sandia corporation

lab news

albuquerque · livermore

VOL. 15, NO. 5 | Published every other Friday for the employees of Sandia Corporation, contractor to the Atomic Energy Commission | MARCH 1, 1963

PLANS for 1963 National Symposium of Institute of Environmental Sciences are discussed by (l to r) E. H. Copeland (7331), a member of the symposium publications committee; A. W. Snyder (5320), chairman of the symposium session on electronic equipment performance; and W. A. Gardner (7300), chairman of the technical program for the symposium. Symposium meetings will be held in Los Angeles, Calif., Apr. 17-19.

Environmental Science Symposium Program Organized to 'Bridge Gap'

Twelve Sandia Corporation employees will take part in a National Symposium sponsored by the Institute of Environmental Sciences in Los Angeles, Apr. 17-19. W. A. Gardner, Director of Environmental Testing 7300, is in charge of the technical program of the meeting.

"The sphere of environmental activities has expanded enormously in a few short years," Mr. Gardner says. "Fresh environmental data are being accumulated at a rapid pace. Hardware designers must understand the use of environments and translate these environmental stresses into design parameters. A vital business of the environmental engineer is to bridge the gap between an understanding of the physics of environmental forces and their effects on materials and hardware. The theme of this year's symposium is 'Bridging the Gap,' and the program has been organized with this goal in mind."

Twenty sessions, covering many facets of environmental science and engineering, have been planned. Lectures, panel discussions, and presentations of invited papers make up the program. A new feature this year, according to Mr. Gardner, is tutorial sessions devoted to the fundamentals of shock and vibration testing theory and application, followed by papers on advanced technology in these areas.

"I've been fortunate in securing men to act as session chairmen who, by their contributions, are exceptionally well qualified to bring to light the most significant developments in their areas," Mr. Gardner points out.

A. W. Snyder, Manager of Radiation Effects Department 5320, is chairman of the session on Electronic Equipment Performance in Nuclear Radiation Environments. S. C. Rogers, Division 5321 supervisor, will present a paper titled "Methods of Predicting the Performance of Semiconductor Electronic Circuits and Systems in a Nuclear Environment." R. C. Dove, professor of mechanical engineering at the University of New Mexico, will present a paper on "Instrumentation for Shock Motion Measurement" in the tutorial session devoted to Shock Testing Theory and Application. Mr. Dove has been on the summer staff of Environmental Research and Operations Department 7320.

Other Sandia participants and the titles of their papers include R. S. Hooper, supervisor of Section 7331-1, "Considerations in Answering the Environmental Engineering Information Problem"; M. R. Madsen, supervisor of Division 7324, "Interpretation of Vibration Signals"; R. R. Prairie and W. T. Zimmer (both 1442), "Factorial Experiments in Environmental Testing with Factors Applied Sequentially"; Max McWhirter, supervisor of Division 7325, "Shock Machines and Shock Test Specifications"; D. F. Hillyer (8121), "The Determination of Accuracy of a Random Noise Equalization System for an Electrodynamic Exciter"; and H. D. Arlowe (7312), "Electrical Noise in Instrumentation Systems."

A total of 107 papers, including supplementals, will be pre-printed in the proceedings of the 1963 IES Annual Symposium, according to E. H. Copeland, Division 7331 supervisor and a member of the publications committee for the symposium.

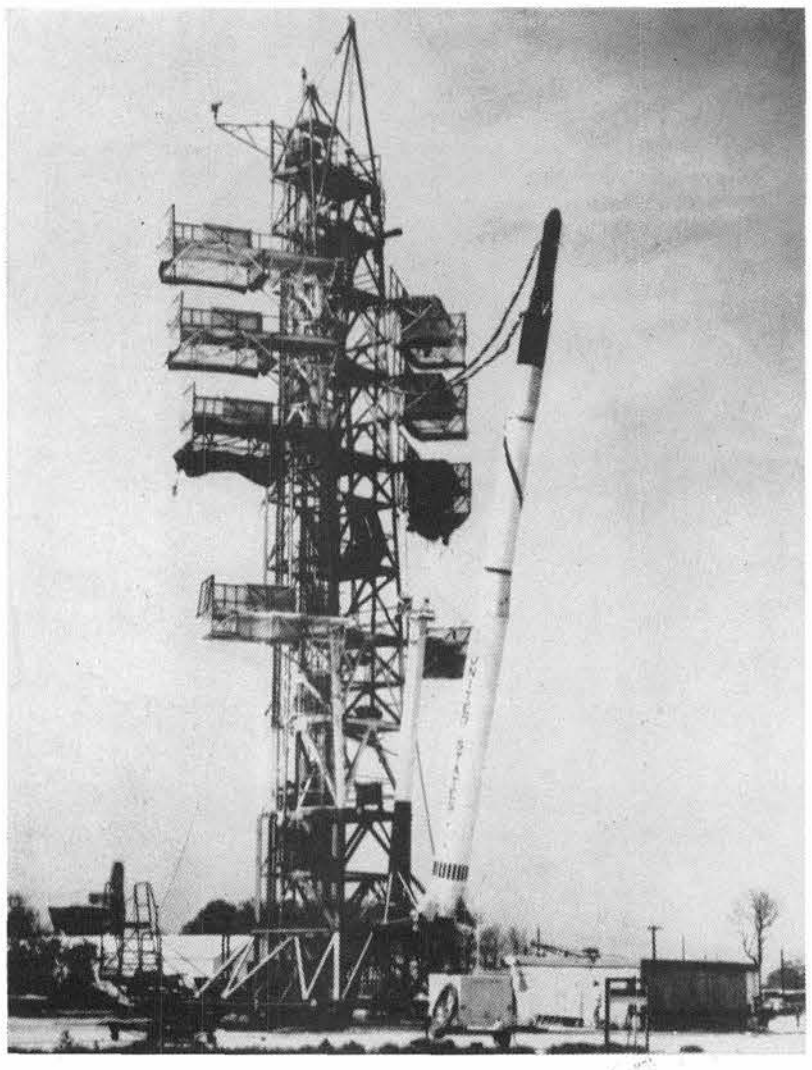
77,861 Documents Removed from Files In 1962 Clean-Out

Results of the 1962 classified file clean-out were announced this week by Security Standards and Development Division 3243. A total of 77,861 documents were removed from files throughout Sandia and Livermore Laboratories.

Of these documents, 65,593 were destroyed, 8,643 were sent to Records Depository, and 3,625 went to Central Record Files.

"Secretaries and accountability stations throughout the Corporation are to be congratulated," T. B. Hanna (3243-1) said. "Removal of excess documents from the files helps reduce the possibility of unaccounted for documents and incurring security infractions."

Rocket Shot to Test Safety of Space-Bound Reactor Mockup



SCOUT ROCKET, such as the one above, will carry a Sandia-designed reentry vehicle about 100 miles above the earth during a forthcoming flight. Sandia is performing safety analysis of a SNAP 10A reactor.

In about three months, a Scout four-stage rocket will lift off from Wallops Island, Va., travel some 800 miles southeast, and splash in the ocean below Bermuda.

The fourth stage of the rocket will contain a Sandia-designed reentry vehicle. On board will be a non-radioactive mockup of a SNAP 10A reactor, a Sandia-designed telemetering package, and a number of simulated reactor fuel elements.

The flight is being conducted to examine the behavior of the reactor and fuel elements when subjected to the extreme heat generated by reentry at high velocity into the earth's atmosphere. Data gained from the flight will be used to verify the effectiveness of safety features incorporated in the reactor design, a Sandia Corporation responsibility under the Atomic Energy Commission's Division of Reactor Development.

The SNAP program (Systems for Nuclear Auxiliary Power) is sponsored by the AEC to meet the future needs of electrical power for instrumentation of space vehicles, satellites, and space stations, and possibly for space propulsion.

"Our future in space depends on our ability to have large amounts of electrical power available," says V. E. Blake, Jr., manager of Aerospace Nuclear Safety Department 7110. "Nuclear energy offers a sound means of providing auxiliary power for space flight. In fact, nuclear power may well prove to be the most important energy source for space explorations."

Currently, Department 7110 is involved in checking the safety aspects of two such proposed SNAP units—the SNAP 10A and SNAP 9A. The 10A is a compact reactor designed and built under AEC contract by Atomics International. The SNAP 9A is a radioisotope-type power source designed and built by the Martin Company Nuclear Division. Radioactivity from the isotope material can provide about 25 watts of electrical energy from the SNAP 9A for five years. The reactor of the 10A is designed to provide 500 watts of electrical energy for a year. This is comparable to the energy output of a two-thirds-horsepower lawn mower engine.

Most of Department 7110's activities have been concentrated on the SNAP 10A due to the imminent flight test. The Bermuda test (called RFD-1) will be the first of a series necessary to study safety features of nuclear power systems.

The RFD-1 test will demonstrate (without presenting a safety hazard) the reactor disassembly and fuel rod burnup during reentry. Optical instrumentation will be used during the reentry to observe the trajectory and burnup of the various materials. Telemetry equipment in the reentry vehicle will transmit to receiver stations the complete sequence of the RFD-1 disassembly and temperature response. Parts of the inert reactor will be ejected from the vehicle during reentry to expose the simulated core.

The ascent will be tracked from Wallops Island and from two coastal down-range stations. Reentry will be tracked and observed from Bermuda and from aircraft. The flight path is designed to insure that the reentry vehicle and associated hardware will always be at least 90 miles from Bermuda.

Night Experiment

To insure the best observation of the experiment from Bermuda, the flight will be scheduled at night and during the dark of the moon. The glow of reentry and the scattering of the burning elements of the vehicle should be visible to the naked eye.

Optical observations will be made from an instrumentation station on the southern end of Bermuda. Provided by Sandia, this instrumentation will include a 24-in. tracking telescope, an ME 16 tracking telescope, a spectrograph, a scanning photometer, a 35-mm Mitchell motion picture camera, a 70-mm photosonic camera, 12 fixed-axis 10- x 12-in. plate cameras and two 18- x 18-in. plate cameras. Installation, calibration, and operation of this instrumentation will be done by Instrumentation Development Department 7220 and Test Support Development Department 7240.

Preparations for the test have been underway for some time. Design of the reentry vehicle was accomplished by Division 7112. Eight of the vehicles were built in the Development Shops 4200 and by Sandia contractors.

A strenuous series of vibration, shock, acceleration, and heat tests

(Continued on Page Three)

Editorial Comment

In Search of Your Opinions

June 10, 1949, the forerunner of the present-day **Sandia Lab News** was distributed at Sandia Laboratory.

The mimeographed "Sandia Laboratory Weekly Bulletin" bore the names of R. B. Powell, J. L. Hickey, V. Harris, and W. Bramlitt as editorial board members. The front page was devoted to interesting facts about New Mexico — not a surprising subject, as a large percentage of employees were newcomers to the state.

On inside pages readers learned that 230 Credit Union members had invested $8000, and more capital was needed. New employees at the Laboratory included Virginia Potter and William Denison. SLX-A golf team (Jim Hook was a member) was leading the golf league. Advertised for sale was a 1941 Plymouth — you could have it for $395. A 1958 Chrysler Windsor would cost you $2475.

Since that first Sandia employee publication was issued there have been several different names for the paper and it has appeared in several different formats. However, through all these changes, the purpose of the publication has been pretty much the same. It is hoped that the **Lab News** is keeping Sandia employees informed about the company for which they work and about the people with whom they work.

Since that initial publication of the **Lab News** there have been 367 issues "come off the press." The staff has tried to present information helpful to both Sandia Corporation and the employees of Sandia Corporation.

Now, we feel, it is time to ask the readers of the **Sandia Lab News** to write down their reactions to what they have been reading.

We have enclosed in this issue of the paper a form on which you may place your comments. We hope that you will be perfectly frank in stating your feelings. We want you to tell us what you dislike and like about the **Lab News.** If you want less of this or that, let us know. If you feel you need more information in any areas, please say so.

We are not asking you to sign your name, but we do want a bit of information about you. Thus the questions on the enclosed blank.

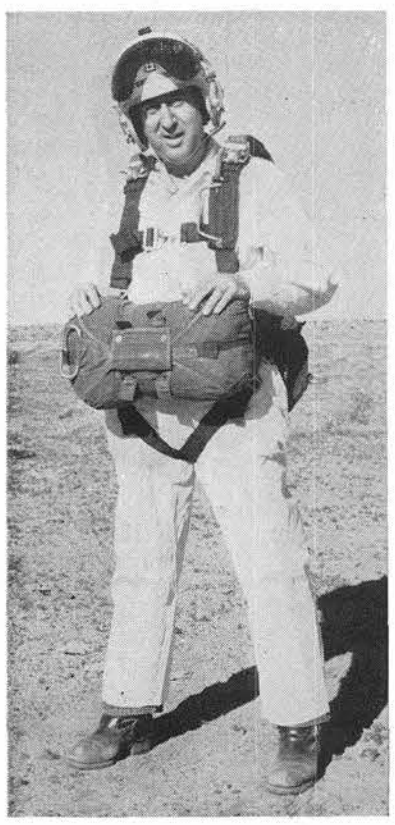
We invite you to take a moment and tell us your thoughts. It will help make the **Lab News** serve you and Sandia Corporation better. Then drop your remarks in Company mail and we will give you a report sometime in the future on the sum of your comments.

Sky-Divers — Believe It Or Not — Are Safety-Minded Sportsmen

You'd expect a sky diver to be an ex-paratrooper with a devil-may-care attitude.

Roy Couzin (4233-3) is neither. But, then, his interest in sport parachuting is really an outgrowth of his earlier interest; photographing from a plane other people floating through the sky.

A drop from 4000 ft. above ground level takes 8-10 minutes. "You can't imagine what it is like," says Roy. "It's quiet and the air is almost still. I'll turn around to look at the city, then turn farther around for a look westward. By the time you have a sensation of the ground rising toward you 2000 ft. below, you're suddenly busy picking your landing spot, calculating cross winds, and avoiding power lines and rocky lava flows."



PARACHUTIST Roy Couzin (4233-3) jumps regularly for pleasure and occasionally makes exhibition jumps to assist charitable organizations in fund-raising during drives.

Roy jumps almost every Sunday with the Falling Angels Sport Parachute Club. The club has permission to use an abandoned airport on the west mesa opposite St. Joseph's College.

Club members are especially safety conscious to minimize any possibility of hurting themselves. New jumpers receive training in controlling and steering their 'chute, packing their parachute, using their emergency 'chute, and landing properly so that the shock is distributed over a wide portion of the body. A Jump Master checks the equipment of all jumpers before they board a plane.

Club members have made several exhibition jumps for nonprofit groups attempting to raise funds. Roy participated in the benefit jump for the All Faiths Home.

Employees Helping Launch Mile-Hi Little League

Several Sandia employees are helping the Mile-Hi Little League baseball organization hold registration Mar. 2, 9, and 16. Boys from 8 to 12 years of age who are interested in playing Little League baseball this summer are welcome. Registration will be at the former Gallenkamp's Shoe Store in Princess Jeanne Shopping Center from 10:30 a.m. until 5 p.m.

Boys living in the Four Hills residential area, south along Central, west to Wyoming, and the city limits to the north and east are eligible to play in the Mile-Hi League, according to Jake De Vargas (3452), publicity chairman.

Other Sandians active in the league are Mrs. Paula Schults (3126), corresponding secretary, and Richard M. Lujan (2624), one of the team managers.

To register for league play, proof of birth date and a $1 fee are required.

Hikers Put Best Foot Forward in Commuting Effort

Taking their cue from President Kennedy, two Sandians at Livermore Laboratory have taken physical fitness to heart—or feet—and are solving their commuting problems at the same time.

Bob Graham and Bill Williams (both 8114-3), are leaving their cars at home and are walking to work. They make the eight-mile round trip in about an hour and a half.

"While we're not hiking 50 miles in 20 hours—the time prescribed by President Kennedy — we estimate that we'll cover about 1800 miles in a year, if our feet hold out," says Bill.

The two of them have been walking to work for about two weeks. "We're still experimenting," Bob says. "We want to find out what type of shoes are best for hiking. I managed to get a few blisters the first day out," he added

"We're not walking just to prove a point," Bill remarked "It's good exercise, and it's a fine way to keep in shape In fact, we plan to keep it up for a while, and if it gets too rough, we'll ride bicycles."

The toughest part in walking to work, according to Bob, is getting up 20 minutes earlier in the morning.

The walking craze has also had its effect on the younger set. Among the Sandians who welcomed their teenage sons home from 50-mile hikes recently were Art Feeney (8232-1), Ruth Flanagan (8210), Truman Casson (8116-2), Ben Guerin (8161-2), J. C. Ludington (8114-1), and Lillian Sprague (8114-3).

Carl DeCeasar (8234-3), his wife, and five of his six youngsters took a practice hike of 10 miles recently in preparation for the big event—a 50-mile hike.

Sympathy

To Larry N. Lesperance (4513-3), Frank J. Lesperance (4513-2), and Rosendo Lesperance (4513-2) for the death of Rosendo's brother at Las Vegas.

To Arthur Castillo (4151) for the death of his five-year-old son, Christopher, on Feb. 4.

To R. R. Wilcox (5132) for the death of his mother in Ithaca, N. Y., on Feb. 1.

Ruth Brown (4211)

Take a Memo, Please

Be cautious at work and at home when working on ladders. Know the safety rules concerning use of ladders and tools.

SEEING SPOTS? Nine Dalmatian pups owned by Dee Ellett (7181) make a soft bed for Fang, a Siamese cat who thinks he is a Dalmatian too. Although outnumbered, Fang holds his own in the litter of lively dogs.

Lorenzo Rivera Died Feb. 16 in Fort Bayard, N. M.

Funeral services were held in Albuquerque last week for Lorenzo Rivera, retired Sandia employee, who died Feb 16 in a hospital at Fort Bayard N. M. He was 68.

Mr. Rivera had been with Sandia 10 years at the time he retired in April 1961. He was assigned to Program Machining Division 4251.

He was one of the first World War I volunteers in the Socorro area and participated in the St. Mihiel and Argonne Forest battles in France.

Survivors include a brother in Presidio, Tex., and a sister and two brothers, residing in Albuquerque

Congratulations

Born to:

Mr. and Mrs. Robert Fueger (2642) a daughter, Kimberly Ann, on Feb. 7.

Mr. and Mrs. L. P. Billmaier (7213) a son, Steven Lawrence, on Jan. 27.

Mr. and Mrs. Raymond A. Ledogar (6030) a daughter, Felicia, on Feb. 15.

Mr. and Mrs. Donald Bates (4135) twins, Sheri and Kerry, on Feb. 16.

Wedding

Joye E. Hughes (4234) and G. R. Osborn (3465-1) were married Feb. 15 at the Heights Baptist Church, Albuquerque. After a honeymoon in Denver, the couple will be at home at 1136 McKee Dr. NE.

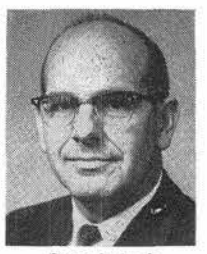
Joye has been at Sandia Laboratory since last July; her bridegroom has been with Sandia since July 1960.

Service Awards

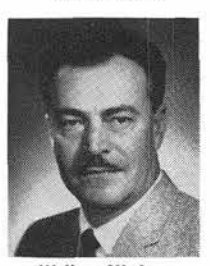
15 Year Pins

Robert W. Durand
2625
Feb. 24, 1948

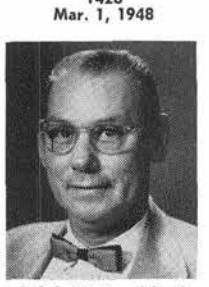
Albert W. Fite
1423
Mar. 1, 1948



Peter J. Cook
7532
Mar. 3, 1948



Wallace W. Ives
3463
Mar. 3, 1948



Ralph G. Carmichael
4233
Mar. 4, 1948

Dorothy E. Holloman
3126
Mar. 5, 1948

S. Sylvan Harris
3440
Mar. 8, 1948

Harold E. Keith
2544
Mar. 11, 1948

10 Year Pins

Feb. 1-15

Russell P. Asbury 4254, Floyd E. Forsythe 7132, Cecil M. Littleton 7513, Orville Padilla 2643, Billy D. Pontsler 8143, Clarence R. Sandin 4541, William A. Jenkins 8233.

Gloria G. Gamberale 3126, Kenney E. Loughlin 8158, Norman W. Berg. 2444, Richard E. Brian 2633, Verna Ann Clark 4234, Gene Allen Daniels 4411, Arthur S. Kraft 4254, R. P. Lewis, Jr. 2323, Gene C. Newlin 6011, and Elmer G. Borbely 4172.

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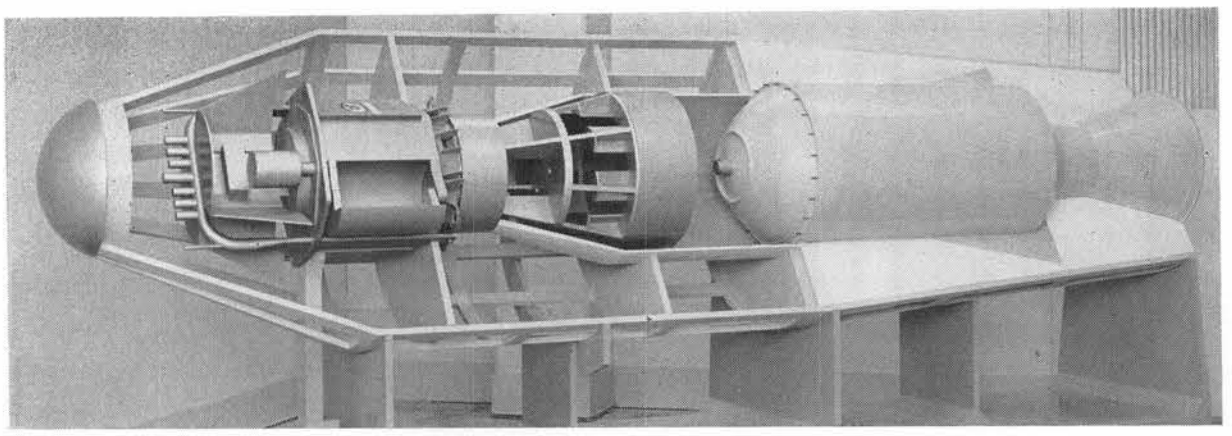
Editor: Robert S. Gillespie
Sandia Corporation, Albuquerque, New Mexico
Editorial Offices

Sandia Laboratory
Albuquerque, New Mexico
Employee Publications
Bldg. 610
Tel.: 256-4411, Ext. 25253

Livermore Laboratory
Livermore, California
Publications & Public Relations
Bldg. 912
Tel.: Hilltop 7-5100, Ext. 2395



MOCKUP of the RFD-1 (Reentry Flight Demonstration) fourth stage shows arrangement of the SNAP 10A reactor right behind the nose cone. Middle part of the mockup shows the Sandia-designed reentry vehicle which will contain the telemetry package. Rear section is the fourth stage motor, to be ejected prior to reentry.

Continued from Page 1

Space Test of Reactor Mockup

have been conducted in Area III by Environmental Research and Operations Department 7320 to qualify the design.

Tonopah Drops

One series of drop tests of the vehicle, consisting of three aircraft drops, has been completed at the Tonopah Test Range. Another series of drop tests into salt water started in February from the Wallops Island station.

These drops check the performance of the fourth stage motor ejection operation, deployment of parachute, flotation gear, signal beacons, and telemetering package.

As desiged by Division 7113, the telemetering package will transmit data continuously during the flight except during the "blackout" of reentry. Heat generated by the earth's atmosphere causes a blanket of ionized gas to form around the vehicle during reentry. This completely blocks radio transmission. A tape recorder device and a delay mechanism will permit the data to be stored during blackout and transmitted afterwards.

Primarily, the information recorded will be of vehicle behavior, disassembly, and burnup of the reactor.

The dummy fuel rods will contain different tracer elements. When the rods are consumed, these elements will flare, thus providing data to establish the burnup rate.

The reentry vehicle was recently tested in the new Arnold Engineering Development Center's hypervelocity wind tunnel. A full-scale model was suspended in the tunnel and air forced past it at velocities up to 7000 mph. Each test run, which lasted only 60 milliseconds, produced temperatures of more than 6000°F. in the air adjacent to the unit.

These tests confirmed design considerations of the vehicle, Mr. Blake said, and were made with the cooperation of the Air Force Special Weapons Center at Kirtland Air Force Base.

Sandia's effort on nuclear safety in the aerospace program is handled by Department 7110. Responsibilities for the program are divided among three divisions in 7110 as follows:

Predict Burnup

Division 7111, under H. E. Hansen, has the responsibility for basic aerospace safety research and development studies of deterioration of materials at high temperatures and other phenomena in the upper atmosphere during reentry. Such basic work is aimed at development of proved analytical techniques which could be used to predict accurately reentry burnup conditions for a variety of geometrical shapes and materials.

Division 7112, under A. J. Clark, Jr., is responsible for the aerospace safety ground test program. This includes testing in conditions which might be expected in case of accident. Division 7112 also shares responsibility for the flight test program which will demonstrate that the safety aspects of the system will function as designed.

Nuclear and thermal studies and analyses are included in the work of this division.

Division 7113, under A. E. Bentz, is responsible for design, development, test, and operation of the flight test telemetry systems, range instrumentation (both electronics and optical) and makes all arrangements with the launch agencies.

"In addition to the work done on this program in Department 7110," Mr. Blake said, "many other groups within Sandia are making sizeable contributions. It is a Laboratory-wide effort."

PHOTO HONORS — Sandia Laboratory photographers earned top honors during recent conventions of the New Mexico Professional Photographers Association and Industrial Photographers Association. Elliot Harris (3465-3), seated center, earned four merit print awards and was elected president of the Industrial photographers. From left, Bob Ezell (3464-3) earned a merit print award as did Bill Laskar (3432), Lab News photographer. Next, Dick Hodges (3464-3) was elected State Director of the Industrial Photographers. Bill Geck (3465-3), right, took first place in commercial black and white prints and earned a merit award in color.

Two Sandians Will Complete Apprentice Program Monday

James L. Hay and Delbert D. Stewart (both 4254-2) will graduate to journeyman machinists in the Sandia Laboratory apprenticeship program Monday, Mar. 4. Both men will have completed some 8000 hours of on-the-job and classroom training.

The graduation will mark completion of training for the original group of 28 Sandians who started in the program when it was inaugurated in 1958. Mr. Hay and Mr. Stewart both took time out of the program to serve stints in military service.

T. L. Beckley Writes Chapter in Book Being Published

Terry L. Beckley of Personnel Methods Section 4112-2 has been notified of publication of a book entitled "Patterns of Success for Selected Small Businesses in Arizona." He is the author of a chapter in the book concerning success patterns in Arizona machine shops

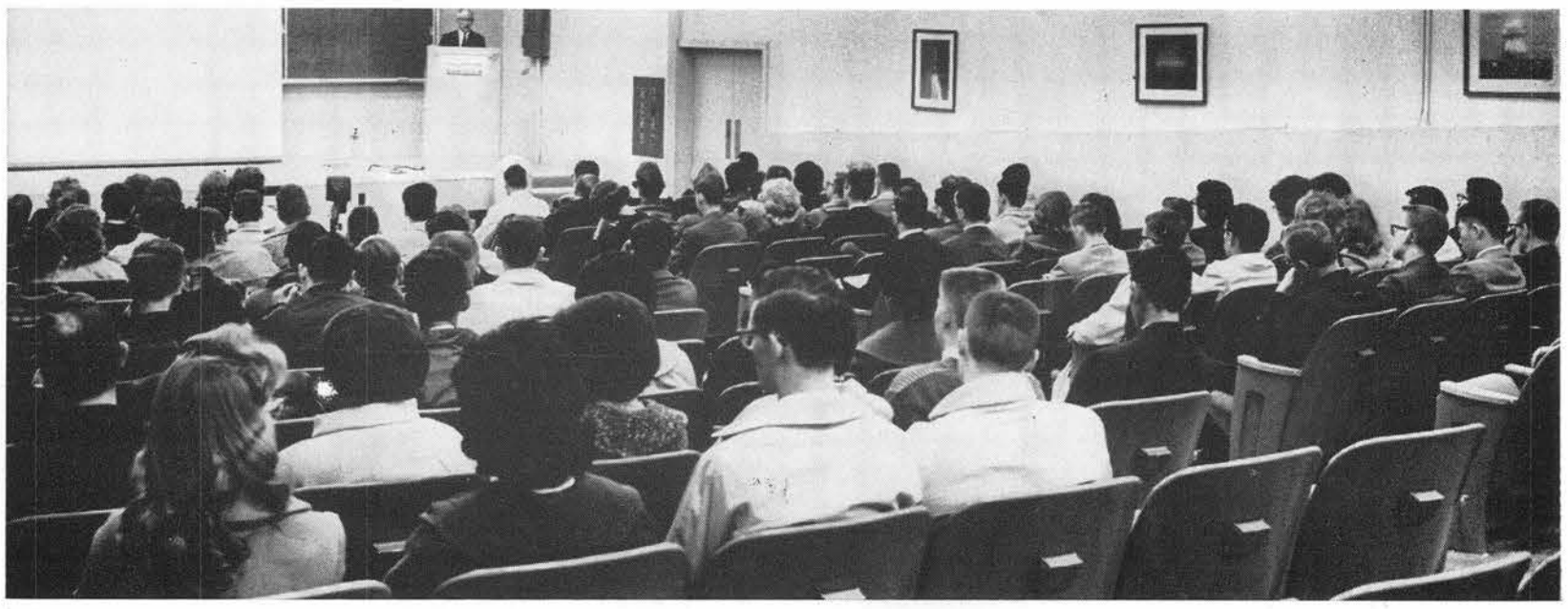
The book is a study completed by Arizona State University at Tempe. Terry completed his survey of Arizona machine shops as a thesis for an MS degree in business administration which he received from ASU in 1960. His chapter is based on the thesis.

Edison Day Event

Superior Science Students Visit Sandia Laboratory

AN EXPLANATION of the workings of centrifuge in Area III is provided for students during Edison Day Tour, Feb. 15, by J. F. Reid (7323-2). Students also visited the sled track and other Area III test facilities.

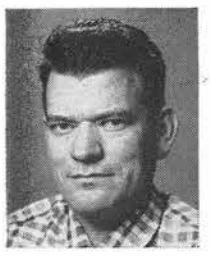
GROUP of top high school students participating in Edison Day Tour, Feb. 15, were intrigued by radiation display at Sandia's Sphere of Science. Group of 117 students toured the Sphere and Area III test facilities, heard R. H. Schuitz (7320) talk on environmental testing.



EDISON DAY TOUR participants heard R. H. Schultz, manager of Environmental Research and Operations Department 7320, speak about environmental testing in Bldg. 815. Some 117 outstanding students from high schools in Albuquerque and Belen took part in tour of Sandia facilities.

Supervisory Appointments

RAYMOND H. OPPERMAN to supervisor of Physics and Advanced Development Section 1413-2, Tube Development Division.



Ray has been at Sandia since May 1950, except for one year when he was given a leave of absence to complete work on his Master's degree.

He received both his Bachelor's and Master's degrees in physics from the University of New Mexico.

During World War II, Ray served 38 months in the Army Air Force, part of the time in the South Pacific.

He is a member of the American Physical Society.

H. GERALD LAURSEN to supervisor of Balloon and Ground Instrumentation Section 7252-3, Test Operations Division.

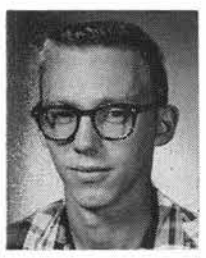
"Jerry" has been at Sandia since July 1951. He was assigned to an engineering organization the first year and has been in the Nuclear Test Department ever since.

His previous working experience includes two years in electronic design and development for Collins Radio in Cedar Rapids, Ia.

He has both Bachelor's and Master's degrees in physics from Iowa State University, Ames, Ia.

During World War II, he served seven years in the Navy and continues to be active in the Naval Reserve.

ALBERT F. HUTERS, JR., to supervisor of Device Support Section 7252-1, Test Operations Division.



Al has worked in Instrumentation Development Department 7220, Test Support Department 7240, and Nuclear Test Department 7250 during his six years at Sandia Laboratory.

He came to Sandia directly from Missouri School of Mines at Rolla, where he received his BS degree in electrical engineering and did some graduate study.

He is a member of the Institute of Electrical and Electronic Engineers.

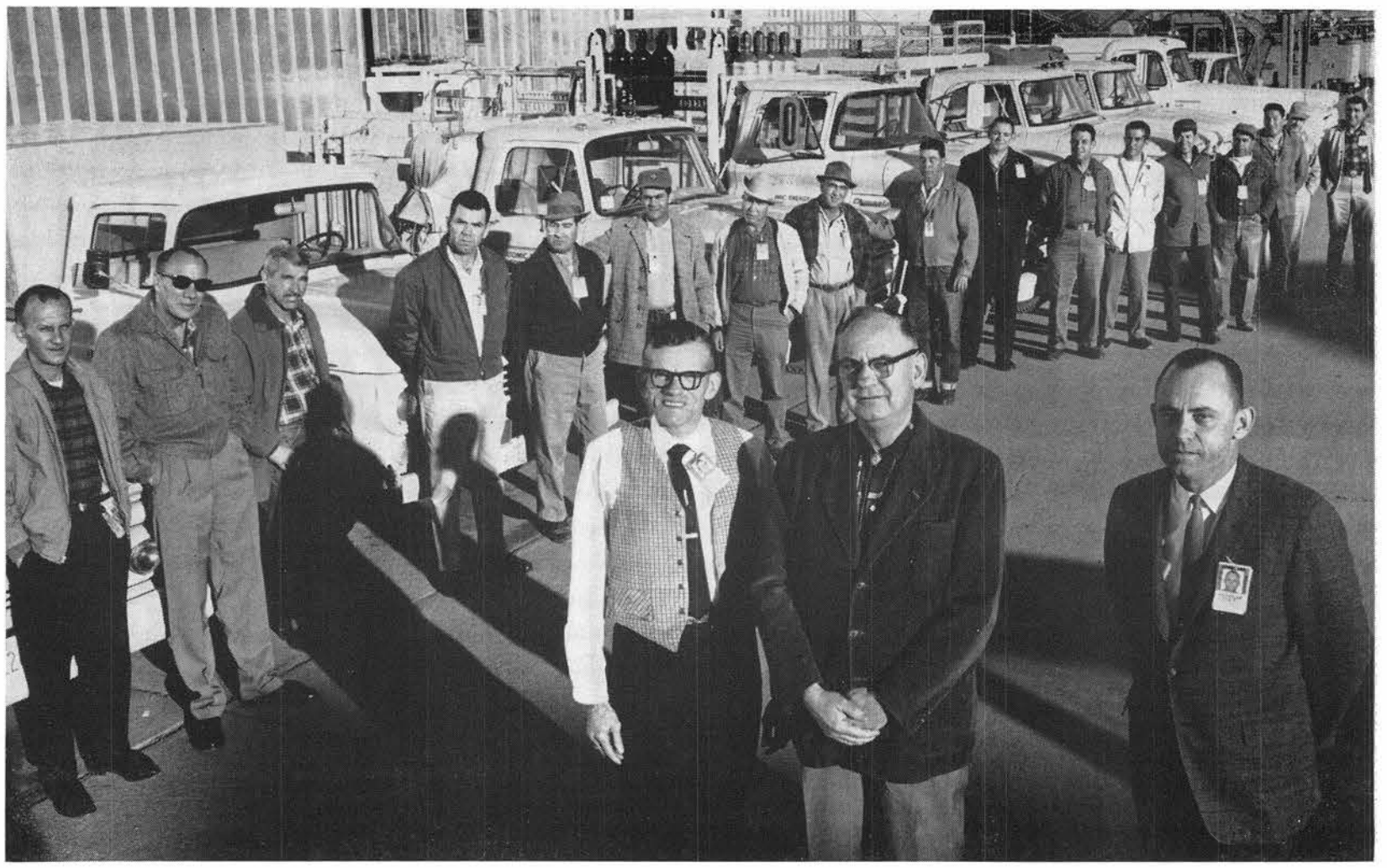
Sandians Helping Present Exhibit On Civil War

James A. Smith, supervisor of Sandia's Staff Training and Education Division 3131, is serving as technical advisor for a "Civil War in New Mexico" exhibit being presented at the Albuquerque Historical Society's Museum, 316 Romero, S.W. Mrs. H. Wilson Maglidt (Mr. Maglidt is manager of Graphic Arts Department 3460) and Miss Bess Streater (3000), both members of the United Daughters of the Confederacy, have assisted in obtaining material for the exhibit.

Mr. Smith, who considers himself "neither a Northerner nor a Southerner, but purely a student of history," has loaned several items from his Civil War collection for display, including music and speeches from the period, a collection of models of Civil War regiments, and Civil War documents.

Other items being displayed include photographs, clothing, household equipment, and battlefield relics, many of which have been found in New Mexico's Civil War battlefield areas.

The exhibit, which opened Feb. 13, will continue through March. Museum hours are 1-5 p.m., Wednesday through Sunday.



MEN OF MATERIAL HANDLING SECTION 4614-2 account for 80 per cent of all material movement within Sandia Laboratory. They make an average of 6000 deliveries and log some 8500 miles each month. In front are (l to r) Marion Brown, G. D. Andrews, and V. A. Southerland.

FORMER TEST PILOTS Joe Cannon (center) of Bell Aerosystems Company, and W. A. Gardner (right), Director of Environmental Testing 7300, exchanged experiences during a recent ASME meeting. Capt. David Jones (left), Hq. AFSWC, arranged for the program here at which Mr. Cannon spoke on "Vertical Take-Off and Landing Aircraft."

Moving Day Comes Every Day But They Are Not Dismayed

Last week, giant tracking telescopes, heavy instrumentation, motors, generators, and assorted bulky Field Test equipment was being loaded onto trailers for shipment to a Sandia test site.

Loading the equipment was a big job. But the 22 men of Material Handling Section 4614-2 are used to big jobs. They make an average of 6000 deliveries representing 50,000 separate items each month within Sandia Laboratory. They log about 8500 miles on 21 vehicles each month.

"Our studies show that this is approximately 80 per cent of all material movement within Sandia," says Andy Blain, Division 4614 supervisor. "This is the material distributed from the Receiving organization and General Stores, items going to Salvage, and material moving to and from various other organizations."

"In addition to these daily jobs, men of the section are also on call during non-operational hours to handle special deliveries," says V. A. Southerland, 4614-2 supervisor. "The men have loaded airplanes in the early hours at Kirtland Air Force Base and unloaded special shipments late at night."

All classified material is moved by this section to and from the Tech areas and other local receiving and shipping points.

To keep the deliveries moving efficiently, two dispatchers—Marion Brown and G. D. Andrews—keep in touch with the drivers via two-way radio. The men move from assignment to assignment receiving instructions along the way.

Special Handlers of the section alternate driving the explosive-carrying vehicles used by Explosives Services Section 4614-1. These men are M. J. Blaylock, A. J. Heimer, Delfinio Jinzo, C. A. Monroe, E. C. Montano, C. M. Salazar, and P. A. Silva.

Other men of the section include John Chavez, C. R. Gamble, Ermenegildo Garcia, Perfecto Garcia, A. J. Graff, Abel Lovato, R. R. Michaels, W. C. Montano, Farael Montoya, C. S. Padilla, Louis Perea, E. G. Sanchez, J. P. Sanchez, E. V. Sedillo, and J. M. Seiler.

Movement of material within the Laboratory is helped by men of Mockup and Building Support Section 4614-3 under O. D. Chapman. These men, located in major buildings in Tech Area I, III, and V, support R&D personnel in internal material handling and readying material for shipment from the buildings.

PLANNING CONFERENCE — Sandia Laboratory, Defense Atomic Support Agency, and the Atomic Energy Commission will sponsor a conference on clean room standards here Apr. 9-10. Some 150 representatives of government agencies and industry are expected to attend. Helping plan the meeting are, seated from left, Jean Gillette (3132); Lt. Col. George Leach, DASA; and J. A. Paulhamus (2564). Standing are Lt. Col. B. L. Forkner, DASA; S. A. Upson, AEC/ALO; and Col. C. E. Fay, DASA. Conference will be in Theatre Bldg. 815.

T. E. Holland Died Feb. 20

Theodore R. Holland, a Sandia employee since 1956, died Feb. 20. He was 35.

Mr. Holland worked in Experimental Aerodynamics Division 7132. A veteran of World War II, he is survived by his widow; a daughter, Cynthia; and a son Craig, all of Albuquerque.

Life Saved by Sandian

Boy 'Who Could Never Walk Again' Now Trying Out For Football Team

Nine years ago volunteer fireman Jim Culver (8222-1) rescued a 10-year-old boy from a blazing house in Westmoreland, Calif. The boy was so severely burned that doctors in Los Angeles feared he would never walk again.

A few weeks ago, while on a visit to Westmoreland, Jim saw the boy once more. Now a healthy teenager, the boy has his doctor's permission to go out for football this year.

"I was surprised and pleased to hear he'd recovered so completely," said Jim. "That morning when I pulled him out of the fire, he was so badly burned I could hardly hold him. He seemed to be dead. I worked on him for about an hour with artificial respiration and oxygen inhaler, and it was nip and tuck. In the ambulance on the way to the hospital he stopped breathing, but with more oxygen and artificial respiration he came around again."

Since the boy was burned over half of his body, he was later taken to the Children's Hospital in Los Angeles where he could get specialized treatment.

During the two years the boy spent in the hosiptal he underwent 20 skin graft operations on the upper part of his body. When he returned home he was confined to a wheelchair.

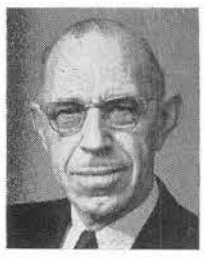
Determined to walk again, the boy persevered in attempts to stand and move. One day, his efforts were rewarded—he managed to stand and walk a few steps. A few months later, he abandoned the wheelchair for good.

"When the boy was in the hospital, he sent me letters by dictating to a nurse or a friend," said Jim. "It was a year and a half before he could write his name."

At the time of the accident, Jim was a fireman for Sandia at the Salton Sea Test Base and lived in Westmoreland. In a way, the life he saved was repayment for a time when his own life was saved. Two lumberjacks rescued Jim when he was trapped in a forest fire in Washington back in the 1920's.

L. E. Foster Retires After 13 Years Service

L. E. Foster (2563-1) retired yesterday after more than 13 years at Sandia Laboratory in production engineering work.



His immediate plans call for visiting his mother and sister at Lake Worth, near West Palm Beach, Fla. However, "home" will continue to be at 4602 Crest Ave. SE, since three of his six children live in Albuquerque. One son is with the Air Force, stationed in Turkey, and has invited Mr. Foster for a visit.

"I've already been in every state in the Union, except Alaska and Hawaii," he said, "and I hope to see Hawaii."

He already has "a shop full of tools" and has a number of projects planned in and around the house.

Mr. Foster has been active for many years in the Masonic Lodge and other organizations.

Sandia Speakers

Following is a list of speakers, titles, and places of presentation for recent talks by members of Sandia Corporation.

Robert Creveling (1413), "The Trippatron—A High Current, High Voltage Switching Tube," IEEE Professional Group on Electron Devices, Albuquerque, Mar. 12.

C. E. Land (5132), "Analysis of the Equivalent Circuit of a Ferroelectric Ceramic Transducer," IEEE Professional Group on Electron Devices, Albuquerque, Mar. 12.

J. A. Hood (1431-3), "Transistor Characteristics After Neutron Irradiation," IEEE Professional Group on Electron Devices, Albuquerque, Mar. 12.

G. W. McClure (5152), "Charge Exchange and Dissociation of $H+$, $H+_2$ and $H+_3$ Ions Incident on H_2 Gas," Physics Department, Washington University, St. Louis, Mo., Feb. 13.

R. A. Graham (5133), "A Quartz Gage for Submicrosecond Observation of High Transient Stress," Seminar on High Energy Rate Forming, sponsored by the American Society for Metals, Santa Clara Valley Chapter, and U.S. Naval Post Graduate School, Monterey, Calif., Feb. 15-16.

Irving Auerbach (5153), "Radical Decay in Polyethylene," National Meeting of The American Chemical Society, Los Angeles, Calif., Mar. 2.

W. S. Hunter (3465), "Sensitometry and Sensitometric Control of the Photographic Process," New Mexico Industrial Photographers State Industrial Conference, Feb. 17.

Seek Qualified Applicants for Apprenticeship

Candidates are now being interviewed for two Sandia Laboratory apprenticeship programs that will start next fall. Employees who are interested in the machinist and electronics four-year programs should contact Personnel Development Section 3121-2, Bldg. 832, ext. 35269, to apply. Deadline is May 1.

The programs provide about 8000 hours of on-the-job and classroom training leading to journeyman status for successful participants.

Applicants must be high school graduates or equivalent and between the ages of 18 and 30, except for those who have served in the Armed Forces. These individuals may be 30 plus the length of military service up to five years.

On-the-job training in the shops will be given in-hours under qualified instructors. Apprentices will be rotated by schedule within the general organization for various types of experience with operations required for their training.

Shop theory classes will be conducted in-hours in the classroom or laboratory.

Related academic subjects must either be passed by tests administered by Sandia's Training organization or must be completed in an out-of-hours class enrollment. These courses include mathematics, mechanical drawing, shop theory, physics, metallurgy, and plastics.

Environmental Test Control Building To Be Constructed

A new control building for environmental test facilities in Area III will be constructed for Sandia Laboratory by the Atomic Energy Commission. Bids are scheduled to be invited Mar. 19.

The one-story reinforced concrete and masonry building will house a data reduction center, a range monitor control room, office space, and an instrument development laboratory. It will be occupied by Environmental Research and Operations Department 7320

Bids for the project are scheduled to be opened about Apr. 16 Work is to be completed in 170 days after the contractor is told to proceed by the AEC.

The project includes installation of an oil-fired hot water heating system, outside utilities, exterior flood lighting, and construction of a gravel surface parking area and fencing.

John C. Snowdon (4543-3) is Plant Engineering Department project engineer.

OXYACETYLENE CUTTING TORCH was used by Richard C. Gonzales (4212-2) in displaying a truncated cone shape, various degrees of bevels, different radii and other cuts possible from four inch thick "boiler plate." Tolerances are .0625 to .2500 in. depending on cut.

Experienced Hand Guides Torch In Close-Tolerance Steel Cuts

Cutting intricate angles, circles, and bevels from wood is difficult enough, but when the material being worked is four-inch-thick "boiler plate" steel and relatively close tolerances are needed, the job takes an experienced hand.

At Sandia Laboratory, this type of job is handled by Richard C. Gonzales (4212-2), who does precision machine-guided burning. His area in Metal Stock and Cutting Bldg. 851 includes two heavy grids upon which the large slabs of steel are laid. The experienced hand is needed to set the oxy-acetylene torch to right speed and right pressure. Incorrectly set, the hot flame forms holes on both edges of the metal and cuts unevenly.

Working often from rough drawings, Dick must determine dimensional requirements, sequence of operations, and set-ups required. In addition to his previous training in his craft, Dick studied Drafting a year before coming to Sandia in 1957; has taken Machine Shop, Typing, and Shop Math at Albuquerque High night school; and has completed two courses in Welding under Sandia's Out-of-Hours study program.

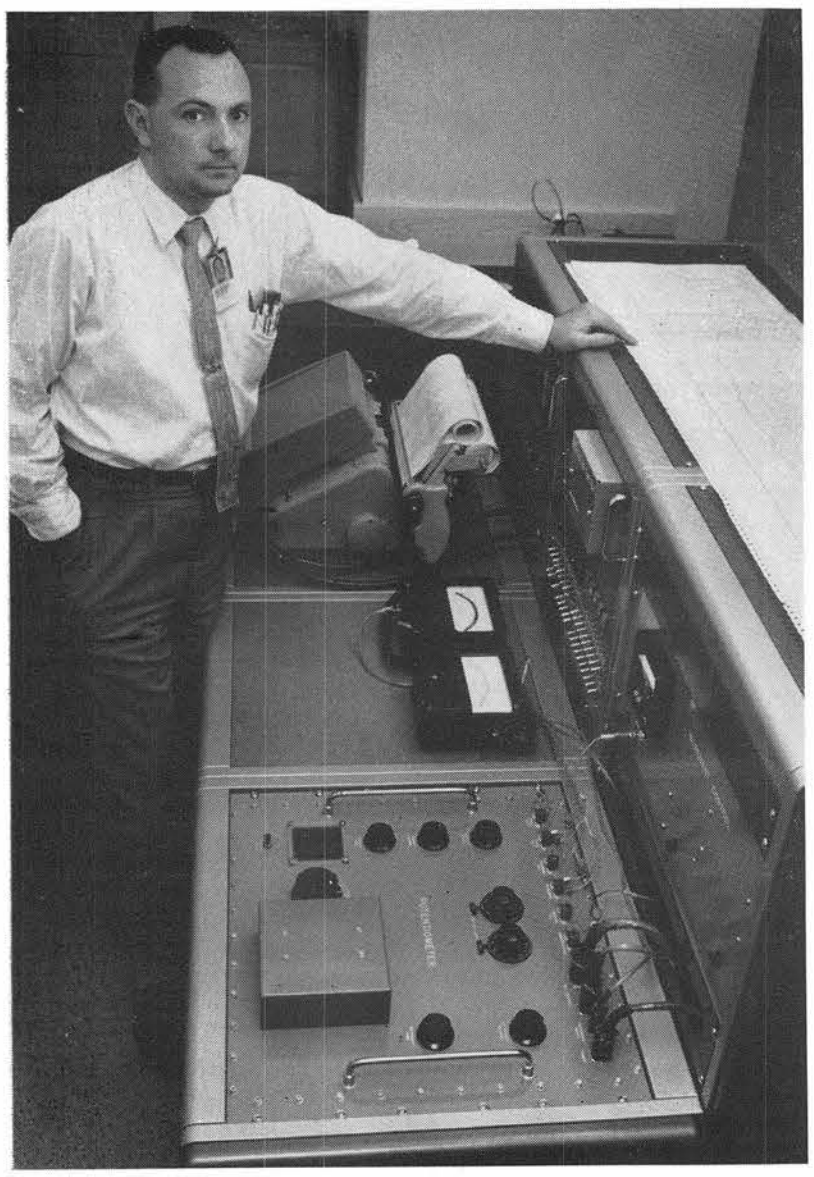
INTER-BASE CHAMPIONS — The Sandia Laboratory All-Star basketball team walked off with the championship trophy in the recent Inter-Base tournament. Sandia defeated Sandia Base 101-93 and Manzano Base 59-57, in the first round. In the finals Sandia Base rallied to take the Laboratory team 96-73 but then went down 80-77 in the last game of the double elimination tourney. In the first row are Carl Cron (1122), Keith Christian (1322), Bill Peila (2531), Phil Loeper (4412), Willie Sisneros (2343), Jim Sanchez (4573), and coach Dick Prokash (2331). Standing are co-coach Seyfred Toledo (3122), O. J. Foster (3122), Dale McLachlan (5132), Jim Hudson (5311), Don Smith (1124), Bob Hedges (7122), Bob Torres (3311), Bob Gardner (3446), and Bud Herzog (1113). The large championship trophy will be permanently displayed in Bldg. 802 lobby.

Promotions

Burnest Benjamin (4574) to Janitor
Judith L. Tripp (3126) to Teletypewriter Operator
Diana Dee Pompeo (3126) to Teletypewriter Operator
Florindo Salas (3444) to Messenger
Robert J. Hurst (8214) to Shipping and Receiving Clerk
Donna M. Govan (8232) to Document Clerk
Canice M. Azevedo (8233) to Library Assistant
Karl J. Livingstone (8121) to Staff Assistant, Technical
George R. Edgerly (4233) to Helper
Orval E. Talley (4231) to Layout Technician
P. J. Underwood (4333) to Teletypewriter Operator
Nancy J. Jacklin (3126) to Secretarial Typist
Keith M. Kreveling (3441) to Message Center Equipment Operator
Robert B. Lale, II, (3444) to Reproduction Service Clerk
Barbara J. Potts (3446) to Reproduction Service Clerk
Avis U. Camp (3452) to Record Clerk
Marian P. Goddard (3122) to Administrative Clerk
Nina M. Stone (4423) to Editorial Assistant
Dorothy M. Washburn (4612) to Service Clerk
James E. Strom (8232) to Pressman
Margaret Jarvis (4624) to Record Clerk
Juan T. Contreras (4573) to Cleaner
Ruth Bauman (8232) to Production Release Clerk
Doris L. Pouard (8233) to Library Assistant
Terry A. Leighley (3465) to Photographic Technician
Charles E. Shipley (4424) to Staff Assistant, Technical
Delfido Gonzales (4251) to Cleaner
William J. Smith (3462) to Bindery Operator
Amador B. Lovato (4212) to Toolkeeper
Naoma A. Levitt (3423) to Typist
Patricia M. Burt (3441) to Message Center Equipment Operator
M. Alice Jarrell (3446) to Document Clerk
M. P. Gabaldon (2563) to Data Reduction Clerk
Marie C. Bowers (3211) to Report Clerk

Supervisory Lateral Transfers

D. E. Irvin from 3126 to 3433
C. B. O'Keefe from 3428/7200 to 3126
A. Goodman from 1124-3 to 7223-2
A. R. Eiffert from 8230 to 3470



DAVE BRAUDAWAY (2412-3) is designer of the automatic standard cell comparator. Chart at right shows voltage gradient for a standard cell.

Cell Comparator 'Automates' Collection of Voltage Data

"The design of equipment to measure standard cells isn't what you'd call a 'rapidly-moving' field . . . Only a few papers about the subject have been written since 1933," D. W. Braudaway (2412) reported recently. "But it's significant that early instruments were well designed. Many early models are still in use."

Dave, who works in EMF and Resistance Standards Section 2412-1, has designed an automatic standard cell comparator. To develop the comparator, Dave had to overcome some unusual problems in switching and in circuit design. The new device has unique advantages in large scale operation not available with other methods of comparison, and its development points the way to design of other equipment, such as a resistance comparator.

The device compares a standard cell of known voltage with an "unknown" voltage of another cell. "Most of the early-designed instruments did this same job well, but we consider the present model an improvement because it 'automates' cell comparison," Dave pointed out. The comparator has been in operation at Sandia Laboratory for about a year.

It can be used to certify unsaturated cells, and saturated cells if a comparison accuracy of 1.3 microvolts is acceptable. The 1.3 microvolt accuracy can be reduced to .6 microvolt by careful adjustment of the operating currents if better accuracy is required. This is about one part per million in terms of the unknown voltage being determined.

Standard cells, the working standards of voltage at present, were developed and patented in 1891 by Edward Weston. They have remained the standard of voltage throughout the world, although their exclusive position is being challenged by zener diodes—devices which, instead of electrochemically generating a steady voltage, have a steady voltage drop when supplied from a relatively unstable voltage source.

Also known as cadmium cells, the general laboratory standard cells are remarkably stable, but they lose voltage very gradually with the passage of time, and during use, they may be subjected to mechanical and electrical abuse which also affects their voltage.

"Physical and Electrical Standards Department 2410 operates the Primary Standards Laboratory for the AEC weapons complex," Dave continued. "We check and certify over 400 standard cells each year. Checking and certification take place at Sandia's Electrical Standards Division 2412.

"With the new comparator, we can conveniently determine the 'unknown' cell voltage more than once a day, and such knowledge enables us to gain insight into cell behavior, especially following a temperature shock. A three-degree-Centrigrade change in temperature can produce a hysteresis (voltage fluctuation) which seriously affects a standard cell's behavior."

The automatic cell comparator can operate around the clock, thus providing a greater amount of information in a 24-hour period than a human operator normally would. Further, the new comparator gathers data directly suitable for computer analysis. It aids study of cells over a period of years to determine long-range behavior.

Sandian Appointed Membership Chairman

Earl Beck (8115-2) has been appointed membership chairman of the Northern California Rubber Group, an affiliate of the Rubber Division of the American Chemical Society.

Earl has been in materials engineering work since he joined Sandia Corporation at Livermore Laboratory in 1960, specializing in elastomer applications. He received his BS degree in chemical engineering from the University of Toledo, Toledo, O., in 1948.

The Northern California Rubber Group has its headquarters in Berkeley. The aim of the organization is to provide a free exchange of opinion, technical information and experience by those interested in the chemistry and technology of rubber and synthetic rubber.

ECP Fund Distribution Reached $35,675 at Close of January

After two months of operation, the 1963 Employees' Contribution Plan has presented a total of $35,675 to the 25 participating agencies of United Community Fund and nine other health and welfare agencies.

As the January checks, totaling $13,037, were mailed, the following distribution of ECP funds had been made:

	January	Year to-date
United Community Fund	$10,276	$27,879
American Cancer Society	658	1,922
Bernalillo County Heart Association	540	1,534
Arthritis and Rheumatism Association	210	590
Albuquerque Association for Mental Health	131	358
N. Mex. Society for Crippled Children and Adults	526	1,414
National Multiple Sclerosis Society	92	277
Albuquerque Association for Retarded Children	197	592
Cerebral Palsy Association of Bernalillo County	276	756
Muscular Dystrophy Association of America	131	353

Charles Judd Teaching Malayans Heavy Equipment Maintenance

Last spring, Charles M. Judd, formerly of Sandia's Tester Fabrication Division 4234, applied for membership in the Peace Corps. He was accepted, and last July he left for an assignment in Malaya.

"Charlie is enthusiastic about everything," Ben Gardiner (4234-1), his former section supervisor, recalls. "He's kept us informed about all of his activities. As part of his Corps assignment, he's teaching heavy equipment maintenance to the Malayans. He wrote recently that he's also planning to start a course in electronics."

The electronics course would be a voluntary assignment for Charlie, and would be presented as "out-of-hours" training for the Malayans. "His letter about the course was full of enthusiasm, which didn't surprise us a bit," Ben says. "While he was here, he was always at work on a project during his spare time—everything from the annual Christmas party to a Sandia out-of-hours Russian course."

Charlie's electronics course, when it's launched, will present basic training in the subject. But to get the course started, he needs some support. He's badly in need of books about electronics, and of electronic parts and hardware.

"He'd appreciate old electronic parts which might be around the house—anything that would provide his students with something to work with, and any information he can get about electronics," Ben concludes. "And he'd enjoy hearing from any Sandian who writes to him."

Charlie's address is PWD District Office, Kuantan, Pahang, Malaya.

Trinity Section of American Nuclear Society Integrates Science Fields

This is another in a series of articles describing the activities of the member organizations of the New Mexico Council of Technical and Scientific Societies.

The American Nuclear Society is one of the youngest technical organizations in the country. It was founded Oct. 11, 1954, in Washington, D.C., by a group of men active in nuclear science and technology. At that time there were few formally-trained nuclear engineers.

Since the founding, the organization has grown to a membership of 5072 which includes 420 foreign members and 548 students.

The Trinity Section (named for the first nuclear explosion) of ANS was founded at Santa Fe in June 1961, and now has a membership of 54 from Los Alamos Scientific Laboratory, Sandia Laboratory, AEC, Air Force Special Weapons Center, University of New Mexico, and Highlands University.

D. M. Ellett (7181) is vice chairman of the Trinity Section.

"Our objectives closely parallel those of the national society," Dee said. "We promote the advancement of nuclear science and engineering, of allied sciences and arts, and the integration of the several disciplines constituting nuclear science and technology. Other objectives include the encouragement of research, the establishment of scholarships, and the dissemination of technical information."

The organization holds four technical meetings and one social meeting during the year. A typical program was conducted last week. A half-day meeting in Bldg. 815, the program covered unclassified aspects of LASL work in nuclear rocket propulsion, possible future nuclear space propulsion systems, critical assemblies, and the Sherwood Program to control the fusion process for peaceful power purposes.

A big effort of the organization currently is planning a national ANS meeting in Albuquerque to be held next fall. Theme of the meeting will be "Nuclear Aerospace Safety."

"The Trinity Section supports the scholarship programs of New Mexico Council of Technical and Scientific Societies and will contribute some special awards to students at the forthcoming National Science Fair which will be held in Albuquerque in May," Dee said.

Other officers of the Trinity Section include Harold Busey (LASL), chairman; Bruce Morrison (LASL), secretary; and Paul O'Brien (5331), treasurer.

National ANS publications include the monthly **Nuclear News** and **Nuclear Science and Engineering. Transactions of ANS** is published twice a year.

"Any member of the Sandia technical staff is eligible for membership in ANS," Dee said. "We welcome inquiries about membership." Contact Willard Schmidt (5331), membership chairman, ext. 46253.

Plan Buildings To House Lab's New Centrifuge

The AEC invited bids recently for construction of three buildings to house a new centrifuge in Area III. Bids were scheduled to be opened Feb. 28.

The new centrifuge, now being built for Sandia Laboratory, will be used to simulate environments of rocket launch and reentry by Environmental Research and Operations Department 7330.

Two of the buildings will be prefabricated and above ground. The other will be a circular underground structure 80 ft. in diameter. The prefabricated metal buildings will have a total size of some 6000 sq. ft.

The project includes construction of an underground control room and reinforced-concrete access tunnels of about 1600 sq. ft. Installation of miscellaneous structural steel items, hoists and monorail, and related mechanical and electrical equipment are included in the project.

Construction is to be completed within 210 days after the contractor is notified to proceed by the AEC.

Plant Engineering Department project engineer is R. G. Piper (4543-3).

Welcome Newcomers

Jan. 28-Feb. 22

Albuquerque
*Isabelle Allan 4333
*Abie D. Bertholomey 2322
Higenia S. Cata 4212
Silviano Chacon 4574
Nina J. Dziadulewicz 3126
*Lucille J. Few 3126
Gene R. Gray 4135
Jose A. Gutierrez 4574
Frutoso Gurule 4574
Basil Herrera 4574
Robert R. Horton 3441
Julene A. Hunt 4622
Viola E. Marsh 4135
Lois I. Mathes 3421
Caroline J. McPike 3451
*Kenneth R. Nielsen 7246
Paul A. Pena 3441
Ruby H. Rael 4613
Audelio Tenario 3441
Martin S. Tierney 5422
Dorothy J. Tolbert 4623

Arkansas
Clarence W. Young, Fayetteville 7112
Sonny W. Pearson, Pleasant Plains 7133

California
Jerry D. Hunter, Los Angeles 4411

Florida
Anthony W. Battaglia, Jacksonville 1322

Illinois
Darrel D. Sand, Melrose Park 5151
William S. Saric, Chicago 7311
Victor E. Schulze, Jr., Champaign.... 7162

Indiana
Donald E. Michalski, Gary 5133
Larry L. Woodard, Lebanon 4411

Kansas
Clifford A. Wilson, Jr., Manhattan.... 7221

Michigan
Mary Ellen L. DuVall, Brighton 3421

New Jersey
Lloyd S. Nelson, Ironia 5414

New Mexico
Louis V. Feltz, Las Cruces 2542

New York
Foster E. Tennant, Horsehead 4224

Ohio
Ward I. Bower, New Philadelphia.... 1311
Lial W. Brewer, Cincinnati 3311
Jack S. Scurlock, Kettering 4412

Oklahoma
Jimmie D. Martin, Stillwater 3111

Texas
James H. Brooks, El Paso 4543
James M. McIntire, II, San Antonio 2313
Richard L. Young, Amarillo 3453

Returned from Leave
Merlene M. Candelaria 4341
Leeland H. Hogue 1431
Jerald W. Long 7241
Lois Quinn 4612

* Denotes rehired

HONORARY COLONELS, Aides de Camp on Governor Jack M. Campbell's staff, are (l to r) A. P. Gruer (7530), H. D. Doro (3452), C. W. Dickinson, Jr. (4130), and J. M. Ralls (7524). They received the appointments Jan. 28, and are charged with discharging "the duties of said office by doing . . . all manner of things . . . in compliance with law, the orders of . . . superior officers, and the usage and discipline of the United States Army." They're examining an official commission.

CWO Joseph P. Duffy Honored for Service As Helicopter Pilot

The son of two Sandia employees — Edith M. (2343-1) and Joe E. Duffy (4333) — has been cited for meritorious achievement while providing support to the Republic of South Viet Nam in its fight against the Communist Viet Cong.

Army Chief Warrant Officer Joseph P. Duffy has served as a helicopter pilot in Viet Nam since last October. He entered the Army in 1955, after attending the University of New Mexico.

Janice Robertson Lab News Reporter For Past 3 Years

Janice Robertson (7120) has been a volunteer **Lab News** reporter for more than three years, representing first Special Services Department 1310, and for the past two years Weapon Systems Development Department I.

A native of New Mexico, Janice, her husband, John (who works for the AEC), and their three sons enjoy camping in the mountains. They usually plan three or four short trips each summer to give the boys an opportunity to fish "They've never caught any fish but they're not discouraged," Janice says. She personally prefers reading a good book on the bank of the stream.

Coronado Club Chef to Feature Menu Of German Food at Dinner Tomorrow

The Coronado Club's "Hofbrau" festival tomorrow night will feature delicious German food, free beer, and dancing to the music of "Sol von Chavez."

Included in the menu will be sauerbraten mit kartoffelpuffers (pot roast with potato dumplings), bratwurst mit kartoffelsalat (sausage with hot potato salad), and eisbein mit sauerkraut (pig knuckles with sauerkraut). Dinner will be served from 6-8 p.m. with free beer from 6-9, and dancing will be from 9-1. Reservations are suggested.

On Mar. 8, the club will again feature a special seafood buffet for $1.50. The club assures patrons that this time, there'll be plenty for everyone; many were turned away at last month's seafood buffet.

Other club events include free dance from 9-1 a.m., Mar. 9, and on Mar. 16, the Adult Dance Class Graduation Ball. The dance will be free to all members of the club with a special $1.50 chicken dinner served from 7-9 p.m. Dinner reservations should be made by Mar. 13

F. M. Smits Contributes To Article Published In Bell System Journal

F. M. Smits, manager of Radiation Physics Department 5310, helped write an article, "Surface Effects of Radiation on Transistors," which appears in the January issue of **Bell System Technical Journal.** Other authors, all of Bell Telephone Laboratories, are D. Stewart Peck, Head of Semiconductor Reliability Department; Royer R. Blair, Military Data Systems Department; and Walter L Brown, Head of Semiconductor Physics Research Department.

No job is so important and no service is so urgent that we cannot take time to perform our work safely.

Sandia Laboratory Places In Fire Prevention Contest

Sandia Laboratory's year-around fire prevention activities earned 22nd place out of a field of 178 in a recent contest sponsored by the National Fire Prevention Association. The award was made in the industrial category of the contest.

FIRE PREVENTION SCRAPBOOK which took 22nd place in a recent national contest is examined by Sandia Laboratory Fire Marshal H. H. Pastorious (4540) and Fire Inspector T. A. Rosenwald (4542).

Sandia's fire prevention activities included fire drills, regular inspections, control of hazardous operations, and an educational campaign of posters, booklets, and displays.

In 1961 Sandia Laboratory had placed 13th in the contest and 11th in 1960.

The award is judged on the basis of a scrapbook submitted by Inspection Section 4542-1. Fire prevention activities are handled by fire inspectors T. A. Rosenwald and W. L. Smith, of the section.

R. D. Wehrle Speaks To Trailer Club

Members of the Thunderbird Travel Trailer Club heard a talk by R. D. Wehrle, member of the board of directors of the Sportsmen's Legislative Action Committee, at a meeting Feb. 26. Mr. Wehrle discussed the purpose and activities of the committee.

coronado club EVENTS

March 1-16

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					1 Social Hour 5:15-7:30 Geo. Davies Buffet 6:30-8 p.m.	2 Teen Dance Instruction Hofbrau Dinner 6-8 Dance 8-1 Sol von Chavez Free Beer 6-9
3	4 Bridge ACBL Charity 7:30 p.m. Ski Club 7:30 p.m.	5 Adult Dance Instruction Basic—7:00 Advanced—8:30	6 Game Night 8 p.m.	7 Bridge Lessons 8 p.m.	8 Social Hour 5:15-7:30 Seafood Buffet 6:30-8 p.m. $1.50	9 Toastmasters Regional Meeting La Granada Dance Max Apodaca—9-1 No Charge
10	11 Duplicate Bridge 7:30 p.m.	12 Adult Dance Instruction Basic—7:00 Advanced—8:30	13 Ladies Bridge 1:15 p.m. ACF Bridge 7:30 p.m.	14 Bridge Lessons 8 p.m.	15 Social Hour 5:15-7:30 T. Kelly Buffet 6:30-8 p.m.	16 Adult Dance Class Grad Ball 9-12:30 Dinner 7-9 $1.50 per person Reservations Required

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CLASSIFIED ADVERTISING

Deadline: Friday noon prior to week of publication unless changed by holiday.

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 Corporation and AEC employees only**
6. **No commercial ads, please**
7. **Include name and organization**

FOR SALE

'56 MERCURY 2-dr. HT, best offer. Strascina, 299-2285 after 5 p.m.

$500 DOWN FHA, 3-bdr., paneled den, 1¾ baths, 1600 sq. ft., attached garage, $15,500. Ray, 11017 Phoenix NE, AX 8-0408.

'62 OLDS 88, 4-dr., 7800 miles, R&H, seat belts, $2975. Dalesandro, DI 4-4774.

TWIN DIESEL LIONEL TRAINS, 275 watt transformer, four variable voltages, automatic loader, decouplers, switches, plus other accessories, $50. Blaine, 299-1036.

CATALPA TREE, 12', dig it up and you can have it. Weir, AX 9-1160.

STAUFFER COUCH, originally $375, sell for $125. Fuller, AX 8-0037.

SKI EQUIPMENT, 6'5" skis, metal edges, Northland safety bindings, aluminum poles, $22; men's stretch pants, 32" waist, $10. Glass, AX 8-0842.

'61 VOLKSWAGEN, radio, seat belts, $1345. Reed, AX 9-7425.

5-PC. DINETTE SET, $25; '57 Pontiac station wagon, 6-passenger, $500. Class, 255-4952.

SELL OR TRADE: Stevens model 325 bolt action 30/30 rifle, $30 or trade for camping or reloading equipment. Scranton, 299-4902.

ALL METAL GARAGE DOOR w/hardware, $30; hand lawn mower w/catcher, $5. Farner, AX 9-6007.

4-TUBE audio output amplifier, Heathkit, WA-P2 pre-amp, power supply for both, $10 each or 3/$25. Boling, 282-3256.

GUNS: Colt Frontier Scout revolver, .22 cal., $40; Winchester Model 12 shotgun, $75; Winchester Model 88 rifle, .308 cal., $115. Kubiak, 256-1513.

TRAILER HITCHES for '59 Buick and '54-'56 Ford wagons, $10 each. Dollahon, 299-8107.

WALNUT DINING ROOM TABLE, 30x42" w/10" leaf, $25; mahogany plywood utility table 80x28", $15. Smith, AX 9-6873.

4-BDR, 2805 Second SW, take property or car in trade, $8500, inquire 2809 Second SW. Chavez, AL 5-5461.

STAUFFER reducing couch, best offer. Mason, 242-9298 after 5 p.m.

DORMEYER elec. mixer w/attachments; Hoover sweeper; toaster; console TV; brown tweed lounge rocker, hassock; Hollywood bed. Newman, AL 6-3295.

FREE PUPPIES, short hair, about 20 lbs. full grown, ready to go approx. March 10. Hickman, 11617 Clifford NE, 298-3804.

BUG GO-KART w/8 hp McCulloch engine, helmet, $95. Driscoll, 298-4641.

WASHER, Kenmore automatic, 4 yrs. old, $60. Llamas, AL 6-2480.

JIG SAW, Sears, 12"x12" tilt table, 18" throat, new, never used, $35. Blaz, 2619 Gen. Marshall NE, AX 9-3063.

8-GAL. AQUARIUM w/pump, lamp and filters, w/guppies galore, $10. Calvery, 255-9545.

'61 FORD 6, 2-dr., new tires. Bourne, 299-0788 after 6 p.m.

NORELCO Continental 300 professional tape recorder, 3-speeds, 50-16,000 cps at 7½ ips, auto. stop digit and modulation indicators, $139. Schmidt, AX 9-8707.

200 CC German made motorcycle; electric stove. Little, 255-7864 after 5:30 pm.

'59 De Ville camping trailer, 16' long. Jelgerhuis, AX 9-3817 after 4 p.m.

CRAFTSMAN TILTING-ARBOR bench saw w/motor, $40. Freund, AX 9-3716 after 5 p.m.

21" Blond TV console. Bendix model. $75. Minter, AL 6-9225 after 5 p.m.

WESTINGHOUSE, stacked washer and dryer; 2-bdr. house w/basement started, attached garage. Hawley, CH 2-3104.

ANCIENT BATTLE MACE, $27.50; Civil War brass hilt bayonet, $17.50; old cartridge board, will trade for old guns, early Indian items or spool cabinet. Smitha, AX 9-1096.

SMITH-CORONA portable typewriter w/ carrying case, $30. Hill, CH 3-3493.

'58 GE WASHER, sell or trade for living room furniture. Cast, 298-3909.

CABIN SITE at El Vado Lake, 1⅓ acre, wooded; '53 Ford Ranch wagon, V-8, stick w/OD. Trumble, 298-3397.

DUNCAN PHYFE SOFA, $65; chair and ottoman, $30; bedroom suite w/mattress, $60. Brayfield, AM 8-6479 after 5 p.m.

LEONARD REFRIGERATOR, 8.5 cubic feet, $50. Baca, TR 7-9355.

3-BDR BRICK, 1¾ bath, carpets, drapes, patio, front porch, front hedge, elec. hedge trimmers, power lawnmower, 2 driveways, sprinklers. Chappell, 299-7860.

15' MERCURY travel trailer, 5 sleeper, carpet, other extras. Summer, 1115 Morris NE, AX 9-1912.

30" ELECTRIC STOVE w/full oven; electric refrigerator-freezer, both by Wards, $60 each. Jansen, AL 6-0855.

NEXT DEADLINE FOR SHOPPING CENTER ADS Friday Noon, March 8

SEWING MACHINE, zig-zag w/cabinet, attachments, $100; rifle, 303 Enfield MK 4 w/ammo, sporterized, $20; encyclopedia set w/book rack, $50. Rauch, 268-0232.

TR-3 PARTS, side curtains, tonneau boot, service manual, windscreen frame, block crank head, Allstate radio, surplus B-11 seat belts. Svensson, DI 4-7700.

PAINT SPRAYER; metal trailer; garage door; transistor portable radio; coffee table; 2 step tables; 2 16" Ford wheels, tires, tubes. Aaron, BU 2-3124.

'60 COMET station wagon, 4-dr., extras, original owner, low mileage, Saavedra, CH 3-7339.

'56 CHEVY, Power Pack, R&H, HT, w/w, 2-tone, auto. 8, 4-dr., $395. Matlack, AL 6-7371.

NEAR SCHOOLS, shopping, Base, landscaped corner lot w/sprinklers, 1600 sq. ft., air-cooled, carpeted, kitchen built-ins, terms. Booth, 298-2107.

BEADED SCREEN 40x40, for 35 mm projection, $5, 1828 Florida NE. Henry, 256-2467.

4-BDR HOME, den, 1¾ bath, pitched roof, hw/floors, landscaped, sprinklers, near schools, La Sala Grande addition, $21,-500, 2908 La Palomita NE. Williams, AX 9-5967.

FORD 12-volt 30-amp voltage regulator, $2.98; 17" Bendix TV table model w/ stand, $9.98; automatic transmission fluid, $.39. Trybul, 298-3325.

MOUNTAIN HOME, adobe, 5 room, all utilities, near lake and stream, 2 hrs. from Albuquerque, paved road, $7000. Guerin, AX 9-4677.

KENMORE automatic washer, $30. Claassen, AL 5-4347.

CHILD's desk and chair, sturdy steel and hardwood construction, 18"x24" top w/ storage beneath, $10. Moore, AX 9-3758.

'56 PLYMOUTH 4-dr. sedan V-8 w/standard transmission, $350. Olson, AL 5-8360.

'51 STUDEBAKER 2-dr., stick, OD, R&H, $150. Lowe, 11404 Bellamah NE, 299-7725 after 4 p.m.

2-BDR. HOUSE near schools, shopping, NE Heights. Arnold, AL 6-6049 during day, 298-3192 after 5:30 p.m.

BENDIX DUOMATIC, $60; GE pushbutton range, $70; twin bedroom set: chests, bedside tables, $125. Hurt, AL 5-5949 after 5:30 p.m.

BABEE-TENDA, $12.50. Beatty, AX 9-3429.

LADY'S BOWLING BALL, 13-lb.; size 6 shoes; bag, $35; figure skates, size 6, $15; roller skates, size 6, $20. Ayers, 1010-A Palomas Dr. SE.

'58 ENG. FORD STWG, R&H, sell or trade for camp trailer. Naumann, 298-6476.

'49 PLYMOUTH 2-dr., new brakes and license, R&H, $95; 4-barrel Carter Carb. model WCFB, $20. Miller, AL 5-2577.

ELECTRIC BROODER, Sears, 300-500 baby chicks; 2 large bird cages w/stands; mating cage w/accessories; Hot Point 11-cu. ft. refrigerator w/freezing compartment. Norton, DI 4-4973.

'48 PLYMOUTH Spl. Dlux., 2-dr., '59 motor, new battery, heater, antifreeze, '63 license, make offer; 8" electric saw and table. Drury, DI 4-4973.

'60 TR3, new paint and tires, w/tonneau cover, $1300. Troy, 268-7105.

2 MEDICINE CABINETS; 64x120" Kirsch traverse rod; drapery panels; two toilet seats; two chrome glass holders. Brautigam, 299-9407.

ALL METAL TRAILER w/3 new tires, $125; gun cabinet, holds 11 rifles, $85; new Remington model 850 20-gauge shotgun, $75. Skelley, Rt. 1, Box 75 B, Los Lunas, 2½ miles south of Los Lunas.

'48 DODGE 4-dr., R&H, $75. Moore, 1515 Georgia NE, AL 6-7177.

'62 T-BIRD, 11,000 miles, all power accessories, electric windows, a/c, etc. Chandler, AX 8-5069.

SWAP 1000 watt 110VAC generator for CB transceiver or mobile ham band receiver. Foster, ext. 27231.

APACHE HEATHKIT 180w transmitter, BC-348Q receiver, some surplus radio gear; home-built "go-kart" w/small 2-cycle motor, sell or trade. Dobias, 256-7476.

'52 PONTIAC 9-passenger station wagon, 2 new tires, new brakes, hydramatic, $200 or make offer. Fisher, AX 8-0526.

8 MM KEYSTONE MOVIE CAMERA, projector, screen; 3-piece white luggage set; stereo-phonograph, radio combination. Newton, 265-1042.

HARDWICK 36" gas range, broiler, lighted oven, $40. Asselin, AX 9-9270 except Fridays after 6:30 p.m.

SELL OR RENT house trailer, see at 1909 San Ignacio Rd. SW, anytime. Sanchez.

'60 BSA STARFIRE SCRAMBLER motorcycle, $375; 2 15" wheels for Chevrolet, $8. Wilson, AX 8-0049.

'61 MERCURY METEOR 600, one owner, 4-dr., 8-cyl., stand. trans., w/OD, a/c, low mileage. Mrs. Schikowski, AM 8-0645.

HIDE-A-BED COUCH, $60. Richardson, AX 8-1688 after 5:30 p.m.

FREE, 5 mo. old pup, female, medium size w/short hair, black w/brown and white markings. Summers, AX 9-4674.

CASCO high chair; Casco jump chair; six-year crib w/mattress; folding stroller. Cockrill, AM 8-5502.

DINING SET, limed oak, $60; Philco TV radio-phon., console, $50; master mobile antenna $14; PE-101 dynamotor, $5. Rockwell, DI 4-5407.

FOR RENT

3-BDR, 1½ bath, carpet, drapes, garage, $100/mo. 3408 Cardenas NE. Burnett, CH 3-2758 or AX 8-2896.

3 ROOMS, 2 blocks from Sacred Heart Church, $35/mo., or all house, 6 rooms, $55, water paid. Chavez, AL 5-5461.

2-BDR, w/w carpet, a/c, refrigerator, stove, 5 min. to west gate. Ross, 610 Valencia SE, AL 5-0486.

15' TRAVEL TRAILER, sleeps five, reserve now for summer use. Colp, AM 8-8035.

WANTED

OUTBOARD MOTOR, 5, 6, or 7½ HP. May, AX 9-5548.

BACHELOR(s) to share furnished 3-bdr. house w/garage, spacious yard; split rent and utilities, cost about $140/mo. Wilson, 1040 Wade Cr. NE, 298-1566.

SEMI-PRO or professional trumpet, Conn or Bach preferred. Dollahon, 299-8107.

RIDE to bldg. 800 from vicinity of Carlisle Plaza. Winter, 3403 Morningside NE, DI 4-4456.

TO JOIN car pool from vicinity 2428 Britt St. NE to bldg. 802 or 892. McCoach, 298-5960.

HEAD SKIS, 6'9", preferably w/Cubco binders. Reed, AX 9-7425.

RIDE from 531 Texas NE to vicinity bldg. 800. Davis, 268-1754.

VOL. 2, Black binding, Compton's Encyclopedia, 5 to 10 year old edition. Haley, DI 4-3919.

RIDE from vicinity of 5952 Avenida la Barranca in Paradise Hills to vicinity Bldg. 800. Barela, 898-2306.

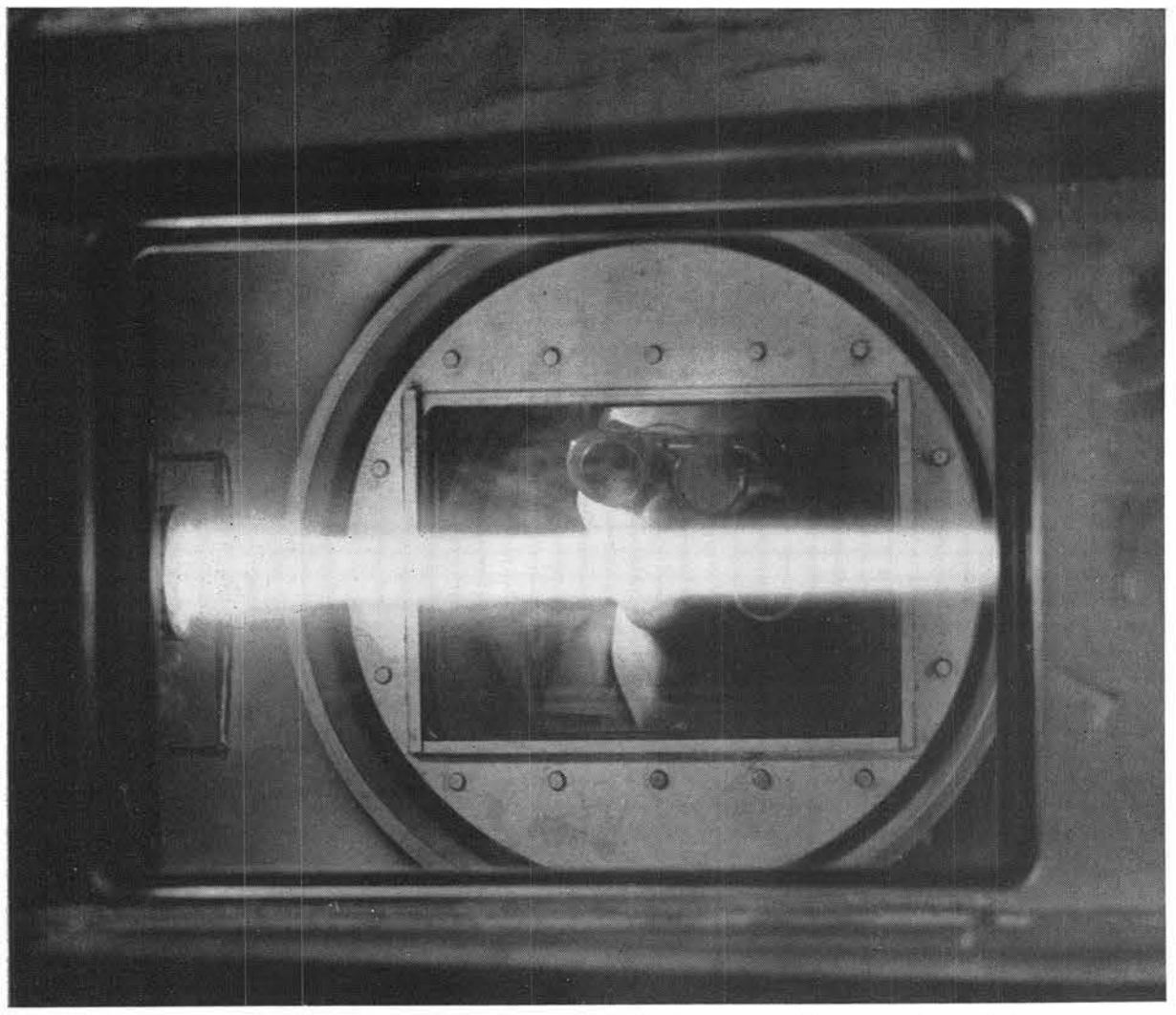
RIDE from 10233 Alder Dr. NW, Paradise Hills to Bldg. 880. Doyle, 898-2191.

CONGENIAL gal to share new, modern apt. near base, w/w carpet, elect kit., patio, 3-bdr., 1¾ bath. Thomas, 299-7089.

LOST AND FOUND

LOST—Diamond ring w/5 diamonds around center diamond, gold pin, green cap, Encore 8-transistor radio, black leather and wool gloves, black coin purse w/2 keys on chain, pink cardigan sweater, 3 keys in Ed Black holder, GM key, keys on Land of Enchantment chain, 4 keys on holder w/penknife and magnifying glass, man's black leather gloves, gold earring w/brown setting. Lost and Found, ext. 29157.

FOUND—Brown leather gloves, white cotton glove, 5-yr. SC tie tack found in St. Petersburg, 4 keys, sunglasses w/ black rims, black and silver snap type cuff links, ring w/orange setting. Lost and Found, ext. 29157.



STREAM OF PLASMA in chamber of 120-kw generator is observed through thick, tinted glass. The brightness of the jet varies with voltage input, but even at low voltage, it emits rays requiring goggle protection.

Plasma Jet Temperatures Reach 20,000°

Temperatures of 20,000 degrees Fahrenheit and air velocities up to 20,000 ft. per second are the order of the day in Sandia Laboratory's new Plasma Research Facility. The facility is part of Aerophysics Section 7131-1, supervised by M. D. Bennett. It is used for magnetoaerodynamic experiments by the Aerophysics Section and for tests and experiments by Materials and Process Development Organization 1100.

CONTROLS of 120-kw plasma generator are adjusted by James V. Williams (7131-1). Nozzle of plasma generator is visible through window.

The facility consists of three separate plasma jets which are housed in a new addition to Bldg. 865; a 120-kilowatt plasma generator, a 240-kilowatt generator, and a 1000-kilowatt generator that is being installed. The plasma jets are fed with power from 20 selenium rectifiers, controlled by a switching system which will vary the current and voltage input to the jets. Cooling of the plasma units is accomplished by a pumping system which provides a water flow rate of 200 gallons per minute at 250 pounds per square inch pressure.

"For a long time science was limited by the temperatures that could be obtained for continuous tests in the laboratory," Dwayne explains. "It was impossible to push the temperature higher than a few thousand degrees F. But the initial investigation of the plasma generator by the Germans in the 1920's changed all that. Now, with the generators, it is possible to electrically produce and maintain temperatures in the 15- to 30,000-degree range long enough to conduct most experiments."

Chemical Bond

The limiting temperature which a material can withstand is set by the energy holding the atoms of the material together—the "chemical bond." At temperatures above 10,000°F, the chemical bond can no longer hold. The atoms begin a random motion so violent that all bonds are broken, and the hardest material is vaporized. Such a vapor, a mixture of electrons, ions, and atoms colliding with each other and generating radiant energy, is called a plasma.

Plasma is generated when an electric arc is produced in a gas. It consists of the charged particles that carry the current across the gap between the electrodes. Thus, the blinding light of a welding arc comes from a plasma, and so does the glow of a neon tube or a fluorescent lamp. Most of these devices operate at comparatively low temperatures.

The plasma jet is produced when a high-current electric arc is generated in a small chamber. A "working fluid" such as argon or nitrogen gas (water or other liquids or gases may be used depending on the application) is injected into the chamber and allowed to pass through the arc which heats the fluid to plasma temperatures.

For a given power input to the generator, temperature of the plasma will depend on the type of fluid used, the pressure in the arc chamber, and the flow rate of the fluid passing through the arc. The plasma is ejected from the chamber into a nozzle to form a jet; hence the name, "plasma jet."

The plasma generator is kept from being vaporized by circulating water through the walls and electrodes of the arc chamber. The working fluid also aids in cooling the generator since it removes heat from its interior.

Energy Lost

"We lose a large amount of the energy we inject into the plasma-producing arc, since it's carried away by the coolant flow," Dwayne says. "We estimate the jet of the 1000-kw generator will contain only about 45 to 50 per cent of the total energy input. Energy loss increases with the increase of plasma temperature. For this reason, after a certain point is reached, any attempt to produce a hotter jet becomes rather like an attempt to fill a sieve with water. At this point, an increase in energy to the arc is offset by an equal increase in energy carried away in the cooling water. Therefore, there's a practical limit to the temperatures we can attain."

"In tunnel experiments, we utilize a partial vacuum in the test chamber to increase the velocity of the high-temperature stream produced by the plasma generator," Dwayne continues. "The Mach numbers produced in such tests are low supersonic values, but since temperatures are high, we're able to simulate extremely high velocities."

In addition to plasma jet experiments involving models positioned in the high-temperature, high-velocity stream, the facility will be used for studies of the characteristics and behavior of the plasma itself.

Radioisotopes Give Peaceful Nuclear Energy Applications

Radioisotopes make possible hundreds of peaceful applications of atomic energy. The many uses of isotopes in research, medicine, agriculture, and industry are vitally important to our progress. Part VI of this series on 20 years of nuclear progress is concerned with the story of the versatile isotope.

The Fermi "pile" established that the controlled release of nuclear energy, made possible by reactors, results in three products: heat, neutrons, and radioisotopes formed from the splitting of uranium atoms in the fission process. The same is true for reactors using plutonium or U-233 (derived from thorium) as fuel.

The heat makes possible the generation of electric power.

The vast quantities of neutrons produced in reactors have been a major factor in the rapid advance of nuclear science and technology in the past 20 years. For some 10 years prior to 1942, only small quantities of neutrons were available.

Reactors are the primary source of radioisotopes and the most widespread and important peaceful applications of nuclear energy today are the hundreds of uses of radioisotopes.

Some important radioisotopes are recovered from the fission products of chain reaction — the wastes or "ashes" of nuclear reactor operation. Among them are strontium 90 and cesium 137. Hundreds of others are made by exposing isotopes of various elements to neutron bombardment in a reactor.

Sometimes a radioactive form of the element is the result, such as cobalt 60. In other cases one form of an element is transmuted into a radioactive form of another. For example, stable sulphur 32 is transmuted into radioactive phosphorus 32, a radioisotope widely used in medicine and agriculture.

The many uses of radioisotopes in research, medicine, agriculture and industry have been widely publicized. The popular and technical literature on the "tagged" or "tracer" atom is voluminous.

Radioisotopes are the basis for most of the new discipline of nuclear medicine. They constitute a diagnostic tool to study body processes and disease, which early in the atomic era was hailed as the "greatest advance since invention of the microscope."

In agriculture, it was said as early as 1950 that radioisotopes had made possible more knowledge of when, how and where plants use fertilizer than had been discovered in the previous half century. Today, radioisotopes show the way to greater crop yields, better knowledge of soils, and greater effectiveness in combating insect pests and animal and plant diseases.

In the life sciences, the radioisotope has made it possible to add much to basic and applied knowledge in such areas as genetics and photosynthesis.

In industry, radioisotopes are finding ever-widening use. Radioisotope gauges control the quality of many manufactured products; "tracer" isotopes follow the course of chemical reactions; radioisotopes are used like X-rays to detect flaws in wells and castings. Radioisotope research also promises to extend the shelf life of large classes of foods such as meats, fruits and fish.

In 1962, the 100,000th shipment of radioisotopes left Oak Ridge and the total amount of useful radiation, measured in curies, has increased even more importantly, setting a record in 1961.

As of September 1962, there were more than 7000 licensed users of radioisotopes in the United States. Some 1500 were physicians and 1500 were hospitals and other medical institutions. Other major classes of users were: industrial firms—2114; federal and state laboratories—1485.

Perhaps the most far-reaching new advance in radioisotope use is the generation of electric power directly from the heat given off during the decay of radioactive substances.

Two of the four transmitters of the Navy navigational satellites TRANSIT IV-A and B were powered by 2.7 watts of electricity produced from the decay heat of plutonium 238. The scientific principle involved is not new but its application to radioisotopes is just in its infancy.

Today, work on isotopic generators or "atomic batteries" to deliver up to 500 watts electrical power is in progress. Already isotopic power has operated the instruments in unmanned weather stations near the Arctic Circle and in the Antarctic and a navigational buoy in the Chesapeake Bay.

These new "atomic batteries" fill a long-felt need for a rugged, reliable unattended power source for use in remote locations and promise to be of great use in filling in present gaps in the accumulation of weather data.

The reality of technical problems has dissipated the hope for development of quick cheap electrical power from use of nuclear reactors. In Part VII of this series a report will be given on the progress in this area.

Sandia Tech Artists Entering Work in Los Angeles Exhibit

Eleven members of Technical Art Division 3463 will submit examples of their artwork to the tenth annual Technical Illustrators Management Association exhibit, Mar. 27-Apr. 21 at the Museum of Science and Industry of California in Los Angeles. Sixteen pieces of work in five categories will be submitted.

Submitting work are T. I. Baggett, Jr., R. H. Chavez, T. M. Clark, and R. J. Mickey (all 3463-1); L. P. Ortiz (3463-2); and C. C. Kinney, R. H. Newman, G. E. Snidow, C. E. Spriggs, W. J. Wagoner, and J. B. Walston (all 3463-3).

Five technical artists from Livermore Laboratory will also submit artwork. They are John Daniel, Ubbie Hammer, Dan Aikin, Evelyn Bachman, and Ray Leri (all 8233-3). They will submit seven pieces of artwork in three categories.

Sandia Authors

Current or forthcoming articles by Sandia authors in technical journals include the following:

D. L. Hanson (5425), "On the Representation Problem for Stationary Stochastic Processes with Trivial Tail Field," March issue, the **Journal of Mathematics and Mechanics.**

J. M. Ortega (5426), "On the LL^t and QR Methods for Symmetric Tridiagonal Matrices," April issue, **The Computer Journal.**

Sandia's Safety Record

Sandia Laboratory	Livermore Laboratory
HAS WORKED	HAS WORKED
1,505,000 MAN HOURS	927,000 MAN HOURS
OR 43 DAYS	OR 180 DAYS
WITHOUT A	WITHOUT A
DISABLING INJURY	DISABLING INJURY