

## Flight Tests Safer, Cheaper If Flown First on the Ground



FLOYD FORSYTHE (1336) attaches a prototype guidance system module to the three-axis angular motion simulator in Sandia's Flight Simulation Laboratory. The simulator generates the angular rates of momentum expected in flight.

# LAB NEWS

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SANDIA LABORATORIES • ALBUQUERQUE NEW MEXICO • LIVERMORE CALIFORNIA • TONOPAH NEVADA



SPURTING LAVA forms a fountain behind Pete Modreski (5831) as Sandians conduct experiments during an eruption of Kilauea volcano on the island of Hawaii. In photo at right, Dick Traeger (5731), Harry Hardee (1262) and Pete ready a heat transfer probe for insertion into the river of lava.

It no longer takes a belief in magic to accept the idea that an unsupported, heavier-than-air object (like an airplane) can move laterally through the air instead of falling to the earth. But how about a nuclear weapon system that flies not through the air, but through a computer? Aerodynamics Simulation Division 1336 flies weapon systems that way all the time—and they routinely fly them one component at a time.

The scene for these in-place flight tests is the Flight Simulation Laboratory in Building 634. And there's not an aircraft in sight—despite the fact the Division's last three major projects have involved: (1) flight simulation and operational testing of the guidance and control hardware for Sandia's proposed Extended Range Bomb (ERB); (2) a study of the dynamics of the retardation system for the B77 full-fuzing option bomb, and (3) studies of flight mechanics problems associated with nuclear artillery rounds and re-entry vehicles.

Actually, the Flight Simulation Laboratory looks pretty much like any other computer facility. There are three analog computers and a digital computer. Coupled together, the combination is called a hybrid computer. The digital computer is extremely accurate and has a large memory, but it's too slow to compute in real time and is difficult to interface with hardware. The analog computers are fast,

[Continued on Page Two]

## Sandians Work During Volcano Eruption

Six Sandians recently spent 11 days performing scientific experiments and making measurements at the eruption site of Kilauea volcano on the island of Hawaii.

The Sandians made temperature measurements, took gas samples, performed materials compatibility tests and inserted a 7-ft.-long probe into the flowing lava to determine heat transfer coefficients.

Members of the team were Mark Davis (5830), Ed Graeber (5822), Charlie Greenholt (5831), Harry Hardee (1262), Pete Modreski (5831) and Dick Traeger (5731). The work is part of Sandia's Magma Energy Research Project; John Colp (5731) is project leader.

The Sandians spent several days and nights camping within several hundred yards of the major erupting vent.

"It was no picnic," says Mark Davis. "The surface of the cooled lava crust was more than 105°C, and it rained about a half-inch every day. When the wind shifted the gas and fumes made face masks and breathing apparatus a necessity, and the lava crust we walked on was hot and broken up—it cut and burned the soles off our boots. We couldn't set our instrument cases down on the hot crust because they

[Continued on Page Two]

# Afterthoughts

No-free-lunch-dept.--Lately newspaper columnists (like Jack Anderson) and a few congressmen have been extolling alcohol as The Answer to our formidable fuel problem. It's usable in auto engines, it creates little pollution and, further, it can be made from agricultural surpluses, timber waste, wastepaper, even municipal garbage. Thus, according to its press, the stuff rather neatly solves (1) the fuel problem, (2) the agricultural surplus et al problem and (3) the balance of payments problem. Wunderbar!

Meanwhile, back in the real world, most of us at Sandia have learned sadly over the years that there are no free lunches in the energy business. Sunlight is nice but expensive. We have lots of coal, but it's a bear to work with and it's dirty. Nuclear energy is clean but... And so on. So what's the catch with this new wonder fuel? We know there is one. Yet no account we've read has revealed the other side of the coin. It's the kind of irresponsible and superficial reporting that seems to mark much that is said relating to energy.

\* \* \*

Keep the Philippines green--Pres. Marcos of the Philippines has taken a novel approach to the problem of his country's deforestation. He's decreed that every citizen over 10 years of age plant a tree each month for the next five years, under pain of fine and loss of certain rights and privileges. It's really a civic improvement thing with a unique kicker: Or else.

\* \* \*

"It is more important to get something done than to seek perfection."  
Virginia Gray, Mud, Space & Spirit  
\*js

Continued from Page One

## Sandians Work During Volcano Eruption

would melt. We finally cut ferns and brush from the rain forest to provide a little insulation."

The team worked closely with the U.S. Geological Survey's Hawaiian Volcano Observatory and University of Hawaii personnel. In addition, support was given to a U.S. Army group which was conducting experiments in lava flow control at the request of the Hawaii County Civil Defense organization.

USGS geologists estimate that at one

point the volume of the lava flow reached one million cubic metres per hour. Harry Hardee, who conducted the heat transfer experiment, computed that this flow rate (at its temperature of 1090°C) contains the energy equivalent of the output of 1000 Four Corners-type power plants.

"As far as we know," Dick Traeger says, "Sandia made the first and most comprehensive thermodynamic measurements ever taken from an eruption and lava flow. The USGS was most complimentary of our efforts."

In addition to the scientific experiments, the Sandians also made tape recordings and shot hundreds of feet of movie film which will be incorporated into a USGS/Sandia documentary film for national distribution.

"We consider the effort worthwhile and successful," Mark says. "We know a lot more about the potential of magma as an energy source than we knew before. Still, we are in about the same position as the cave man looking at a forest fire—the power is there but we have a way to go before we know how to use it."



Kathy Waterman, a recent graduate of the journalism school at San Francisco State, decided to eschew big town, big time papers. She recently started her own weekly in Mechanicsville, Iowa. The *Pioneer-Herald*, according to the locals, helps to hold the community of 1600 together. Besides, as one old timer put it, "Now that we've got a newspaper, there'll be someplace to put my obituary."



HYBRID COMPUTER in Sandia's Flight Simulation Laboratory is a useful tool in component design. John Phelan (1321) is working on the design of an autopilot for the guidance and control system of the Extended Range Bomb (ERB).

Continued from Page One

## Flight Simulation

reasonably accurate and readily interfaced with hardware.

Together, and in concert with an angular motion simulator that induces pitch, yaw and roll, it is possible to investigate in the laboratory the effects of complex aerodynamic forces and moments that flight vehicles such as nuclear weapons encounter.

Talking about his division, Ken Cole (1336) points out that flight simulators are useful from the very beginning of component design. "The early ideas can be modeled on our simulators. And it's fairly simple for a designer to work directly with the hybrid system, asking questions, varying functions one at a time to get a better mental picture of how a component would actually perform."

The ERB system provides a good example of how the simulation system is used in a complex project. ERB (LAB NEWS, June 19) is a standoff weapon that can either be guided to target from a predetermined release point, or programmed to return to a target that has been overflowed by a low-flying delivery aircraft. According to Ken, "Initial simulations involved only the hybrid computer and ERB's guidance and control computer and this combination was subjected again and again to a variety of flight conditions. Then, when the inertial measurement unit (IMU) and canard actuator hardware were completed, the hardware replaced the modeled counterparts.

"The IMU was mounted on the three-axis angular motion simulator, which is controlled by the hybrid computer and generates the angular rates expected in flight. Outputs from the IMU went to the guidance and control computer, which sent attitude control commands to the canards. Enough simulations were run to determine that the ERB hardware functioned properly."

When ERB was actually flight tested at Tonopah Test Range earlier this year, it worked as planned. John Phelan (1321), John Nielson (1336), Floyd Forsythe (1336) and the other people who had worked on the ERB simulation weren't surprised. They had already flown the ERB in the hybrid computer enough times to know there shouldn't be any.

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# LIVERMORE NEWS

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LIVERMORE LABORATORIES

NOVEMBER 18, 1977

## 'Looking Good'

### VP Cook Addresses SLL

Livermore VP Tom Cook looked away from a chart projecting for the next five years SLL people assigned to weapons activities (a level line), energy (rising from the 10 to the 15 percent level), and reimbursables (level) and addressed his audience with a grin. "We can be sure those projections will change," he noted. "What we don't know is which ones and which direction."

The occasion was a "state of SLL" presentation to the Livermore troops filling the LLL auditorium last week. It was the first such gathering since 1969.

Though lacking a clear crystal ball, his tone was upbeat, his outlook positive. "We may well be entering into a comprehensive ban on weapons testing with Russia. However, less than 5 percent of Sandia activities is involved in testing, so the effects of such a ban should be small. Decreases in testing activities might well be offset by increases in simulation and verification efforts."

Tom did remind his listeners that the Labs has been shifted "without perturbation" to its new contract manager, the Department of Energy. "Even the accounting and budgeting systems remain intact. DOE is a much larger federal agency—20,000 people—so there's going to be more red tape, but I know we'll be able to handle it."

Tom briefly reviewed the SLL shift over the last 10 years in education levels. "We then had a technical staff composed of 17 PhD's, 91 masters, and 167 bachelors. Now it's 111 PhD's, 112 masters, and 90 bachelors."

Construction at SLL continues to advance. In addition to new office and warehouse buildings, Tom spoke with pride of the new tritium research lab—"the most modern and safest in the world, a major advance in Sandia resources."

Looking ahead, he listed several new capital expenditures either budgeted or proposed. Definite items include a combustion research facility in FY 78—"This one began at literally zero just three years ago. Now we're going to have the national combustion diagnostics center." A new Class IV computer is in the FY 79 budget. Total SLL operating budget last fiscal year

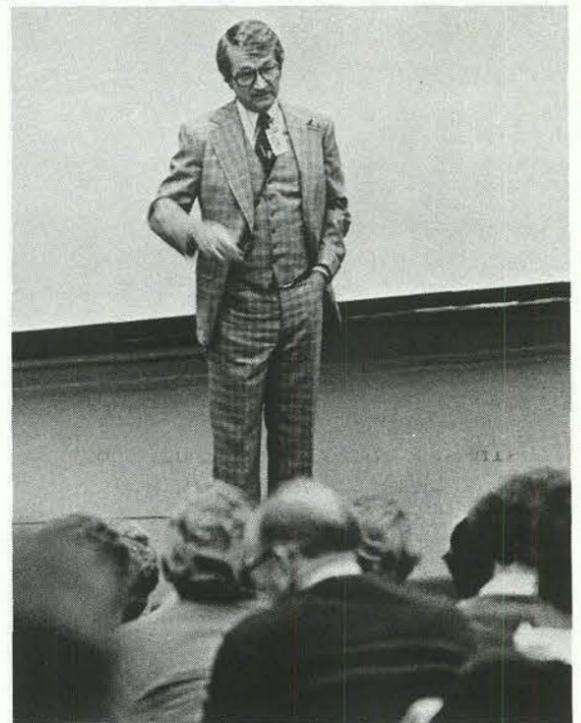
was \$53 million; this year's is about \$60 million.

In addition to modest rises in people and facilities, Tom noted that purchases, both from commercial suppliers and from integrated contractors, are at an all-time high, \$14 million each, or about half the budget. "You've probably noticed that it's a busy time around the Labs, and we expect it to continue."

Weapons programs are funded more heavily than they've ever been, too. "In fact, the B77 R & D program, at \$30 million this year, is far and away the largest program Sandia has ever done."

Energy programs, while nowhere near as large as weapons programs, will likely see more growth in 1978—"from about 100 people to perhaps 160," said Tom. He noted that each of the energy areas complements Sandia's weapons work—"They're a good match with our people and facilities."

The presentation ended with a five-year projection and one caveat: "All of what we do in weapons depends on national policy, and that's under major review right now. We may have a comprehensive test ban ahead. But banning weapon production completely, as the Russians have mentioned, is not at all likely—it would be impossible to monitor. So our basically optimistic projections are as valid as they can be at this point."



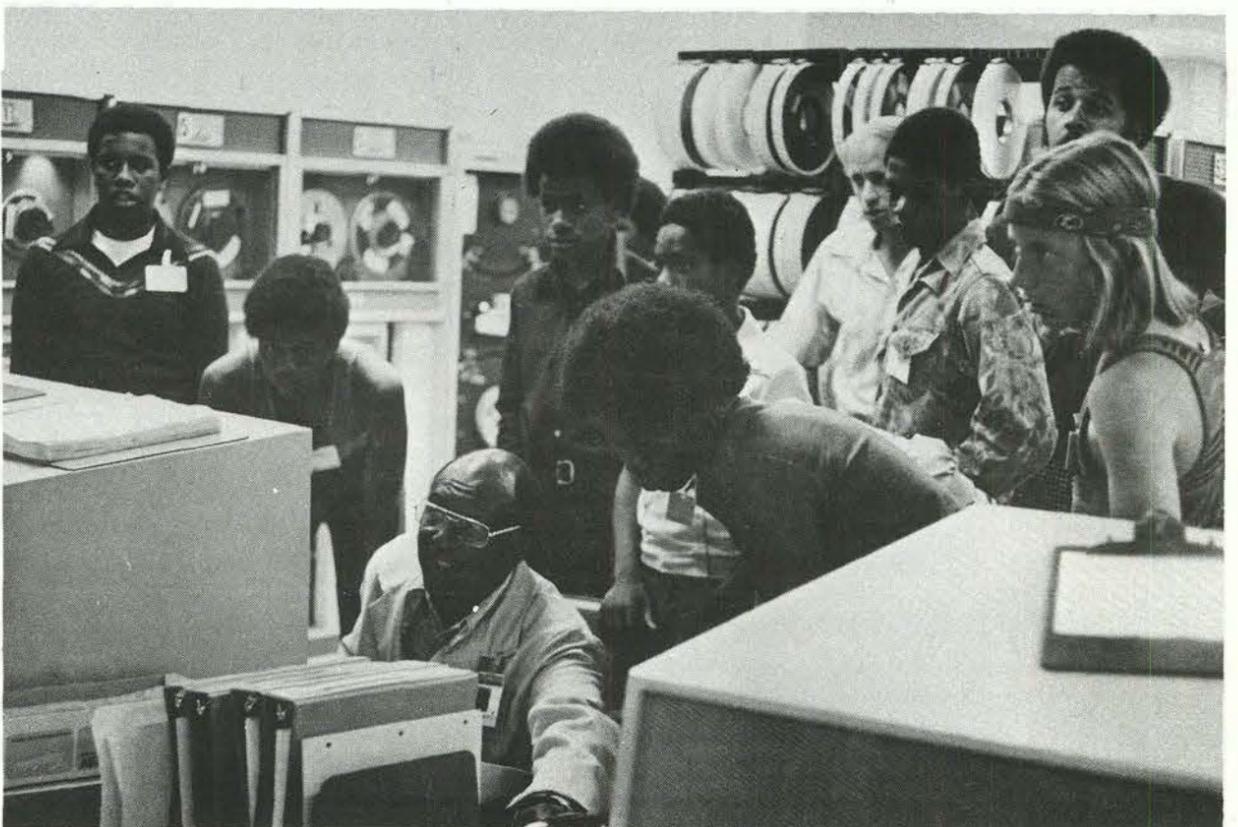
TOM COOK, VP/SLL

### New MTS's Get Tech Orientation

An employee orientation was recently held at Sandia/Livermore for 55 new technical staff members who came on roll during the past two years. President Morgan Sparks welcomed the group and opened the first session by presenting a history and the current status of Sandia. Vice President Tom Cook (8000) followed with an overview of SLL, DOE and the integrated contractors. Other sessions were led by various representatives of technical management including Vice President Gene Reed (2000).

In addition to 14 hours of technical orientation, participants toured on-site locations, providing them an opportunity to become better acquainted with available support and special facilities.

Coordinators for the orientation were Bill Alzheimer, SLL representative to Sandia's On-Premises Educational Committee (8120), and Jim Smith of Training Division 8214.



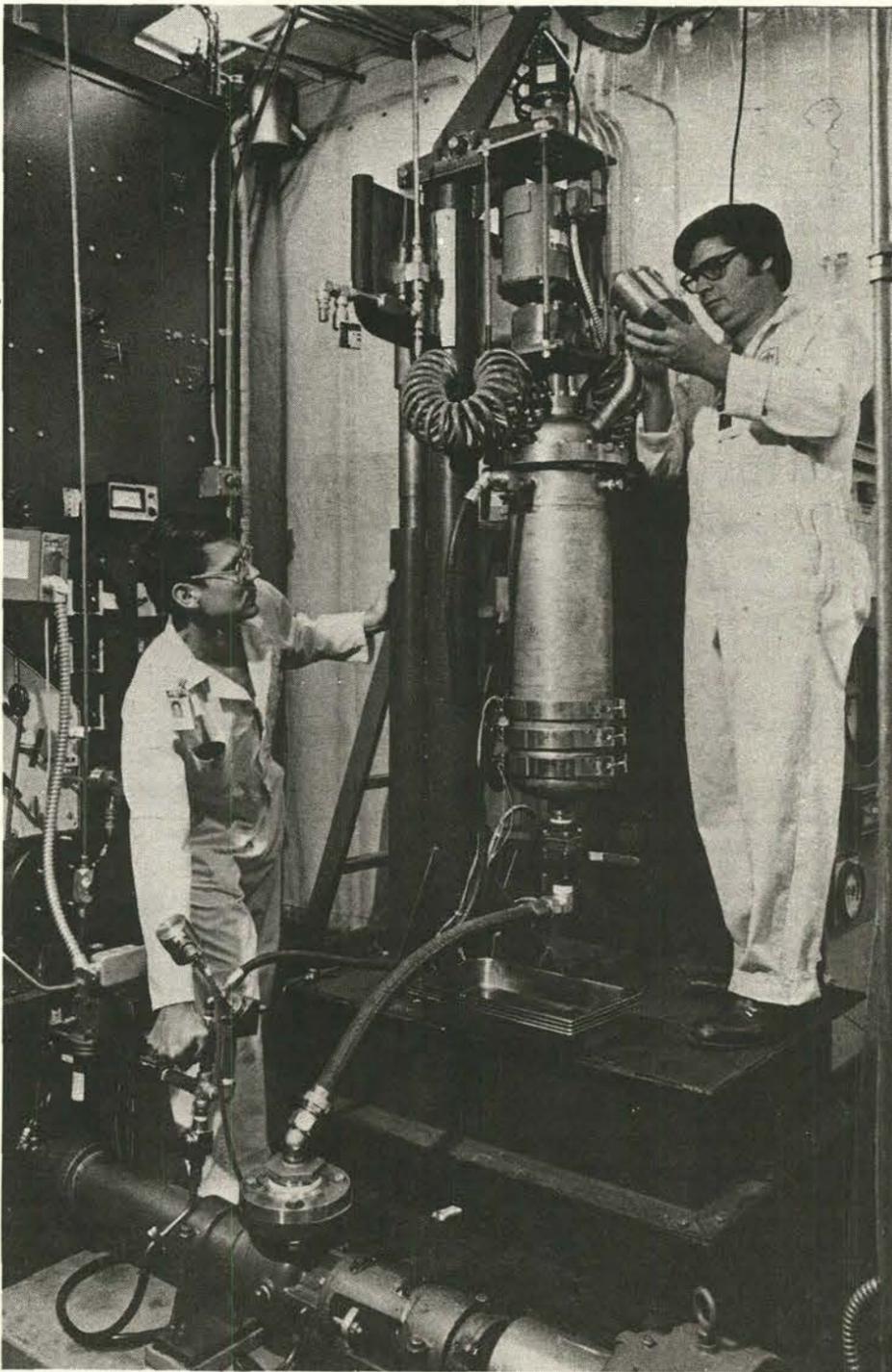
YOUNG PEOPLE from Chabot Ranch at Alameda County Boys' Camp recently toured various SLL facilities. The tour was set up to give the youths the opportunity to view firsthand jobs they might aspire to. Computer operator Charlie Brown (at console) and section supervisor John Benapfl (in background), both 8323, explain the computing center to the group.

### Sympathy

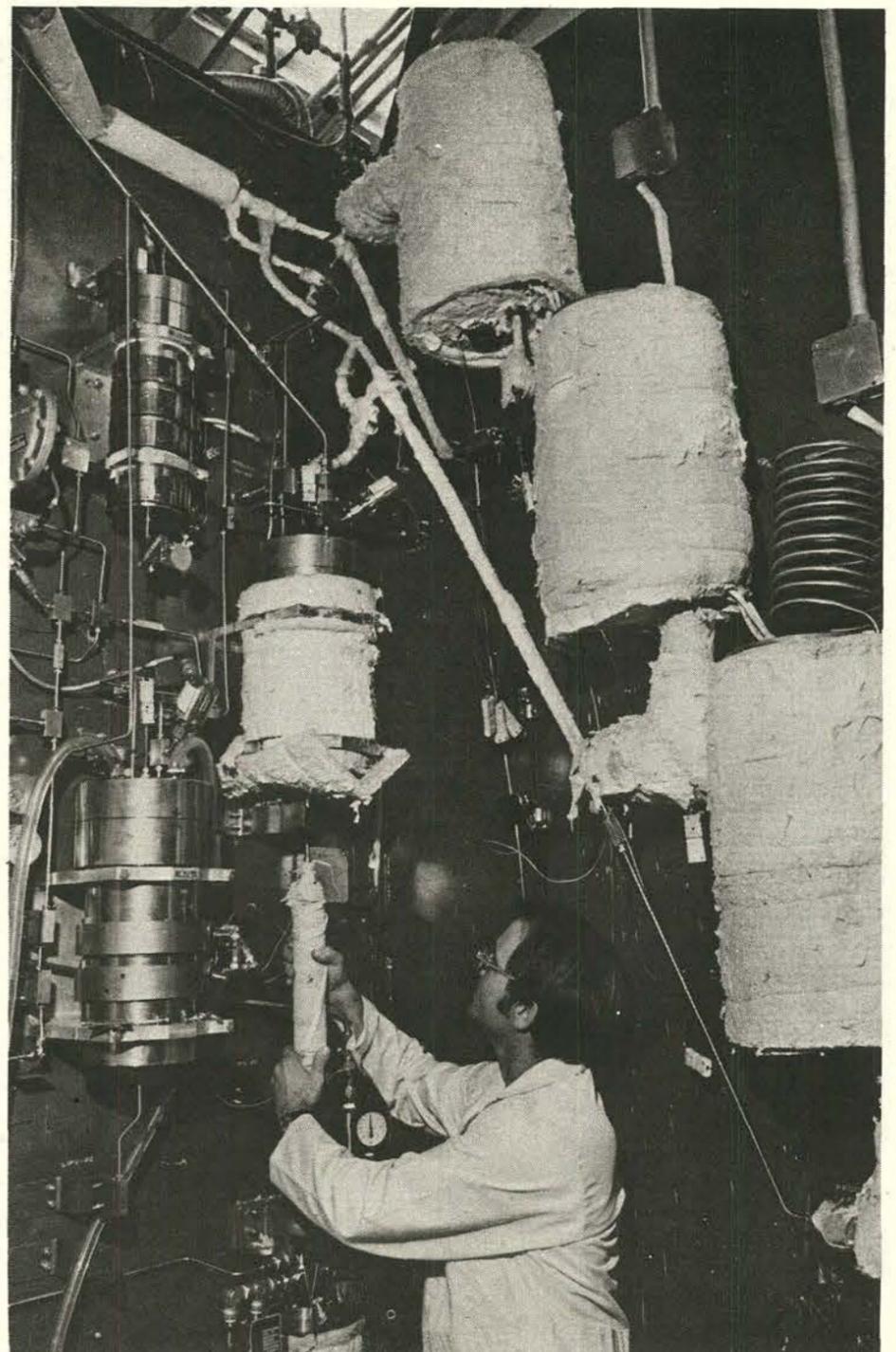
To John Vitko (8342) on the death of his mother-in-law in Cuernavaca, Mex., Oct. 21.

To John Cordial (8161) on the death of his brother in Springfield, Ohio, Oct. 28.

To Jim Mitchell (8413) on the death of his father in Phoenix, Ariz., Nov. 1.



**COAL SLURRY** charges the low pressure module of Sandia's coal liquefaction apparatus. Dave Hawn and Jim Lyons (both 5731) load the module which mixes and preheats the slurry up to 100°C.



**HIGH PRESSURE REACTOR** operated by Dick Curlee (5731) heats coal up to 475°C at pressures up to 4000 psi. Various chambers provide a flexible sampling system at any stage of coal liquefaction process.

### ***Coal Liquefaction***

## **Sandia Starts Process Research Program**

Coal can be converted to liquid fuel. The process is called coal liquefaction, a phrase destined to be around a long time as the U.S. draws upon its vast reserves of coal to meet energy needs.

In government and industrial laboratories several approaches to coal liquefaction are being investigated. Sandia Laboratories was recently assigned two DOE projects to perform process research in this area. Funded at \$620,000 for FY 78, the work is centered in Advanced Development Division 5731 under Dick Traeger.

Experimental large scale DOE liquefaction plants are operating. Sandia is doing supportive process research related to mineral matter effects and catalyst degradation and studying the kinetics of coal conversion.

Coal liquefaction starts by crushing coal, mixing it with liquids, preheating the resultant slurry to about 450°C and pumping it into a catalytic chamber where the coal is converted to liquid fuel while ash and various noncombustible minerals are isolated.

Sandia is analyzing the preheating process, the solvents and fluids used to form a slurry, and characterizing the catalysts

used. A major problem in coal liquefaction is the catalyst—it is both expensive and short lived. Sandia is searching for major deactivation mechanisms so that industry can develop a more efficient catalyst.

Barry Granhoff (5731) is studying the effects of minerals contained in coal (clay, pyrite, etc.) upon the catalyzing process. He is attempting to predict how different coals will react in existing liquefaction processes.

Mike Thomas (5731) is receiving used catalysts from existing plants and attempting to identify deactivating factors in the catalysts.

Dick Curlee (5731) has designed and built a unique, multi-stage chemical reactor for studying the kinetics of liquefaction processes. The reactor is included in the more than \$300,000 in supporting facilities being used for Sandia's coal liquefaction process research.

"Sandia has done process research in many areas—materials, component manufacturing and semiconductor technology to name a few," Dick Traeger says. "Our background and present expertise should enable us to make valuable contributions in the coal liquefaction area."



**FINAL PRODUCT**, a liquid fuel produced from coal, is displayed by Dick Traeger (5731).

### ***Sympathy***

To George (1120) and Bruce (9352) Hansche on the death of their mother and grandmother in Racine, Wis., Oct. 26.

To Alfonso Santisteven (9718) on the death of his mother-in-law, Nov. 2

To Dorothy (3735) and Merrit (9563) Hummer on the death of Dorothy's mother in Huntington, Ind., Oct. 10.

To Frank Koletar (2553) on the death of his sister in Reading, Pa., Nov. 8.

## Fun & Games

**Sandia Recreation Assn.**—On the back page is an article on the new look for SRA and its new, full-time director, Bob Giersberg. The Coronado Club, SRA and Bob have ambitious plans, and we wish them *bon voyage* and offer our support. We suggest you check out the article.

\* \* \*

**Sandia Archers**—The club hosts a turkey shoot tomorrow, Saturday, Nov. 19, at the KAFB archery range. The shoot starts at 1 p.m. Two fourteen-target rounds are planned with three arrows per target. Archers shoot as bowhunters freestyle (bowsights) or as bowhunters instinctive. Archers shooting the highest score in each class win a butterball turkey, and other prizes will be awarded. Archers with the lowest score in each class win a guinea hen. The giant bear target will be set up at 11 a.m. at 150 yards for those who wish to shoot giant bears. Call Dean Pershall (4-7528) for further info.

\* \* \*

**Ski Touring**—We've had a report that there is ski touring on Sandia Crest. The last storm dropped about a foot of snow at the higher elevations in the Sandias.

\* \* \*

**Sandia Runners**—Last issue we suggested that runners and would-be runners from Sandia and DOE send their names and other pertinent data to Jim Harrison (4361) so that we could compile an updated SRA membership list and thus be able to inform you of discounts and other deals available for runners. Jim says he's got about 50 sign-ups thus far. Be sure to get your name on his list if you haven't already.

\* \* \*

**Go-Karts**—The public is invited to the Albuquerque Go Kart Club's "turkey" race Sunday at 11000 Central NW around noontime. Turkeys are not racing, the prize is a turkey. Races will continue all afternoon. More info from Mike Johnson (5216), 4-6408.

### Dental Plan Gets Wide Use

The tooth fairy, in the form of Sandia's Dental Expense Plan, visited 5485 Labs' employees and their eligible dependents during the first half of 1977, paying out more than \$280,000 in benefit claims.

According to the plan's insurer, the Travelers Insurance Company, employee claims filed had a value of \$122,000 and Family member claims were \$158,000.

Plan participants can each receive up to \$500 annually in coverage under provisions of the program. Sandia pays the full premium for those eligible.

### Congratulations

To Mr. and Mrs. Richard Thompson (9654), a son, Anthony Richard, on Oct. 11.

To Mr. and Mrs. James George (5713), a son, Oct. 20.



LYLE WHELCHER (3723) and RAPP RAPPLEYEA (9584-2)

## Supervisory Appointments

**FRANK LESPERANCE** to supervisor of Structural Section 9713-2 of the Plant Modification Division. In this position, Frank will supervise carpenters and millwrights. He has been at the Labs for 26 years, 24 of those years as a carpenter. More recently, he worked in plant engineering as a construction inspector. Before coming to Sandia, Frank owned and operated a sawmill near the Pecos Wilderness. During WWII he served in an Army tank battalion in Germany.

Off the job, Frank enjoys hunting and fishing; he just returned from a successful elk hunt in Colorado. Frank and his wife Sally have three married daughters, a son, and two grandchildren. They live in the NE Heights.

**LYLE WHELCHER** to supervisor of Purchasing Division F, 3723, effective Nov. 16.

Lyle joined the Laboratories in June 1957 as a technical department service representative for weapons systems engineering. Two years later, he transferred to the Purchasing organization where he has since worked. In his new position, Lyle has responsibility for annual contracts for the procurement of stores, for integrated contractor and federal agency orders, and for contracts for equipment maintenance service and repair.

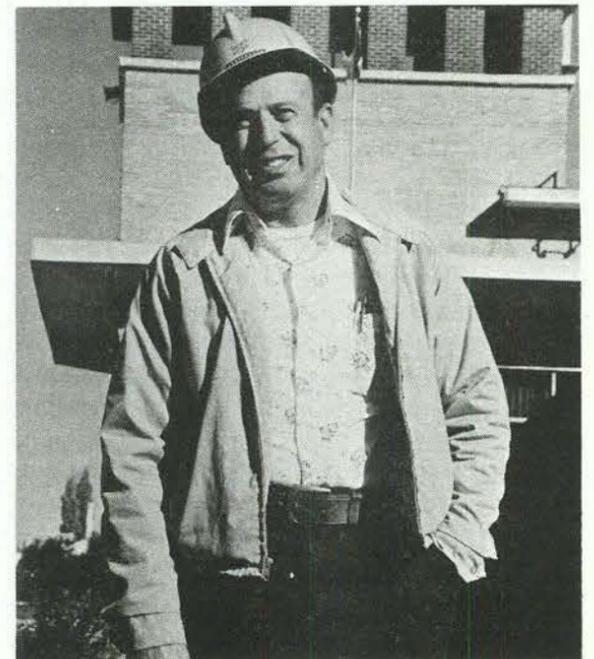
Lyle has a BS degree in business administration from Montana State University. He is an active member of his church, coaches little league basketball and, for several years, has worked with girls' track and field groups. He and his

wife Marilyn have four children and live in the NE Heights.

**WILLARD (RAPP) RAPPLEYEA** to supervisor of Project Development Section 9584-2, effective Nov. 16.

Since coming to Sandia in 1951 as a machinist, Rapp has worked in all phases of the machine shops. He was a lead man for 15 years and also served as an apprentice instructor. Rapp, a native of Michigan, had worked in the auto industry before moving west for his son's health.

Rapp served two years in the Air Force as an aviation cadet. Off the job, he enjoys bowling, golfing, fishing and hunting. He and his wife Thirzah have three children and live in the NE Heights.



FRANK LESPERANCE (9713-2)

# 1978 Sandia Affirmative Action Plan Released



Jim Walston

## Faces to the Future

### Sandia Laboratories Policy Statement

In launching the 1978 Affirmative Action Plan year, I wish to reiterate the Statement of Policy under which we have been operating. As President of Sandia Laboratories, I reaffirm our commitment to the principles of equal opportunity. We will continue our policy of conducting matters involving people without regard to race, color, religion, sex, or national origin, and in accordance with the laws and regulations concerning age, physical or mental handicap, and disabled or Vietnam Era veterans. This policy extends to every facet of our activities, including recruitment, hiring, compensation, transfer, training, advancement, and termination. Not only will we comply with all applicable laws, directives, and regulations of federal, state, and local governments and their agencies pertaining to equal employment opportunities, but we will also strive to develop the true spirit of these acts throughout the Laboratories.

I am happy to note again that our affirmative action efforts over the past years have had gratifying results. These efforts plus our conduct of business have advanced the cause of equal opportunity both in the Laboratories and throughout the communities with which we interact. Internally our progress is reflected not merely in numbers of minorities and women on roll but in their greater representation in the professional and supervisory jobs. The ultimate objective toward which we continue to strive is the optimum use of our personnel resources.

Our affirmative action program has been developed with the view of assuring good faith implementation of our equal opportunity policy by all Laboratories people. Information is regularly disseminated through the policy statements, employee news media and special meetings. Every supervisor is expected to be familiar with our affirmative action program and take an active and positive role in maintaining and promoting our equal opportunity commitment. Accordingly, responsiveness to this commitment will be a consideration in supervisory assessment and review programs.

Mr. J. R. Garcia, my Special Assistant for Equal Opportunity, will continue to monitor all equal opportunity activities and report to me on the effectiveness of our affirmative action program, including recommendations for necessary action to insure attainment of our objectives.



*Morgan Sparks*

President Morgan Sparks this week endorsed the Labs' Affirmative Action Plan for 1978. Discussing the Plan, Mr. Sparks emphasized progress made by Sandia in matters pertaining to affirmative action and equal opportunity: "In these areas we sometimes tend to emphasize our shortcomings unduly—to stress only the things that need to be done. But as we launch this Affirmative Action Plan, let's indulge ourselves a bit and look at the substantial gains we've made. These gains are the result of the individual efforts of a lot of Sandians at all levels. And, although the AA program is designed primarily to help minority people and women, many of the resulting changes actually help everyone."

One goal of affirmative action has been to increase representation of qualified minority people and women at all job

levels. The table below shows progress toward that goal since 1973.

The Labs has recognized from the outset that it can achieve its AA goals only through purposeful effort in recruiting and hiring, in education and training, and in transfer and promotion.

Cornerstone of the program is the Affirmative Action Plan, the 1978 version of which was distributed to supervisors this week. Basic to the Plan is the workforce analysis, which enables the Labs to pinpoint work areas in which women and minority people are under-represented. Goals and timetables can then be set to remedy underutilization where it exists, bringing the representation of women and minority people in the various categories at least to the level of their availability in the hiring market.

SANDIA LABS TRENDS BY JOB CATEGORY

	March 31, 1973			September 30, 1977			Increase/(Decrease)		
	Total	M.G.	Fem.	Total	M.G.	Fem.	Total	M.G.	Fem.
Officials & Managers	727	39	20	743	52	22	16	13	2
Professionals	2176	77	39	2497	154	120	321	77	81
Technicians	1288	123	27	2031	375	182	743	252	155
Office & Clerical	1328	397	840	971	376	810	(357)	(21)	(50)
Craftsmen	470	138	3	436	151	6	(34)	13	3
Operatives	298	192	20	404	270	36	106	78	16
Laborers	62	48	6	13	10	0	(49)	(38)	(6)
Service Workers	160	86	1	169	86	22	9	0	21
<b>Total</b>	<b>6509</b>	<b>1100</b>	<b>956</b>	<b>7264</b>	<b>1474</b>	<b>1198</b>	<b>755</b>	<b>374</b>	<b>242</b>
<b>Percent of Total</b>		<b>16.9</b>	<b>14.7</b>		<b>20.3</b>	<b>16.5</b>		<b>5.4</b>	<b>1.8</b>



LAURIE FARREN (8256) runs a fork lift in Sandia Livermore's shipping and receiving area.



JUDY LOVING (9584), third year machinist apprentice.



JOHNNY RICE (9562), second year electronics apprentice.



KAREN SHANE (3163), MAS trainee.



A FIRST STEP in equal opportunity is to assure that qualified minority people and women are introduced to Sandia. Here Frank Gallegos (3531), Tech Institute Recruiting Coordinator, discusses the hiring program with recruiters Dolores Chavez (4111) and Felton Bingham (1151).



TOM ARCHULETA (9584), third year machinist apprentice.



DANNY PRICE (9584), fourth year machinist apprentice.



# Only Whether's Weather



NOTHING (EXCEPT MAYBE RAIN) deters the road crews from their appointed rounds—in this case the total redo of Wyoming. Rain two weeks ago put the crews a week behind, but the contractor is still forecasting a late December completion for the entire project.

On Monday (unless bad weather intervenes) there should be some visible and welcome changes on base for Sandia drivers. There will also be one very visible and not-so-welcome change—but it will be shortlived.

Working through the weekend if necessary, the contractor plans to complete Wyoming, including curbs and striping, from "O" street to the south side of Gibson ("E" St.). During the weekend, he also plans to tear up the entire Gibson intersection—and to put it back together and have it in operation by Wednesday, Nov. 23.

Those using Wyoming (and they'd

experience less frustration if they used either the Gibson or Eubank gates) will find a new detour. They'll turn right just north of the Coronado Club and follow the signs, coming back onto Wyoming at the fire station ("F" St.) until Gibson intersection reopens, at which time the detour will reenter Wyoming at that point.

Other changes expected to be effective on Monday include:

1. Normal one way traffic on 5th Street: south from "G" to "H" and north from "G" to "F."
2. Normal parking on 5th Street between "G" and "H."

## Events Calendar

Nov. 18, 19—Erick Hawkins Dance Company performance with N.M. Symphony Orchestra, Popejoy Hall 8:15 p.m., 265-3689.

Nov. 22—"The Robber Bridegroom," a Broadway musical comedy presented by the UNM Cultural Program Committee, Popejoy Hall, 277-3121.

Nov. 23—"Modern Germany," Travel-Adventure Film, Popejoy Hall, 7:30 p.m.

Nov. 25-27, Dec. 2-4, 9-11—"Garden of Delights," Vortex Theatre, 106A Vassar SE, 8 p.m.

Nov. 27—"Shakespeare's People," with Sir Michael Redgrave, UNM Cultural Program Committee Celebrity Series, Popejoy Hall, 277-3121.

Nov. 30—"Four Fathom World," Audubon Wildlife Film Series, Popejoy Hall, 7:30 p.m.

Dec. 1—Handel's "Messiah," UNM Choruses and Orchestra, Popejoy Hall, 8:15 p.m.

Dec. 3—St. Andrew's Celebration, Scottish pipers and dancers, dinner, Old Town Sheraton, \$8.50, 6 p.m., St. Andrew's Society of New Mexico.

## Sandians Pledge \$557,315 Total To ECP Campaign

With a total of \$577,315 pledged, Sandia's ECP drive was virtually wrapped up last week. The total is up 12 percent over last year's total of \$508,000.

Number of employees contributing stands at nearly 84 percent, last year's participation stood at 80 percent.

Average gift of contributors is \$111.15. Some 52 percent of employees made Fair Share contributions (one hour's pay per month or better).

George Samara (5130), ECP chairman, says "The ECP committee is delighted with the campaign. The results reflect the dedication and effort of the directorate representatives and solicitors who conducted the drive. But above all, the results reflect the enthusiastic response of Sandians to the needs of the community."

## Take Note

Corry McDonald (9636) again moderates at a noontime presentation on the Labs' Technology Utilization Program on Tuesday, Nov. 22, in Bldg. 815. The TU Program aims to facilitate transfer of unclassified technology generated in the weapons program to the outside world. Following a short presentation, technology will be discussed, and ideas and innovations relating to the subject will be welcomed. The gathering is inside the Tech Area.

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More than 600 items go on sale at the city's public auction on Saturday, Nov. 26, at the City Yards, 5501 Pino NE. Vehicles of all types, including police motorcycles, as well as tools, televisions, audio equipment and other assorted junk goes on the auction block. The sale begins at 9 a.m.

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DOT says don't mix radial tires with snow tires—unless the snow tires are of radial construction. If you do, your car's handling characteristics will be adversely affected.

\* \* \*

At tonight's November meeting of ASME and AIAA (combined), Senator Jack Schmitt will address the group on the congressional view of the energy crunch and the government's involvement in the problem. The program starts at 8:45 p.m. and is being held in the 4-Seasons Motel.

\* \* \*

Anyone interested in forming a local chapter of the Electric Auto Association? Their home office is in Mt. View, California. If you are, call Matt Dillon (4-1798), Fred King (4-3660), or John Lavasek (4-3554). If enough people are interested, Matt-Fred-John will get more info and call a meeting.

## Retiring



Willie Montano (3421)

# Speakers

N. J. DeLollis (5813), "Activated Gas Treatment of Silicone Surfaces," and "Processing and Bonding Characteristics of a Urethane Resin/Silane Primer System"; DeLollis presented "Commercial Urethane Replacements for Ordiprene/MOCA" for A. J. Quant (5813); "Castable Thermoplastic Urethane Elastomers—Formulation Applications as Removable Encapsulants" for K. B. Wischmann (5811); and "A Materials Compatibility Data Bank" for K. E. Mead (5811), JOWOG 28 Meeting, Sept. 19-22, AWRE Aldermaston, Basingstoke, England.

M. C. Jones and W. E. Taylor (both 2551), "Instrument Recall at the Sandia Primary Standards Laboratory," IMOG Gaging Subgroup, Oct. 4-5, SLA.

R. L. Parish (5734), "An In-Situ Oil Shale Rubblization Experiment Using Slurry Explosives in Horizontal Hydra-Fractures"; R. R. Neel (5734), "An Overview of Shale Oil Recovery Techniques," Fall meeting, Texas, N.M. and Mexico Engineers, Oct. 6-8, Albuquerque.

T. O. Hunter (1133), S. Abdel-Khalik and G. L. Kulcinski (both Univ. of Wis.), "Response of First Walls in Inertial Confinement Reactors to Thermonuclear Radiations," Conference and Workshop on Fusion Reactor Design, Oct. 10-21, Madison, Wis.

T. J. Headley (5822), "Transmission Electron Microscopy of Phase Transformation in a Beta-Titanium Alloy," Materials Technology Exchange Seminar Series, Oct. 12, SLL.

B. T. Kenna (5824), "Activation Analysis," Seminar to Chemistry Club, NMIMT, Oct. 14, Socorro.

R. J. Buxton and I. M. Holovka (both 2516), "Thermal Stability of Hexanitrostilbene in Mild Detonating Fuze," Joint meeting on Explosives R&D with TTCP Technical Panel W-1, Oct. 18-20, Silver Springs, MD.

L. R. Hill (5311), "Isolation of Radioactive Wastes in Southeastern New Mexico," Princeton Univ. Engineering Seminar, Oct. 19, Princeton, N.J.

N. J. Magnani (5831), "Stress Corrosion Cracking in Metals," NMIMT, Oct. 20, Socorro.

J. M. Holovka, P. K. Peterson (both 2516), and D. M. O'Keefe (2515), "The Oxidation of Trinitrotoluene to Hexanitrostilbene," Symposium on Nitroaromatic Chemistry, Oct. 21, Dover, N.J.

A. M. Kraynik (5813), "Wall Slip and Extrudate Roughness of Aqueous Solutions of Polyvinyl Alcohol and Sodium Borate," Society of Rheology meeting, Oct. 23-27, Madison, Wis.

R. D. Klett and D. R. Anderson (both 5444), "Thermal Sensitivity Analysis and Rock Melting Experiment," Workshop on Heating Experiments and Thermal Aspects of Underground Disposal of Radioactive Waste, Sept. 15-16, Harwell, England.

T. E. Hinklebein (5842), "Microstructural Interactions of Geologic Media with Waste Radionuclides"; R. G. Dosch (5824), "Radionuclide Sorption on Geologic Media Associated with the WIPP Site in Southeastern New Mexico," WISAP Contractors' Information Meeting, Sept. 20-23, Seattle, Wash.

J. C. King (2300), "A Look at Engineering Developments at Sandia Laboratories," Engineering Excellence Society, Sept. 21, Bell Labs, Merrimack Valley.

S. L. Pohlman (5831), "The Energy and Material Crises as Viewed by an Extractive Metallurgist," Graduate Seminar, Dept. of Metallurgy, NMIMT, Sept. 21, Socorro.

R. T. Dillon (5413), "Modeling Geohydrological Transport of Deep Geological Nuclear Waste Disposal," N.M. Academy of Science Fall Meeting, Sept. 30 - Oct. 1, Silver City, NM.

S. M. Myers (5111), "Observation of H Trapping by Ti in Fe Using Ion Beams," Symposium on Hydrogen and Helium in Metals, Oct. 3-7, SLA.

G. L. Maxam (9353) and J. E. Solberg (9354), "Degradation of EMP Hardening Devices," EMP Environments and Protection Implementation Seminar, Oct. 4-6, Eglin AFB, Fla.

R. S. Claassen (5800), "Common Sense Won't Solve the Energy Problem," Univ. of Wisc., Oct. 6, Madison.

M. M. Newsom (5735), "The Continuous Chain, Downhole Changeable Bit—A Status Report"; C. F. Huff (5735), "STRATAPAX<sup>®</sup> Bonding and Bit Development Program"; B. Granoff (5731), "Pyrolysis Kinetics for Low Porosity Pelletized Oil Shale Particles"; D. A. Northrop (5732), "Instrumentation Assessments Obtained from the Hanna II In Situ Coal Gasification Experiment," 52nd Annual Technical Conference and Exhibition, Society of Petroleum Engineers of AIME, Oct. 9-12, Denver.

P. H. Holloway (5825) and G. E. McGuire (TI), "Approximations in the Analysis of Defect Diffusion in Thin Films"; H. J. Stein (5112), "Effects of Ion Bombardment on the Electrical Properties of CVD Silicon Nitride"; L. R. Dawson (5154), "Reliable High Speed LEDs for Short-Haul Optical Data Links"; H. O. Pierson and E. Randich (both 5834), "The Coating of Metals with Titanium Diboride by Chemical Vapor Deposition"; S. M. Myers (5111), "Micro-Metallurgy by Ion Implantation"; J. A. Borders (5111), "Metastable Phases Produced by Ion Implantation in Metals"; R. M. Biefeld (5154), R. T. Johnson (5155) and J. D. Keck



**BREAKING HISTORIC GROUND.** Prior to the ceremony, Suzanne de Borhegyi, Museum Director, (at left) commented to a crowd of some 300, "groundbreaking is a tradition—and that, when you come down to it, is what a museum is all about." Dick Bice (VP, 9000) observes tradition by tossing a symbolic shovelful of earth to launch construction of the new Albuquerque Museum of Art, History and Science while Albuquerque Mayor Harry Kinney applauds his efforts. Located at 19th and Mountain Road near the site of the first buildings in Albuquerque (and on ground rumored to contain buried Civil War cannons) the museum is scheduled for completion in 1978.

(2521), "Lithium Ion Conducting Solid Electrolytes"; R. C. Hughes (5814), invited presentation, "Hole Transport in SiO<sub>2</sub>," The Electrochemical Society Conference, Oct. 9-14, Atlanta.

G. W. Arnold (5112), "Ion Implantation Damage in Crystalline Quartz and Fused Silica"; G. B. Krefft and K. L. Brower (both 5112), "F-Center Formation in Ion Bombarded MgO"; P. S. Percy (5112), "Proton-Induced X-Ray Measurements in Ion Implanted MgO," International Conference on Defects in Insulating Crystals, Oct. 9-14, Gatlinburg, Tenn.

K. T. Gillen (5813), "Accelerated Aging in Combined Stress Environments"; C. J. M. Northrup (5824), W. J. Kass (5846) and A. G. Beattie (9352), "The Use of Acoustical Emission in Determining the Phase Diagrams of Hydrides"; J. W. Munford, H. J. Rack (both 5832), and W. J. Kass (5846), "Hydrogen Embrittlement of Thermomechanically Treated 18Ni Maraging Steel," Conference on Environmental Degradation of Engineering Materials, Oct. 10-12, Virginia Tech and State Univ., Blacksburg.

K. T. Stalker (1354), "Digital Reconstruction of One Dimensional Coded Aperture Imagery"; D. P. Aeschliman and J. C. Cummings (both 5217), "Application of Raman Spectroscopy to the Study of a Laminar Hydrogen Diffusion Flame in Air," 1977 Annual Meeting, Optical Society of America, Oct. 10-14, Toronto, Canada.

T. L. Paez (1284) and S. D. Meyer (1282), "Measurement of Suspension Loads and Determination of Suspension Reliability for a Store in the F-111 Weapons Bay," Fourth JTCG Aircraft/Stores Compatibility Symposium, Oct. 12-14, Ft. Walton Beach, Fla.

G. W. Schueler (5719), "ERDA/Sandia Photovoltaic Systems Definition Project," Photovoltaic Power Conditioning Workshop, Oct. 13-14, Albuquerque.

J. E. Davidson (3441), "An Introduction to the Safety Inspection Guide," American Society of Safety Engineers, Oct. 17, Albuquerque.

A. J. Mulac, W. L. Flower, R. A. Hill and D. P. Aeschliman (all 5216), "Enhanced Spontaneous Raman Scattering Technique for Highly Luminous Environments," Western States Section of the Combustion Institute, Oct. 17-18, Palo Alto, Calif.

L. J. Keck (5733), "Results from a MHF Surface Electrical Potential Mapping Experiment," First Eastern Gas Shales Symposium, Oct. 17-19, Morgantown, W. Va.

R. A. Anderson (5814) and J. P. Brainard (2154), "Insulator Surface Charging During Fast Pulsed Surface Flashover in Vacuum"; and Brainard and Anderson, "Electron Trajectories in the Avalanche Process," Conference on Electrical Insulation and Dielectric Phenomena, Oct. 17-20, Schnectady, NY.

F. M. Delnick (2523), "Passive Iron: a Semiconductor Model for the Oxide Film," Fourth International Symposium on Passivity, Oct. 17-21, Airlie, Va.

D. A. McArthur (5423), "Parameter Studies of a CO Reactor-Excited Laser at Room Temperature," 13th Annual Gaseous Electronics Conference, Oct. 18-21, Palo Alto, Calif.

R. A. Benham and P. B. Higgins (both 9355), "Light-Initiated Explosive Application to Impulse Testing of Complex Shaped Structures"; Higgins and Benham, "A Non-Contacting Beta Backscatter Gage for Explosive Quantity Measurement," Shock and Vibration Symposium, Oct. 18-20, Huntsville, Ala.

G. Voida (2154), "Design and Assembly of Precision-Tiered Flat, Flexible Cables," 10th Annual Connector Symposium, Oct. 19-20, Cherry Hill, N.J.

W. B. Boyer (5242), "Data Acquisition and Processing on Electron Beam Fusion Accelerators," 1977 Nuclear Science Symposium, Oct. 19-21, San Francisco.

L. J. Klamerus (5432), "Cable Tray Fire Tests," Workshop on Flammability of Electrical Insulation, Oct. 20-21, Albany, N.Y.

L. W. Goldstein (2113), "Automated Test Generation for Digital LSI Circuits," Invited Seminar at Princeton University, Oct. 21.

R. J. Hanson (5122), "Basic Row-Column Operations with Orthogonally Linked Sparse Matrices for Use with FORTRAN"; A. H. Treadway (2613), "Comparison of Numerical Methods for Multicomponent Radionuclide Ion Migration in Adsorbing Media"; W. H. Vandevender (2613), "Stability of An Invariant Imbedding Algorithm for the Numerical Solution of Two-Point Boundary-Value Problems"; B. Marder (2613), "Solving Elliptic P.D.E.'s on Arbitrary Domains Using Initial Value Methods," SIAM fall meeting and SIGNUM Software meeting, Oct. 21 - Nov. 4, Albuquerque.

D. A. Powers (5831), "Penetration of Steel Liners by High-Temperature Melts" and "Sustained Molten Steel/Concrete Interactions Tests"; J. B. Rivard (5422), "In-Reactor Experiments with Simulated LMFBR Debris Beds"; R. A. Sallach (5831), "The Sodium/Limestone-based Concrete Reaction"; J. E. Smaardyk (5167) and D. L. King (9337), "Large Scale Sodium Test Facility at Sandia Laboratories" and "Large Scale Sodium Interactions with Limestone Concrete"; G. A. Carlson (5423) and H. G. Plein (5422), "Sandia In-Core Molten Fuel Pool Experiment Results"; H. J. Southerland (5167), "Measurement of the Penetration of Molten Core Materials into Concrete Using an Acoustic Technique," Annual Post-Accident Heat Removal Information Exchange, Nov. 2-3, Argonne National Laboratory, Ill.

A. K. Jacobson (2513), "Development of a New Low-Voltage Flying-Plate Detonator"; D. B. Hayes and D. E. Mitchell (both 2513), "Hydrocode Models for Predicting Shock Sensitivity of Porous HNS Explosive"; D. B. Hayes, J. E. Kennedy, D. E. Mitchell (all 2513), and P. W. Cooper (2514), "Lateral Release Wave Effects in Shock Initiation of Explosive Devices"; A. C. Schwarz and D. M. O'Keefe (both 2513), "Shock Sensitivity Testing of HNS," 2nd Annual Firing System Conference, Nov. 2-3, LASL.

J. C. Newton (2352), "Ion Beam Analysis of Manufactured MC2980 Tubes," 3rd Critical Process Symposium, Nov. 2-4, St. Petersburg, Fla.

L. F. Shampine (5122), "Stability Properties of Adams Codes"; P. B. Bailey (5121), "Automatic Solution of Sturm-Liouville Eigenvalue Problems," SIGNUM meeting on Mathematical Software; Nov. 3-4, Albuquerque.

# You Too Can Do Five

My running log from a few years back carries this entry:

Thurs. 2-22-73 5.0! 47'

first time — around track

indicating simply that I'd finally managed to put together five miles in one run, not fast but there it was.

Since that time I've been running fives and longer distances routinely. But I still recall the exhilaration of crossing the five-mile-barrier for the first time, and I think that most people on the jogging/running scene look at the completion of their first five-miler with a similar feeling.

► The fact is that five miles is a long distance. In three-foot strides, it represents 8800 of them. If you stand in place and raise and lower each foot 4400 times, you might achieve somewhat the same physical effect, if you don't fall asleep in the process.

Now that my first five miler is behind me, I don't give the running of that distance much thought. But when I was running one milers and an occasional breathless mile-and-a-half, the circumstance that some runners, more or less my contemporaries, were actually running five miles left me a little awe-struck. How could they do it? I was out there dying after a mile and they were doing five times that distance—wow!

As I was to find out, ordinary mortals—nearly all of us—can run five miles. It's a matter of pace, pulse, and persistence. What follows are the bare-bones elements of getting to that point where you, too, can casually let drop before your thunderstruck friends, "As I was running my five miles last evening I saw the prettiest sunset...":

- **Pace**—if you are now just about totaled, a basket case, after running your customary one or two miles, then consider this runner's axiom: *You can actually run three times your accustomed training distance.* If you've been doing two-milers, you can run six miles. Really. Obviously, however, you can't do it at your accustomed pace. Slow down. If you run at an eight-minute/mile pace, slow down to a nine or even ten minute/mile pace. At

the outset, try running just one-and-a-half or twice your normal distance at the slower pace. Gradually increase the distance.

- **Pulse**—in an earlier column we discussed the relationship of pulse rate to training effect, i.e., detectable improvement in the cardiovascular system, and noted that most physiologists recommend endurance training at 75 to 80% of maximum pulse rate (220 minus your age for a rough estimate). Pace and pulse in a sense are mirror images, one of the other, and you can thus regulate your pace through monitoring of your pulse. To wit, if you now do two miles in 16 minutes and your pulse is, say, up around 160 beats/minute, you can try running the longer distances not so much against the clock but rather against the pulse, aiming at a rate perhaps 10% below your usual 160. Again, don't try for five right off—work up to it.
- **Persistence**—the principal ingredient. Through the late 60's I'd been running a mile or so a day, and it wasn't until late 1972 that I decided to address running seriously. First entry in my running log is dated Dec. 5, 1972, a run of 2.1 miles. Through that month and the next, I worked up to threes and fours and, finally, on Feb. 22 did my first five-miler. That's nearly three months of persistent, five-times-a-week effort. It wasn't easy, but most distance runners will tell that it's that first mile or two that's the toughest. Once you can handle two miles without undue difficulty, the addition of a third mile is nowhere nearly as difficult as going from one to two miles. Similarly, going to four, then to five and so on becomes progressively less difficult.

\* \* \*

It's three months from now and you've just done your first five-miler. Hey—that's alright! People are beginning to call you a jock, an animal (but in respectful tones). So what's next?...well, 10 miles has a nice ring... • js

## Labs Man Visits Soviet Physics Labs

Fred Vook of Radiation & Surface Physics Dept. 5110 has recently returned from visits to a number of research laboratories and institutes in the Soviet Union. He was a member of the first US team to begin exchanges in solid state physics as part of the US-USSR Co-operative Program on Fundamental Properties of Matter.

This program led to previous exchanges in fast reactor safety research (since 1972) and in fusion research (since 1970). The US team was organized at the request of James Kane of DOE (ERDA), and members were selected from Argonne, Brookhaven, Oak Ridge and LASL National Labs, as well as from Sandia. The specific topic of the exchange was the use of accelerated ions in materials research and

the use of pulsed neutron sources in neutron research.

Laboratories in Moscow, Kharkov, Kiev, Leningrad, and Dubna were visited. Major expansions of reactor and accelerator facilities are taking place in the Soviet Union to explore solid state physics. Particularly impressive, notes Fred, was IBR-2, a pulsed neutron source at Dubna rated at 8300 mW power which emits a flux of  $10^{16}$  n/cm<sup>2</sup>sec during a 92 microsecond pulse. The reactor is designed for repetition rate of 5 pulses/sec. Construction is finished, and the facility is ready for fuel loading of 100 kg of PuO<sub>2</sub>.

Fred also noted with interest that none of the Soviet reactors he saw possessed a containment shell of the type found in US reactors. "No protesters either," Fred adds.



FROM SIPI—This young person is one of a group from the Southwestern Indian Polytechnic Institute who recently toured some Labs facilities. The Hybrid Microelectronics lab of Division 2145 was one of the stops; this student is focusing on a chip developed in the lab.

## Interested in Learning Listening, Speaking, Thinking?

If you've been looking for ways to develop your abilities as a communicator, you might look into Toastmasters International Club 2524, which meets every Wednesday at the Coronado Club for a light lunch and a heavy round of formal and impromptu speeches.

A learn-by-doing organization, Toastmasters (which now includes both men and women in its membership) concentrates on developing leadership potential by giving its members the opportunity for "practice and training in the art of public speaking and in presiding over meetings." Their three-pronged training program also emphasizes listening and thinking.

More information is available from any of the six Sandians who are members of Club 2524: Frank Biggs (5321); J. M. McKenzie (5433); Don Schroeder (2648); "Chief" Schwyzer (4121); Norbert Siska (2316) or Charley Vittitoe (5231).

## New Cafeteria in Bid Phase

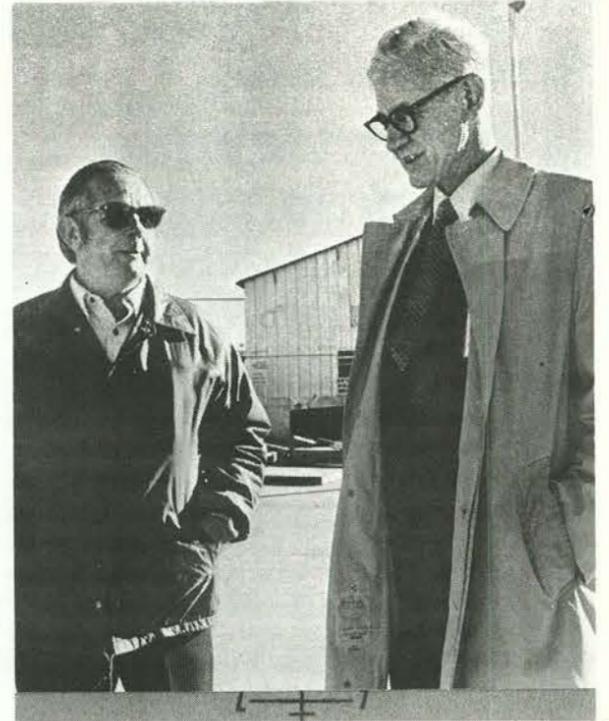
Bids were invited this week by DOE/ALO for construction of the Labs' new cafeteria building, to be located east of Bldg. 860. The project, estimated to cost between \$300,000 and \$400,000, is set aside for small business firms only.

Work includes a concrete slab floor, concrete masonry exterior walls, steel windows and exterior doors. Also included are site improvements and special kitchen equipment.

Bids will be opened about Dec. 15, and work is to be completed within 120 days after the contractor receives notice to proceed.



In Hong Kong, television struck again. The Tokyo Broadcasting System put up \$20,000 for food and props and hired 11 celebrities to partake in a two-day re-creation of an ancient Chinese Imperial banquet. For the camera, they ate such rarities as preserved whale and shark bladder, a 30-year old sturgeon, deer tails and bird tongue. TV star Amachi Fusako summed up the experience (undoubtedly over a tall, cool glass of plop, plop, fizz, fizz): "The elephant trunk tasted like beef stew and the bear paw was a little too oily and odd."



DALE MYERS, No. 3 in DOE as Under Secretary of Energy, visited Sandia last week. He's shown with Glen Brandvold (5710) as Glen explains solar reflector operation. Pres. Sparks looks on. Above, Tom Harrison (5712) chats with LTG Dodd Starbird, Acting Asst. Secretary of Energy for Defense Programs, who accompanied Mr. Myers. As a jet fighter pilot in Korea, Tom had last met General Starbird in some remote Korean village during the conflict there. Later, Tom was shot down and spent the rest of the war as a POW.

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4. Use home telephone numbers.
5. For active and retired Sandians and ERDA employees.
6. No commercial ads, please.
7. Include name and organization.
8. Housing listed here for rent or sale is available for occupancy without regard to race, creed, color, or national origin.

**MISCELLANEOUS**

**GAME TABLE;** misc. baby items; childrens clothes; 2 children's bikes; 10-gal. aquarium w/light; bicycle carrier. Arranaga, 294-5581.

**NEW AM/FM car radio** from '77 Lincoln, compatible w/most Fords (cars & pickups), \$60 or best offer. Torres, 265-7194 after 6.

**24" SCHWINN bicycle,** girl's, make offer; 1 pr. each, boys & girls ski warm-ups, \$20/pr. Scales, 296-9295 after 5.

**41 SQ. YDS.** of green carpet and padding, \$75. Baca, 296-8474.

**SAILBOAT:** 13' Cyclone racing class, includes trailer, cover & all go-fast items, \$750, Denton, 821-4488.

**FREEZER,** upright, white, 12 cu. ft., coils in shelves, \$170. Richardson, 298-6527.

**TRAVERSE drapery rod,** Kirsch, 6-12 ft., \$10, Shane, 296-4430.

**MACHINIST TOOLS & supplies:** misc. tool holders, hand tools, milling cutters, lg. snap-on roll cab tool box, lg. steel storage cabinet & more. Lucero, 836-5375.

**MATCHING couch (8')** and chair, yellow crushed velvet, \$150; green 6' couch, \$100; king-size bed, \$100. O'Malley, 821-0196.

**SEIKO ladies watch,** retail \$145; sell for \$75, never used, in original casing. Lewis, 296-7896.

**QUILTS:** hand-stitched, dacron filled, applique, pieced, solids or embroidered, \$75 & up. Eversgerd, 265-2303.

**ENCYCLOPEDIA AMERICANA,** 30 vol., 1953 ed., \$40. Baczek, 255-3429.

**WARDS refrigerated auto air conditioner w/brackets** for Ford 352/390 engine, \$50. Cilke, 296-3665.

**2 TWIN BEDS w/headboards,** dresser & mirror; dining room table, upholstered chairs; lamp, misc. Bolwahn, 821-6278.

**STEREO SPEAKERS,** 10" woofer, inch dome tweeter, electronic crossover, walnut veneer cabinets & black grill cloth. Ricker, 296-2191.

**ONE LOBO season basketball ticket,** \$50. Sullivan, 298-0148.

**CARBURETOR,** Holley 650 CFM, dbl. pumper, \$60; or trade for Holley 600 CFM in equally good condition. Brion, 298-1761.

**WOODSTOVE,** new, cast iron, 2-lid, 26", \$89; Kenmore auto. zigzag, floor model sewing machine, 7 pattern discs, \$75. Dalphin, 265-4029.

**7-MONTH-OLD Labrador/Shepherd** cross to good home, \$15. Barnard, 831-4114 after 6.

**COUCH,** new, never used, wood frame w/removable cushions, \$155. Neff, 265-0987.

**MOVIE CAMERA,** Sears Model L-122, 8mm, reflex zoom lens, \$35. Paylor, 266-8527.

**IBM SELECTRIC Typewriter w/paper** tape reader & punch, suitable for use w/home computer. Hansen, 299-2337.

**HYDRAULIC tongue trailer jack,** 2000#, \$60; Wilson 3000 tennis racket, \$20; Sunbeam water-pik, \$5. Windham, 293-8107.

**SKATE BOARD,** banzai board w/tape grip, ACS-650 trucks w/shock pads & precision wheels, \$35. Gallegos, 298-3589.

**WORK BENCH w/vise,** \$18. Treadwell, 294-4626.

**SONY tape recorder,** 7" reel-to-reel, tapes & head demagnetizer included, \$35; Binoculars, 7x35 field, \$15. Esch, 292-0754.

**HOUSE INSULATION,** R-11, 70' roll, 4 120-ft. batts. Falacy, 293-2517.

**GRANDFATHER CLOCK,** "Viking," 73", solid cherry wood, chimes, moon-dial, new, \$395. Baczek, 255-3429.

**75 HP outboard motor,** boat & trailer, boat needs some cosmetic work, all for \$725; antique upright piano, newly refinished, \$625. Kaye, 293-0499.

**CHEROKEE TENT trailer,** \$380. Campbell, 294-6000.

**STOCK or utility trailer,** 12x5x4 1/2, tandem axels, brakes, completely rebuilt, \$900. Wilkinson, 299-8327.

**74 INTRUDER travel trailer,** 24', self-contained, AC, lg. awning, \$4500 or best offer. Konkel, 299-5108.

**CARPETS:** Shag, 9x10, red/blue, \$35;

commercial w/backing, 9'x12', red/black, \$65. Tallant, 299-0862.

**HELIARC TORCH;** carbon arc torch; shop vacuum; Vega shop manual, 5" CRT's, RG-8 coax cable. Norris, 877-6415.

**FIREPLACE SCREEN,** brass, \$15; room divider, 8'x4', \$12. Binder, 299-2937.

**TIRE:** 7:75x15 on 5-hole Rambler rim, \$4; 1-spd. bike, thorn proof tires, baskets, \$20. Guttman, 243-6393.

**MENS Sears Free Spirit bike,** 10-spd., \$65. Marrs, 299-3865.

**CAB OVER HORSE RACK** for lwb, 3/4 pipe construction, alum. front shield, \$100 or best offer. Castillo, 877-0924 after 5.

**GIRL'S BIKE,** 20" Spyder, \$25; propane infrared heater, safety shut-off, 12,000 BTU/H, \$50; elec. water pipe heater, immersed, 30', 110/12 volt, \$25. Stevens, 299-6086.

**KELVINATOR refrig.,** white, \$50. Carlson, 242-4493.

**WINCHESTER 52D target rifle,** Lyman peepsight, case & glove. Dean, 299-3281.

**BEDROOM SET:** dark red mahogany, headboard & frame, night table, 6-dwr. low dresser, \$90. Auerbach, 296-1489.

**SCHWINN bicycle,** 20", 5-spd., \$55; 8mm camera & projector. Siska, 298-5756 after 5.

**CB RADIO w/antenna,** quick release, 40 channel, bought Aug., novelty gone by Sept., \$75. Shunny, 265-1620.

**TRANSPORTATION**

'69 DATSUN 510, needs some work but priced to allow-for repair. Otts, 299-3423.

**MOTOR HOME,** '76 Titan, 25', 6000 miles, fully equipped, many extras, 4kw power plant, roof AC, AM-FM-8 track, \$13,500. Anderson, 299-2595.

'67 FORD Fairlane S.W., 4-dr., 289 engine; '67 Ford Fairlane, 2-dr. sedan, \$650 ea. Sanchez, 292-3852.

**MERLYN MK 11A formula Ford w/trailer.** Lucero, 836-5375.

'71 JEEP, Universal, HT, new paint, carpet throughout, rear tire mount, 2 gas can carrier, 40,000 miles, \$2600 firm., '77 Kawasaki KZ-900, \$2200. O'Malley, 821-0196.

'76 MERCURY Monarch, 23,000 miles, one owner, 2-dr., Air, AM-FM, tape, std. Baca, 255-1576.

'74 LINCOLN Continental Mark IV, low mileage, white/red leather interior, all extras, \$6250/best offer. Chapman, 292-2800.

'74 VOLKSWAGEN Thing, convertible, 4-spd., roll bar, \$300 below book at \$1700. Ward, 281-5993.

'76 OLDS, Delta 88 Royale, 2-dr., custom roof, AC, power, radio/tape cruise control, silver, below book \$4500. Wheeler, 296-4793.

**KARMAN GHIA VW Classic,** 1600 cc, new tires, new battery, AM/FM, 6800 miles on re-built, many extras. Blate, 296-5139.

'70 DATSUN 510 wagon, 4-dr., new tires, battery & clutch, 30mpg city, 40 hwy, \$1150. Benson, 268-3586.

'70 BUICK Electra 225, 2-dr., fully loaded. VanDomelen, 299-3674.

'64 PLYMOUTH V8, AT; new tires, brakes, battery, alternator, fuel pump; good mileage. Martin, 299-6768.

'74 MUSTANG II, 4 cyl., AT, new tires, \$1800. Weatherbee, 869-2849.

'74 DATSUN 610 stn. wgn., 30,000 miles, AC, AT, new radials, new disc brakes, \$2950. Horton, 821-0936 or 298-4449.

**HONDA XL350,** '76, street-ridden by adult, new battery, carrier. McConnell, 255-2488.

1947 BUICK Super 4-dr., body, engine & drivetrain good original condition; identical parts car restorable condition, both \$1600. Ruminski, 898-9273.

'70 VW Squareback, AM-FM, AC, new steel radial tires, 30,000 miles on complete engine rebuild, \$1250. Healer, 298-6967.

**ELECTRIC MOPED,** 2 spd., headlight, taillite, stoplite, front & rear brakes, \$318; kit to convert bicycle to electric power, \$222. Bassett, 898-6243.

'67 CAMARO, rebuilt 6-cyl., 3-spd., tires, body, paint, all engine parts new, \$1200. Baca, 877-3072.

'73 JEEP Wagoneer, 258CID6, 4-wd., AT, AC, PS, hitch receiver & brake controller \$3300. Lauson, 298-2769.

'65 CHEV. Biscayne, 2-dr., 283-V8, \$200. Schultz, 898-2144.

'77 YAMAHA XT500D Enduro, 500 cc single, 2900 miles, \$1100. Braithwaite, 294-5282.

'61 CORVAIR, runs but needs work, will explain, \$150. Colgan, 344-3776.

'75 CAMARO, white, AT, PS, PB, AC.; '75 Bricklin SV-1 gull wing sports car. Norris, 877-6415.

'76 JEEP CJ-5, Levi-Renegade, 4-spd., 4-wd, big 6, 9000 miles. Marshall, 281-5821 after 6.

**REAL ESTATE**

**2 ACRES,** Ponderosa, end of road, view, access, Manzanos. Patrick, 255-5944.

**2-BDR CONDOMINIUM w/garage,** fp, dishwasher, refrig., washer/dryer hook-up, \$29,500. Caruthers, 296-5953.

**NE HEIGHTS,** bi-level, 4-bdr., 2 1/2 baths, 3-car plus R.V. garage, den, fp, many extras, corner lot, views, 2398 SF, mid 60's. Harvey, 293-5237.

**FOR RENT**

**DUPLEX,** 2-bdr. w/garage, carpet, drapes, kitchen appliances, NE near I-40, \$190/mo. Knief, 268-4294.

**SMALL studio** in Corrales for person (artist?) who will occupy most of the time, day & night. Stern, 898-6524 or 898-6405 after 8 p.m.

**4-BDR.,** 1 1/2 bath, carpet, garage, fp, unfurnished, NE heights, \$375/mo. firm. Harvey, 265-0547 or 265-3055.

**WANTED**

**TEACHER** wants used World Book for class reference. Dougherty, 299-7529.

**PING-PONG TABLE,** folding, roll-away, good condition. Binder, 299-2937.

**TELEPHOTO OR ZOOM LENS** for Miranda bayonet mount camera. Esch, 292-0754.

**VIOLIN,** 1/4-size for young student, reasonable condition & price; B78-13 tires, Miyoshi, 821-9118.

**BEGINNING guitar students,** classical or chords, references. Cave, 299-5066.

**SNOW-BOUND cabin** for week after Xmas, Shunny, 265-1620.

**LOST AND FOUND**

**LOST—Rx glasses** w/round black frames, one brown/one black ear-piece; turquoise watch & watch-band w/3 stones; wire frame Rx safety glasses.

**FOUND—Brown suede ladies' belt,** size 12 w/gold slide buckle; sterling silver screw-type dangle earring. **LOST AND FOUND,** Bldg. 832, 264-6245.

## Singles Hayride Set Tomorrow

**HAPPY HOURS**—Tonight Shalako plays for dancing; pot roast and lasagna are on the buffet menu. Next Friday, Nov. 25, the day after Thanksgiving, no buffet or entertainment scheduled; Happy Hour prices at the bar.

**LOBO BUSES**—In addition to the football buses, the Club will again offer bus service to basketball games. Departing the Club parking lot at 6:55, the buses will run tonight, Nov. 25 and 29. Football buses will run at 6:45 tomorrow and Nov. 25. Fare is 75 cents for members, \$1.25 for guests. Lucky tickets win free drinks at the Club after the games.

**TRAVELOGUE NIGHT** Tuesday, Nov. 22, will feature slides of Israel presented by Robert Spencer of Meier International Study League of Houston. In addition, a 30-minute movie of a Mediterranean Cruise from Athens to Venice via Greek Islands, Israel and Egypt will be shown. This cruise will be offered to Club Members in June '78. Starting at 7:30 p.m., it's free to members and families.

**TRAVEL DIRECTOR** Ed Neidel will be in the lobby tonight from 6 to 7 to discuss a Holy Land tour during the Christmas holidays. The package includes air fare to Tel Aviv, five days of touring on deluxe motorcoach with English-speaking guide, deluxe hotels and all meals. Cost is \$1084 from Albuquerque.

**SINGLES** get your tickets (\$3) today to join the hayride tomorrow. The event starts with a cocktail party in the Eldorado Room at 5. The bus leaves the Club at 6 for bonfire, hot dogs and other goodies at 4-Hills Ranch. Bus returns to the Club at 9 p.m. Tickets and more info at the Club office.



**HEADS RECREATION**—Bob Giersberg was recently hired by the Coronado Club to implement the expanded Sandia Labs recreation program.

### New, Full-Time Honcho

## C-Club To Head Labs Rec Program

It may be a whole new ball game. At least it's a new deck and a new deal.

On Oct. 1 Sandia transferred responsibility for the Labs' recreation program to the Coronado Club.

Previously, recreation was conducted under the banner of the volunteer 15-member Sandia Labs Recreation Council which represented all of the Labs' 15 organized sports—football, softball, golf, bowling, etc. Each league presented its own budget and was responsible for its own activities.

The Recreation Council will continue operation. Under the new system, however, a single budget request for all activities will be submitted. The Club has hired Bob Giersberg, recreation professional, to coordinate all recreation.

"Team and competitive sports will continue and be encouraged," Bob says, "but we plan to offer new activities for noncompetitive individual activities, classes for physical fitness and new recreation services for Sandia employees and their families—organized hiking and backpacking, for instance."

Intent of the change is to create a focal point for all Sandia recreation programs. Bob will be a coordinator and an innovator. "We will encourage all on-going programs and offer new ones as opportunities arise," he says.

Although Sandia is subsidizing the recreation program, fees will still be necessary for most activities. Most sports leagues now require membership dues which will remain in effect, although the rate structure may change. LAB NEWS will publish the new fee schedule when it become available.

Some of the new program possibilities

under consideration are:

- Providing shower and locker facilities at the C-Club for joggers and bicyclists
- Physical fitness classes for men and women
- Organizing group purchasing power to buy athletic equipment
- Forming a square dance club
- Integration of the Coronado Club swimming pools and tennis courts into the Sandia recreation program
- Organizing backpacking, hiking and bicycle tours
- Scheduling special events

"The Club Board is committed to expanding the recreation program," Bob says. "My job is to implement it."

A native of Vermont, Bob has held various recreation positions with schools and government agencies. He earned his BSE in health and physical education from Arkansas State in 1969 and did graduate work there. He completed U. S. Army paramedical training in 1975. He was a member of the Interservice Track Team in 1961-64 and attended the 1964 Tokyo Olympics as an alternate for the 10,000 metre event.

Bob is married, has an 8-year-old daughter and a 9-month-old son.



This item is almost too ephemeral to mention. It involves the North American office of the Ephemera Society—and an exhibit at the Bennington museum called, "This is Ephemera." If you're having trouble recalling the meaning of the word, ask any of those among us who collect shopping lists that go back to our 13th birthday, handwritten comments on old grade school report cards, Grandpa's letters to the garbage company or tin can labels from the Paradise Cannery in East Orange, New Jersey. Calvin P. Otto, who heads Ephemera in North America says the idea is "to collect those things which man does not normally keep." He calls the process wastebasket archeology, and defines the ephemerist as someone, for example, who collects bills, greeting cards, ticket stubs, menus or promotional material.