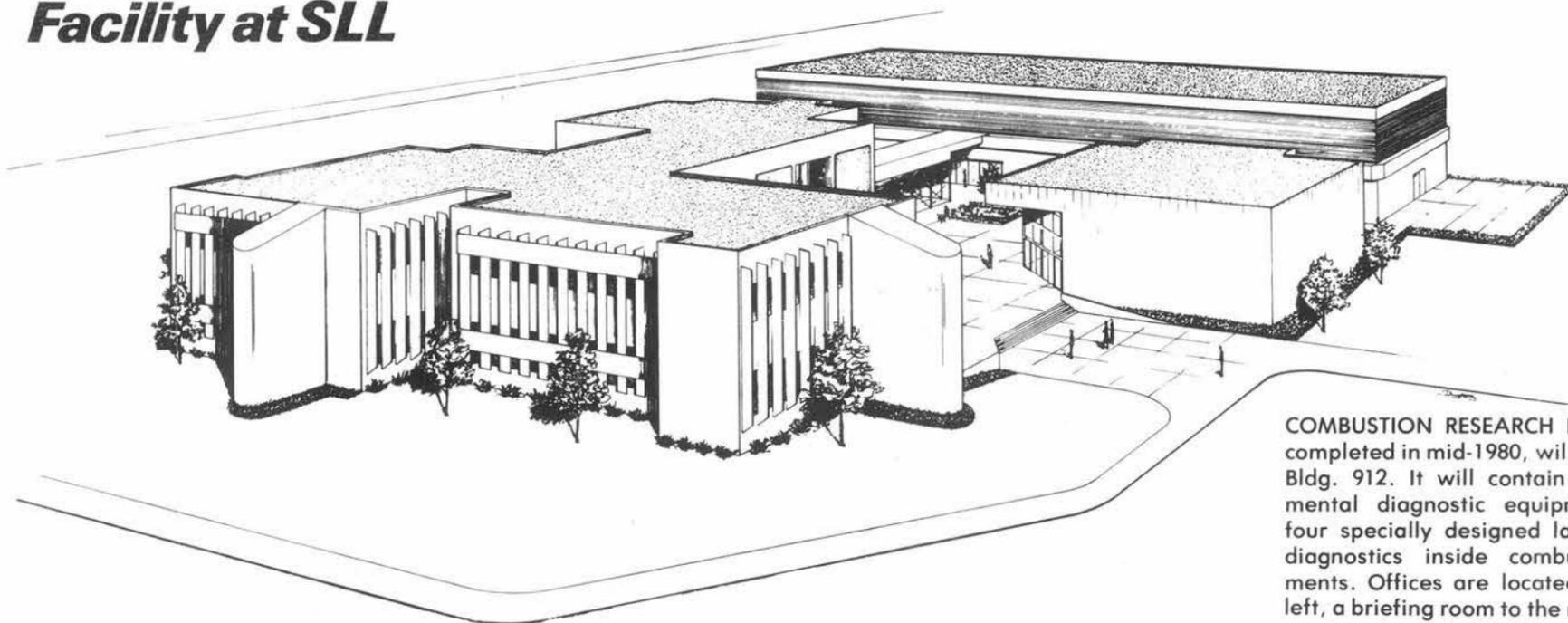


New Combustion Research Facility at SLL



COMBUSTION RESEARCH FACILITY, to be completed in mid-1980, will be east of SLL's Bldg. 912. It will contain unique experimental diagnostic equipment, including four specially designed lasers for optical diagnostics inside combustion environments. Offices are located in building at left, a briefing room to the right of the open courtyard, and 17,000 square-foot lab building, at rear, will house 14 labs. Complete story on page 7.

LAB NEWS

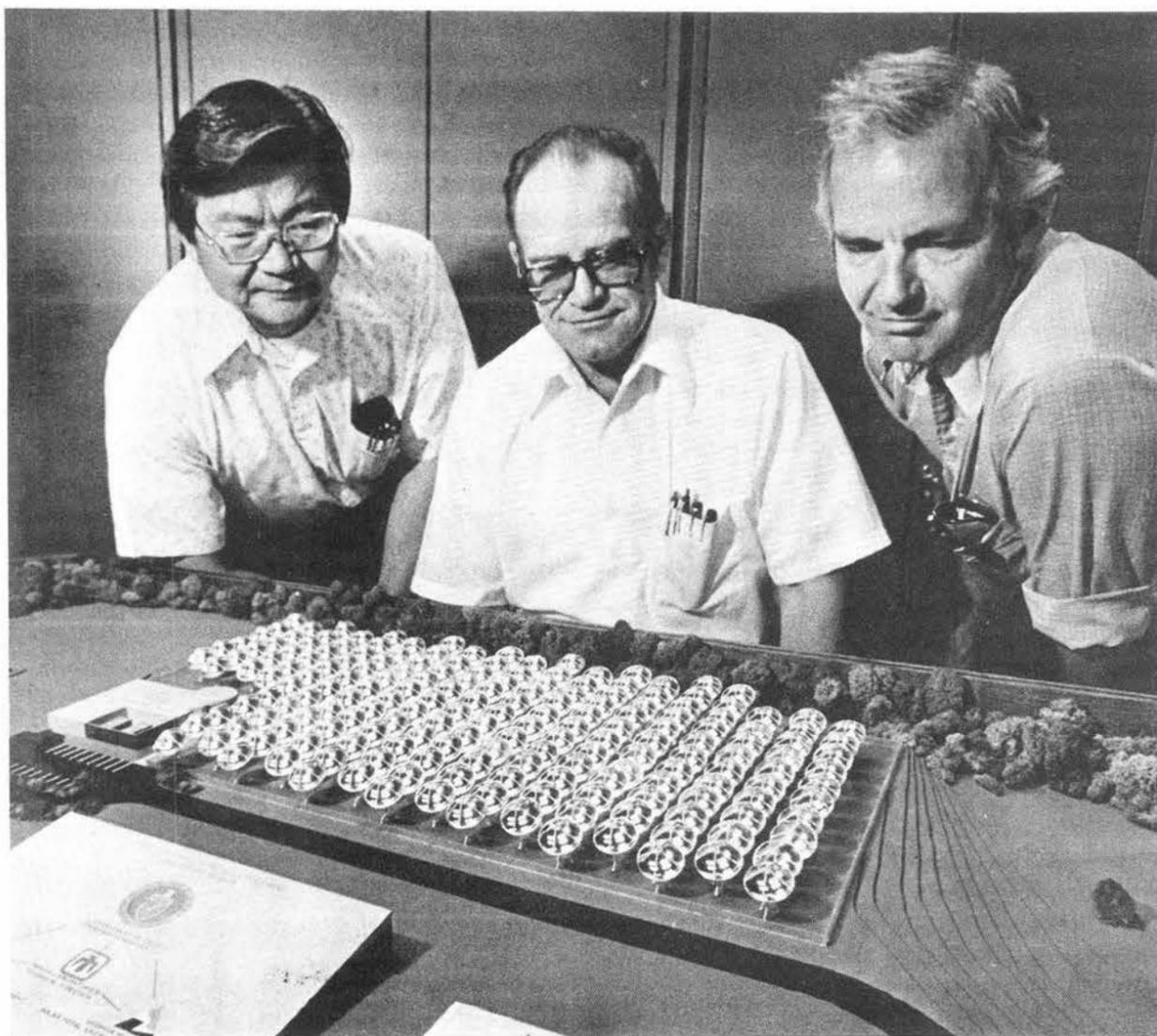
VOL. 30, NO. 13

JUNE 23, 1978

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

Sandia Has Technical Management

DOE Building Solar Total Energy System for New Plant



MODEL of solar-powered knitwear plant to be built near Shenandoah, Georgia, is examined by George Kinoshita, Bob Hunke and John Zimmerman of Dispersed Power Applications Division 5722. Sandia has technical management of the project which will be the first industrial application of the solar total energy concept. Plant is scheduled to become operational in July 1980.

In a major technology transfer effort, Sandia Labs is guiding the design and construction of a solar total energy system for a knitwear manufacturing plant to be built in Georgia.

The plant will incorporate the solar total energy concept pioneered by Sandia. With 42,000 sq. ft. of interior space, the plant will be supplied with energy—electricity, process steam, hot water, heating and cooling—derived from a 5-acre collector field of dish-shaped parabolic collectors. The system will be a factor of 10 larger than Sandia's solar total energy system now supplying energy to Bldg. 832.

The solar experiment, the first industrial application of the solar total energy concept, is a joint venture of DOE and Georgia Power Company. Sandia is technical manager of the project for ALO.

When DOE first called for proposals for a new application of solar total energy, Sandia assisted in preparing the request and performed technical evaluation of the proposals received. Sandia also assisted in the site selection of the new knitwear plant.

Bleyle America, makers of the knitwear, will operate the manufacturing plant. It is expected that 300 people will be employed in two shifts.

The site is in the newly-developed community of Shenandoah, some 25 miles south of the Atlanta airport.

General Electric Company, Space Division, has been selected (following a competitive design phase) as the designer

[Continued Next Page]

Afterthoughts

War is heck--We happened to note the military dining hall menu as carried in a recent issue of Focus. "... today, baked stuffed cabbage, Teriyaki steak, grilled breaded pork steak and French fried fillet of cod for lunch (underscore ours), and roast fresh ham, baked turkey with noodles, shrimp curry and salmon loaf for dinner; tomorrow, roast rib of beef au jus, grilled ham steak with pineapple slices, grilled lamb riblets and roast duck..." Somehow it's difficult to reconcile this epicurean largesse with the vision of a military that's lean, tough, and quick to respond. Whatever happened to the green spam and powdered eggs?

* * *

Ah Taos--Lots of funny things happen in Taos, maybe it's all that certified charm, and the most recent development in the Taos story was carried in last week's Journal: "Two School Officials Sued by Third Grader in Taos." Seems that 9-year-old Bliss Logue circulated a petition urging that the about-to-be-transferred school principal be kept on. A school board member and the acting superintendent heard about it and are alleged to have leaned on the little petitioner a little more than they should have. So Bliss and the Civil Liberties Union are suing and figure the incident calls for \$35,000.

* * *

"There is no absurdity so palpable but that it may be firmly planted in the human head if you only begin to inculcate it before the age of five, by constantly repeating it with an air of great solemnity." Schopenhauer, Studies *js



Bus Notes

Sharla Vandevender (5333) has analyzed the Labs' bus survey returns and notes in her report that "the majority of riders are reasonably satisfied." Not all, however, and a number of riders are dissatisfied with increased travel time and narrowly missed connections. The round trip is slower for 35% of respondents, about the same for 15%, and faster for 11% (the remainder didn't respond). And few report successful utilization of the 2-way radio system. Drivers are generally considered helpful, although a few are singled out for strong criticism—"sabotaging the grid system."

Why are they riding? Conservation (64%), convenience (58%), and cost (47%). Eleven percent didn't ride the bus until the advent of the grid system. Specific comments about the grid were 2 to 1 in its favor. Only 9% expressed strong negative opinions. (Of course, the survey didn't reach those former bus riders who dropped out when the grid system came along.)

Jeff Gammon (3725) of the Employee Transportation Committee discussed the survey with John Cashwell of SunTran, who was so impressed that he asked to be permitted to review each survey return. Other items arising from the Gammon-Cashwell talk: ideas, suggestions and criticisms are welcomed by SunTran but, to minimize churning, funnel them through Jeff Gammon or another member of the Committee; major changes in the grid system are not likely to take place for another two months, the idea being to institute them all at once rather than piecemeal; buses going into Sandia's Tech Area are not "Sandia Specials" but, rather, "peak hour service"; and, finally, many new riders are playing the schedule too closely—the nice guy driver sees them coming a block or more away, waits for them, and when the process is repeated for several riders, the schedule falls considerably behind. Jeff also reports that bus ridership is up compared to pre-grid days—38.7 per bus today compared to 37.5 six months ago.

Continued from Page One

New Solar Total Energy Plant

of the DOE funded and owned solar total energy system.

Objectives of the project are to:

—Develop within industry engineering and development experience with large scale solar total energy systems.

—Acquire additional data on cost and performance.

—Assess the interaction of this new energy technology with an industrial application and with an electric utility system.

—Publish technical data on the project to provide a basis for further growth of this solar energy concept.

Bob Hunke of Dispersed Power Applications Division 5722 is project leader for the new solar facility. George Kinoshita

(5722) is responsible for technical coordination with Georgia Power Company and the GE component development activities. John Zimmerman (5722) is performing systems analysis for the project.

Others contributing to the project include Roscoe Champion (5722), reflector development; Ed Beauchamp (5846) and Roy Rainhart (9572), materials development; Colin Hackett (1262), thermodynamics studies; Joe Abbin (2324) and Ruben Urenda (2334), turbine generator development and procurement; Vic Burolla (8424), heat transfer fluid characterization studies; and Bob Workhoven and Tom Harrison (both 5721), GE collector prototype testing and evaluation at Sandia facilities.

LAB NEWS

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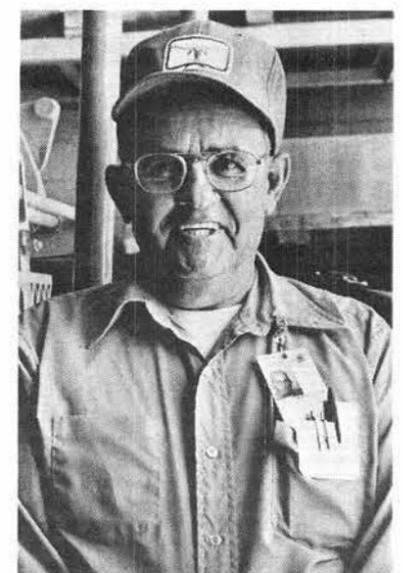
Retiring



Lloyd Wilson (3422)

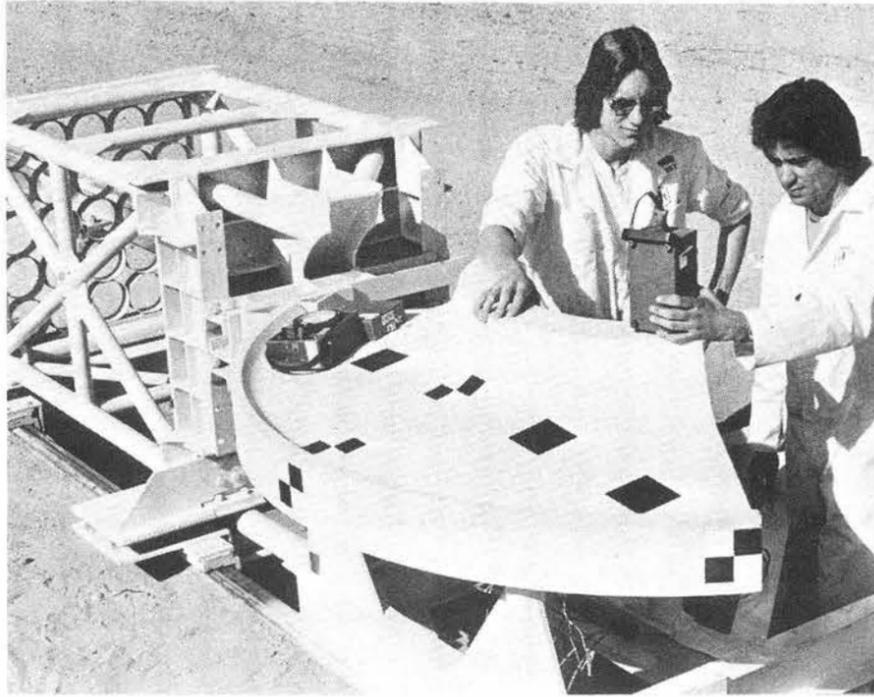


Gus Miller (3171)

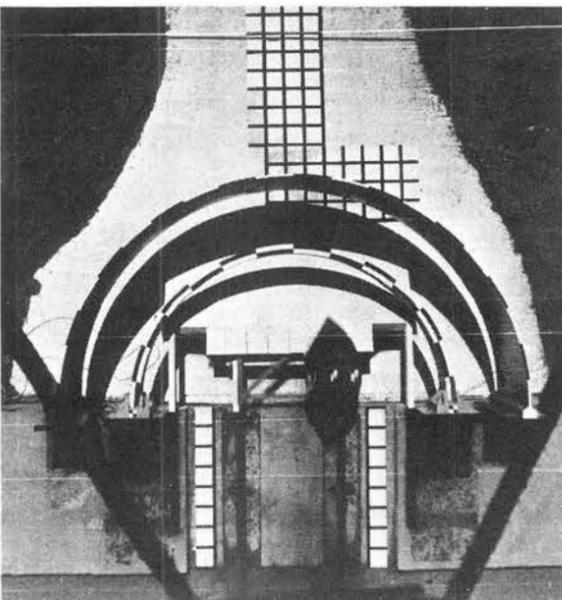
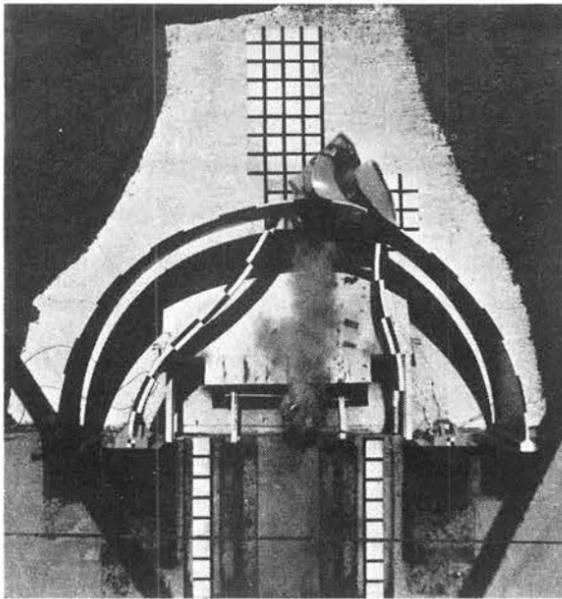
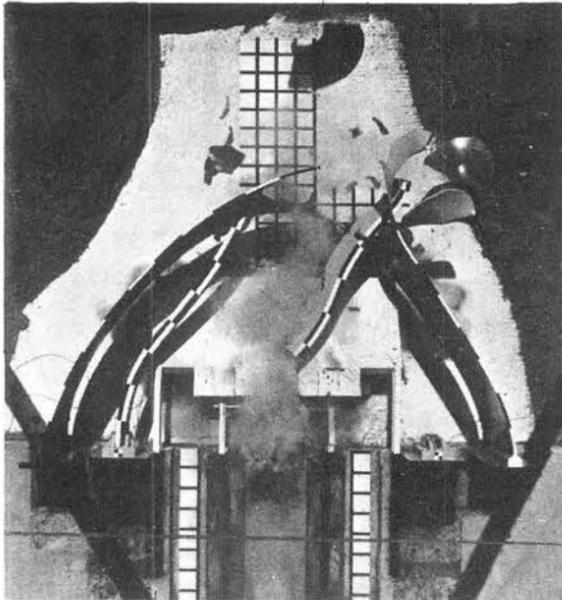


Stanley Eastman (9582)

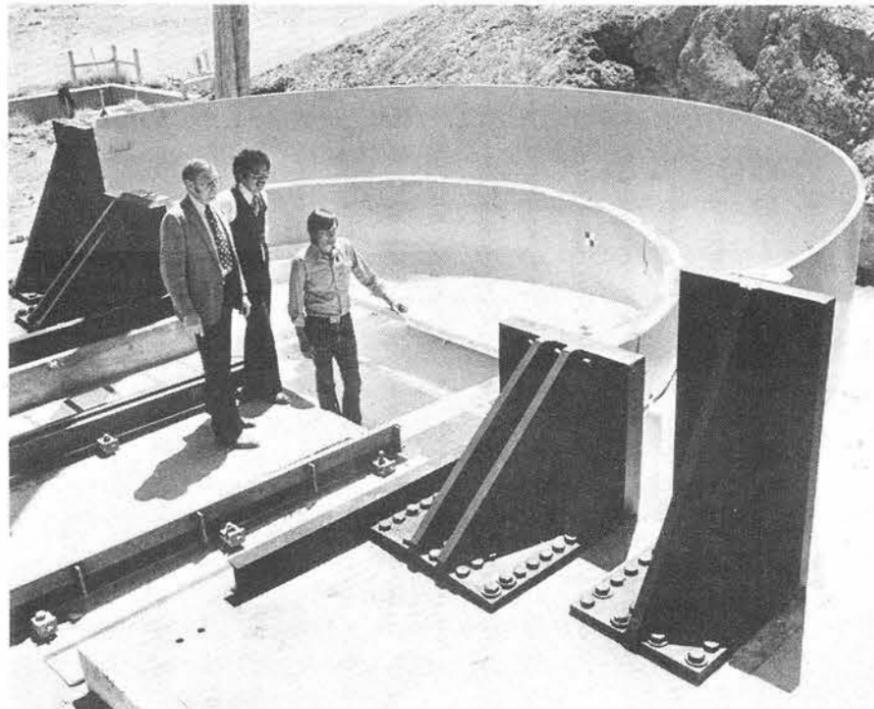
Turbine Breakup Tests Underway



DEAN JACOBY (MANZANO LABS) AND LEROY PEREA (9335, right) CHECK ELECTRICAL CONNECTIONS BEFORE FIRST TEST. The 120° segment of a turbine hub weighed about 3400 pounds. Mounted on a lightweight sled, it was propelled by rockets to a speed of 320 mph. Before impact, explosive bolts decoupled the turbine segment.



AS PREDICTED, SEGMENT OF TURBINE HUB broke through turbine housing and came to rest in earth embankment. (Camera is mounted overhead.) In bottom photo, hub segment approaches simulated turbine wall at 320 mph. In center, segment breaks through, two thirds of its original energy absorbed. Hub impacts embankment (top) at about 185 mph.



DAVE BICKEL (9335), RICHARD YOSHIMURA (5433) AND BOB LUCAS (9335) inspect target structure for turbine fragment test—a full-sized model representing a portion of the low pressure section of a large steam turbine. Inner steel ring was heated to about 100°F to approximate actual turbine operating conditions.

Studies are now underway at Sandia to determine what might happen in the highly unlikely event that the spinning steel hub of a large steam turbine in a nuclear power plant were to fail. From a safety standpoint, the key question is this: could pieces of the failed hub exit the turbine with enough energy to breach the reinforced concrete walls that protect the reactor and other safety related components?

No turbine has ever broken apart in a U.S. nuclear power plant. However, to insure that the risk to the public from such a postulated accident is acceptably small, designs to now have been based on conservative calculations which take into account: (1) the low probability of turbine failure (about once in every 10,000 reactor years); (2) the still lower probability that fragments of metal would strike a safety related component if the hub failed, and (3) the strength of the two- to six-foot thick reinforced concrete walls that separate and protect the reactor and the safety related components from potential turbine fragments.

In a very real sense, this is a situation analogous to that which led to the recent full-scale crash tests at Sandia of casks used to transport spent nuclear fuel. None of these casks had ever been in a severe, real-life truck or train accident, so their design criteria were ultra conservative. The full-scale tests, though run to confirm our

capability to predict accident effects accurately and to verify those predictions through scale-model testing, also proved how rugged the casks really are.

Sandia is now running full-scale tests to simulate the effects of a failed steam turbine—to determine the condition of turbine hub fragments and the energy remaining after breaking through the turbine housing. Based on a comparison of computer studies and data from the first two tests, Test Engineer Richard Yoshimura (5433)—who was also in charge of the full-scale cask tests—says mathematical predictions of exit speed closely matched test results. In the next test series, the hub fragments will be impacted into a reinforced concrete wall.

All tests are being conducted for EPRI, the Electric Power Research Institute.

Sympathy

To Ruben Trujillo (9712) on the death of his mother in Albuquerque, June 8.

To Paul Kind (9718) on the death of his mother-in-law in Little Rock, Ark., May 31.

To Donald Quayle (9573) on the death of his wife in Albuquerque, June 2.

To Forest Baker (9673) on the death of his mother-in-law in Santa Ana, Calif., June 5.

To Lorella Salazar (3512) on the death of her brother, former Senator Montoya, in Washington, D.C., June 5.

Take Note

Upcoming colloquium: on June 28, Prof. Dennis Meadows from Dartmouth, "The Role of Simulation Models in the Design of Sustainable National Energy Systems." Prof. Meadows plans to describe the dimensions of the fossil energy shortage and will summarize needed changes to shift to a coal economy.

* * *

UNM is again offering its free series of "Lectures Under the Stars." These are held on the Central Mall of the campus (or in the SUB in bad weather) and start at 8 p.m. Here's the schedule: June 26, Dr. Hans Hofmann, *We The People*; July 10, Joe Plut, *Love: The Need for Affirmation*; July 17, Dr. Charles Trumbull, *Issues in Scientific Exchanges with the USSR*; July 24, Hugh Prather, *Prayer & Meditation*; July 31, Jane Morrison, *The White Heron*; August 7, *Sid Fleming and His Old Time Fiddlers*.

* * *

Also at UNM, at Popejoy, the Albuquerque Civic Light Opera presents an ambitious summer program. *Fiddler on the Roof*, June 23, 24, 25; *I Do, I Do*, July 21, 22, 23, 28, 29, 30; and *How to Succeed in Business Without Really Trying*, Aug. 18, 19, 20, 25, 26, 27, Sept. 1, 2. And, on July 8 and 9, a special children's attraction, *Winnie the Pooh*. Call Popejoy on 277-3121 for tickets and other information.

* * *

Joe Laval (3133), board member of the Corrales Adobe Theatre, has a special buy on five admission tickets—\$12.50. Normally, they're \$3 each. The theatre, located in the old San Ysidro Church on Corrales Road, performs every Thursday through Sunday at 8:30 p.m. for the remainder of the summer. *Bus Stop* runs through July 9. *Tea and Sympathy* is scheduled July 13-30; *Prisoner of Second Avenue*, Aug. 3-20; and *Tobacco Road*, Aug. 24-Sept. 10. Call Joe on 4-6531 for more information.

* * *



EUROPEAN SCIENTISTS working in Dept. 5420 are Jean-Louis Portugal and David Worledge.

Visiting Scientists Working at Sandia

Two European scientists are currently working in Advanced Reactor Research Department 5420 as part of international agreements for information exchange on nuclear reactor safety.

Jean-Louis Portugal, a specialist in nuclear reactor core physics, is on the staff of the Commissariat à l'Énergie Atomique of France. He is associated with the Cabri reactor program operated cooperatively by a number of European nations and Japan.

Cabri is a research reactor located in France designed to perform fast breeder safety experiments. As part of the recent "ACPR/CABRI" agreement exchanging Cabri research results with those obtained from Sandia's Advanced Reactor Safety Research Program, NRC has also become a member of the Cabri project.

Before coming to Sandia, Jean-Louis spent two months at Argonne National Laboratory. At Sandia he is particularly

appreciative of the team approach to problems and the sharing of technical expertise. Jean-Louis will be at Sandia about 16 months.

David Worledge is a member of the Safety and Reliability Directorate of the United Kingdom's Atomic Energy Authority.

He is a nuclear physicist working at Sandia on the development of a reactor accident containment code. He hopes to participate in some nuclear experimental work when the ACPR reactor becomes operational, particularly in the analysis of the results and modeling of accident energetics and containment phenomenology. David will work at Sandia for two years before returning to England.

Both men are at Sandia under agreements between their national nuclear agencies and the U.S. Nuclear Regulatory Commission.

J. R. Wayland (5311), "Theoretical Approach to the Effects of Extremely Low Frequency Electromagnetic Fields on *Physarum polycephalum*," Vol. 74, 207-216, RADIATION RESEARCH.

D. J. Johnson (5244), "Impedance Characteristics of Heated REB Diodes," Vol. 32, No. 10, APPLIED PHYSICS LETTERS.

J. P. Vandevender (5245), "The Resistive Phase of a High-Voltage Water Spark," Vol. 49, No. 5, JOURNAL OF APPLIED PHYSICS.

G. B. Krefft (5112) and E. P. EerNisse (5133), "Volume Expansion and Annealing Compaction of Ion Bombarded Single-Crystal and Polycrystalline α - Al_2O_3 ," Vol. 49, No. 5, JOURNAL OF APPLIED PHYSICS.

W. D. Drotning (5832), "Optical Properties of Solar-Absorbing Oxide Particles Suspended in a Molten Salt Heat Transfer Fluid," Vol. 20, No. 4, SOLAR ENERGY.

P. M. Richards (5132), "Correlated Hopping Conductivity in a General Two Sublattice Structure," Vol. 68, No. 5, THE JOURNAL OF CHEMICAL PHYSICS.

C. B. Norris (5112), "Temperature, Injection Level, and Frequency Dependences of the Luminescence in

Authors

Lightly- and Heavily-Doped CdTe:In," Vol. 16, No. 3, JOURNAL OF LUMINESCENCE.

P. M. Richards (5132), "Effect of Low Dimensionality on Prefactor Anomalies in Superionic Conductors," Vol. 25, No. 12, SOLID STATE COMMUNICATIONS.

M. D. Bennett (1331), "Approximate Velocity of Bodies Powered by Cold-Gas Thrusters with Small Propellant Mass," Vol. 15, No. 3, JOURNAL OF SPACECRAFT AND ROCKETS.

J. P. Hohimer and P. J. Hargis, Jr. (both 5216), "Atomic Fluorescence Spectroscopy of Thallium Using a Frequency-Doubled Dye Laser and Vitreous Carbon Atomizer," Vol. 27, No. 43, ANALYTICAL CHIMICA ACTA.

J. P. Lurette (1132), "Longitudinal Variations of Very-Low-Frequency Chorus Activity in the Magnetosphere: Evidence of Excitation by Electrical Power Transmission Lines," Vol. 4, 275 (1977), GEOPHYSICAL RESEARCH LETTERS.

G. C. Nelson (5825), "Surface Composition of Equiatomic Electrodeposited Tin-Nickel Alloy," Vol. 125, No. 3, JOURNAL OF THE ELECTROCHEMICAL SOCIETY.

D. K. Brice (5111), "Lattice Atom Displacements Produced Near the End of Implanted u^+ Tracks," Vol. 66, No. 1, PHYSICS LETTERS A.

S. K. Lyo (5151), "Electron-Phonon Enhancement of Thermoelectricity in Metals," Vol. 17, No. 6, PHYSICAL REVIEW B.

Share Certificate Accounts

New regulations now allow the Credit Union to offer share certificate accounts. These accounts earn dividends at a higher rate of interest than a regular account, but a penalty is assessed for withdrawal of any portion of the principal amount prior to maturity.

Certificates to be offered are given below. Additional amounts may be obtained in multiples of \$500 for any term.

Certificate Term	Minimum Amount	Nominal Dividend	Yield (APR) (Daily Compounding)
12-35 months	\$ 500.00	6.75%	6.98%
36-59 months	1,000.00	7.25%	7.52%
60-72 months	1,000.00	7.75%	8.06%

Dividends specified are dependent upon sufficient earnings by the Credit Union being available for that dividend period. It is anticipated that sufficient funds for the specified dividends will always be available; however, Federal regulations prohibit payment of dividends in excess of available earnings.

All or part of the principal amount may be withdrawn at any time. However, in the event of early withdrawal, government regulations provide that dividends on the amount withdrawn be reduced to the rate paid on regular share accounts, and that all dividends for 90 days on the amount withdrawn be forfeited. Early withdrawals of principal must be in multiples of \$500.

Dividends will be compounded daily on share certificates and posted to those accounts on the first day following each calendar quarter. Posted dividends may be withdrawn without penalty at any time, but if left on deposit, they will continue to accrue dividends at the same rate as the certificate.

Dividends on regular share accounts will continue to be calculated as in the past. The dividend rate on regular share accounts is anticipated to be 6% but is, of course, dependent upon earnings being available to cover all dividends.

Loans using regular share accounts or share certificates for collateral will be available for 100% of the amount on deposit. Interest rates on such loans will be 2.00% above the dividend rate for regular share accounts and 1.75% above the nominal dividend rate for certificates.

The amounts of funds accepted by the Credit Union for investment in share certificates will initially be limited to a total of \$10 million. Deposits for each member are limited to a total of \$40,000 plus accrued dividends for share certificates and regular share accounts combined. Share certificate accounts will be available July 3.

New Loan Rates

To further balance loan income and dividend payments, loan rates have been



RAILROADED—Closest thing to the real thing for Railroad Night/Downtown Saturday Night was Bill Laskar's (LAB NEWS) operating steam engine. Built pretty much from scratch by Bill, the locomotive pulls several cars on a track laid out in the Laskar back yard. Scale is 1 1/2"/ft., track gauge is 7 1/2". For DSN, train attracted young and old, contributed distinctive smell and sound of old-time railroading.



DOE SCIENCE FAIR winners toured facilities in Area III last week. Accompanied by Joan Harper, at left, program coordinator for DOE/ALO, they are Mark Rainosek and Michael Bickel. Dave Bickel of Track & Cables Division 9335 gives them the word on the hydraulic centrifuge facility. Young Michael listens with special intensity—he'd better, Dave's his Dad.

adjusted as summarized below. Rates on first and second mortgages became effective May 22. All other rates were effective June 5, except new loans secured by regular share accounts or share certificates, which become effective July 3. Rates on all loans (at 8.4%) secured by regular share accounts will automatically be reduced to 8.0% on July 1.

COLLATERAL	APR Rate
Aircraft	11.00%
Automobiles	9.75%
Boats	10.25%
Furniture and Appliances	11.00%
Life Insurance	9.00%
Mobile Homes	10.25%
Motorcycles	11.00%
Motor Homes	10.25%
Passbooks and Certificates of Deposit	10.00%
Real Estate - First Mortgage	9.50%
Second Mortgage	11.00%
FHA Title I	11.00%
Share Certificates - 12-35 months	8.50%
36-59 months	9.00%
60-72 months	9.50%
Shares - Credit Union Regular Account	8.00%
Signature	11.00%
Listed Stocks, Bonds, etc.	9.50%
Other Securities	11.00%
Student Loans - Credit Union Program	9.00%
Travel Trailers and Campers	10.25%

Re-Insulating? Try This Advice

Fire Protection Engineers Vern Duke and Ray Cohrs (both 9751) pass along this word of advice for Sandians who plan to re-insulate their homes.

"Pay particular attention to the insulation around recessed incandescent light fixtures," Vern says. "They will reach higher temperatures with the new insulation and this can cause fire. There have been several instances of wooden ceiling joists near light fixtures catching fire after new insulation was added—it seems that the heat cannot radiate as readily into the attic space."

Vern suggests keeping the insulation away from the recessed light fixtures. He also suggests that you use only UL labeled insulation and enclose foam plastic and paper-backed insulation within fire resistant cavities.

Also, if you have any questions about installation or operation of a woodburning fireplace or stove, Vern has a pamphlet which might help—give him a call on 4-1958.

Hot Weather Running

*Mad dogs and Englishmen
Go out in the midday sun...*

—song by Noel Coward

The sweat rolls into your eyes. The soles of your feet burn. The breeze is more hot blast than cool zephyr. The heat mirage shimmers and your vision is distorted. Your mouth has that full-of-cottonballs feeling.

This is fitness? It seems more like penance to expiate some unspeakable sin.

No doubt about it, running in Albuquerque on a summer day can be misery. But, in one more tribute to the astounding adaptability of the human body, you can become acclimatized—somewhat—to the heat and, with a little planning and a few precautions, can continue your fitness regimen through the summer without undue misery.

First, a simplistic prescription: you learn to run in the heat by running in the heat. I know of no way to comfortably jump from 50° running weather to 90° running weather. To an extent, our weather cooperates in this and you don't have to make an abrupt transition—running through April, May and June provides a gradual shift from cool to hot.

Still, some modifications in your regimen are wise. I shorten my accustomed distance from six to four miles, the premise being that hot weather makes the body work harder. And, indeed, I seem to feel more tired after four on a hot day than after six on a cool one.

If you're an inveterate clock-watcher and insist that each mile be done in your accustomed cool-weather time, no matter what, you're inviting misery. The best regulator of pace—in any weather—is your pulse rate, and if it's up around, say, 150 at your usual pace in cool weather then that same pace will surely produce both a significantly higher pulse rate and a measure of misery when the temperature is pushing 90. So slow down.

Clothing and fluids. I've concluded that these are matters of personal choice following each person's own experience.

Some wear hats, many don't. I like the illusion of coolness produced by a hat and dark glasses (after all, running *is* largely a mental thing). Some wear T-shirts, many don't. If sweat causes chafing around your thighs, try vaseline. For runs of less than an hour I haven't found fluids necessary, though a swallow—if it were available—would be nice to relieve the cottonball problem. For longer periods, fluids are desirable, even essential. Weigh yourself before and after a run on a hot day. Most people will lose two to three pounds per hour, and the loss is virtually all fluid. I've tried most of the proprietary products supposed to supercharge a runner and found (1) they taste awful and (2) I wasn't supercharged, so I've gone back to water. Incidentally, if you insist on something grander than water, try tomato juice and water, half and half. It contains all the chemical species we're supposed to replenish our bodies with, and it's cheaper than the snake oil mixtures.

There are alternatives, of course, to running on a hot day. The Olympic swimming pool behind the gym offers as much of a workout as you care to pursue. Unfortunately, now that summer is here, the military, with curious logic, closes down the pool on Mondays and Tuesdays. Another alternative is bike riding. You can achieve the desired elevated pulse, and I've noted on hot days that the more rapid movement produces a cooling effect, i.e., sweat evaporates rapidly and you thus feel cool.

Finally, if none of the above mollify or reassure, there is the one draconian solution to the fitness-in-hot weather problem: the dawn patrol run. At six these mornings, our temperature is around 60. And you get to watch the sunrise, too.

Thought for the day—Attending the recent medical seminar *Exercise and the Heart*, we came away with this bit of heartening wisdom: "Exercise does prolong life, but the extra time you get you'll spend running."

•js

Fun in our National Forests—A while back we commented on the problem of backpackers who leave their car at some trailhead to go off for a few days, only to return to a vandalized car. Well, they have one comfort at least. Chad Looney (1583) called to report he took off on an overnight from Borrego Mesa (near Cordova and Truchas) and had no problem with vandals—his car was simply stolen. It was a '67 Olds. Chad's recommendation: remove some essential component like a distributor rotor before you take off. (Ed. inquiry: Would TV surveillance equipment developed at Sandia in connection with Safeguards have any application in this area? Photographic identification of the culprits would be a big first step in mitigating the problem.)

* * *

Horseshoes—Bob Schuch (5232) reports that the C-Club's annual 4th of July doubles tournament will again be held, with play starting at 12:30 at the Club's courts. You can choose your own partner (ladies are welcomed) or draw for a partner. It's for grown-ups only. Entries and details: from Bob on 4-2676 or sign up at the C-Club pool office. Incidentally, horseshoe pitching and instructions are offered at the Club courts every Thursday from 4:45 to 6:30 p.m.

* * *

Tennis—The Sandia Tennis Assn. is planning a men's doubles tournament for July 10 to 14, after working hours. Entry fee is \$3 per team, and entries are due July 5. The single elimination event with a consolation round is being directed by Tom Kerschen (1312). Call Tom on 4-1040 to submit your entry.

* * *

Running—A couple of dates: La Luz Trail run, August 20; the Albuquerque Marathon, Oct. 15.



CATHY SQUIRES (5122) aims to learn about pistol shooting, and her target shows that she has been an apt pupil. She and Marie Hinojosa (3521) are two students in Dave Overmier's (9486) class in basic handgun instruction for



women. Class is under auspices of C-Club Rifle & Pistol Assn., runs through five sessions, is conducted after hours, and costs one buck. Equipment is furnished. Interested women employees can sign up by calling Dave on 4-3436.

Sandians Work on Mounted Patrol

The white patrol car moves slowly through the dimly lit West Central motel parking lot. Some out-of-state plates catch the patrolman's eye. Playing a hunch, he picks up his radio mike. "218 to Albuquerque."

"Go ahead 218," the dispatcher replies.

"Can you run a 29 on California passenger Adam Charles Nora 268?"

"10-4. Stand by."

The police officer driving the patrol car is Ken Nowotny (2532), one of the several Sandians who are members of the New Mexico Mounted Patrol.

"Albuquerque to 218. License ACN 268 comes back with a warrant for armed robbery in California. State Police is enroute 10-87 (to meet you)."

* * *

The Mounted Patrol was authorized by the State Legislature in 1941 as a non-paid police agency and official bodyguard to the governor. At the time, its primary purpose was to assist the low-budgeted and understaffed State Police with qualified volunteers. Even today the number of Mounted Patrolmen in the state is about the same as the number of State Police.

The legislative act authorizes the Patrol to work with any law enforcement agency in the state. The Mounted Patrol officer has identical authority, powers, and responsibilities as a salaried officer of the agency he is assisting. Here in Albuquerque, the 35-member troop works chiefly with the State Police; other troops in the state work with sheriff or city police departments.

In Bernalillo County, the MP trooper operates his own marked patrol car without direct supervision of a salaried officer, a unique arrangement for a reserve police officer.

* * *

It's 11:30 p.m. on I-40, west of Albuquerque. A roadblock has been set up to stop eastbound traffic. Red flares line both sides of the dark highway. The police, including the Mounted Patrol, are checking traffic, looking for anything unusual. The officers are busy with cars pulled from the traffic flow when a large sedan with one passenger slowly rolls past the stop sign in the center of the road. An alert officer notices, calls to his MP partner, "There's one, let's go!" They jump into the State Police car, and a 90-mph chase ensues. The result: some \$1,500,000 worth of marijuana is confiscated, and the two dealers are arrested.

Why do people volunteer to be part-time police officers? For some it's the fulfillment of a boyhood ambition: they've always wanted to be a cop. Others are attracted by the excitement. "It's the unknown or potential danger," says Ken Nowotny. And a police officer stands out from the crowd—such distinction can also be ego satisfying. But it's not all roses. Says Larry Hermesmyer (1754), "It can be inconvenient. You'll be subpoenaed into court, which makes for delayed plans or time away from work. And it can be



LABS MEN on New Mexico Mounted Patrol are Larry Hermesmyer (1754), Russell Smith (3162) and Ken Nowotny (2532).

grim—an accident with a dead kid doesn't make for a fun weekend."

Getting a Mounted Patrol commission takes persistence. After the background investigation and interviews with credit and character references, the applicant is commissioned in the Patrol. During a 6-months probation period, he receives classroom and on-the-job training in first aid, vehicle stops, arrest procedures, and other Patrol procedures. When probation is completed, the Trooper must then supply at his own expense a vehicle for Patrol use, either a white 4-door sedan or 4-wheel drive vehicle. It must then be outfitted by him with red lights (covered when off duty), a siren, radio and other essential equipment.

Troopers normally work two shifts a month, from 7 p.m. to 3 a.m., on Friday or Saturday night. However, they are always on call in emergencies such as riots or other civil disturbances. Normal patrol areas for the Albuquerque troop are high traffic sectors, mostly in the north and south valleys. On duty, two troopers work together in one vehicle. Many on the Patrol spend extra time riding with a State Police officer to gain experience.

* * *

Six men play cards intently in a northeast heights motel room. The money on the table says this is no penny-ante game. And two of the players are not the amateurs they make themselves out to be. Their marked decks make it easy to clean out the other players. In just a few rounds one player loses nearly two hundred dollars. But his wife won't mind—the money he loses belongs to the City. The money is marked, and the Mounted Patrolman losing it is working undercover for the APD. The Mounted Patrol is occasionally called on when a new face is needed.

People from many professions like working on the Mounted Patrol. Some are ex-police officers. Others have full-time jobs in the ministry and in school teaching, as laboratory technicians and garage mechanics, as businessmen and retirees. But when they put on the western style MP hat, a throwback to territorial days, they all take the role of helping to provide safety and law and order very seriously.

[Ed. Note: author Russell Smith, photographer for LAB NEWS, is himself a member of the Mounted Patrol.]

* * *

BSE Program Extended

The program of breast self-examination (BSE), sponsored by Medical for employees and wives of employees, has been extended. About 200 women have attended the sessions conducted by Dr. Judy Ewing (3322) and other medical people from Organization 3300 who are certified BSE instructors. Meetings for employees are held from 12-12:30; sign-ups will be notified of date and location. Wives of employees will be notified concerning sessions to be held from 4-4:30 at Medical. For additional information call Renee Foster, 4-3993.

RETURN TO: Wanda Cupp - 3321
BSE Course

Wife of employee _____ Employee _____
Name Org.

Bldg. Telephone Number

(Wives of employees: list husband's name and org. and your own name and home telephone number.)

LIVERMORE NEWS

VOL. 30, NO. 13

LIVERMORE LABORATORIES

JUNE 23, 1978

New Combustion Research Facility at SLL

Sandia breaks ground June 29 for a \$10 million Combustion Research Facility in Livermore. Designed to foster major advances in understanding of combustion phenomena, the DOE-sponsored facility will be, after its completion in mid-1980, a national center of combustion studies for researchers from industry, universities, and government laboratories.

To help define the most vital combustion research, Sandia will work with a newly appointed Combustion Advisory Board, made up of scientists from the auto industry, universities, and industrial laboratories. The Board will begin its task with a series of briefings and discussions at SLL on the day of the ground-breaking.

Official earth movers at the ceremony will be John Deutch, director of Energy Research, DOE Washington; Jim Kane, Director of Basic Energy Sciences, DOE Washington; and Tom Cook (8000).

Why a combustion research facility? Although gas has been burned in the internal combustion engine for over 75 years, and coal has been harnessed to produce energy combustion even longer, there's much that isn't known about combustion. And new knowledge that will lead to greater fuel efficiency, lower pollution levels, and greater flexibility in choosing alternate fuel forms is badly needed—even a 1% improvement in automobile fuel economy would result in a savings of millions of barrels of oil annually.

What are the most promising research areas? For one, an investigation of how the design of a combustion chamber influences the burning of the fuel-air mixture. Effort here concentrates on the nature of turbulence—how air and fuel mix within a cylinder—and on flame propagation.

Another important area is flame research. Working with simple flames, researchers can make precise measurements and develop detailed models while avoiding the complexities introduced by an operating engine. Flame studies are a particularly fruitful method of developing diagnostic capabilities.

Still another promising area is coal combustion. Knowledge gained here can be applied immediately, since coal is both the country's most abundant fossil fuel and its leading short-term energy alternative to gas and oil. SLL researchers hope to identify combustion-degrading and pollutant-producing mechanisms as a first step toward cleaner, more efficient coal burning. Combustion problems in actual boilers will be studied and research pursued relating to pulverized coal combustion.

Success of this and other research depends to a large extent on Sandia's development of innovative technologies, especially in laser diagnostics and with computer-generated combustion models (see related story in this issue).

The new facility will permit more efficient use of Sandia's expertise and equipment in studying combustion. Totaling some 50,000 square feet, the four-building complex includes 14 laboratories, a briefing room, office space for 60 people, and space for mechanical equipment. The lab building is designed around four diagnostic laser systems whose beams can be directed to any of the labs by optical means.

Dedicated minicomputers will handle the data acquisition and experiment control tasks in many of the labs. Standard hardware interfaces and software drivers serve to simplify experiments and reduce set-up time. The minicomputers will be connected to a larger data processing computer for more sophisticated data reduction, graphics, and mass storage.

A clean room for optical work, a chemistry lab, an experimental assembly area, and a shop with machine tools for small jobs and equipment modification are also included.

Architect-engineering firm for the new facility is Garretson, Elmendorf, Zinov, and Reibin of San Francisco; Turner Construction Co. of San Francisco is acting as construction manager.

Advisory Board Appointed

An advisory board of representatives from industry and the academic community will help assure best use of the Combustion Research Facility in the solution of technical problems relating to fossil fuel combustion. (Some 90% of the nation's energy is derived from these fuels.) The board's duties will include advising on the scope and direction of the research program and on the allocation of facility time.

Members of the board, who will meet at SLL on June 29 for briefings and discussions, include William Agnew, General Motors Research Laboratories; William Schlichter, Bell Labs; John Ross, Massachusetts Institute of Technology; Howard Palmer, Pennsylvania State University; Sol Penner, University of California, San Diego; and Robert Sawyer, University of California, Berkeley. Board members will serve for from two to five years.

Experiments Not Enough

Models Aid Combustion Research

Laboratory experiments and mathematical models are equally important in achieving a coherent combustion theory, one that can serve as the basis for designing improved engines. Experiments can measure many phenomena—flow patterns, temperatures, chemical concentrations—but these measurements become valuable only when they are integrated into an ever-more-accurate theory of the nature of combustion.

Mathematical models are a way of expressing a theory conveniently and precisely. Those dealing with combustion processes are complex. In combustion, a fuel and an oxidizer are converted to a variety of products by chemical processes that proceed at vastly different rates. The conversion is characterized by fluid motion, usually turbulent, which involves mass, momentum, and energy transport. Even for the simplest fuels, hydrogen or methane, an adequate description of the kinetic processes encompasses 50 to 100 elementary reactions involving 10 to 30 chemical species.

The resulting models would be unsolvable without modern computers. But even the simple models of diffusion flames can take many hours of CDC 6600 time, about 90 percent of it solving the differential equations which describe the chemical kinetics.

Best results are obtained if the hydrodynamics, or fluid motion, and chemical kinetics are considered separately. That's why SLL researchers are working on two general types of mathematical models. One looks at simple flames, the essence of combustion, that permit detailed models of chemical kinetics. The goal is to identify the chemical reactions so as to find a way

of inhibiting those reactions creating pollutants. In particular, researchers are looking at nitric oxide and soot formation, hoping to gain an understanding leading to the means to prevent nitric oxide and soot in the first place. (Present anti-pollution devices seek only to eliminate pollutants after their creation in the engine.)

Some flame models have already aided understanding of basic combustion processes. With one model of a hydrogen-air flame, the experimental results have given insight into the distribution of free radicals and mechanisms by which oxygen is chemically transported in the flow.

In the second model, an attempt is underway to predict the effect of engine geometry on the turbulence necessary for clean burn. One typical program describes the wave-dominated fluid dynamics of the prechamber in stratified-charge engines. It is used to study effects of chamber volume, nozzle shape, and spark location on the amount of unburned fuel emitted from the prechamber.

Future work will see models more detailed and, in their operation, more closely resembling the actual combustion processes. The thorniest problem is turbulence; an accurate description of turbulence is currently the single greatest impediment to formulating detailed models of practical combustors. A relatively new numerical method being developed at Sandia, called vortex dynamics, may ultimately provide part of the answer. This new method constitutes another important area of theoretical research, one with potentially large payoff for combustion problems.

A Matter of Degree at SLL

These Sandians recently completed degree requirements under the Labs' Educational Aids Program:

Carole Celoni (8327)	Bachelors in Bus. Adm.	UofSF
Steve Guthrie (8347)	Bachelors in Physics	Cal State/Hayward
Gabe Gutierrez (8273)	Bachelors in Bus. Adm.	UofSF
Art Kellom (8461)	Masters in EE	UC/Davis
Bob Marmon (8412)	Bachelors in Bus. Adm.	UofSF
Blanche Matter (8161)	Bachelors in Bus. Adm.	UofSF
Jan Vandermolen (8010)	Bachelors in Bus. Adm.	UofSF
Marge York (8266)	Bachelors in Bus. Adm.	UofSF
Larry Humphreys (8461)	Masters in EE	UC/Davis

Sympathy

To Moe Robert (8257) on the death of his brother in Central Falls, Rhode Island, June 7.

Congratulations

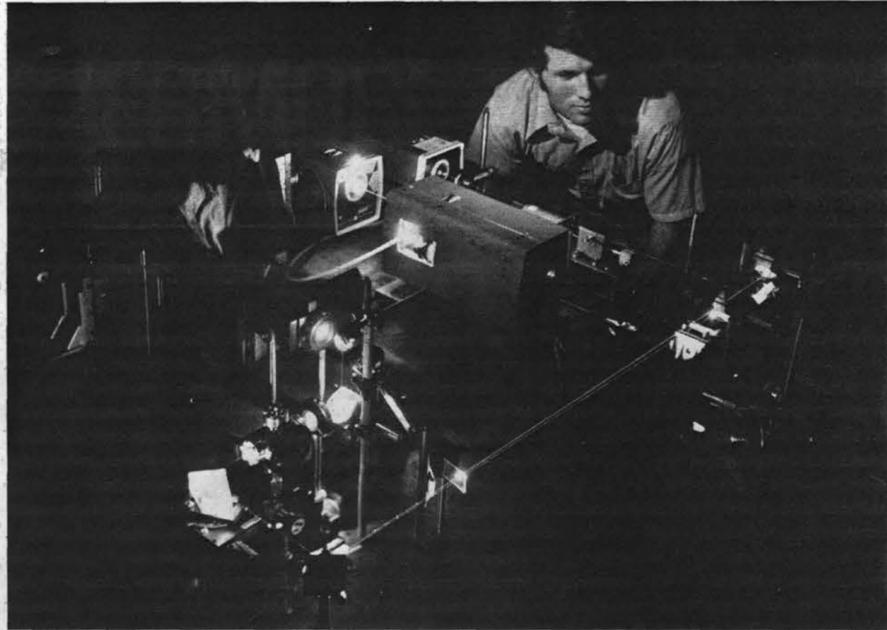
Vic Ham (8314) and Sally Ann Hodges, married in Carson City, Nev., June 3.

Dan Morse (8347) and Joanie Van Hook, married in South Lake Tahoe, Nev., May 6.

Take Note

Security inspectors (Sentry Security) assigned at SLL took two trophies for marksmanship at the regional DOE Pistol Tournament held recently. Sponsored by DOE/SAN, the meet is open to security staffs who protect valuable, hazardous or classified DOE property. Participants competed over two courses: the Camp Perry bull's-eye course in which inspector Carl Feighner placed third, and the National Police Combat course in which Ron Higgins placed second.

The Happy Hookers again finished first in the bowling league's winter competition. Team members are captain Chris Imler (8265), Gil Esquibel (8183), Ray Gott (8424), Jim Rego (8424), and Dick Silva (8257). In second place was the Tigers. Gil Esquibel with a 279 and Chris Imler with a 219 received awards for their high scratch games. Other award winners: Paul Dominguez (8273), Eva Leong (8265), Bob Gaeddert (8210), Jo Ricks (CRU), Dave Ross (8256) and Mary Sandoval.



CARS FOR COMBUSTION—Coherent Anti-Stokes Raman Spectroscopy (CARS), demonstrated here by Larry Rahn of Applied Physics Division 8342, is one of the methods of laser diagnostics being developed for combustion studies at SLL. The technique gives high resolution, strong signals, and good rejection of fluorescent light, advantages which make CARS useful in measuring temperatures and species concentrations in combustion environments.

Lasers Key to Combustion Research

The inside of an engine is a tough place to explore: hot, dirty, highly unsteady, and—most frustrating of all—inaccessible. Yet researchers need to measure temperatures, pressures, and gas concentrations inside the engine while it's operating if they are to improve engine efficiency and reduce pollutants.

Physical probes have been tried in the past, but they disturb gas flow patterns and may change the temperatures and chemical compositions they're attempting to measure. With the laser, however, researchers finally have a tool capable of entering a combustion chamber and measuring precisely what occurs there without disturbing the event.

A laser emits a single, intense, wavelength of light. If an engine has a transparent surface, the laser light can penetrate to the engine interior, where it is scattered by the gas mixture. The scattered light is observed and recorded as a number of lines of different wavelengths.

One type of light scattering is called Raman scattering (after physicist Sir C. V. Raman who discovered it in 1928). The pattern of Raman-scattered lines from a chemical species is unique and thus can be used to tell whether that species is present in the gas being studied. The relative intensities from one pattern to the next give information about the relative amounts of each chemical species present; the relative intensities of lines within a pattern can be used to determine the temperature of the gas.

Another method makes use of light that is absorbed by the gas, then re-emitted. This is called fluorescence, and it is used to supplement the information from Raman scattering.

Laser measurements are extremely accurate. Adjacent lines in a Raman spectrum can be only nanometers apart, yet clearly identifiable. This means that

flame temperatures can be measured to within a few degrees, concentrations to within a few percent.

SLL's new Combustion Research Facility is specifically designed for laser experiments. Part of the building will be set aside just for lasers, whose light will be made available to all of the laboratories by means of an optical ducting system.

Four special laser systems are planned: a pulsed laser with single-line output at high energy and low power density, for Raman spectroscopy of turbulent combustion processes; one which can be tuned across a band of visible colors for resonant and non-linear scattering techniques; one with high average power with single-line emission at a minimum power of 50 watts, for use in spectroscopic studies of steady-state flames; and a laser which can be tuned to infrared lines, for use in detecting trace species.

Lasers at SLL, originally developed in response to weapons program needs, have been contributing to combustion research for nearly half a decade; for example, laser Raman measurements have been made of nitric oxide concentrations in flames. The motive is to determine the mechanisms leading to the production of this pollutant. In other work, fuel-air ratios in an engine have been determined with an accuracy of a few percent. The goal is to be able to map the fuel-air distributions in stratified-charge engines and thus to design cleaner burning versions of this more efficient engine.

The lasers planned for the new facility mean improved capabilities for Sandia staff and visiting researchers alike. And improvement in combustion research should bring more rapid progress toward the basic goals: more efficient engines, better use of our natural resources, and a cleaner environment.

El Camino Real: The Royal Road

During the 16th century, the first handful of Spanish explorers ventured into New Mexico. No defined trail led north beyond the mining camps of Santa Barbara, Mexico, until 1598, when Onate and his colonists developed a new route which extended the Camino Real—The Royal Road—700 miles northward to the capital of the new province, La Villa Real de la Santa Fe de San Francisco.

For more than 200 years this trail was the lifeline for settlers in New Mexico. Caravans subsidized by the royal treasury carried friars and mission supplies, newly appointed officials and settlers, royal decrees, mail and merchandise northward. Much of the merchandise was for the rich only—carved chests and furniture, mirrors, muskets, silk shawls and jewelry.

Abandoning the oxcarts used by Onate, government caravans used heavy-duty wagons with iron-tired wheels and arched hoods, similar to the "prairie schooner" later used by settlers from this country. The wagons had a capacity of some 4000 pounds. The round trip took six months each way and six months in the province to distribute goods. Caravans returning to Mexico City carried retiring officials and friars, traders, salt, pinon nuts; buffalo, deer and antelope hides, sheep, raw wool, some rough woven cloth and, occasionally, convicts and prisoners of war.

A normal caravan consisted of 32 wagons, each harnessed to eight mules. The mayordomo, or wagonmaster, had 16 wagons under his command, and the lead wagon of each group flew the royal banner. These were accompanied by a military escort, herds of cattle and spare mules.

The harshness of the terrain is revealed in the provisions of spare parts: each detachment of eight wagons took along 16 spare axles, 150 extra spokes, 24 reserve iron tires, 500 pounds of tallow (for lubrication), 24 pounds of cord, a 27-pound sledge, a tremendous assortment of small hardware, and an extra team of mules for each wagon.

By 1719, Mexico's northern trade center was Chihuahua in the wealthy silver mining area. For the next 125 years, New Mexico was almost completely dependent upon the Chihuahua merchants. Commercial caravans (mule pack trains began to replace the heavy wagons) now dominated the Royal Road, carrying to Santa Fe tobacco, boots, chocolate, sugar, liquors, imported fabrics, paper, ink, tools and arms. Obligated to buy on credit from Chihuahua, New Mexico traders could never accumulate enough money to own their own goods outright. The low prices paid for produce of the province—100 pounds of New Mexico flour brought only \$2—and the exorbitant prices of the Chihuahua merchants led to a continual drain of New Mexican money—and early day trade deficit.

When Mexico gained its independence from Spain in 1821 and royalty was no longer in favor, the Camino Real became the Chihuahua Trail. Changes began to



take place in New Mexico's economy. The Santa Fe Trail trade from Missouri branched out south to Mexico, undermining the Chihuahua monopoly.

According to Josiah Gregg's *Commerce of the Prairies*, in the year following Mexico's independence—1822—Santa Fe Trail trade with Chihuahua amounted to \$9000. But by 1843, \$300,000 in goods was delivered to that Mexican city. The expanded trade bolstered the economy in New Mexico, and the flow of silver and Mexican mules into Missouri enhanced that state's financial base.

Journals of early travelers on the Camino Real give us this itinerary out of Santa Fe: south to Santo Domingo, following the east

bank of the Rio Grande for the next 150 miles to the camp of Fray Cristobal (near present-day San Marcial), plodding through the 90-mile length of the Jornada del Muerto, then down the river again to El Paso del Norte, and on south through northern Mexico to Chihuahua.

Camps were often made in or near the pueblos. One journalist records a camp at Algodones "where the orchards were enclosed by cactus-crested mud walls." And they camped at Bernalillo, "the home of Julian Perea, one of the wealthiest merchants and ranchers in New Mexico." At Peralta, the camp was at the Chavez hacienda where there were "large corn fields, pastures, cottonwood groves, a comfortable house, huts of Indian servants, all enclosed by adobe walls and an irrigation ditch."

Further south they camped at the Rancho de la Parida (opposite present-day Socorro), but beyond that point the Navajos and Apaches were a threat. Camps were made near water and grass when possible, and defensive corrals were formed by the wagons. The trail wound southward, passing through San Diego (near present-day Rincon) and Robledo (Radium Springs), to Pueblo de Dona Ana, Rancho del Bracito and finally to the vineyard-surrounded Villa del Paso del Norte.

The Camino Real has seen many travelers: Coronado passed over portions of what was to become the Royal Road, Onate extended the route further north, caravans struggled over it until the pueblo revolt in 1680 when the colonists used the trail in their flight south. During the reconquest, in 1693, DeVargas and 800 settlers returned to New Mexico, driving their cattle ahead to trample the brush that had overgrown the trail. American traders and armies later traveled the Royal Road, and the railroad followed a portion of the route in 1882. From unexplored wasteland to a mere foot trace, to wagon trail, to stage road, to railway and finally to paved highway, the Camino Real follows much the same route as it did almost 400 years ago. U.S. Interstate 25 from Santa Fe to El Paso and Mexico's Camino 45 from Ciudad Juarez to Chihuahua and on to Mexico City follow the ancient trail. •nt



Events Calendar

- Through June 25—N.M. Arts and Crafts Fair, State Fairgrounds
- June 23, 24, 25 and June 29, 30, July 1, 2—Corrales Adobe Theatre, "Bus Stop," 8:30 p.m., 898-1943
- June 23, 24, 25—Albuquerque Civic Light Opera, "Fiddler on the Roof," Popejoy Hall, 8:15 p.m., 344-2317
- June 24—Downtown Saturday Night
- June 29—Acoma Pueblo San Pedro Feast Day
- July 5-7—Santa Fe Opera, "Tosca"

Speakers

C. L. Olson (5241), "Experiments and Scaling of the IFA," and "The Power Balance Limit in Collective Ion Acceleration"; R. B. Miller (5246), "Collective-Effect Electron Acceleration"; S. Humphries (5244) and G. Yonas (5240), "Space Charge Neutralized Linear Ion Accelerators for Fusion Applications," Third International Conference on Collective Methods of Acceleration, May 22-25, Laguna Beach, Calif.

D. L. Hicks (5162), and B. Epstein (UNM & AFWL), invited talk, "Error Estimation Procedures for Solutions to Difference Equations"; A. R. Iacoletti (2644), "Computer Graphics at Sandia Laboratories," Spring meeting of the Rio Grande Chapter of the ACM, April 28, Portales.

S. Humphries, Jr. (5244), "Design Considerations for A 10 kA, 1.5 MV Pulsed Linear Ion Accelerator"; W. K. Tucker and E. C. Cnare (both 5233), "Magnet Optimization for Pulsed Energy Conversion"; J. R. Freeman (5241), P. A. Miller (5244), L. Baker, J. P. Quintenz (both 5241), T. P. Wright (5231), J. W. Poukey (5241), L. P. Mix (5242), and M. M. Widner (5241), "Multiple Beam REB Fusion"; K. D. Bergeron (5241) and J. P. VanDevender (5245), "Fast Opening Plasma Switch"; M. T. Buttram (5246), "Current Instability in Electron Beam Diodes with Blade and Needle Cathodes"; C. W. Mendel and S. Humphries, Jr. (both 5244), "Active Circuit Elements for Use in Pulse Power Experiments"; R. J. Leeper (5242), J. Chang (5244) and L. P. Mix (5242), "Beam Target Neutron Production in REB Diodes"; T. P. Wright, L. Baker, J. R. Freeman (all 5241) and M. Cowan (5230), "Numerical Simulation of Compressed Magnetic Flux Pulse Power Generators"; D. J. Johnson, G. W. Kuswa (both 5244), R. J. Leeper (5242), S. Humphries, Jr. (5244), and G. R. Hadley (5241), "Initial Studies of Magnetically Insulated Ion Diode"; D. Woodall, M. Gusinow (both 5215) and J. Anthes (5214), "Measurements of Hydrodynamic Energy Transport in Planar, Laser-Target Interaction Experiments"; J. J. Ramirez and D. L. Cook (both 5246), "Studies of Micro second E-beam Diodes"; R. S. Clark, J. J. Ramirez and K. R. Prestwich (all 5246), "Electron Emission Studies of Planar Diodes for Low Current Density, Microsecond E-Beam Accelerators"; J. P. Quintenz, J. W. Poukey (both 5241), and D. J. Johnson (5244), "Calculations of Magnetically Insulated Ion Diodes"; J. P. VanDevender (5245), "Power Flow in High Current Particle Accelerators for Inertial Confinement Fusion"; J. N. Olsen (5244), M. M. Widner, L. Baker (both 5241), and J. Chang (5244), "Fuel Preconditioning Studies for Electron Beam Fusion"; T. A. Mehlhorn (5241), "Charged Particle Transport Using a Space and Time-Dependent Fokker-Planck Code"; M. A. Sweeney and A. V. Farnsworth, Jr. (both 5241), "Central Igniter Magnetic Targets with Voltage Shaping"; J. Chang, C. W. Mendel, S. A. Goldstein (all 5244), "The C-Diode—A Highly Efficient REB Diode for Target Irradiation"; G. W. Kuswa (5244), "Applications of Pulse Power Technology to Inertial Fusion," 1978 IEEE International Conference on Plasma Science, May 15-17, Monterey, Calif.

R. E. Whan, T. M. Massis, R. K. Quinn and P. G. Neiswander (all 2516), "Corrosion of Pyrotechnic Actuators"; R. G. Jungst and R. N. Roberts (both 2516), "Corrosion of Metal Alloys by Mixtures of Organic Solvents"; D. J. Sharp (5834), "Corrosion-Inhibiting Effect of Platinum Family Metals in Various Thin Film Structures"; H. H. Madden (5114), "Surface Analytical Investigations at Sandia Labs, Albuquerque," 8th Conference on Surface Studies, May 8-11, Savannah River Laboratory, Aiken, S.C.

G. P. Steck (5121), J. R. Wayland (5311), A. J. Russo (1261), W. D. Brown (1351), H. W. Church, et al (5333), J. L. Spring, P. E. McGrath and L. T. Ritchie (all 5413), "Investigations of the Adequacy of the Meteorological Transport Model Developed for the Investigations of the Adequacy of the Reactor Safety Study"; D. A. Dahlgren (5411), G. P. Steck (5121), R. G. Easterling and R. L. Iman (both 1223), "Uncertainty Propagation Through Computer Codes"; R. G. Easterling (1223), "Probabilistic Analysis of 'Common Mode Failures,'" Probabilistic Safety Meeting, ANS, May 7-10, Newport Beach, Calif.

D. R. Koehler and T. J. Young (both 2531), "Transient Frequency Changes Induced by Radiation Deposition in Quartz Resonators"; T. J. Young, D. R. Koehler and R. A. Adams (all 2531), "Radiation Induced Frequency and Resistance Changes in Electrolyzed High Purity Quartz Resonators"; T. J. Young, R. A. Adams and D. R. Koehler (all 2531), "Electrolysis of Synthetic Quartz for Radiation Hardening"; E. P. EerNisse (5133), "Rotated X-Cut Quartz Resonators for High Temperature Applications," 32nd Annual Frequency Control Symposium, May 31-June 2, Atlantic City, N.J.



GEORGE WAGNER (right) with his "little brother" Victor Byrum. They enjoy an easy, relaxed companionship from which both young men benefit.

George Wagner Is A Big Brother

George Wagner (1731) is 22 years old, single, has lived in Albuquerque a year, and is a Big Brother. "In Chicago, my home town," George says, "the Big Brother program is very popular; I've been aware of it all my life. After moving here, I thought about it, checked it out in the city telephone directory and volunteered."

The Big Brothers and Big Sisters Program is sponsored by the Child Guidance Center and funded by Albuquerque's United Way. Volunteers are matched to young people who need mature companionship and who have been recommended for the program by school counselors, churches, juvenile authorities and, very often, by parents. The most common request for a Big Brother comes from the divorced or widowed mother who feels her son needs male companionship.

W. Shurtleff (9321), "Solar Energy System Testing: Some Experiences with Minicomputers"; J. Watkins (5719), "Sandia Photovoltaic Test Experience"; V. E. Dudley (EG&G) and R. M. Workhoven (5712), "Concentrating Solar Collector Test Results"; R. M. Workhoven (5721), "Sandia Laboratories' Mid-temperature Solar Systems Test Facility"; B. Stiefeld (5722) and R. N. Tomlinson (9321), "Data Acquisition and Signal Processing for a Vertical Axis Wind Energy Conversion System"; E. C. Boes (5719), "Solar Radiation Data Modeling and Its Role in Solar System Studies," Institute of Environmental Sciences, May 22-24, Gaithersburg, Md.

R. Alvis (5715), A. Perino (5742) and L. Lukens (5743), "Solar Irrigation—Present Status and Future Outlook," 4th Annual Los Angeles Energy Symposium, May 23.

J. A. Cantwell (3522), invited presentation, "Obsolescence and the American Knowledge Worker: A Study of In-Hours Continuing Education in Five Major R&D Organization," Education Committee, May 2, LLL.

Since last October George has been big brother to a 14-year-old boy whose father is disabled. "Victor is lucky," George says. "He has a loving family but because his father is unable to take part in the normal activities of a teenager, his parents felt that the Big Brother program would be helpful. When I'm with him, I keep reminding myself 'take it easy, get to know him.' It's possible that what I do or say may later influence his own actions, so I want to know him well and I want us to be good friends.

"It's not a big deal spending time with him—sometimes we just have a Coke, walk and talk. We bowl or play basketball or pinball or go swimming. Sometimes we plan for a special event—a couple of months ago we went to watch the Harlem Globe Trotters—but most of the time it's a spur-of-the-moment type afternoon. I usually spend Saturday afternoons with him, and we have one or two phone conversations during the week.

"I can remember how I was when I was Vic's age, so when we have a good time together and I see a certain expression on his face or notice that he's enjoying my company, then I feel good. I'm doing something for this kid, but he's doing something for me, too."

Currently the program has a waiting list of 60 little brothers, ages 7 through 17, who need big brothers. Sometimes these young people need grandparents as well, so retired people who can spare about three hours a week are welcome volunteers also. Volunteers can call the Big Brothers and Big Sisters office at 265-5939 for more information.

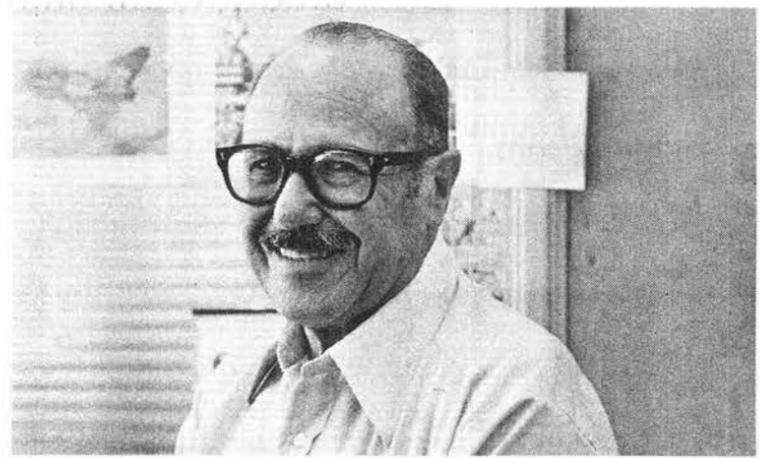
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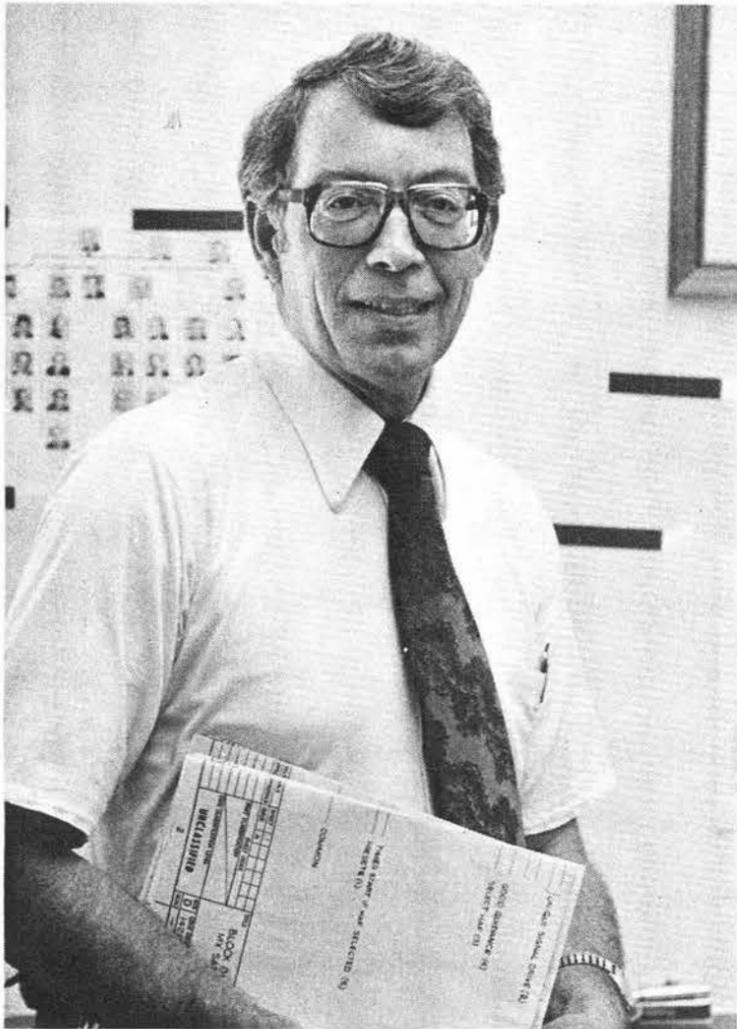
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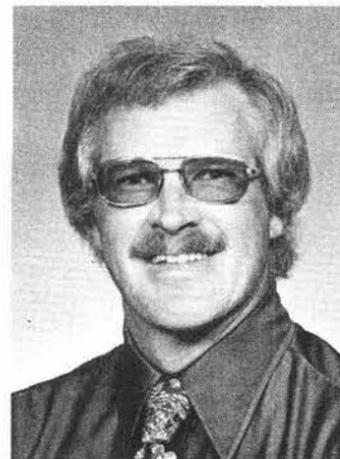
Howard Bluestein - 4335 25



Dan Hardin - 4362 25



Harry Pastorius - 9740 30



Ron Andreas - 1322 15



Florence Brewster - 9631 20



Jessie Waddles - 3421 25



Jack Reed - 5333 30



Jim Wright - 8151 20



George Curry - 1764 30



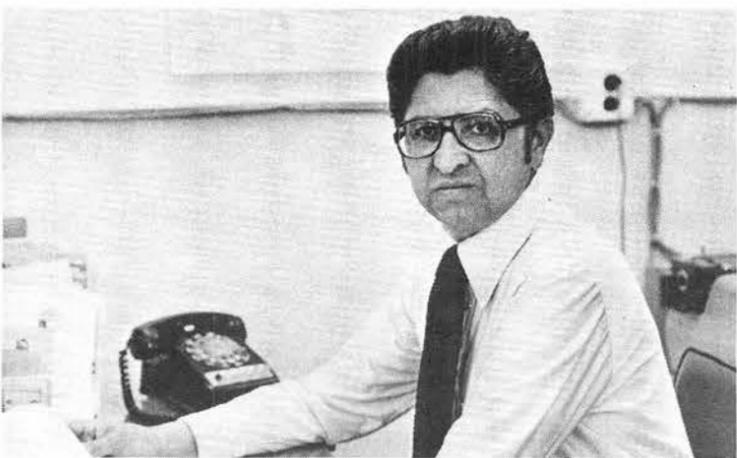
Frank Duggin - 3713 30



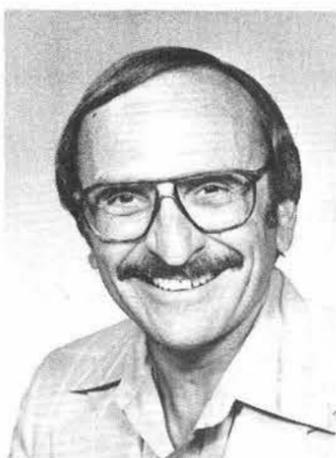
Larry Hoffa - 8272 10



Charles Nidever - 9421 15



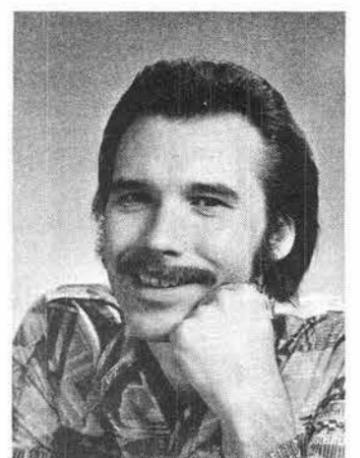
Pete Hernandez - 9422 25



Jim Avis - 4322 25



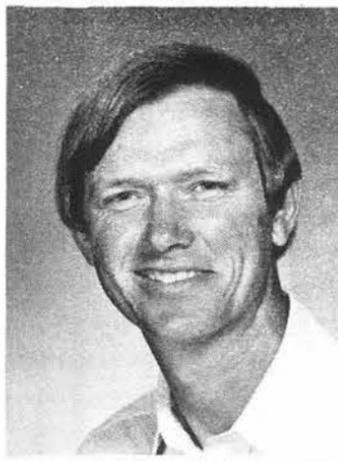
Leo Armijo - 3421 25



Ron Pastrone - 8423 10



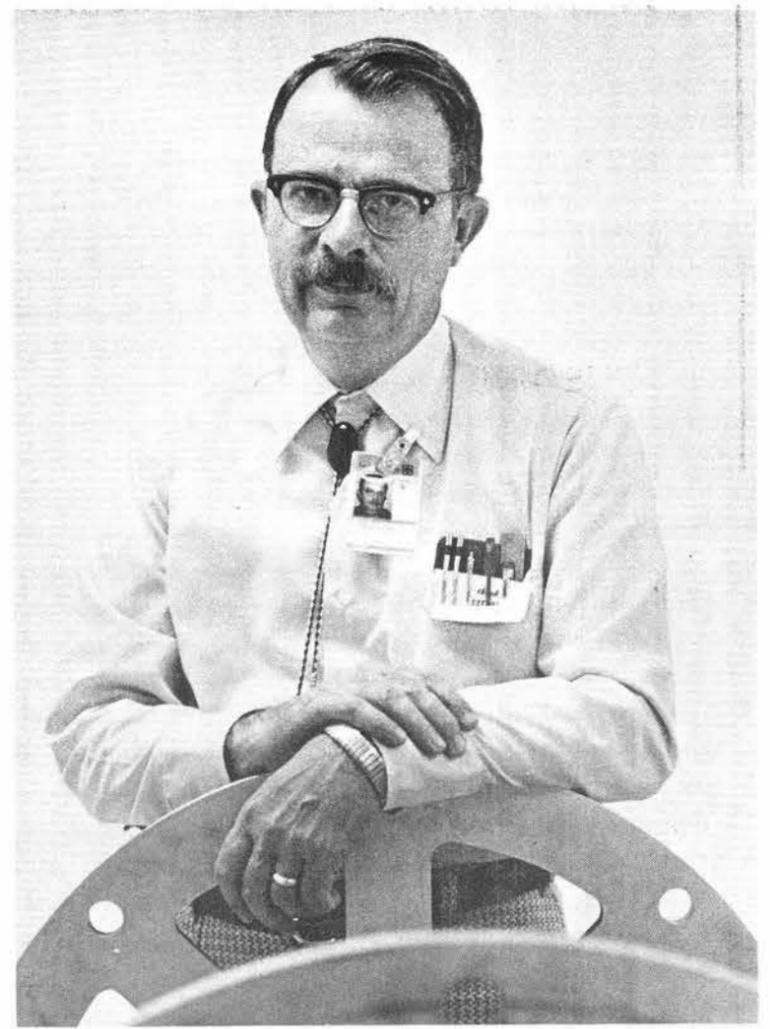
Mabel Bracken - 2000 10



James Martin - 1759 15



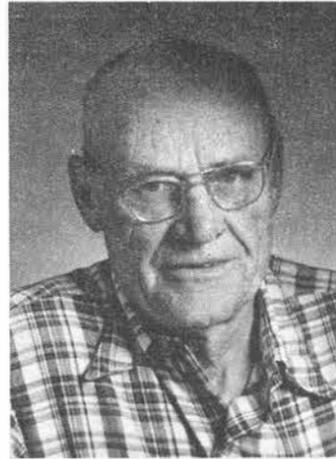
Jack Hubner - 8264 20



Charles Sain - 9341 25



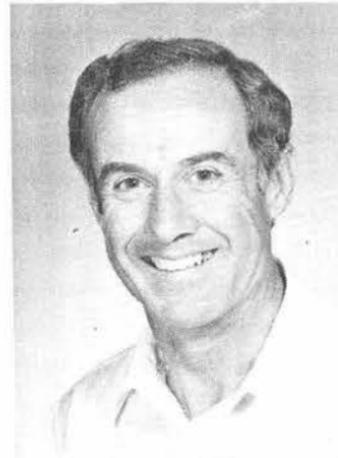
Adolfo Sanchez - 3413 30



Zell Terry - 8257 10



Thomas Hill - 4343 25



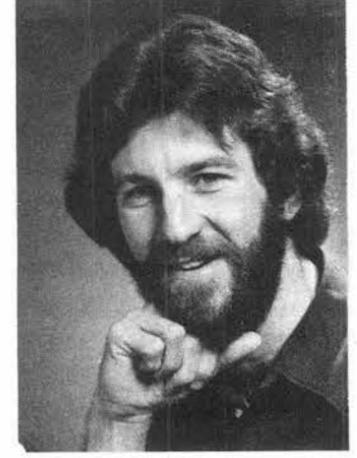
Fred Johnson - 3533 20



Jimmie Robinson - 9631 15



Ted Welton - 1243 15



Tim Sage - 8214 10



Robert Burnett - 2513 25



Connie Coalson - 9335 20



Don Fitchhorn - 9633 30



Marian Goddard - 1522 20



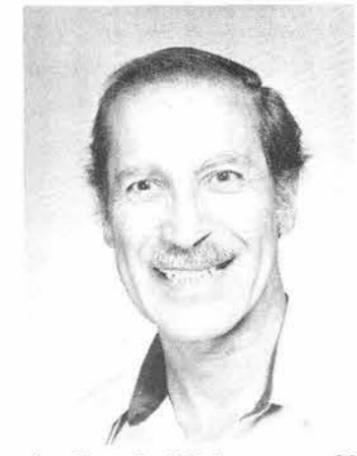
Elsie Anderson - 3421 15



Dorothy Calloway - 2611 20



R. T. Jankowski - 2531 20



Joe Teresi - 9514 30



Herb Gentry - 9718 30



Jose Salazar - 9572 15



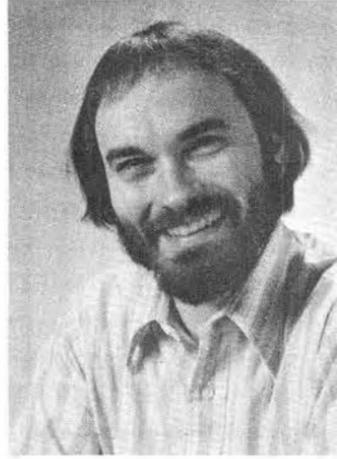
Margaret Boyd - 3732 15



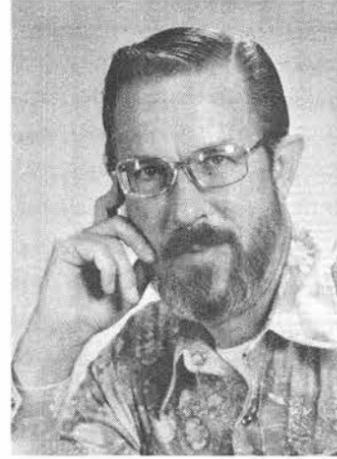
Bob Ware - 8161 30



Lewis West - 9718 30



Terry Heidelberg - 8323 10



Hal Short - 8327 20



Ilene Mathes - 3414 15



Ray Beall - 3727 30



Edwin Wittwer - 1247 25



John Wheeler - 3531 25



David Barton - 3212 15



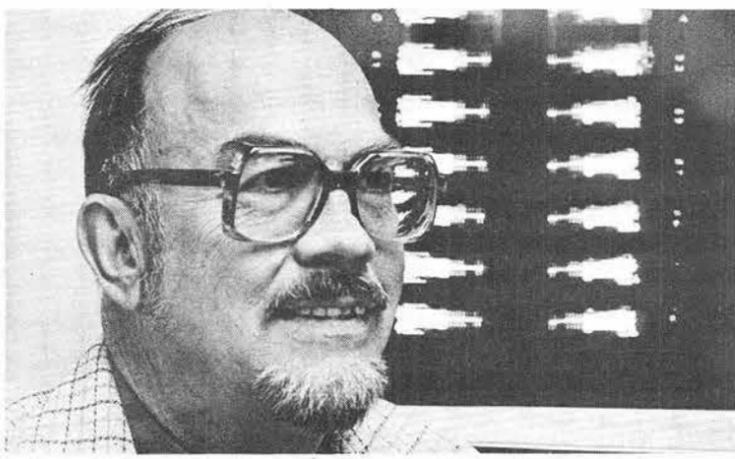
Curtis Specht - 8271 10



George Anderson - 8440 25



Garry Ogle - 1125 20



Doug Ballard - 9351 30



Marvin Daniel - 5742 15



Bob Graham - 5131 20



Don Harwood - 9515 25

Q. A few weeks ago I had occasion to call 4-HELP because someone had passed out in our building. Some of the questions, particularly the name of the person on the floor did not seem pertinent. Just exactly how much information does the system need before responding?

A. I have reviewed our handling of emergency calls with both the receptionists and the nurses. Obviously, the first thing needed is the location of the accident or incident. This frequently requires further inquiry. The calling party assumes the location given is adequate. This must be judged by the individual at the other end of the line, and they know the most common error is inaccuracy in pinpointing the area of the incident. The name of the victim may be particularly valuable because, while the ambulance is responding, we are able to get his or her chart and check it, for example, for a history of diabetes, heart attack, etc. Obtaining this information doesn't significantly alter response time and enables us to more completely evaluate the situation and

feed liback

respond in a more meaningful manner.

P. B. Mossman, M.D.
Medical Director 3300

Q. The micro-wave oven in Bldg. 836 is intended for use in warming the purchased foods. However, 80% to 90% of its use is in the heating of employee home prepared foods.

Why not place a micro-wave oven in all the major buildings for use by all employees?

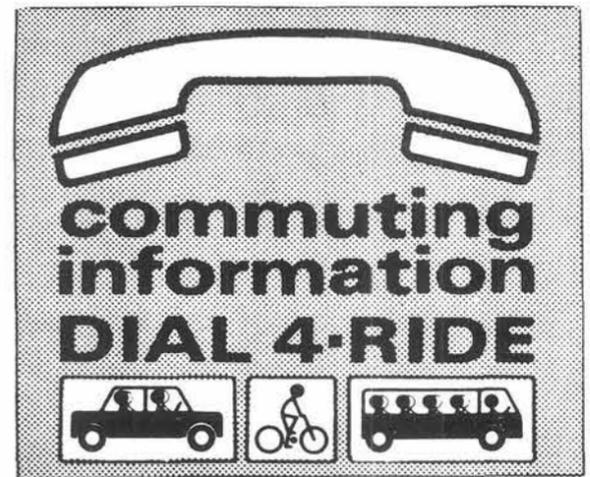
A. The microwave ovens in the vending areas are owned and maintained by the vending contractor. They inform us that these appliances are difficult to keep clean and maintain.

Since Sandia has no personnel that could be assigned for such maintenance, it would not be in the best interest of the Labs to obtain such equipment.

We agree that the first priority for use of the ovens should be purchasers of the vending food and have asked Szabo to

consider putting a sign up to that effect. While we know some employees will disregard such a notice, perhaps others will be more considerate of vending purchasers.

J. R. Garcia—3500



In a display of unabashed totemism, a rock group called "The Good Rats" is attempting a new line to success. Lead singer Peppi Marchello is now known as "Sinatra" Marchello, guitarist Mickey as "Bing" Marchello, guitarist-keyboard player John as "Segovia" Gatto, bassist Lenny as "Leonardo Di" Kotke and drummer Joe as "Ringo" Franco. (Perhaps a name change is in order for the group, too. How about "The Good-But-Namedropping Rats?")

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. 3182 (814/6).

RULES

1. Limit 20 words.
2. One ad per issue per category.
3. Submit in writing. No phone-ins.
4. Use home telephone numbers.
5. For active and retired Sandians and 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

TRASH BAGS, city approved, \$4/box, \$20/case of 6, South Hwy. 14 Project. LAB NEWS office, Bldg. 814.

CONTINUING BARGAIN BOOK SALE: new stocks added every day, hundreds at 5 cents each. LAB NEWS Office, Bldg. 814.

1200x16.5 TIRE, half tread, 8-ply nylon, \$20. Stephenson, 299-3914.

ROLLEICORD V, medium format camera, sharp lens, \$40. Smith, 242-9576.

BABY DUCKS, \$2; chickens, 50 cents to \$5, hatched to 4 mos.; Bantam chickens, 4 mos., \$5; Polish & Houdans, \$1-\$3; will trade or buy hay. Lackey, 898-6638.

CAMPER SHELL, fully insulated, paneled, full rear door, \$200; 7' drafting table & drafting machine, \$90. Stott, 294-2292.

WATER SKI life preserver vest, used twice, \$16. Horton, 298-4449.

HQ-110 hamband receiver, S meter, tuneable BFO, Q multiplier, \$90. Mendel, 265-3840.

CHILD'S stereo, GE, almost new, \$20. Gendreau, 268-3436.

WARDS 15' refrig/freezer, \$50; Datsun 73 L-18 engine & PL610 manuals; L-18 timing chain & tensioner. Aeschliman, 281-1227.

HOTPOINT refrig., 15 cu. ft., \$50. Patrick, 255-5944.

HAND-TIED FISHING FLIES, many types to choose from or I will tie your specialty. DeVenzo, 299-2833 or 299-0088 evenings.

PADDED ANKLE BOOTS, Vibram soles, Goodyear welt, etc., size 12D, too large, \$50 new, 2 trips, now \$20. Baxter, 344-7601.

FOLBOAT, 16', 3-passenger, w/2 dbl. paddles, seat cushions & life vests, \$275. Ames, 256-7007.

FREE KITTENS: some tangerine, some tabby, some part Wildcat. West, 345-4827 or 281-3460.

SINGER sewing machine, Model 900 Futura w/cabinet, auto. buttonholer & plaid matcher, stretch & decorative stitches, all attachments, \$600. Ruvolo, 296-1316.

KENMORE washing machine. Michele, 298-8576.

DINETTE SET, wrought iron w/stained oak formica top, 4 chairs, extension leaf, \$200. Owyong, 294-1884.

GARAGE door opener, Heath, screw-drive, \$90. McConnell, 255-2488.

LARGE Stratolounger recliner, brown vinyl, \$85; 8' table saw w/27"x44" table, \$165. Browning, 299-6384.

COMPONENT STEREO: Scott solid-state amplifier, tuner; Garrard changer; Electrostat-4A speakers, 11 yrs. old, new cost \$1070, sell for \$250. Schkade, 293-7453.

PLASTIC boat battery box, \$3.75; Lionel train set, model 244 "O" gage, best offer. Sherwood, 299-2169.

CB BASE STATION antenna, 0.64 wave, Radio Shack model 21-964, \$35. Gallagher, 821-7452.

WINCHESTER Model 70 22/250, new, \$175 cash. Gonzales, 247-9406.

BUNDY clarinet, \$65; .22 automatic, \$85; Nechi sewing machine, \$150 or best offer. Herrera, 836-1768.

U.S. STAMPS: mint plate blocks 40's, 50's, 60's, used commemorative 40's-present. Korbin, 821-9658.

LADIES' RINK SKATES, white, size 4, \$20. Lewin, 898-2303.

72 FIREBALL Travel Trailer, completely self-contained, sleeps 2, shower, gas-elec. refrig., \$2000. Kelsey, Belen, 864-7692.

SCREEN DOOR, left hand opening, unframed aluminum, 32" wide, \$30 or best offer. Finning, 298-0743.

TRAVEL TRAILER, Fireball, 17', pressurized water tank, sleeps 6, bathroom holding tank, spare tire, elec. brakes. McTigue, 266-3652.

10 1/2' Eldorado Camper, self-contained, Mohawk model. Kaspar, 293-6070.

8mm SOUND MOVIE projector, Technicolor model 1300, cost \$550, will take \$300 or trade for 35mm SLR camera. Guerin, 299-4677.

SWIMMING POOL FILTER, Ward's Hawthorne Model No. SHE 6164, 1400 gal./hr., \$40. Stevens, 299-6086.

CUSTOM sewing, crochet & knitting for women, men & children. Keck, 294-2887.

STEREO record player, GE, \$20. Magnuson, 821-5330.

71 COLEMAN TENT TRAILER. Gallegos, 298-9235.

HONEYWELL PENTAX Spotmatic camera (screwmount), w/f1.4 50mm lens + f 3.5 135mm telephoto lens & f 2.0 35mm wide angle, w/cases & sun shades, \$250. Brewster, 898-0144 after 5:30.

BMX-BIKE, \$15; electronics set, \$5; fold-up ping-pong table w/casters, \$20. Madden, 296-1082.

WALL TENT, 10x12, \$25; stn. wgn. luggage carrier, \$20; 3HP outboard motor, \$95; rollaway bed, \$25; lawnmower, \$5. Bradley, 298-2263.

CAMERA LENS, Zoom-Macro, 38-90mm, "T" mount, auto coupled

for Canon SLR, \$140, cost \$198. Whitfield, 299-4521.

COLOR TV, 25" console, \$250; portable 21" B&W TV, \$150; AM/FM phonostereo, console, \$300. Gallegos, 255-5264.

TRANSPORTATION

'63 FORD Galaxie 4-dr. sedan, V8, std., AC. Burchett, 299-1689.

'72 YAMAHA Enduro 360cc, recently overhauled, \$400. Kelsey, 266-6460.

'75 TOYOTA Corolla HT, 8-track, R&H, AC, ski rack, 38,000 miles, 5-spd. Garcia, 298-0726.

'68 FORD LTD, 390V8, AT, PS, PB, AC, many extras, 73,000 miles, needs paint, \$350. Wedaman, 299-1598.

'74 VEGA Hatchback, new shocks, tires, \$950. Baca, 247-4841, 5-10 p.m.

GIRL'S 24" blue & silver spyder bike, banana seat, butterfly handlebars & basket, \$35. Carter, 296-8709.

'71 DODGE Coronet, AT, AC, new tires, low mileage, \$850. Klimas, 881-0294.

'74 MONTE CARLO, AC, PB, PS (tilt), AM radio; '77 650cc Yamaha w/extras, 1000 miles, \$1550. Gonzales, SFE 982-2831.

'73 CHEV. 3/4-ton, AT, PS, PB, AC, 454 V8, camper shell, trailer package, 50-gal. gas capacity, loaded, \$2990. Klecotka, 821-1466.

'72 CHEVROLET 1/2-ton 4x4 pickup, 350, PS, PB, AT, LWB, \$2200. Wilkinson, 299-8327.

'76 HONDA 550CB, low mileage, \$1300. Swagerty, 821-8437.

'74 HONDA Elsinore MT 125cc, \$395. Sarason, 299-2443.

'76 Caddy El Dorado, gold w/white top, low mileage, below book, \$6950. Browne, 881-3772.

'73 JEEP PICKUP, \$2895. Marder, 268-9643.

'75 DODGE Ramcharger, 4-wd, loaded SE package, mags T.A radial 60's. Hopper, 292-3059 after 5.

'65 BUICK LeSabre 4-dr., AT, R&H, \$250 or best offer. Herrera, 836-1768.

'69 CHEVROLET BelAir 4-dr., 6-cyl., std., \$600 or best offer. Herrera, 836-0687.

KAWASAKI-KZ 200, '78, \$575 or best offer. Peet, 294-1250.

'74 VW BUG, lt. blue, AM/FM radio, new radial tires, \$2050. Harrer, 294-4069 or 344-3957.

'76 FIAT X1/9 sports car, new Michelin steel belted tires, AM/FM radio, yellow, \$3850. Galbraith, 298-0712.

'75 VEGA GT Hatchback, 37,000 miles, \$1700. Kenna, 298-6059.

'72 FORD 3/4-ton, PS, PB, AC, dual wheels, '72 Coachman 11' camper, many extras. Ward, 255-5780.

'69 FORD Galaxie, 4-dr., AC, PS, AT, 390 cid V8, \$600. Van Deusen, 299-4328.

'77 DODGE 1-ton D300, Adventurer SE package, PS, PB, AT, 360 V8, dual tanks, dual wheels, \$5700. Jensen, 266-0849.

BOAT, 14' aluminum Deep-V, cartop, \$195; Merc outboard 20HP, old but good, \$75. Hueter, 242-1620.

REAL ESTATE

NE HEIGHTS TRIPLEX, all furnished, low 50's, 509 Vermont NE, no agents. Chavez, 255-1585.

2-BDR. HOUSE & 2-story barn on 1 acre; plus option to buy 2 more acres, in Peralta area. Abeyta, 869-2524.

INEZ BRICK, 2310 sq. ft., 3-bdr. plus spare, lg. den, fp, lg. lot, low 70's, evenings & weekends. Ray, 299-1253.

3, 4, 5 or 6 BEDROOMS, 2408 sq. ft., 2 1/2 baths, lg. rec room, wet bar, full basement, mature trees, Juan Tabo/Menaul area, \$54,950. Asprey, 296-6673.

2-BDR. TOWNHOUSE in Shadow Hills, LR, den, 2 fp, 2 baths, DR, lg. kitchen, refrig, AC, landscaped, view. Hurford, 299-9477.

3-BDR HOME, workshop, garage, \$35,000. Ray, 296-8923 after 5:30.

3-BDR on .1 acre, irrigation rights & horses allowed, near Central in SW Valley, \$36,000. Chavez, 243-4825.

FOR RENT

3-BDR., NE, LR, lg. den, FP, washer, dryer, refrig., built-ins, gas bbq, dbl. garage, sprinklers, near schools & shopping. Gurule, 294-6541.

LARGE 2-bdr. on Constitution west of San Mateo, den w/fp, 1 1/2 baths, carpeting, all appliances, freezer, hwc, dbl. garage, lg. yard, refrig, AC, lease, \$325/mo. Browne, 881-3772.

NEW BRICK, 3-bdr., den, fp, 2 baths, NE Heights, AC carpeting, dbl. garage, landscaped, dishwasher, disposal, \$475/mo. Lutheran, 293-8364.

EASTRIDGE, 3-bdr., LR, DR, FR w/fp, 1 1/2 baths, utility rm., dbl. garage, carpet, drapes, built-ins, \$420 water paid, first, last, \$200 DD. Kenna, 298-6059.

3-BDR., den, fp, LR, all kitchen appliances, carpeted, drapes, fenced, landscaped, Manzano NE, \$350/mo., lease/yr., water paid. Moody, 292-2975.

NE HEIGHTS, near base & schools, 6 yrs. old, washer, dryer, refrig., stove, 3-bdr., 1 1/2 baths, garage, carpeting & drapes, \$325/mo. Ball, 265-8025.

3-BDR., 1 1/2 baths, den, carpeting, drapes, appliances, NE Heights, near Sandia HS, available July 1,

WANTED

TRADE 30m Madeira for classical guitar. Williams, 345-1444.

RE-LOADING DIES for .270 & 22-250. Stuart, 299-9190.

TO RENT 1- or 2- bdr. unfurnished house w/garage. Richardson, 298-6527.

BOY'S BICYCLE, 20-24 inch, 3-5 speed, good condition. Aeschliman, 281-1227.

BOOK: *What To Do Till The Messiah Comes*, by Bernard Gunther. George, 194-4603.

DARKROOM EQUIPMENT: enlarger, timer, film holders, tanks, dryer, whatever. McConnell, 255-2488.

WIND deflector to reduce air drag on camping trailer. Cropp, 296-1877.

USED concrete mixer; Abney hand level such as used by engineers in highway work. Causey, 881-7534.

RIDE from 312 Graceland SE to Bldg. 800. Weiss, 266-2278.

WATER SKIS with slalom; ski vest. Heuter, 242-1620.

WORK WANTED

SUMMER WORK, window washing, trash hauling, yard work, vacation watering, house sitting. Peter Shunny, 265-1620.

SITTING for house, children, yard, dogs, plants. References provided, experienced in dog grooming, university student. Judy Holpp, 299-4809.

PAINTING, landscaping, home maintenance, hauling, repairs; college student, have tools & pickup. Stixrud, 298-0478.

LOST AND FOUND

LOST—One Sandia-type notebook & one govt. black notebook, blue zipper Sandia briefcase, man's bifocal glasses in black case, man's black shell-rimmed bifocals, tire & rim, glasses w/bluish grey frames in black case with name inscribed, silver rimmed safety glasses.

FOUND—Small roadrunner tie tac, religious medal on chain, 5 keys (one electric blue), 2 men's turquoise rings, Cross pen. LOST AND FOUND, Bldg. 832, 264-1657.

Coronado Club Activities

Only 10 Days 'Til July 4

FOR PEOPLE who count such things, it's only 10 days until the Club's gigantic 4th of July old fashioned picnic and celebration. Swimming, games for all age groups, Happy Hour bar, 25 cent beer, and a concert by the Albuquerque Municipal Band are all part of the 11 a.m. until 6 p.m. celebration. The snack bar will be open all day featuring a special hot dogs and bean plate for \$1. Admission is free for members and families.

TONIGHT'S HAPPY HOUR features Cornish game hen on the buffet menu, Natural Persuasion on the bandstand with singer Charlie Baca. On Friday, June 30, Happy Hour will see a giant steamship round of beef buffet and the Mellotones playing for the dancing.

TOMORROW, a mighty group called Brown Sugar returns to the bandstand to wail from 9 to 1 for Soul Session. Admission is free to members, guests \$1.

VARIETY NIGHT, Saturday, July 1, will present two short plays by the Albuquerque Children's Theatre—great fun for the youngsters—and a movie called "Sammy the Way-Out Seal." Admission free to members.

SUPER SINGLES PARTY is set Friday, July 7, starting at 4:45 at the Club's Annex pool. Swimming, dancing and goodies are planned.

THE CORONADO WOLFPACK can save you a bundle on UNM season football tickets. Buy them at the Club office by July 10 and pay only \$21 per seat. They're good for six home games. For more info call Pro Padilla (3735) or Bill Duggin (5233).

MAZATLAN, also known as the Coronado Club South, is a fantastic travel package scheduled Oct. 28-Nov. 4. The tour includes seven nights at the Playa Mazatlan resort hotel, a cocktail party and a Fiesta entertainment evening. Available in the area are excellent deep sea fishing on charter boats, the best seafood restaurants in the hemisphere, scenic tours, golf, swimming on the beach, etc. The cost is \$275 (dbl. occ.) and \$314 (singles). Sign up right away; this one fills up fast.

CANCUN on Mexico's Yucatan Peninsula near the Mayan ruins of Chichen Itza is scheduled for Sept. 9-16. The basic package includes air fare and seven nights in the Cancun Caribe, Mexico's newest resort. Cost is \$366.50 (dbl. occ.) and \$436 (singles).

Travel Director Ed Neidel will be in the lobby tonight from 6 to 7 with the scoop on these trips plus others. Check about discount tickets on the Cumbres and Toltec scenic railroad tour Aug. 26.



THREE-LEGGED RACES (demonstrated by C-Club lifeguards Dennis Newman and Helen Atkins), pole climbs, balloon tosses and sack races for all age groups are just part of the fun scheduled for the Club's old-fashioned picnic and 4th of July celebration. The Albuquerque Municipal Band will play a concert from noon until 2 p.m. and Happy Hour prices will be in effect all day. C'mon out; it's free to members.

FRIDAY	SATURDAY
<p>23—HAPPY HOUR Cornish Game Hen BUFFET</p> <p>Adults \$3.50 Under 12 1.92</p> <p>NATURAL PERSUASION</p>	<p>24—SOUL SESSION 9—1</p> <p>BROWN SUGAR</p> <p>Members free Guests \$1</p>
<p>30—HAPPY HOUR STEAMSHIP ROUND OF BEEF BUFFET</p> <p>Adults \$3.50 Under 12 1.92</p> <p>MELLOTONES</p>	<p>JULY 1— VARIETY NIGHT Two short plays by Albuquerque Children's Theatre</p> <p>"Sammy the Way-Out Seal"</p> <p>Food—6 Show—7</p>



Two University of Edinburgh researchers recently reported in the Journal of the Royal College of Physicians of London that what we destroy awake, we restore asleep. "The sleeping/waking rhythm of higher animals induces concomitant fluctuations in cellular work," they report. "As a consequence, metabolic balance alters so that degradative processes are stimulated during activity or waking, and restorative processes are inevitably favored during inactivity and sleep." The restorative process probably doesn't apply to losses in the market or at your Friday night poker game.

