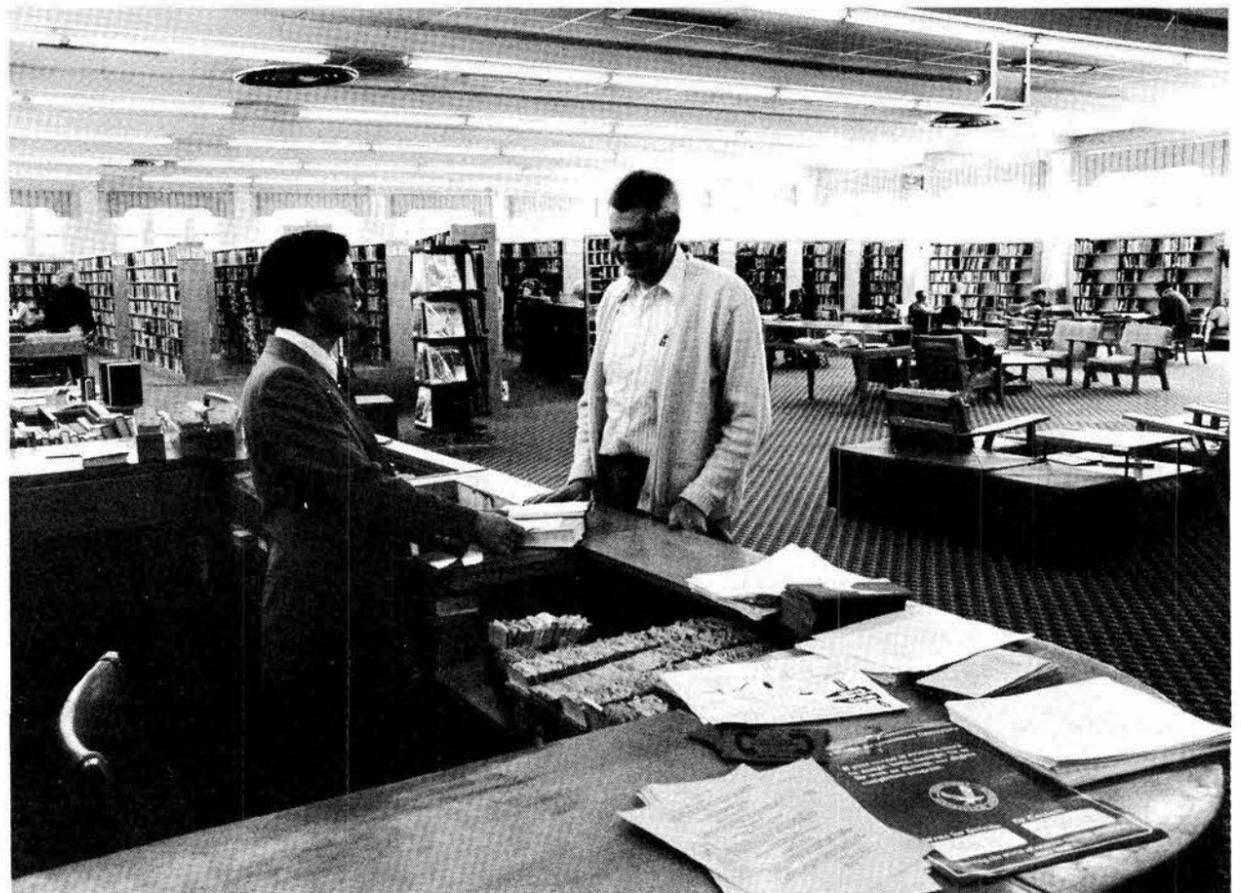
The library subscribes to some 300 periodicals. Back issues are filed, some for as long as five years. A popular section is that with telephone directories from major U.S. cities, handy if you wish to locate a business or person in some distant city.

The library, located in Bldg. 204, is on the south side of Gibson Blvd., one block west of Wyoming. If you drive to the library, park in the lot on the west side.

Sandians may check out books for two to four weeks by presenting their Sandia IDs; no badges please. Dependents may also use the library, provided they have their Base IDs. The library is open from 9 to 9,

Monday through Thursday, 9 to 5 on Friday and Saturday, and closed Sundays

and holidays. The phone number is 4-0795.



MANY SANDIANS use the Base Library, located just south of Gibson and about a block west of Wyoming. Don Gunderson (1754) here checks out book from librarian Robert Mathews.

feed **feedback**

Q. An awful lot of heat generated by our computers seems to be going up in steam [cooling towers]. Is any of this energy being recycled?

A. The low-level waste heat from the computer annex, as well as process heat from other areas of 880 which have high internal gain, is vented at the northeast corner of the building.

As you may know, heat flows "downhill" from a higher energy level (temperature, in this case) to a lower level. We cool the warm air from the computer room by passing it over finned pipes containing 45°F chilled water. In this process, the chilled water is warmed to about 55°F.

The chiller upgrades the heat enough so that the cooling towers can vent it outside irrespective of outside conditions.

The point of the above is to emphasize the low entropy (a fancy word for quality) of the energy involved. Generally speaking, the building does not need the heat during occupied hours because most offices and labs have enough internal gain to keep them warm.

Thus, utilization of this low-grade heat presents two problems: (1) storage—keep it somewhere for use at night or on weekends, and (2) quality—upgrade the energy so that it can flow downhill into the building.

When 880 was built, oil was \$2/bbl and saving energy took too much costly hardware to be given consideration on the basis of reasonable payout. Building 880 uses so little heating, compared with cooling, that this generally is still true. A heat pump (to upgrade the energy) and huge insulated tanks for storage are too expensive to pay off within 20 years.

Such hardware, when installed in new construction, is far less costly and payout economies are better. Our new Bldg. 821 has these features as will Bldg. 823.

We have taken several measures in 880 to remove the waste heat more efficiently and have several more in process. Thank you for your suggestion.

R. W. Hunnicutt—3600

Q. Two suggestions for energy conservation:

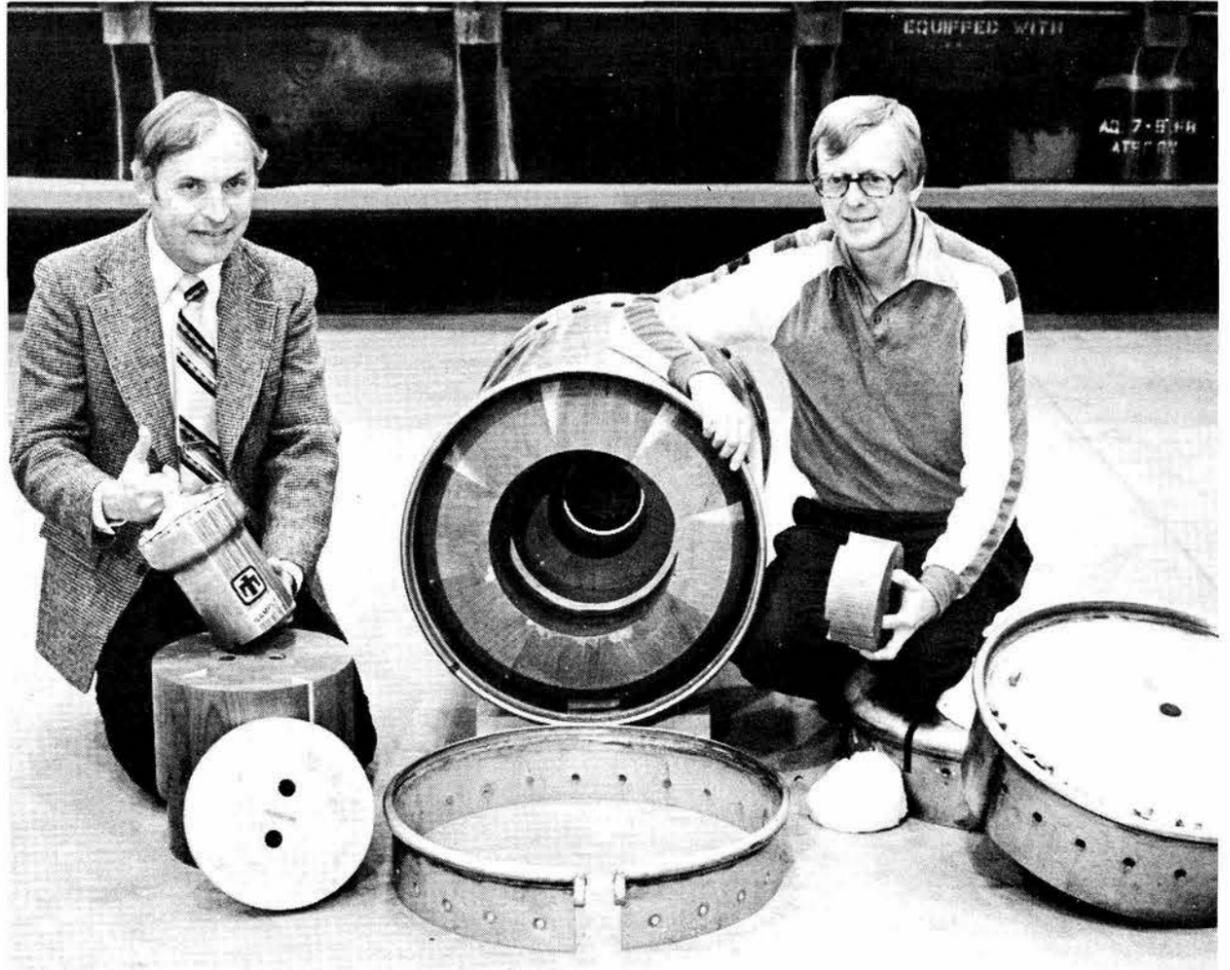
1. Eliminate the half-hour lunch period—most of us can eat a sandwich, apple, etc., while working. This would save 5.9 percent of light, heat, etc., energy.

2. Work four 10-hour days each week, Mon. through Thurs., or Tues. through Fri. This would help in two ways: 1] it would save the half-hour or so of warm-up [cool-off] of the buildings one time per week, and 2] the Labs would be working the same times as BKC and SLL/LLL, i.e., 7 a.m. to 5 p.m.

It might also save gasoline since everyone who drives to work might not use that gas on the extra day off.

A. I appreciate your concern for energy conservation. We need everybody's help and cooperation.

Your suggestion that we eliminate the formal one-half hour lunch period is



PATENT AWARDED—Inventors Ken Cole (5656) and John Andersen (1721) display components of their plutonium shipping container. The cask, weighing some 500 lbs., survived a severe testing program without leaking. It will be used to ship up to 4.4 lbs. of solid plutonium between nuclear reprocessing plants, storage sites, fabrication plants and research facilities.

Plutonium Shipping Container Patented

A patent has been awarded DOE for a plutonium shipping container invented by John Andersen (1721) and Ken Cole (5636).

"We subjected the container to a series of brutal tests simulating, among other things, an aircraft crash and jet fuel fire," John says. "There was no leakage from the container as a result of any of these tests."

The accident-resistant transport container was designed at the request of the

interesting and is appealing to me personally. As you may know, we went from an hour to a one-half hour lunch period as an energy conservation measure. While I think that it has been quite successful, we still regularly get suggestions that we go back to a full hour for lunch.

Currently, we have at least a thousand people who go to one of the cafeterias for lunch. I suspect that some of them would be upset if we eliminated the lunch period.

Others have previously suggested that we work four ten-hour days. We suspect that there wouldn't be much, if any, energy savings at work. The potential savings would be transportation to work four days instead of five. On the other hand, there is also a potential for a net energy loss since given a three-day weekend, many might drive to Colorado to ski or fish instead of to the local golf course or tennis court on a two-day weekend. We also need to work similar if not exact schedules to DOE Headquarters and other DOE and contractor locations.

I'm not sure what the future energy conservation requirements will be. It may be that at some time in the future we may need to try one or both of your suggestions. Thank you.

R. W. Hunnicutt—3600

Nuclear Regulatory Commission (NRC) to contain up to 4.4 lbs. of solid plutonium during shipment between fuel reprocessing plants, storage sites, fabrication plants and research facilities. The container may also be used by the International Atomic Energy Agency in its plutonium safeguards efforts.

Resembling an ordinary 65-gallon drum, the 500-lb. package is about 3½ feet high, two feet in diameter and consists of a double-layered stainless steel shell filled with laminated redwood. Sandwiched within the redwood is an aluminum layer which spreads impact loads throughout the wood and dissipates any heat generated by the plutonium. Within the innermost wood section is a high-strength stainless steel vessel hermetically sealed with a copper gasket and bolts. Nested within this vessel is a stainless steel can in which the radioactive cargo is carried.

"Redwood exhibits the highest specific energy absorption, when loaded parallel with its grain, of any material we evaluated," John says. "Also, it has outstanding fire protection characteristics after it has charred."

The container, licensed by the NRC, has survived a severe six-phase test sequence which included:

— Impacting into an unyielding target at 300 mph.

— Crushing under a 70,000-lb. load.

— Puncturing with a 500-lb. steel spike dropped from a height of 10 ft.

— Slashing twice with a 100-lb. length of structural steel dropped from a height of 150 ft.

— Burning in a jet fuel fire with temperatures of at least 1850°F.

— Immersing in three feet of water for at least eight hours.

Report Identifies Why Motorcycle Accidents Happen

Last year in LAB NEWS we carried articles on commuting to work by motorcycle and by bicycle. Both had a favorable response, and the number of Sandians who cycle or bike to work—already in the hundreds—was probably augmented.

Safety was a dominant concern in these articles and, in the absence of valid data, this writer could only discuss it in terms of personal experience. But now I've completed reading a rather extraordinary report: "Motorcycle Accident Cause Factors and Identification of Countermeasures," prepared by Hugh Hurt and a research team at the Univ. of Southern California for the Dept. of Transportation. The report presents findings from the on-scene, in-depth investigations of 899 motorcycle accidents and the analysis of 3622 motorcycle-involved traffic accident reports.

The report itself is 174 pages long, meaning that that which follows is a synopsis of a synopsis. In presenting the more significant findings, I commend them not only to Sandia motorcyclists but to Sandia bicyclists as well—the fact is that the accident scenario and the conclusions to be drawn from it usually apply to both motorcycling and bicycling.

Why Accidents Happen

Most (50.8%) accidents occurred because an automobile failed to yield right-of-way to the motorcycle. Typical of these is the case of the automobile in on-coming traffic turning left into the path of the motorcycle. Almost invariably, the automobile driver declares that he did not see the oncoming motorcycle. Researcher Hurt sums up the problem as ". . . failure to detect a relatively unfamiliar vehicle on a collision path where motion conspicuity is absent." If you think about it, a cyclist does have a relatively small cross-sectional area, especially when approaching head on. Further, in the head-on mode, our eyes don't perceive motion as well as when the object is moving across our field of vision.

Motorcycle rider error was the cause in 40.8% of the accidents. Typical here is the cyclist coming to grief for taking a curve too fast. The motorist's failure to yield right-of-way and motorcycle rider error thus account for the vast (91.6%) preponderance of accidents.

Other Factors

In 79.9% of the accidents the road was straight. Moderate or heavy traffic was the situation in 59.2% of the accidents. Approximately two-thirds of the accidents occurred at intersections, while an alley or driveway intersection was the scene of 12.6%. The median pre-crash speed was 29.8 mph, while the median crash speed (determined by post-crash analysis) was 21.5 mph. Using a clock face for directional orientation, 43.5% of accidents had an 11 o'clock pre-crash line of sight from the motorcycle to the other vehicle. This is typical of an automobile just beginning to turn left in front of the

cyclist. The sum of pre-crash line of sights from the 11, 12, and 1 o'clock positions is 77.1%. Moral: Watch where you are going! That is where at least three-fourths of the accidents are coming from.

The Problem of Conspicuity

Looking at, yet not seeing the cyclist is a phenomenon that cyclists must reckon with. It's cold comfort to be lying upon the pavement reassured in the knowledge that you had the right of way. Researcher Hurt is somewhat tentative here in his conclusions. He notes that only two (of 899) cyclists were wearing high visibility garments, e.g., a bright yellow jacket. More typical was the rider wearing an army surplus olive-drab jacket, by definition a form of camouflage. Yet the complexity of the conspicuity problem is illustrated by those cases where cycle conspicuity was outstanding. As the report notes: "Such a case is a law enforcement motorcycle in pursuit of a traffic violator. The motorcycle has headlamp and flashing red lights on and is slowed to 35 mph going through an intersection. Just past the intersection an automobile driver pulls out from a driveway into the path of the motorcycle. The automobile driver says, 'I didn't see the motorcycle.' The cycle rider says, 'The automobile driver looked right at me and I thought we had eye contact.'"

Hurt's finding: the cycle rider *must not accept apparent eye contact* as some significant indicator of communication with the motorist.

One new technical development may offer a partial fix for the conspicuity problem. Called a "Q-switch," the device causes the headlight to pulse or flicker like the headlight on a rail locomotive. It does get attention, but it may not be legal in all states since it may be classified as a flashing light.

Rider Profiles

It appears that the inexperienced and those who learn little from experience comprise a disproportionate share of accident-involved riders. More than half (54.5%) of these had no cycle license, required by law in California; 10.2% had no license of any sort and 1.7% had revoked licenses. Of the 899 riders, 49.2 had one to three traffic violations on their records. And, of the 54 fatal accident victims, 43.5% had a similar number of violations, while 23.8% had a record of four or more violations.

The Role of Equipment

If you don't want a squashed head, wear a helmet. That's unequivocal. Not surprisingly, the more helmet you wear, e.g., full-face, the less injury suffered. When head impact did occur, the helmet prevented or attenuated the impact injury 80.9% of the time. When head impact occurred with unhelmeted riders, some degree of injury always resulted. Curiously, almost any helmet, even the Juarez specials, gave adequate protection. Crash bars appear to offer no protection, probably because they cannot be made substantial enough to resist crash forces.

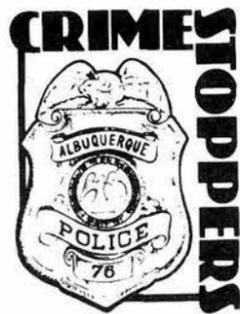
Finally . . .

Two macabre items. Of those involved in the 54 fatal accidents, more than one in four (28.3%) had one or more tattoos. And Harry Hurt's personal assessment of the most dangerous place for a motorcyclist: "The biggest thing is freeways at night. You've seen those dogs on the freeways? Well, if you go down on the freeway at night—then *nobody* can see you—that's what you're going to look like. Freeways at night—if you go down, then the only thing I can say is you better spring up fast, running 55 mph in the right direction . . ."

• js

Our Town

Crimestoppers — It's Working



Anyone who lives in Albuquerque is aware of Crimestoppers. The program, started in September 1976, is responsible for the return of stolen property approaching one million dollars in value and the clearing of 931 felony crimes with 205 convictions.

The program pays people for information that leads to a grand jury indictment. The informant may remain anonymous. Each informant who has helped Crimestoppers is indirectly responsible for clearing up an average of five crimes, this because the apprehended criminal has usually been active in his chosen profession. Average payment is \$400.

Detective Tim Kline, Crimestoppers coordinator, states that the program solves

crimes that otherwise would still be open cases; moreover, the criminals would still be robbing and burglarizing.

To keep Crimestoppers in action, a continuing flow of cash contributions is needed from the community. The money comes from individuals, business firms and institutions. A 21-member civilian board of directors oversees operation of the Crimestoppers program.

To encourage donations from individuals to Crimestoppers, the First National Bank of Albuquerque matches each individual donation with an additional 10% of the donation. The First National plan will continue through 1980.

If you're interested in contributing to Crimestoppers, drop your check off at any branch of the First National or Albuquerque National Banks. For additional information, call Crimestoppers at 842-8000.



Margie Gaddy and Melissa



Fred Yost, Melanie and Stephanie

Little Free Time

On Being A Single Parent

In the film Kramer vs Kramer, Dustin Hoffman's wife leaves him abruptly, and he finds himself the sole guardian of their five-year-old son. At first he is unmoved and preoccupied with his personal world, but gradually the realization dawns that raising his child is just about the biggest thing in his life.

These days, raising children solo is commonplace, yet that circumstance hardly makes the job less demanding. Many Sandians are single parents, and we recently talked with three of them concerning the pleasures and difficulties of their parenting job. They are Margie Gaddy [1766] whose child, Melissa, is nine; Fred Yost [5832] with daughters Melanie, 13, and Stephanie, 16; and Laura Garcia [5511] whose daughter, Soña, is three.

* * *

LN—A general question first—what does it mean to be a single parent?

Fred—I entered that category more recently than Laura and Margie—just a little over a year ago—so I've had some fresh experience. I've found that being a single parent just consumes more time than I would have believed—it's an awful lot of work. Seems there's always something to do—taking Melanie to practice, buying clothes, doing laundry, attending various school functions, helping with the homework, and so on. It's just very hard to find some time to yourself.

Margie—It does mean a full schedule. Melissa and I have been on our own since she was two. In the morning I drop her off at the nursery on the Base and she walks to school. Then, after work, I pick her up and we go to the Base gym. I run and she plays with her friends. Later we go home, get dinner, and do the dishes together. There isn't much time left after that.

Laura—Soña and I have always been by ourselves. But that's not entirely accurate because both my Dad and Mom and my grandparents are here in town. Even so, and with all their help, being a single parent is difficult, really difficult—the

money has to stretch further, so does the time.

LN—What about the absence of the other parent—is this a problem?

Margie—I don't think so. Melissa notices that her friends may have nice things that I can't afford and she'll say "it would be nice to have a daddy," but it doesn't seem to bother her a great deal.

Laura—Soña made up a story once that her father was in California but that he had died. Actually, with Grandad and uncles and cousins around, she already knows there's someone else besides her mother. She's only three, so I wouldn't expect this to be a problem at this early age.

Fred—I've noticed, and I think the girls have, too—being a single parent or being the child of a single parent is not so unusual these days. We don't feel like strange beings . . . we're getting along.

LN—How about the various singles groups in town—are they worthwhile?

Fred—I've been to several gatherings, including Parents Without Partners. They all have different aims—some social, some spiritual and educational. Right now, I'm involved in a church group called "Beginning Experience" for people who are widowed, separated and the like . . . I find it worthwhile.

Margie—I haven't participated in any of these groups, though my friends have suggested it. For me, it's been a matter of time. I think I'd like to remarry, but I like my independence, too. I was first married fresh out of high school and knew very little about the world. Now, if I did marry again, Melissa might not be too happy about it . . . maybe a little jealous.

LN—Should adults who are essentially on their own consider having or raising children?

Laura—I think some women—and some men—could handle it. Others couldn't. As I said earlier, it's difficult, really difficult. And I've had a lot of support. For me, having and raising my child has been a rich experience.



Laura Garcia and Soña

Authors & Speakers

R. L. Iman (1223), "The Rank Transformation as a Bridge Between Parametric and Nonparametric Statistics - Small Sample Efficiency of Fisher's Randomization Test When Applied to Experimental Designs," Department of Statistics Seminar, Kansas State University, April 3.

J. J. Forrestal (4342), B. W. Duggin (4221) and R. I. Butler (1233), "An Explosive Loading Technique for the Uniform Expansion of 304 Stainless Steel Cylinders at High Strain Rates," Vol. 47, pp 17-20, March 1980, JOURNAL OF APPLIED MECHANICS.

Sympathy

To Jerry Campos (1471) on the death of his brother in Albuquerque, April 5.

To Jac Constant (1473) on the death of his mother in Albuquerque, April 5.

Congratulations

Mr. and Mrs. Gary Phipps (1556), a son, Jeffrey, April 1.

Mr. and Mrs. Bill Camp (4425), a daughter, Julia Marie, March 19.

Fun & Games

Swimming—There's a problem at the Olympic pool after work: no lap swimming. That's not a rule—it's a fact of life. With kids plunging off the diving boards while others splash around in the shallow end, there's just no way a swimmer can do laps. If enough Sandians and DOEans express interest in lap swimming from, say 4:45 to 6:00 p.m., we're prepared to plead their cause with the Base people (results not guaranteed!). Send your name, organization and phone number to Swimmer, LAB NEWS, if you're interested.

* * *

Running—Teams are now being formed for the various events in the Corporate Cup, scheduled for the weekend of May 30 (which, incidentally, is *not* a three-day weekend). Some fifty Sandians have already signed up. If you're interested, call LAB NEWS on 4-1053 for information and a fact sheet. A practice session and time trails are scheduled for all participants on May 17 at Wilson Stadium (near Manzano High), starting at 9 a.m.

* * *

Dirt Road Cycle Touring—Do you own a trail motorcycle and like to tour on logging and other dirt roads? An effort is underway to get a club going that would operate in much the same manner as the Mountain and Ski Touring Clubs, offering a schedule of Saturday and Sunday trips and pooling transportation to the jump-off points. The club would be only for touring, not racing. Send your name, organization and phone number to Cycle Club, LAB NEWS, if you'd like more information.

* * *

Biking—You can still sign up for the Tour of the Rio Grande Valley, which takes off this Sunday, April 20, at 6:30 a.m. from the UNM campus. Go for 100 or go for 50 miles. LAB NEWS has entry forms and other information—we're in a trailer east of Bldg. 814.

* * *

Arts & Crafts—The Base A&C Center is offering these classes: photography, leather working, pottery, tole painting, macrame, stained glass and watercolor painting. Also classes in ceramics—glaze combinations, beginning brush strokes, and clay flower construction. Call 4-0222 for more information.

GARY SHEPHERD (2614) coaxes his cast of youngsters in the Neighborhood Drama Project through a tense moment in "The Orphans of Arnaud," his ninth original musical show for this group. The show plays Saturday, April 19, with curtains at 2 and 8 p.m. and again Sunday at 8 p.m. Supported partially by the New Mexico Arts Commission, the Project asks a 50-cent donation. It's family entertainment. Project is located at 1020 Edith SE.



FOR A WHILE, it looked like The Blizzard of '57, when scores of Sandians were stranded overnight at the Labs. Snow fell furiously on the morning of April 1. By quitting time it was gone. LAB NEWS photographer Gerse Martinez caught this pair taking a chilly walk.

Take Note

Huning Castle, once an elegant Albuquerque landmark, stood at 14th and Central. Franz Huning, an early-day merchant and trader, built the castle as a home for his family. Before its demolition in 1955, the Huning home was the site of a private school—the Mary Trudelle Elementary Day School—in operation from 1942 to 1954. Louise Bland (3332), a former student, is helping organize a Trudelle reunion. She asks former students, teachers, or persons knowing the whereabouts of anyone associated with the school to contact her at 265-6286.

* * *

Leonard Nelson (1485) has been named Elk of the Year by Albuquerque's Lodge 461. The 6000-member fraternal group selected Leonard on the basis of his continuing participation in the many volunteer activities associated with the Lodge. A 15-year member, Leonard has been especially concerned with youth programs. The award is marked by presentation of a plaque and pin.

* * *

The Albuquerque Convention Center will be the scene next month, May 13 to 15,

of the second annual ISE (Ideas in Science & Engineering) electronics show. Over 300 booths are scheduled, and both seminars and panel discussions are being offered. Last year, more than 5000 people came to ISE and more are expected this year. Posters with free ISE registration forms will be put up during the last week in April at bulletin board locations in the Labs. Shuttle bus service between Sandia and the Convention Center will be provided by ISE.

* * *

They've had three times at bat and it would be nice to report a home run each time but it's more like a three-bagger. Which is to say that Medical's team of Price & Cheromiah in their three stop-smoking clinics have convinced most, not all, of their students to stay off cigarettes for keeps. But that's a pretty good record, so session number four is being set up for you would-be quitters to start May 20, 3:30 to 5 p.m., Tuesdays and Thursdays, eight meetings. "Who quits?" we asked Arlene. "Those who come to our clinic with a resolve to quit," she replied. Call Arlene on 4-8038 or Phil on 4-3993 to reserve one of the 15 places.

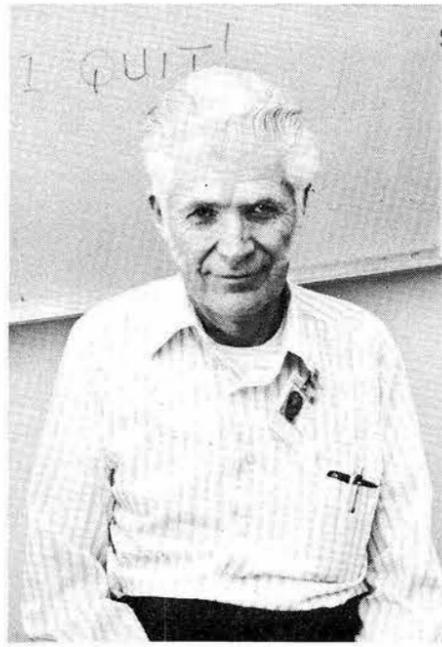
* * *

Another Sandia Medical offering is addressed to those with back problems. It's a class that meets Tuesdays and Thursdays for four weeks from 5 to 6 p.m., starting May 6. Says the course description: "Learning and practicing exercises to strengthen your back, as well as learning how to relax when your back is tense, are keys to a healthy, trouble-free back. Relaxation techniques and back exercises are emphasized in this class taught by a physical therapist and an instructor in body awareness." Enrollment is limited to 15. To enroll, send your name, organization and phone number to Back Class, Wanda Cupp, 3332-1.

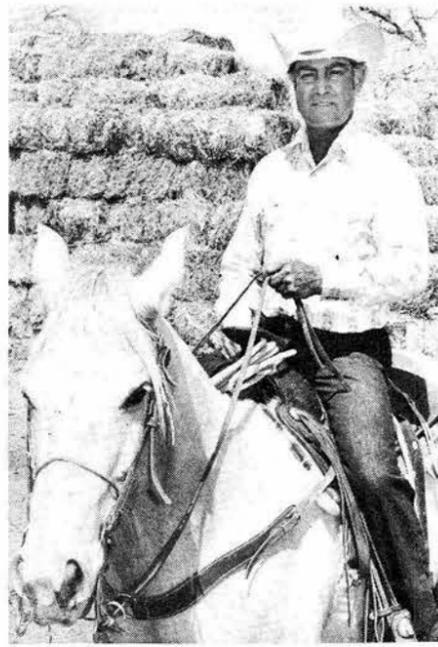
Retiring



Leonard Baker (4741)



Marvin Causey (5522)



Joe Silva (2145)



Hazel Minter (1100)

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 (M0125).

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

CARDBOARD storage bin boxes, 4"wx12" deep, extra dividers, 30 cents ea.; HD pegboard, 4'x8' sheets, \$5/sheet; photoelec. relay system, \$15. Barnard, 256-7772.

TWO screen doors: 81x36 & 81x32; fp screen, 24 high x 32 wide; hand lawn mower. Worden, 881-4486.

10 1/2 FT. cab-over camper, all conveniences, sleeps 7. Open Road, \$875. Monroe, 296-4206.

302 engine, needs repair, \$75; auto. trans., \$75; 3-spd. trans., \$50. Romero, 865-4823 after 5:30.

NEW black leather pull-over motorcycle jacket, size 38-40, satin lined, fully zippered, \$100. Lujan, 299-9600.

TIRE: Firestone deluxe champion 685.15, unused; 2 Chevy truck wheels. Edenburn, 869-2911.

CLASSICAL guitar w/case, Lyle, \$125. Oravec, 281-3667.

72 JAYCO Thrush tent trailer w/awning, sleeps 6, \$1200. Harker, 265-7328.

TWO NEW rainsuits: bib pants, zipper jacket w/hood, rubber outside, fabric inside, snap cuffs, large, medium, \$9 ea. Stamm, 255-2640.

ROTARY MOWER, \$20; assorted houseplants; sewing machine, \$25; modular table & chair, \$50. Feibelman, 242-1946.

UTILITY TRAILER, 3' 1/2" by 6' 1/2". Sanchez, 344-5031.

STURDY bumper bike rack for 2 bikes, \$7.50; std. Pinto wheel, \$5. Baxter, 344-7601.

3-SPD. trans. for '64 Dodge Dart, 6-cyl., best offer. Gray, 821-8617 after 6.

GAS TANK, fits LWB Chevy, \$80; Bronco wheels & tires, \$7 ea; misc. 13-16" tires. Bentz, 299-3448.

SPEAKERS, KLH, model CD-10, 2-way, \$150/pr. Bennett, 299-1144.

EXERCISE CYCLE, Sears list \$129.50, 3 mos. old, \$100. Dossey, 294-1167.

HIDE-A-BED sofa, dbl. bed size, black naugahyde, \$175. Haskell, 296-7141.

CABOVER camper, 11', self-contained, shower, gas, 110 VAC, refrig., stove, heater, carpet, jacks, \$2000. West, 299-7314.

TELEVISION analyzer, B&K model 1075, \$85. Lee, 281-5496 weekends only.

BUNK BEDS/mattresses/ladder, \$50;

truck tire & wheel, 9.50x16.5, new, \$75. Weart, 298-0614.

TIRES: 11x15 4-ply, 2 Big-O Sun Valley, 1 Goodyear Tracker. Benson, 897-3821.

SEARS 25'x16', 4' above-ground swimming pool w/pool deck, filter, vacuum & other accessories, \$400. Romero, 865-6558, 9 a.m. to 5 p.m.

ANTIQUA DRESSER, 2 oriental rugs, 1 Turkish, 1 Karestan 10'x14'; 1 king white headboard. Comeford, 293-8433.

LUGER model .22 cal., made by Stoeger, used once, holster included, \$80. Esch, 292-0754.

FOUR place burial lot #6 in Sandia Memory Gardens' Garden of Mercy area, \$800. Herrmann, (214) 836-2752, Oak Hill, Texas.

ANTIQUA piesafe, punched tin panels, 34"x6"x15", \$295; brass-iron folding bench, velvet seat, \$95; misc. accessories, camera, tripod. Shepherd, 299-9066.

DOG CAGE by Kennel-Aire, 22"x14"x16" high. Mighty Dog dog food. Bircher, 268-0726.

ELECTRONICS LAB: scope, RC bridge, sine-square wave gen., RF gen., VTVM, \$250 takes all or \$65/item. Rice, 884-5472.

ZENITH Chromacolor 17", earphone, color sentry, UHF, AFC, \$250; mattress/springs, twin, \$80. Korak, 296-1165.

LUDOWICI red ceramic roof tile, retail \$1.50 ea., approx. 500 pieces plus trim, \$450; older Canon elec. adding machine, \$40. Miller, 344-7725.

DRAPERIES: 84x84, thermal backing, wine & black + sheers, \$30; 82x82 red antique satin, 1-way pull, \$20; woven wood, shades of red yarn, 48x104 wide, \$35. Greenholt, 294-5286.

TURKEY CALLS, box type, handmade, La. & NM tested, season 4/12/80-4/27/80, \$10. Sartori, 294-7837 after 4.

WOOD LATHE, Craftsman, 12", w/motor, 3-dwr. stand, 4" faceplate; all for \$175. Linnerooth, 884-8615.

GLASS DOORS for fireplace, Sears, used less than 1 yr., \$75. Patterson, 299-1062.

ELECTRIC cook top, 30", used, \$35; kitchen sink, dbl.; queen size bed & mattress, almost new. Trott, 266-2632.

TYPEWRITER, portable Remington Performer, \$35; tire chains, 7.50:16, never used, cost \$23 1975, sell today \$23. Klecotka, 821-1466.

HEATH KIT Novice License program #ERS-3701, \$20; Heath Kit solid state electronic Code Keyer # HD-1410, \$25. Jensen, 821-6178.

RUMMAGE SALE: May 2, Scout Troop 285, 8 a.m.-5:30 p.m., Sombra del Monte Christian Church, 2528 Utah, NE. Cover, 881-3860.

BUNK BEDS, solid maple frame, \$75; metal bed frame, adjustable twin-full, \$15. Cummings, 292-0524.

RECORDERS, Dolmetsch, 2 sopranos, 1 alto, 1 tenor w/C# key, all 4 at \$25. Janney, 881-4622.

SEARS auto. clothes washer, \$50; patio swivel rocker w/hood, \$50. Sublett, 884-4426.

ANTENNA TOWER, 60' self-supporting, \$150 you move; free dishwasher, motor needs work. Wampler, 281-1307.

SIX light blue tablecloths, used once for reception; used golf balls. Kraehling, 268-8126.

WASHER, auto. clothes, Frigidaire, HD, 1-18-lb. capacity, under parts warranty, \$250 negotiable. Alvarez, 821-6817.

PORTABLE SAFE, \$75; Great Books of the Western World, 54 vols. w/ synopticon, \$175; Baldwin organ, Leslie speakers. Sumlin, 869-9124.

OLDSMOBILE service manuals, two, 1978, all models, \$12; Volvo hitch. Sasser, 298-1439.

WASHER, Whirlpool, lg. capacity, avocado finish, \$45; port. B&W TV, \$15. Baack, 296-2312.

30 SQ. YD. blue & aqua tweed carpeting, \$20; Kenmore sewing machine w/cabinet, \$100, make offer. Barton, 265-8607.

FORMICA COUNTER TOP, two pieces, \$10. White, 294-4347.

DRYER, Maytag, \$90. Metzgar, 242-1028.

TRANSPORTATION

LADY'S model 3-spd. bicycle, 26" wheels. Barnard, 256-7772.

'69 MUSTANG, new paint, new interior, \$2500 or best offer. Romero, 865-4823 after 5:30.

2 DATSUN pickups: '66 w/rebuilt engine for \$1150; '72, wrecked but repairable, \$850. Cowan, 299-3172 or 897-1836.

'69 FORD Country Sedan, SW, 6-pass., AC, PS, PB, \$300. Sweet, 281-3652.

'72 HONDA CL175, dual purpose bike, removable windshield, luggage rack, new battery, low mileage, 60 mpg, \$350. Sholtis, 294-7073.

BOAT, 14' aluminum; trailer; 18 HP motor; 6-gal. gas tank; oars; swivel seats; spare tire; cover, \$750. Schuster, 299-1072.

'72 FORD F-100 Explorer pickup, 390 V8, AT, PB, PS, AC, LWB, 68,000 miles, \$1650. Harker, 265-7328.

'75 VW BUS, 7-pass., AC, radio, sun screens, new tires. Pryor, 344-2931.

'73 CHEVY Impala, 4-dr., AC, radio, PB, PS, \$1250. Mason, 281-3052.

'73 EXPLORER 20 motor home, 45,000 miles. Chevrolet 350, roof & cab Air, new tires, \$5950. Knotek, 296-6291.

TWO 1978 XR75 Honda dirt bikes. Sanchez, 344-5036.

'77 MUSTANG II, 4-cyl., 4-spd., 2-dr. HT, new tires, under book. Hardin, 293-5679.

'71 VOLKSWAGEN BUS, recently rebuilt engine, major tune-up, \$1200. Lynch, 884-7977.

'67 IH SCOUT, 4-wd, hubs, V-266 eng., dual tanks, 60,000 miles, one owner. Bennett, 299-1144.

'68 INTERNATIONAL Travelall, AT, AC, PS, PB, new tires, dual gas tanks, \$700. Newell, 255-5959.

'77 MOTO GUZZI Le Mans 1000cc, \$2950, Sig Erson cams, Pirelli tires, Barnett clutch, Koni shocks, Ceremis, Venolia pistons, custom half fairing. Watterberg, 294-6759 or 299-8929.

'67 CHEV. pickup, 3/4 ton, 4-wd, SB radials, split rims, \$1200. Zanner, 281-1789.

FISHING/SKI BOAT, 15' Starcraft, 85 HP Johnson outboard, trolling plate, anchor, bait lights, HD trailer, \$2000. West, 299-7314.

'71 DELSTAR 12' bass fishing boat,

fiberglass, w/trailer, 15 HP Seahawk eng., swivel chairs, fishing box, \$800. Kaminski, 877-2988.

'74 MERCURY Montego MX 4-dr., full power & air, sell close to wholesale. Schultz, 294-7079 after 5.

'74 MUSTANG II, air, 4-spd., AM/FM cassette, \$2400. Wilkinson, 299-8327.

'68 COUGAR, 320 eng., vinyl top, w/mags. Forrest, 299-3538.

'79 AMC JEEP, CJ-7, 6-cyl., 3-spd., low mileage, stripes, soft top, carpet. Behring, 265-7205.

'74 INTERNATIONAL Travelall 4-wd., w/8000-lb. winch, '72 20' Prowler self-contained travel trailer, \$6000 for both. Ault, 281-3280.

'74 CHEVY 3/4 ton van, CB, whip antenna, AT, 350 eng., radials, trailer hitch, 18 mpg, \$1500. Guerin, 299-4677.

'77 AMC PACER, 38,000 miles, AC, PS AM/FM tape, radials, \$3150. Hendrick, 296-2163.

18' POWER BOAT, Tahiti, 325 HP Olds eng., 180 total running hrs., Berkely jet drive, HD tandem trailer, \$5500. Perryman, 294-6113.

'74 MUSTANG II, AT, \$1400. Mattox, 821-3945.

'77 LTD Landau, 9400 miles, loaded, \$3390 or pick up Credit Union payments \$151/mo. McMaster, 884-8055.

'79 TOYOTA Corolla 2-dr. deluxe sedan, AC, AT, radio, \$500 below book. Patterson, 299-1062.

'78 CHEVY VAN, 39,000 miles, customized. Pimentel, Belen 864-7542 after 5.

MOTORCYCLE: BMW, 1974 R60S, 14,000 miles, bags, fairing, headers, many extras. Lutheran, 293-4462.

17 1/2' AQUAFLEET fiberglass boat, 90 HP Merc. engine, tilt trailer & accessories, \$2000. Powell, 877-4939 after 5.

1960 OWENS 15' boat, 35 HP Evinrude motor & trailer, \$950. Keller, 281-3490.

'73 JEEP truck, 4-wd, 44,000 miles. Widner, 294-2014.

'77 SUZUKI GT185, 1600 miles, adult ridden, \$650. Mischke, 294-5247 or 884-3120.

'73 PLYMOUTH DUSTER, 6-cyl., 23 mpg highway, PS, sun roof, space-maker trunk, steel radials. Trowbridge, 293-1073.

'78 HONDA, CVCC hatchback, AM-FM stereo, low mileage, \$4400. Neiswander, 884-7142.

'66 GMC 3/4 ton pickup, PS, PB, AT (new), saddle tanks, etc., \$850. Schneider, 299-6243.

'70 FIAT 850 Sport Coupe, rebuilt engine, extras, \$1095 or best offer. Gardner, 344-2547.

'71 FIREBIRD V8, 350, 3-spd., FM radio (CB override), \$1650; '75 Monza coupe, 4-cyl., 4-spd., 65,000 mi., \$1850. Jones, 884-7486.

'75 CHEV. pickup, C 10 Custom deluxe, SWB 250, 6-cyl., 3-spd., HD bumper, gauges, \$2250. Liguori, 256-3613.

REAL ESTATE

'69 NASHUA house trailer, 14'x65', 2-bdr., screened porch, covered patio, located in Univ. Trailer Park, 1907 Buena Vista SE, \$9000. Newell, 242-5959.

1974 AMERICAN 1-bdr. mobile home, located near base. Cooke, 298-6045.

FOR RENT

3-BDR. adobe on tree-lined st. near UNM, fp, solarium, basement, all appliances, avail. 5/1/80-5/31/81, \$450/mo. Feibelman, 242-1946.

NE 3-bdr., den, 1 1/2 bath, fenced yard, near Collet Park & Jackson schools on Britt NE, \$360 + DD. Chavez, 299-5102.

SPACIOUS 3-bdr., avail. May 21-Aug. 21, covered patio, balcony, refrig. air, completely furnished, lawn service. Miller, 296-1645.

4-BDR, convenient to base, close to mountains, \$425, avail. May 1, 14324 Camino del Rey. Bell, 294-2094.

3-BDR., 1 1/2 bath, LR, FR, FP, carpet, drapes, dishwasher, laundry room, garage, fenced, NE, \$370/mo., lease. Follstaedt, 883-1649.

2-BDR., Lomas & Juan Tabo, private storage, carpet, drapes, appliances, W/D hook-up, no pets, \$220/mo., water paid, \$200 DD. Chen, 298-2422, 292-5139.

WANTED

WOODEN dining room table w/chairs, excellent condition. Sanchez, 831-1785.

SIX 1/2 fare airline travel coupons. Taboas, 293-9623.

ECONOMY CAR. Hymer, 293-6029.

.45 AUTO or good .38 or .357 pistol. Morgan, 256-7994.

OUTDOOR rabbit hutch. Sharp, 842-0218.

56" old-style venetian shade. Kraehling, 268-8126.

USED weight bench w/leg lifts. Sinerros, 265-2162.

LOVING HOME for year-old Labrador, house broken, spayed, friendly. Krefft, 881-3486.

WORK WANTED

LAWN mowing & trimming. Owens, 822-0969.

SHARE-A-RIDE

Interested in forming car pool w/1 or 2 other riders from Eisenhower Middle School area. Rogers, 293-8201.

LOST AND FOUND

LOST—Gold chain necklace w/gold star, 3 keys on ring, man's black gloves, 5 keys on ring, brown sunglasses in black belt strap case, woman's gold watch w/expandable band, check book, silver & turquoise ring, locker key (# CAT 95) & reg. key on ring.

FOUND—Gold Pentel pencil. LOST AND FOUND, Bldg. 814, 844-5677.

Casino Night Set Tomorrow

TONIGHT the Happy Hour buffet spread becomes spectacular with your choice of king crab or filet mignon. The price is right—\$7.50—and you can always use the discount ticket from your Club calendar, good for \$2.50 off the top. Youngblood is wired into the ballroom bandstand, while Gary Waters and guitar hold the main lounge. Happy Hours start right after work and run until midnight with special prices (cheap) in effect all evening.

Next Friday, April 25, sees Cornish game hens on the buffet spread, Country Showmen on the bandstand and Gary Waters entertaining in the main lounge. Call the Club office, 265-6891, by mid-week to reserve buffet tickets.

TOMORROW the Club will be rigged like Las Vegas on the Rio Grande with a full-scale casino operation in the ballroom. You exchange your \$1 admission for a bundle of play money and try your luck at the crap table, blackjack, roulette and stuff like that. Elton Travis and the Westernaires play for dancing starting at 8:30. Door prizes will be awarded at various times throughout the evening.

WHERE ELSE except at the Coronado Club can you buy standard mixed drinks and draft beer on Wednesdays from 4:30 until 6:30 for two bits?

CORONADO TENNIS CLUB has a few memberships open. Singles are available for \$160 initiation fee and \$20 a year, family memberships for \$200 and \$25 a year. The initiation fee is refundable. Call Gary Snow (2531), membership chairman, 4-8648, for details.



LADY LUCK smiled on Lisa Herrington (tossing dice) recently during a Coronado Club trip to Las Vegas. She held the dice for an hour and 50 minutes at a Strip casino, making more than 30 consecutive passes. Witnesses were Pres Herrington (4543), left, and Mary and Ivars Gals (1767). This crew will man one of the C-Club crap tables during Casino Night tomorrow evening. You're invited to try your luck.

TRAVEL DIRECTOR Frank Biggs (4231) announces two trips to Mazatlan—Nov. 3-10 and Nov. 10-17. Airfare, transfers, a week on the beach at the Playa Mazatlan and more costs about \$300 per person double occupancy. Also, Frank has a

tour of Washington, D.C., in the mill for next fall and information on low-cost charter flights to Europe and Hawaii. See Frank in the Club lobby tonight between 6 and 7 for more details.



OPENING SOON. Service clerks Jess Sanchez and Buford Coleman (both 3742) stock open bins in new Self Service Store while Patt Shea (2611) and Bill Martin, Manager of Purchasing, Stores, Reservations and Traffic Management Department 3740, discuss final details. Patt designed the facility while earlier assigned to 3740. New store is housed in buildings T-50 and 51 (across the street north of building 892). Over 6000 design and development items plus limited stationery items will be stocked. Building T-50, connected to T-51 by a breezeway, also provides office space for Charlie Chavez's Small Value Procurement Section 3741-2. Opening date for new store and other details will be announced in a forthcoming Weekly Bulletin.