

LAUNCH ANGLE of 20 degrees is used for new high velocity, low altitude rocket test vehicle designed by Sandia. Gary West (7250-A), test project manager, inspects the two-stage vehicle on launcher at Tonopah Test Range.

### High Velocity at Low Altitude

## New Sandia Rocket System Tested at Tonopah Range

On May 21 a new kind of Sandia designed two-stage rocket streaked low over the Tonopah Test Range. Designed as a high velocity, low altitude test vehicle for materials research and studies of aerothermodynamic heating, the rocket system's maiden flight was — with minor qualification — successful.

The system is designed to achieve 9000 feet per second (Mach 8.6) at an altitude of 10,000 feet above the range. The trajectory rises to 20,000 feet and impact is some 20 miles downrange from launch. Total flight time is about 200 seconds, of which six seconds is burn time. At apogee the 65-pound payload separates and is recovered by parachute.

The rocket has the greatest acceleration of any system tested at Tonopah — 40g on the first stage Terrier and 105g on the Second Stage Recruit.

The trajectory is achieved with a launch angle of 20 degrees and "flare stabilizing" of the second stage. The rear of the Recruit motor flares from 9 to 18 inches in diameter. The flare provides better stability than fins would at high Mach numbers and serves to slow the vehicle after burnout. The flare also allows for greater efficiency in the expansion of the rocket gases and, thus, more thrust is achieved.

The system performed to expectations during its first flight from the moment of launch through burnout of the second stage plus two seconds. At this point the vehicle broke apart at the payload-to-

motor adapter. However, the payload and second stage motor were recovered with only minor damage caused by impact.

"We're convinced that using a different kind of ablation material on the flare section will solve our problem," designer Larry Rollstin (9324) says. "With the exception of burning through a portion of the flare (which caused an angle of attack which in turn caused the vehicle to break apart), the flight was successful. Telemetry data shows that the velocity was approximately 9000 feet per second."

A second system, slightly modified, will be flown at Tonopah in about six weeks, Larry says. A test program using seven of the vehicles will be conducted for Ken Cole of Fluid Dynamics Division 9341 following the successful completion of the Tonopah tests.

Larry is responsible for the aerodynamic design and ballistics of the system. Bob Fellerhoff (9323) performed mechanical design. Dave McVey (formerly 9328, now 1543) did the nose cone design. Don Johnson (9324) is responsible for the recovery system and Larry Lauger (9328) for the thermal protection coating for the vehicle. Project leadership is shared by Bill Barton, supervisor of Rocket and Recovery Systems Division 9324, and Ed Rightley, supervisor of Mechanics and Programming Division 9323.

With the exception of the rocket motors, the entire vehicle was fabricated in Sandia's Development Shops 4200.

### Simulation By Computer

## Marshall Berman Moves Mountains

On the screen is a diagram. At first glance it looks like hundreds of odd-shaped blocks. Then it moves and it makes sense. It is some kind of chamber and it is blowing apart. The convolutions continue for about three minutes. The yellow blocks have contracted and expanded while the red, green and blue blocks have moved, scattered and some have disappeared.

The lights are snapped on and Marshall Berman (9112) explains that the movie is a computer simulation of an underground nuclear explosion. Since joining Sandia 18 months ago, Marshall has been investigating variations of stemming designs which keep the explosions contained underground.

Recently he has programmed the problem so that one of the final outputs is on color film. Some problems have been programmed in three dimensions so that the diagram appears to have depth. The printed computer output is generally so complex and voluminous that movies are essential for analyzing the computer results. The viewer can then quickly perceive the scope and action involved.

The problem represents a tremendous amount of work. More than 2300 individual blocks (or zones) are defined. In addition to the geometry of the zones, many other physical parameters such as weight, density, energy, temperature, etc., go into the definition.

A complex system of equations embodied in computer hydro-codes then manipulates the zones according to a governing set of

differential equations that represent the flow of energy from the device into the surroundings.

Each of the movements of the movie represents nearly infinitesimal points in time.

Marshall's achievement is this: his work gives the designer concerned with underground nuclear tests information that is available from no other source. It is extremely valuable in the planning phases of a test.

How accurate is the simulation?

Marshall shrugs. "Let me say this. The computer simulation of Sandia's last underground shot approximated the real event in those areas where we are able to make measurements. There are other dimensions to the event that are physically impossible to measure. Here we must rely entirely upon the computer."

Marshall emphasizes that the computer simulation takes into account great masses of data — all of the things that are known about the device, the structure of the chamber, the geology of the earth and other factors that bear on the test. These data are manipulated by the hydro-codes which reflect what has been learned. Hours of computer time are needed, and the programs are continually revised in light of new data and new information.

In one case Marshall noticed that the computer simulation was "off" in the area

(Continued on Page Two)

# LAB NEWS

VOL. 22, NO. 13

JUNE 19, 1970

SANDIA LABORATORIES - ALBUQUERQUE NEW MEXICO & LIVERMORE CALIFORNIA

## Local Universities Confer Degrees On Sandia Labs Students

Degrees were conferred upon a number of Sandians during recent commencement exercises at universities in New Mexico.

Most of the student-employees completed their studies under one of Sandia Laboratories' programs: Education Aids Plan, Computer Science Program, or Doctoral Study Program.

Those receiving PhD degrees at the University of New Mexico were: Thomas Edrington (2625), electrical engineering; Edward Graeber (5522), geology; Charles Harner (7292), mathematics; Carl Murphy (7362), physics; and Harold Mackay (5314), biology.

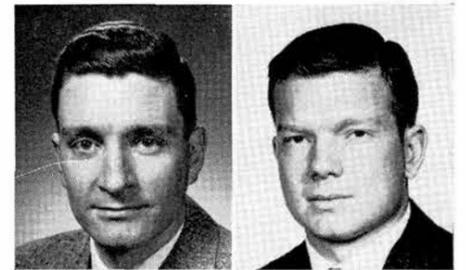
Master of Arts degrees were conferred upon Ken Miller (3463), art, and Merrill Jones (7451), mathematics. Those receiving Master of Business Administration degrees included Ronald McIntire (7634), Richard Reed (4122), Richard Shepardson (3135), and Ralph Bonner (3121).

Master of Science degrees were awarded David Barnes (7211), Gail Barton (1222), Gary Benson (2443), Leonard Flesner (7422), Leon Maschoff (7291), Robert Mikkelsen (7291), Henry Monteith (9422) David Nokes (2452), Lawrence O'Connell (2442), Kazuo Oishi (7262), and Stanley Roescke (9322) all in electrical engineering; Jerrel Lochner (2316), nuclear engineering; Jose Martinez (7344), civil engineering; John Middleton (1551), nuclear engineering; Donald Rigali (9328), mechanical engineering; Carl Curtis (7263), mechanical engineering.

Those receiving Bachelor's degrees at the University of New Mexico were: Edwin Moss (9411), Lynne Dehghanmanesh (1224), Fred James (9223), Dal Jensen (2615), Edward Lane (2344), Carlton Pennington (4574), James Simpson (7263), Isaac Griego (4121), and David Shank (7634).

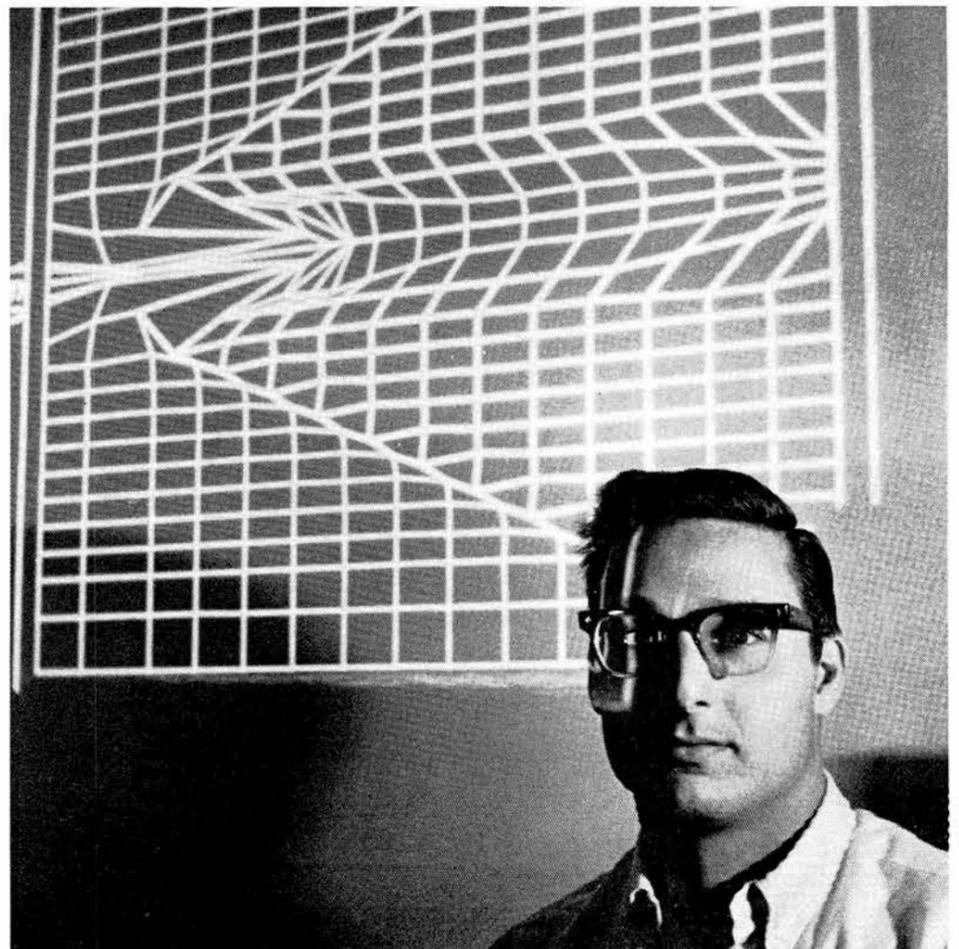
At the University of Albuquerque, Bachelor's degrees were awarded Joe Garcia (4611), Donald Gould (2341), Norman Grandjean (1221), Kenneth Grothaus (2343), and Maurice Tobyas (4252). Wayne Cyrus (5314) will receive his in August.

In addition, MS degrees in metallurgy



DOCTORAL DEGREES were conferred on Edward Graeber (5522), and Tom Edrington (2625), upper row, and on (l to r) Charles Harner (7292), Harold Mackay (5314), and Carl Murphy (7362) during recent commencement exercises at the University of New Mexico.

were conferred upon Maurice Karnowsky and Charles Albright (both 5535) at New Mexico Institute of Mining and Technology, Socorro.



COMPUTER SIMULATION of underground nuclear tests has been programmed by Marshall Berman (9112) to include three-dimensional, color movies as output on the problem. Design in the background is a hypothetical exercise.

# What's Solution for Waste Disposal?

Are environmental problems like the weather — everyone talks about them, but no one does anything? In some ways this may be true. Pollution, population increases, and threats to our natural resources are all popular subjects at the moment for every citizen, from children in grade school to politicians in major offices.

This instant interest worries environmentalists. They fear that the public has taken on environmental problems as the latest fad and that the interest will disappear as fast as it developed. This may be true, but the extensive coverage of environmental problems by all media cannot help but arouse a lasting concern in at least some people. And public knowledge of the problems will make it easier to sell solutions.

Already colleges and universities are coming up with environmental workshops and other special courses; biologists and other scientists are beginning to specialize in this field; someday a national conscience might even be developed about littering.

What kind of improvements can we expect? Well, research chemists of the Department of the Interior have developed a new process which would produce a barrel of oil for each ton of organic waste. The oil could be refined into gasoline or other petroleum products.

In the process, the chemists took wet, ground up garbage and paper and exposed it to carbon monoxide and steam at about 700° F. for 20 minutes. The treatment converted 90 percent of the organic material in the garbage and paper into a substance that was 40 percent crude oil and 60 percent water, with only minor amounts of gas and ash.

No one claims this would be an economical way to produce petroleum, but the process would dispose of waste and leave something useful in its place.

Another approach has been suggested by two Atomic Energy Commission scientists. They believe the answer to disposal of waste materials may lie in development of a controlled fusion process; the extreme heat would vaporize the stuff and might break it down into its elemental forms for reuse. Unfortunately, development of the fusion torch may take a few decades.

Still another solution has been suggested by conservationists in California. They figure that one ton of waste paper, salvaged and recycled, would save the cutting of 17 trees. In a month-long trial in San Francisco, housewives bundled up 70 tons of newspapers a day. The waste paper was collected by the city refuse collectors, freighted to a recycling plant in Pomona, and transformed into new rolls of newsprint within a week.

To be economically feasible, a \$15-million recycling plant would daily require a minimum of 300 tons of newsprint — the

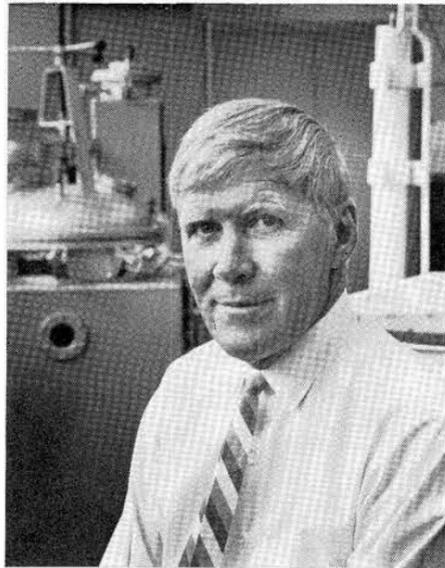
equivalent of some 5000 trees per day. The entire Bay Area could probably support a salvage program of this magnitude, but housewives (and others) would have to cooperate by separating waste paper from other trash or garbage.

Several Sandians have opinions about how the problem of solid waste disposal might be solved:

Corry McDonald (3416) discusses the disposal of waste paper: "Paper should no longer be burned because this contributes to air pollution, but paper does comprise the bulk of waste. I think that waste paper should be converted into 'noodle pulp,' using existing commercial machinery, and this pulp then recycled into building paper or fiberboard. With the addition of cement and minor amounts of polyvinyl chloride, the pulp could be processed into building blocks.

"If the waste paper at Sandia Laboratories were recycled, appreciable savings in disposal costs could probably be recovered. We'd need a few extra paper baskets, but only the simplest sorting would be necessary. A small amount of wetting agent in the noodle pulp machine dissolves inks and coatings. Ordinary staples are no particular problem.

"Best of all, since noodle pulp is part of the paper making process, this use of waste paper would limit the need for additional pulp plants."



Al Quant

Al Quant (5513), who has worked in the field of plastics for many years, has these feelings: "The big problem with plastics is that there is no way to make them biodegradable, and burning is neither efficient nor economical — in fact, some plastics (such as vinyl and Teflon) emit toxic gases when exposed to temperatures high enough to cause melting.

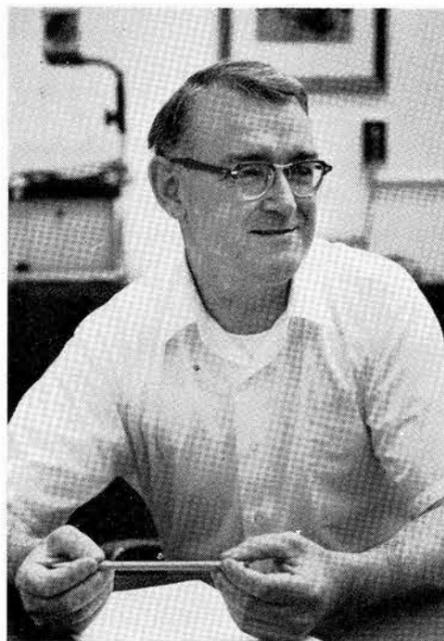
"That leaves burying as the only practical solution. Gather all plastics in a plastic bag (naturally!) and grind them up to reduce the volume.

"I firmly believe in a dust-to-dust policy with all material created from natural products returned to the soil in some useful form. Perhaps a disposal tax imposed at the manufacturing level would make it economically possible to grind up waste plastics so that, combined with fill soil, at least some type of ground cover could be grown."

Craig Hudson (1751) has this to say. "There is no technological reason why solid wastes cannot be fully integrated into our economy so that we have — in a sense — a closed ecology. But economics itself prevents this integration.

"Government subsidies have been used to overcome other economic disadvantages and we need such subsidies now. These grants should be made available to industry, to engineering schools, even to the general public, offering support for the development of good ideas showing ways in which worn-out, damaged, or outmoded products can be recycled into the same or another industry.

"It will take a generation to realize that controlled solid wastes can be achieved, but this will not come without some changes in industry. For example, it will be more expensive to build an automobile if old chassis have to be used. Municipal garbage dumps could be converted into garden compost processing areas by the use of certain bacteria, but plastics would have to first be separated from the garbage by



Craig Hudson

the consumer. Old refrigerators, TVs, washing machines, etc., could be rehabilitated and exported to have-not nations (assuming they would take them).

"But first we need an educational program which will urge the reuse of resources and thus encourage the acceptance of a closed industrial ecology."

## Sympathy

To Kenneth Harper (4542) for the death of his mother in Wichita, Kan., on May 28.

To Dan Fenstermacher (7261) for the death of his sister in Oklahoma City, on June 6.

To Franklin Myers (4518) for the death of his father, June 8.

## Congratulations

Mr. and Mrs. Jerry Freedman (DSP, Northwestern University), a daughter, Deborah Lynn, May 17 in Evanston, Ill.



JOSE SANCHEZ  
Instrument Service 7513



RONALD BURKE  
Design Analysis 9512

## Take Note

Don Bliss (7533) has been elected treasurer and a member of the council of the Albuquerque School Volunteer Program (formerly Albuquerque Tutoring Council). He has been active in the council for some time and, during the past school term, tutored a 13-year-old boy in math and reading. Don participated in a recent drive for additional Sandia volunteer tutors.

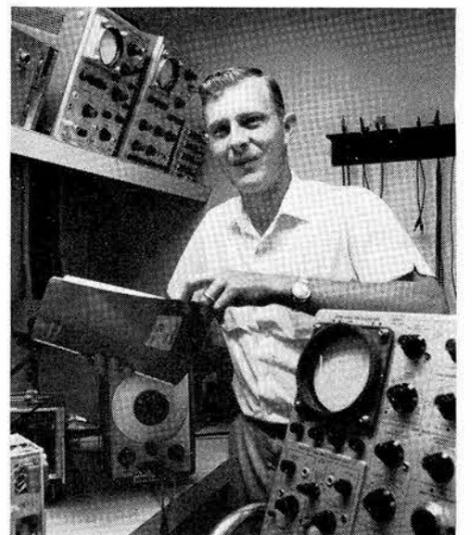
If you're planning a visit to Disneyland anytime between now and Sept. 13, stop by Employees Services Division 3123 and pick up a "Magic Kingdom Club Card." This card, presented at the Disneyland box offices, enables a Sandian and his family to purchase tickets at a discount. In addition, the card offers special discount rates at the Disneyland Hotel. Employee Services is located in Bldg. 832, Rm. 30, ext. 2757.

Galen Straub (5151) will present "Pseudopotential Determination of the Martensitic Phase Transition in Sodium" at the 5100 Staff Seminar on June 23.

Lynn Barker (5161) will discuss "A Model for Stress Wave Propagation in Composite Materials" June 30.

The seminar meets Tuesdays at 8:30 a.m. in rm. 201 of bldg. 806.

Fred Norwood of Applied Mathematics Division 1721 is serving this summer as a consultant to the College Enrichment Program at the University of New Mexico. The program provides 100 high school students who will be freshmen at the University next year with intensive instruction and counseling to give them a head start for regular classes. The students have backgrounds indicating educational deprivation along with a potential for high academic achievement. The program, financed by federal and state grants, is an effort to reduce the number of college dropouts among new students, about a quarter of whom leave the University during the first semester.



TOP GRADES and heavy load of classes enabled Ed Bush (4231) to finish electronic apprenticeship three months early. He went directly into the apprenticeship program after being hired and has supplemented shop training with out-of-hours courses at Sandia, North American Technical Institute, and UNM.

Continued from Page One

## MARSHALL BERMAN

relating to the sand used to line the underground explosion chamber. After checking, he discovered that the actual sand used had composition different from that anticipated, so that the figures representing its physical characteristics had to be revised. This is indicative of the meticulous care which goes into making the simulation as accurate as possible.

"The goal," Marshall says, "is to gain more and more confidence in the computer simulation. It is a job of continually refining and checking the output and making comparisons with the real event."

(Ed. Note — Berman's project represents a portion of Department 9110's analytical work concerned with stemming and containment of underground tests. A future LAB NEWS article will discuss other work in this group.)

## LAB NEWS

Published every other Friday

### SANDIA LABORATORIES

An Equal Opportunity Employer

ALBUQUERQUE, NEW MEXICO  
LIVERMORE, CALIFORNIA

Editorial offices in Albuquerque, N. M.

Area 505-264-1053

ZIP 87115

In Livermore Area 415-447-2111

John Shunny is Editor, Don Graham Ass't. Editor

Cherry Lou Burns, Staff Writer  
Matt Connors & Lorena Schneider  
are Staff Writers in Livermore  
Bill Laskar is Photographer  
Norma Taylor / All The Rest

## Dads Face Big Issue At Labs

Sunday is Father's Day, and for a number of men in the Livermore area "like father, like son (or daughter)" means both have chosen careers at Sandia Laboratories.

Here are most of these combinations presently on roll at the Laboratories. See if you can figure out who goes with whom.

No peeking at the answers given below.



A



B



C



D



E



F



G



1



2



3



4



5



6



7

# LIVERMORE NEWS

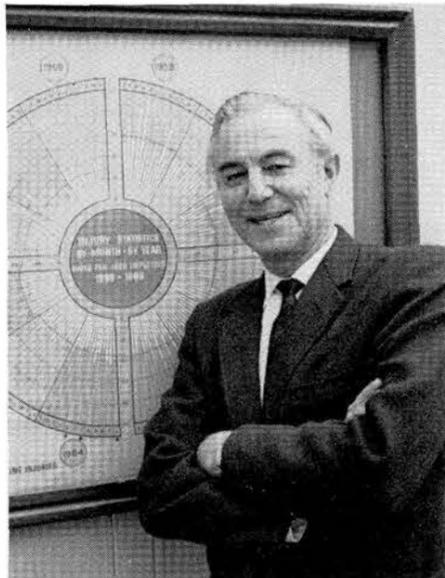
VOL. 22, NO. 13

SANDIA LABORATORIES

JUNE 19, 1970

## Answers to Faces

- A3 Andy Anderson (8264) and Karen Madellos (8332)
- B6 Herman Armijo (8222) and Linda (8312)
- C4 John Barnhouse (8256) and John (8322)
- D5 Charles Drummond (8162) and Greg (8216)
- E7 Ralph Freeman (8226) and Paul (8223)
- F1 Bob Neighbors (8129) and Paula Cooper (8321)
- G2 Red Sparger (8256) and Denny (8129)



## Supervisory Appointment

RAY RATY to supervisor, Security Division 8261, effective June 1.

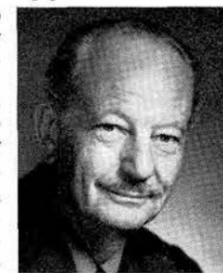
Ray joined Sandia in November 1961 as a staff member in the Security Division where he was involved in special investigations, security education and training, and guard force operations. In June 1965, he transferred to the Classification Division where he has had responsibility for writing classification guidance and assisting technical organizations in classification matters.

Before joining Sandia, Ray served for 21 years with the U. S. Army, including overseas assignments in Japan, the Southwest Pacific, Germany, and the Philippine Islands. He retired as a lieutenant colonel in September 1961.

Ray attended Los Angeles City College for three years, majoring in speech, and the University of Maryland for one year in military science. He is a graduate of the U. S. Defense Language Institute at Monterey, Calif., and the U.S. Army Command and General Staff College at Ft. Leavenworth, Kans.

He is a member of the National Classification Management Society.

Ray, his wife Mildred, and their four sons live at 1023 Westridge, Danville.



BETH REECE

Product Definition Control 8252-3

## RETIRING

GIL RHODES

Supervisor, Safety Engineering 8262

## Seven Sandians Rescued from River

# Boat Cruise Not So Funsy After Pileup and Dunking

"Never in our lives were we so happy to see anyone as those men in the helicopter and boat as they came in for us," agree the seven Sandians who were rescued recently from the choppy waters of the San Joaquin River. "It's all a kind of a laugh now but couldn't have been more serious at the time."

The incident started when Hilt DeSelm (8200), Bill Funk (8210), Bob Gaeddert (8000), and Don Wagner and Gordon Ross (both 8212) decided to show two visiting boat enthusiasts from Sandia/Albuquerque, Ken Sutton (3250), and Jack Rex (3251), some of the sights in the Delta region just north of Livermore.

Boarding Gordon's 25-foot cabin cruiser early in the evening, they spent several hours on the open waterways and sloughs. While looking for a restaurant for dinner, the boat developed propeller and rudder problems, causing loss of power and inability to steer. About 10:30 p.m., still under some power but troubled by the tide and wind, the boat hit a submerged piling and became stuck upstream from the Antioch bridge.

"The boat was caught about midship, diagonally across the hull," says Gordon. "To balance the boat, three of the fellows stayed out on the bow, but they were in a miserable position because the waves kept breaking up over them and it was very slippery. The others set up a bailing operation and for perhaps an hour and a half I sent intermittent SOS signals with light and horn until the battery went under water. However, we never had any indication of recognition.

"There was no panic at any time, with everyone agreeing to stay on board," continues Gordon. "We had life jackets and although it was cold and wet, each was

anticipating that the moment daylight came it would be only a question of minutes before somebody would see us and we'd be off that boat.

"Daylight arrived and the first thing we saw was a big freighter. We waved to it, plus several other boats, through the course of the morning. In fact, for a long time I was standing up on the bow waving my life jacket and several were in the back waving white shirts.

"By now the tide was going out and the boat was pivoting on the piling with the back end in the water," recalls Gordon. "The bow had drained completely. It was still blowing hard—about 25 knots—and there were white caps. Then the boat shifted and slipped off the piling. A large hole in the bottom caused the boat to begin filling with water and she started to sink.

"We all jumped into the water—four of us swimming back toward the pilings where we were able to hold on, the others getting immediately caught in the current, drifting away. The boat went down, turned over on its side, and drifted to the west. We probably were in the water about 40 minutes before rescue about 10 o'clock."

But for the U.S. Coast Guard which was notified of the missing men by the Sandia Security Office and for the watchful bridgetender at the Antioch bridge, the story might have had a much different ending. The bridgetender had alerted a nearby marina when he noticed someone in the water and the marina owners picked up four of the men in their boat. A Coast Guard helicopter came on the scene about the same time, lowered a basket, and brought the other three ashore.

"It was a most unfortunate occurrence," comments Gordon, "but nevertheless, I plan to go right back to boating. The boat

is now in dry dock where it is being looked at by the insurance adjusters. One opinion is that it's totaled out; another is that there's about \$4000 worth of damage.

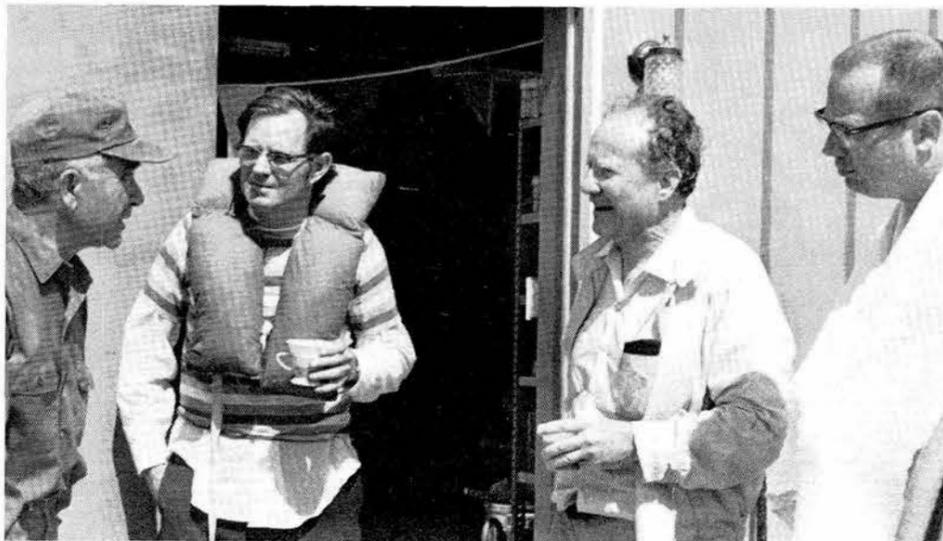
"She was called 'Esther,' but the next time we overhauled her we had planned on changing this to something with my wife's name in it. Now my wife is not so sure. My sons suggest 'Lady Jinx'."

Gordon now feels it was amazing how calm the group remained the entire time and how great the spirit was. "Everyone stayed on good terms, which wasn't always an easy thing since no one was very

comfortable. We cheered each other up throughout the night with lots of humor and jokes.

"There were also many funny incidents—when Bill reached for his wallet while in the water and Bob asked him what he was checking for. Bill answered that he wanted to see whether he had his swimming card with him.

"And the five from Livermore kept promising Ken and Jack that they'd be sure to have something exciting for them to do on their next visit, rather than the dull time we were all having!"



SAFE ON THE SHORE—Three of the seven Sandians rescued from the San Joaquin River chat with one of their rescuers, Earl Cooper (left) as they warmed up after their ordeal in the water. Shown from left are Ken Sutton (3250) from Sandia/Albuquerque and Hilt DeSelm (8200) and Bob Gaeddert (8000) of Sandia/Livermore.



# So What's He Doing?

Well, he's just thrown a javelin. A moment before (right) he was involved in launch activities.

Name a sport and sooner or later some Sandian shows up who is an enthusiast no matter how far out the sport may be. LAB NEWS has talked to polo players, skin divers, automobile racers, even parachute jumpers, but John Kelly's game — the decathlon — may be the farthest out, at least in terms of physical demand.

"The 10 events in the decathlon are usually done over two days," explains John, a physicist in 5223. "Four of them are running events — including high hurdles — while the rest are tests of specific skills and strengths — throwing the javelin, shot putting, pole vaulting, and so forth. But all take maximum effort — physical and mental — so that fatigue is the critical factor."

Although chiefly associated with the Olympics, the decathlon was not in the original Grecian games; rather it was the pentathlon whose five events then included leaping, foot racing, wrestling, and heaving the discus and javelin. Nowadays, decathlons are held with some frequency throughout the country, but the number of serious contenders is relatively small compared, say to the number of distance runners.

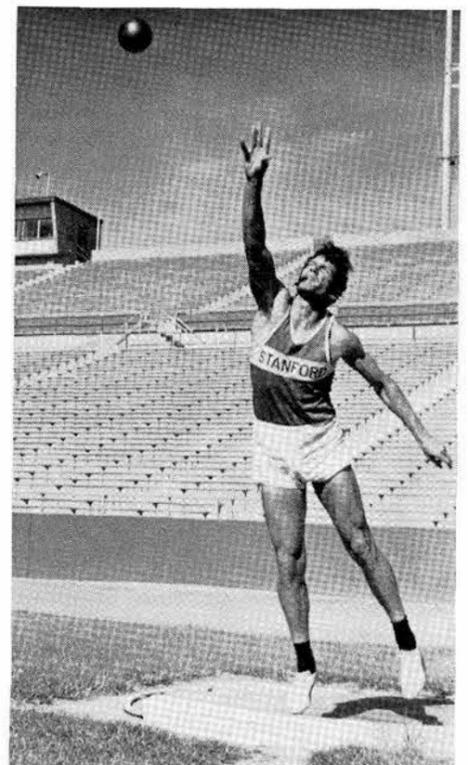
John trains daily, for at least an hour or better yet up to three. "You know you've had a good work out when you're just about sick to your stomach from exertion," he says. During the lunch hour he works out with the javelin or 16-pound shot at the oval track north of the Base gym.

What are the effects of aging on performance? "Well, as you get older your technique in the various events should improve. On the other hand, your muscles don't have quite as much spring. I know one guy though who competed in the decathlon when he was 36 years old."

John ranked a respectable 12th in the nation last year in decathlon standings. And he took a first in the state meet held a few weekends back.

How about fun sports? In winter John skis and in summer consistently loses in tennis with wife Cissy, a well-known tournament player in the Southwest.

A new generation of Kellys is coming along. The name alone of their infant son (their first) is calculated to psych out opponents: Trek Thunder Kelly.



## Speakers

J. C. Crawford (5153), "A Piezoelectric Field Effect Strain Gage," 1970 Society for Experimental Stress Analysis Spring Meeting, May 19-22, Huntsville, Ala.

D. C. Wallace (5151), "Theoretical Calculation of the Electronic Thermal Expansion of Simple Metals"; R. W. Lynch (5152) and L. R. Edwards (5132), "Thermal Expansion Coefficients and Grueisen Parameters of bcc Li-Mg Alloys"; L. C. Bartel (5132), "Magnetic Contributions to the Thermal Expansion in Antiferromagnetics," 1970 Symposium on Thermal Expansion of Solids, June 10-12, Santa Fe.

C. H. Williams (5224), "An Automated Signal Averaging Data Acquisition System for Ionization Studies" and "Interpretation of Ion Yield Curves for Positive and Negative Ions from Carbon Vapor"; R. T. Meyer (5224), "Mass Spectrometric Studies of Nitrogen Evolution from Prenitrided Zirconium Droplets Burned in Pure Oxygen," 18th Annual Conference on Mass Spectrometry and Allied Topics, June 14-19, San Francisco.

L. B. Smith (5233), "Atmospheric Dispersion in the Stratosphere-Mesosphere as Revealed by Falling Spheres," Symposium on the Dynamics of the Mesosphere and Lower Thermosphere, June 15-18, Boulder, Colo.

R. W. Rohde (5531), "Mechanical Response of Solids to Shock Wave Compression," Gordon Research Conference, June 15-19, Plymouth, N. H.

D. M. Mattox (5332), "Helium Incorporation in Deposited Gold Films," International Vacuum Metallurgy Conference and Symposium of the Southwest section of the American Vacuum Society, June 15-19, Anaheim, Calif.

P. J. Chen (1721), "On the Growth of Longitudinal Waves in Anisotropic Elastic Mixtures," Sixth U.S. National Congress on Applied Mechanics, June 15-19, Cambridge, Mass.

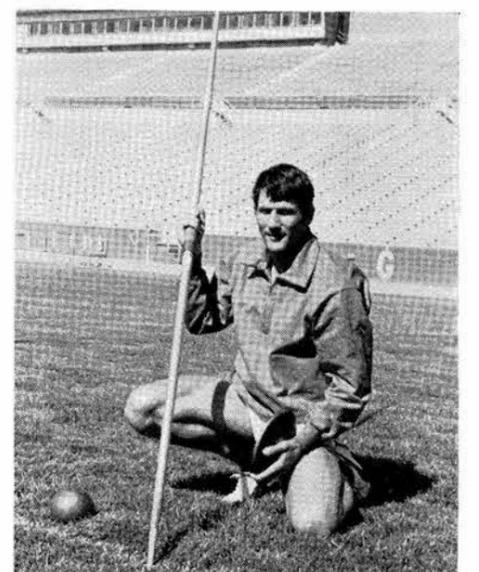
L. J. Vortman (9111), "Excavation with Nuclear Explosives," Albuquerque Branch, American Society of Civil Engineers, June 10.

S. J. Buchsbaum (5000), "Controlled Thermonuclear Fusion: Why? How? When?" University of Houston, May 14.

G. G. Wilson (9325), "Impact Point Dispersion Due to Overspin," AIAA-sponsored Atmospheric Flight Mechanics Conference, May 18-20, Tullahoma, Tenn.

A. R. DuCharme (5331), "Pseudopotentials and Atomic Rearrangement," Naval Ordnance Lab, May 19, Silver Spring, Md.

M. J. Davis (5530), "Some Metallurgical Factors in Electronic Joining," and "Troubleshooting Electronic Welding Processes," Interworks Metals Joining Conference, May 19-21, Chicago.



## Supervisory Appointments



**RAY PARKER** to supervisor, Inspection Calibration and Standards Division 4213, effective June 1.

He joined Sandia in September 1950 and worked on fabrication in the Development Shops until July 1957, when he was promoted to section supervisor. Since that time, Ray has served as supervisor in numerous sections — Branch Shop, Apprentice Shop, Miniature Shop, Numerical Control Machine Section, Numerical Control Programming, and most recently in the Abrasive Machining Section. Before coming to Sandia, Ray worked 13 years as a machinist for the Santa Fe Railroad in Albuquerque.

Ray is a native of Albuquerque and attended UNM. He and his wife Eileen live at 2203 Hendola NE. They have a married daughter and two grandchildren, and their son is presently attending UNM.

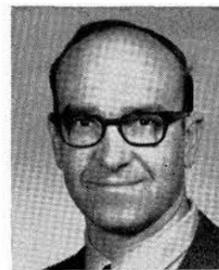


**RALPH JOHNSON** to supervisor, Electrical Transport Phenomena Division 5134, effective June 1.

Since joining Sandia in October 1965, Ralph has been examining the effects of nuclear radiation and static-high pressure on electrical-transport properties of compound semiconductors. From 1963-65, he was an officer in the Air Force, stationed at the Air Force Weapons Laboratory at KAFB, where he helped develop rocket-borne instrumentation in the high altitude test readiness program.

Ralph received his degrees in physics — BS, MS and PhD — from Kansas State University. He is a member of the American Physical Society and Sigma Xi.

Ralph, his wife Ruth, and four children live at 6601 Arroyo Del Oso NE.



**DICK CRANER** to supervisor, Division I 1751, in Exploratory Systems Studies Department, effective June 16.

Dick joined Sandia Laboratories Livermore in June 1960 as a staff member doing project and preliminary design work. He was on educational leave of absence during 1965-66 completing work on his master's degree. Dick transferred to Albuquerque in September 1967 and has been with the exploratory systems studies group since that time.

He has a BS in electrical engineering from the University of Idaho and MS from the University of California at Berkeley.

Dick served two years in the U.S. Navy during the Korean War. He is a member of the Institute of Electrical and Electronic Engineers and Sigma Tau, honorary society.

Dick, his wife Ruth, and their two children live at 8512 James NE.

# Service Awards

## 20 Years



Robert McCallum 7452    William Myre 1210    Cliff Pecha 4513    Billie Pierce 7514    Clem Toft 3512    Manuel Vallejos 4513

## 15 Years



Warren Arthur 4573    Richard Ashmore 2321    Philip Boling 9239    Eugene Cnare 7346    Pat Coonce 1211



Kenneth Cordes 9224    George Elliott 3251    Eldon Frame 7421    William Gibson 4252    Jay Gilson 8175



Lewis Hanchey 9521    Roman Heuer 7513    William Jackson 4115    Donald Lewis 1651    Wayne Lewis 3520



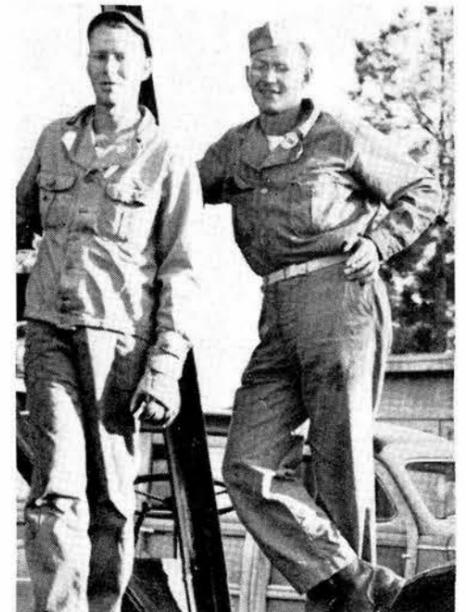
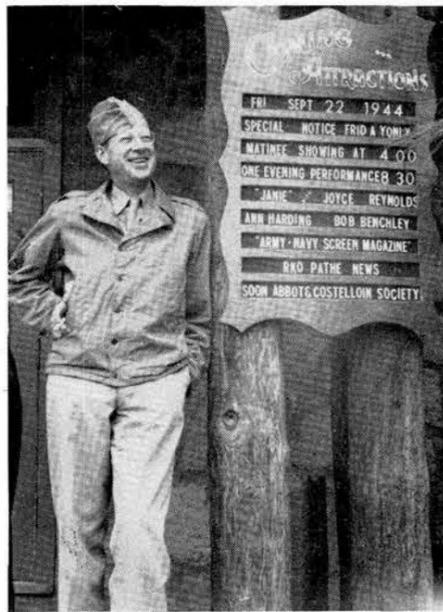
Gertrude Minshall 4614    Richard Othmer 1544    Edward Phinney 3414    George Volda 2635    Bruce Wickesberg 9211

## 10 Years

Arlo Nord 1542, William Sullivan 1548, Donald Gunderson 1641, Leo Klamerus 2635, Curt Franklin 8157, Jerry Slusser 9132, Anthony Russo 9341, Joseph Rivard 5222, Robert Henderson 1514, Alfred Giddings 2322, Thomas Workman 2333, Roner Roberts 2631, Mario Sanguinetti 3412, Clarence Rogers 8222, Douglas Browne 9425, Thomas Shishman 2352, and Gerald Rohwein 8343.



ABOUT 1000 persons are expected at Los Alamos next weekend to attend the reunion that will mark the 25th anniversary of Trinity, the nuclear event that marks the beginning of the atomic age. Among those who served in Los Alamos during WW II were a number of Sandians. Charles Barncord (7600) heads the Albuquerque committee for the reunion. The committee includes Ben Benjamin (9123), seated at left, with Mr. Barncord. Standing from left are Jerry Jercinovic (7630), Doug Ballard (7361), Louis Jacot (6011), Mike Michnovicz (7632), Phil Dailey (9242), and Ray Brin (7250). Some "before" pictures are given below — can you match them up?



# LAB NEWS

PAGE FIVE    JUNE 19, 1970

## SHOPPING CENTER ● SHOPPING CENTER ● SHOPPING CENTER ● SHOPPING CENTER ● SHOPPING CENTER ●

**CLASSIFIED ADVERTISING**  
Deadline: Friday noon prior to week of publication unless changed by holiday.  
A maximum of 125 ads will be accepted for each issue.

**RULES**

1. Limit: 20 words
2. One ad per issue per person
3. Must be submitted in writing
4. Use home telephone numbers
5. For Sandia Laboratories and AEC employees only
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.

**FOR SALE**  
**MISCELLANEOUS**

6:95 x 14 TIRE, \$6; four 6:45 x 14 tires, \$10 for the 4. Eaves, 299-7728.

21" RCA table model TV w/stand, \$30; 18" Magnavox table model TV, \$10; Grolier encyclopedia, \$40 complete — or sets — Books of Knowledge, Lands & Peoples, Popular Science. Hamblett, 298-6052.

LAWN EDGER, electric, medium duty, \$10; Ray, 299-1253 after 6.

'69 TRIUMPH 250 motorcycle, 3000 miles, \$500 or \$200 cash & assume payments. Troy, 268-6865.

PICKUP CAMPER, 8', stove, sink, refrig., water tank, sleeps 6, jacks included, factory built, \$675. Hammons, 296-1142.

GUITAR, classic 6-string Espana w/case, \$70. Krebs, 296-2710.

PUPPIES, Great Pyrenees cross, good family dogs, \$25. Magnani, 299-8693.

HONEYWELL 35mm SLR Model H3; TDC 35mm projector w/trays; playpen; rocking horse. Hanson, 298-0637.

SEAR'S Kenmore upright vacuum w/attachments, \$10; portable hair dryer, \$5; hobby horse, \$5; fire chief truck, \$8. Nissen, 296-3387.

'69 SUZUKI 500, 6000 miles, windshield & saddle bags. Griffin, 265-9484 after 5.

SWIFT binoculars, 7x35 wide angle, retractable eye-cups, \$40; Polaroid electric eye camera, \$30. Parks, 296-2261.

8' COMBINATION step-extension ladder, \$7; unused grocery cart, \$4; 3 bathroom shelves, chromed pole-type, \$3. Drake, 299-1209.

POODLES: miniature purebred, 4 females, 1 male, 8 wks. old, 2 apricot, 3 silver, \$35 ea. Hanchett, 1-865-7390.

'65 CHICKASHA 12x60 mobile home w/4x10 tip-out, LR size 16x20, 2 bdr., front kitchen w/sliding glass door, furnished, \$4200. Liguori, 296-6559.

16.5' SAILBOAT, fiberglass hull, aluminum mast & boom, stainless & bronze fittings, \$150; dacron main & jib, Sear's trailer, all for \$985. Shuster, 268-8491.

COMBINATION desk/bookcase, ideal for student. Pearce, 265-9170.

BICYCLE, girl's 26" Schwinn; Zenith color TV, \$150. Hill, 255-6538.

WAXER-BUFFER, Hoover, \$10; puppies for free, 8 wks. old, mother-reg. Bassett, father—Heinz. Aronson, 268-7109.

MAGNAVOX stereo console, solid state, maple finish, \$100. Hardeman, 265-4375 after 5.

COLT .25 auto. pistol, trade for old Navajo Indian blankets or pay cash for blankets or rugs. Smitha, 299-1096.

SMALL DESK, \$15. Love, 296-6328.

1/5 SHARE in '59 Skyline 182. Gelt, 298-0548.

'70 HONDA CL450 scrambler motorcycle, 2600 miles, will sell or trade for pickup. Murphy, 296-4089.

ACCORDION, Melody Manor, 120 bass, blue, case; drum set: Tempo, Grey, 4 units. Lenz, 298-3872.

AKC REG. Great Dane, 6 mos. old, female, honey fawn color, presently in obedience school, has all shots & ears cropped. Phillips, 268-6446 after 5:30.

'64 VINDALE mobile home, 10x55, unfurnished, completely set up w/skirting, awning, AC and many other extras. Young, 298-7841.

METAL TOP for Jeep Universal; Renault bucket seats w/new white naugahide; Scott silent hand-mower; folding baby stroller. Scheer, 265-1983.

SILVER POODLE pups, 6 wks. old. Patterson, 299-5650.

'59 VW transmission; feeding table for baby; Girard AT6 record changer; 2-barrel intake manifold & air cleaner for small block Chevy; misc. electronic gear. Bernard, 268-1183.

IRONING BOARD, \$5; 2 1-dwr. night stands, \$5 or \$3 ea. Pollard, 299-1318.

16 CU. FT. FREEZER, \$100; 3/4 bed & mattress, \$50; lg. blonde dresser, 6 drawers, \$25. Houston, 255-4658.

TABLE SET: 2 step tables, 1 end table, mahogany finish, \$20; end table, mahogany finish, \$5; trunk, 34"L, 23 1/2"H, 20"D, \$10. Stark, 299-5953.

GOOD HORSE for young riders, 9-yr.-old gelding, \$150. Sharp, 867-2815, Placitas.

BASS GUITAR, Hofner, new \$250. Duimstra, 299-9278.

GERMAN Shorthaired Pointer/Black Labrador Retriever cross puppies, 7-wks. old, both dam & sire excellent field dogs; black w/white markings. Labrador confirmation, \$10 ea. Holland, 898-3118.

EARLY AMERICAN baby bed w/mattress, \$20; net playpen w/pad, \$15; port-a-crib w/mattress, \$15; bassinet. Adkins, 296-1284.

TACO minibike, 3 hp, \$100 or best offer. Binder, 299-2937.

GI MINE DETECTOR w/carrying case & all attachments, no battery, it works. Carter, 256-9166.

AIREDALE puppies, father reg., born June 9, \$35. Pritchard, 268-9618.

GOLF CLUBS, Macgregor Championship, 8 irons, 3 woods, putter, bag, \$80. Bircher, 268-0726.

TWIN SIZE BED, foam rubber, \$25. Ferraro, 296-7958.

POODLES, AKC REG., 6 wks. old miniature, chocolate color, 2 male, 3 female, champion background. Schaefer, 298-1041.

FREE KITTENS, 6 wks. old, medium-long hair. Whan, 268-0687.

SET of Spaulding golf irons, 2 to 9 & sand wedge, \$25. Verstynen, 298-6087.

SCUBA EQUIPMENT, U.S. Divers, tank, regulator, wetsuit, weights, fins, gauge, life-belt, \$125. Chaffin, 296-5139.

ELECTRIC GUITAR & amplifier, \$55. Gallagher, 268-1988.

TWO TRAIL MOTORCYCLES, Honda CL-90, Honda CT-90, less than 2000 miles, \$175 each. Ewing, 268-6920.

HEATHKIT compact KW linear amplifier, DX-60 & Chennex xmtrs, 5" oscilloscope, VFO; 4-1000-A KW amplifier & misc. Cave, 299-5066.

ZENITH TV, 16" screen, antenna, nearly new picture tube, \$25. Smith, 299-6873.

MAFLE breakfast set: 9x12 umbrella tent; fold down camper for station wagon; 36" panel door; dishes; teenage children's clothing. Dodd, 299-6350.

16' THOMPSON BOAT w/12 hp Johnson, trailer canvas cover, remote control, \$275; power post hole digger, \$75. Sanchez, 298-5330 after 5.

FREQ. METER, 110 volt BC 221, w/cal chart, 125 KC to 20 M CPS, \$55. Wilson, 282-3225.

1970 KAWASAKI 100cc trail bike, \$395. Otero, 265-2549.

**CARS AND TRUCKS**

COLLECTOR'S ITEM: '59 Edsel Rammer, 4-dr. sedan, PS, PB, AC, R&H, \$550. Roth, 299-5033.

'60 VOLKSWAGEN BUS, red, full top luggage rack, new '68 engine, \$450 or best offer. Woodward, 255-4234.

'64 FORD Country Squire, 6-passenger, PS, PB, AC, new tires. Fisher, 1-636-2864 (Bosque Farms).

PONTIAC convert., full power, low mileage, below book \$875, top never been down. Brownz, 344-2986.

'68 RANCHERO Fairlane 500, 302 V8, 3-spnd., std., tonneau cover, sell or trade for camper van. Schuler, 296-2271.

'57 CHEV., 8-cyl., 1611 Gonzales SW. Metzgar, 242-1028.

'69 VOLKSWAGEN, white, AM/FM, stereo tape deck, new w/w tires, tachometer. Smelich, 242-0431.

'64 GMC 1/2-ton, lwb, wide side custom cab, 2-tone, AT, R&H, V-6. Positraction, 44,000 miles. Blackmon 298-2095.

'55 CAD. sedan, good transportation, \$210. Shummy, 265-1620.

'69 VW auto. stick shift, take over payments. Contreras, 242-0480 after 8 p.m.

'61 LANCER, 2-dr. HT, slant-6 engine, AC, new tires, \$400. Barr, 298-3718.

'62 BUICK LeSabre 4-dr. sedan, PS, PB, AT, AC, R&H, 401-V8, \$325. Dye, 299-2823.

**REAL ESTATE**

UP TO 8 acres, irrigated permanent pasture, ideal home sites, 1/2 mile east of Peralta. Shuman, (1) 636-2618.

APPROX. 12 acres in the Sandias; 1-acre lot in Corrales. Clement, 298-4994.

3-BDR., fp, 1 1/4 baths, dbl. garage, total price \$18,500, monthly payments \$118 including tax & insurance. Scott, 298-0712.

3-BDR., 1 1/2 bath, den w/tp, built-in range, extra cabinets, carpeted, landscaped, available immediately, below FHA, assume 5 1/4% w/terms negotiable. Daniel, 296-3676.

**WANTED**

WATER TANK, approx. 250 gal., portable pump; also small tank or plastic bottle holding about 50 gal. Rose, 298-4849.

CAR POOL member from area of Candelaria & Morris to Bldg. 802. Blakely, 299-5249.

TEXT BOOK—"Vacuum Deposition of Thin Films" by L. Holland, printed by John Wiley & Son, Inc. Smith, 298-3113.

TRADE girl's 26" bike for boy's 20" bike. Laskar, 299-1024.

RIDE from Alameda to gate 4 or 6. Torrez, 898-3213.

TRADE: male silver miniature poodle, champion blood lines, for portable typewriter. Roth, 877-4997.

TENT, camping type. Fisher, 299-9235.

BELT SANDER, jointer planer, compost shredder. Nelson, 264-1674.

TO RENT a house for my parents (will be well kept) from mid-July to mid-August. Erdman, 298-3097.

USED, ladies golf clubs. Levesque, 299-1213.

**FOR RENT**

GARAGE, single car, near UNM, on alley, \$10/mo. Hueper, 242-1620.

**LOST AND FOUND**

LOST—Small red leather purse w/key in it; girl's pearl ring w/2 small diamonds, clear Rx glasses w/black frames in brown case. LOST AND FOUND, tel. 264-2757, Bldg. 832.

FOUND—Cuff link w/N.Y. World's Fair design, silver w/turquoise roadrunner pin, small silver key, Masonic tie clasp, Rx sunglasses in black case, brass key "Bike Pals", roll of paper (possibly data recording tape) tied w/rubber band, lady's Bulova watch w/white gold band. LOST AND FOUND, tel. 264-2757, Bldg. 610.



Diana Romero  
(3256)

**MEXICAN  
FOOD BUFFET  
Social Hour  
Tonight**

**Coronado Club Activities**

**Huge Porker Turning on Barbeque Spit**

Tomorrow night the Coronado Club patio will resemble Polynesia for the annual luau. Tribal rituals start with mai-tai cocktails at 6:30 as a huge porker, turning slowly on the spit in the patio, gets the final touches. Roast pork will top the menu which includes sweet and sour pork, lani lani salmon, corn on the cob plus assorted salads and fruit.

Two floor shows featuring five grass-skirted Polynesian dancers will be presented during the evening. Dancing continues until 1 a.m.

Break out your grass skirts, sarongs and wild sport shirts. This is one of the big

parties of the year. If you call the Club office right now (264-4561) and pick up your tickets tonight, you can still make it. Cost is \$3.50 for members, \$4 for guests.

**Social Hours**

Tonight Mexican food is the buffet feature and it will be spread from 6 to 8 p.m. Cost is \$1.25 for adults and \$1 for kids. The twin pools will be open and it's okay to take your dinner to the patio. Happy hour prices will be in effect from 5 to 9 p.m. Phil Graham and the orchestra will play for dancing from 6 to 9 p.m. Then Yolanda Adent takes over the entertainment with a sing-along in the main lounge.

On Friday, June 26, the Club's famous chuckwagon roast beef will be the buffet feature while Frank Chewiwie holds the bandstand.

Since Friday, July 3, will be a holiday, happy hour will be held from 5 to 9 p.m. on Thursday, July 2, in the main lounge only — no buffet.

**Independence Day Celebration**

Annual Fourth of July family picnic for Coronado Club members will start at 11 a.m. when the twin pools open for recreational swimming. Games, contests and races for both kids and adults will fill the afternoon. The Albuquerque Parks and Recreation 35-piece band will present a concert from noon until 1:30 p.m.

A special price of 40 cents for two hot dogs, baked beans and a soft drink has been set. (Snack shop will open at 1:30 p.m.) Ten-cent beer and happy hour prices will be in effect. Membership cards will have to be shown for admission.

**Disneyland Tour**

Deadline for registering for the Coronado Club's travel package to Disneyland Aug. 6-9 is July 1. The tour includes air travel, three nights at the Galaxy Motor Lodge adjacent to Disneyland, admission to the park and tickets to 10 attractions plus other tours. Price of the package depends on room occupancy. For a family of two adults and two children, the cost would be \$106 each for the adults and \$90 per child. Call the Club office, 264-4561, for additional information.

**Bridge**

Coronado ladies bridge meets Thursday, July 2, at 1:15 p.m. Duplicate bridge meets Tuesdays at 7 p.m.

**Coronado Club Offers Travel Package to Grand Bahamas**

Kings Inn on Grand Bahamas Island in the Caribbean is one of the world's plushiest resort hotels. It is located on a beautiful tropical island surrounded by white beaches and a clear sea. It also features two 18-hole championship golf courses, multiple swimming pools, tennis courts, a casino and headline entertainment in the lounges.

You can spend six nights there — Dec. 9-15 — as part of a Coronado Club travel package for \$315. Included in the package is first class jet flight, transfers from airport to hotel, welcoming cocktail party, breakfast and dinner each day, and unlimited swimming, golf and tennis.

Other attractions in the area include deep sea fishing, glass bottom boat trips, and tours of the island via motorbike or doubledecker bus.

Only continuous Coronado Club members (at least six months membership) are eligible for the package. Anyone interested in making the trip should join the Club before the end of June to meet this qualification. All AEC and Sandia employees are eligible for Club membership. Dues are \$2.50 per month by payroll deduction.

"This is another tremendous buy," says Chet Fornero (4335), Club travel director. "Rooms at the Kings Inn usually go from \$50 to \$70 per day. The hotel brochures show really fabulous facilities and golf courses. So take mama to the Bahamas for Christmas."

Reservations are "first come, first served" with a \$25 per person deposit required. Total payment must be made by Oct. 15. Refunds may be made through Oct. 31. A total of 141 persons must register to make the trip feasible as a package.

**Bowling Association Elects Officers; Gives Trophies**

Bowlers of the year were named, other top awards were made, and new officers were elected recently at the annual banquet of the Sandia Laboratories Bowling Association.

Ruth Brooks (3132) earned the scratch trophy and Wanda Gross (4614) the handicap trophy in the women's "bowler of the year" competition. In the same competition for men, Bob James (3134) took the scratch trophy while Stan McCammon (retired) took the handicap trophy.

John Nakayama (1514) was elected president of the organization. Jim Dyer (2314) is vice president; Dutch Eisold (7651), treasurer; and Mary Ward (7651) and Mel Mefford (4315), representatives at large.

Trophies were awarded to Bob James for taking the city singles championship and to Leo Bressan (7452) for taking the singles handicap championship in the state tournament. Al Dadian (retired) received a trophy as a member of the team that won the city championship.



**Death**

Roman Martinez, a machinist in Machine Shop Division 4252, died suddenly June 2. He was 38.

He had worked at Sandia Laboratories since June 1968.

Survivors include his widow, two daughters and two sons.

**Events Calendar**

- June 19-21—Albuquerque Civic Light Opera presents "The Desert Song." UNM Popejoy hall.
- June 19-21—Jean Anouilh's "Waltz of the Toreadors," Corrales Adobe Theater.
- June 19—June Music Festival, Albuquerque Little Theater, 224 San Pasquale SW.
- June 21—Exploratory hike into Bear Canyon, west side of the Sandias. N. M.

- Mountain Club, leader Don Peterson, tel. 299-4714.
- June 24—San Juan Day Dances, San Juan and Taos Pueblos.
- June 28—Hidden Canyon in the Sandia foothills. N. M. Mountain Club, leader Bill Tryon, tel. 299-6895.
- June 29—San Pedro Day dances, Laguna, Acoma, Cochiti, and Isleta Pueblos.
- July 3—Santa Fe Opera presents "La Traviata."

**Sandia's Mail Service Goes Coed**

For years Sandia Laboratories mail service has been just that—male. Since mid-December however, Irene Chavez has changed all that. The attractive 18-year-old is Sandia's first girl to deliver internal mail.

"I like it," Irene says with enthusiasm. "I've always wanted to work at Sandia and the mail room seems a great place to start."

She graduated from Manzano High

School last summer. In school she took typing, shorthand and bookkeeping — courses she plans to continue in Sandia's out-of-hours educational program.

Before joining Sandia, Irene worked as a seamstress at the Levi Strauss plant in Albuquerque.

How does it feel to be the only girl with 25 guys?

"Great!" she says. "They are all very helpful."



WHO SAYS MAIL SERVICE ISN'T BETTER?—Delivering the mail with a smile is Laboratories' first female mail clerk, Irene Chavez. Sorry, we didn't get the recipient's name . . .

**The Smoking Breed**



**FEMME FATALE**

Cigarettes are part of the costume. Next week she learns how to inhale.

**Cigarettes kill — why go up in smoke?**