CLEAN-OUT-THE-FILES CAMPAIGN—Forty-five classified waste burn bags were filled recently when Division 7182 cleaned out its files. Division secretary Marilyn Brown, left, and Flo Gossin (7125) conducted the file purge. D. M. Bruce is division supervisor.

Sandia Gets Excellence Award For Ultra-Micro Circuitry Work

A Certificate of Excellence in miniaturization was presented to Sandia Corporation at the annual Miniaturization Awards banquet recently in New York City.

Al Goodman, Applied Research Section, Advanced Development Division 7223, and Iben Browning, Sandia consultant, accepted the award for Sandia Corporation.

"Ultra-Micro Circuitry at Sandia," the Corporation's entry in the national miniaturization contest, was submitted as a joint entry by Advanced Development Division personnel. The entry described the development of a "fiber switch," a tiny (overall dimensions of 3-5 mils) switching device utilizing the principle of fibration. Remainder of Sandia's entry described concepts in ultramicrocircuits that current development shows is promising for continuous production of microscopic components and eventual fabrication of devices with a component density of 10^9—the neurone density in the human brain.

Mr. Goodman assembled and submitted the entry. Those who contributed to the program include Robert Matthews, Robert Swyers, John Lohse, William Jacoby, Arthur McCarthy and Milton Zimmerman (all 7223).

Sandia Corporation's award was one of 10 Certificates of Excellence presented for achievement in the field of miniaturization. There were 160 entries in the contest sponsored by Miniature Precision Bearing, Inc., Keene, N.H. Entries were judged by a committee of selected authorities in the field.

Sandia Corporation
LAB NEWS
ALBUQUERQUE, N. MEX. • LIVERMORE, CALIF.

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Sandia Tech Papers Will Be Presented at Science Meeting

A dozen technical papers, authored by Sandia Corporation employees, will be presented during the New Mexico Academy of Science semi-annual meeting in Socorro, April 8.

The meeting, at the New Mexico Institute of Mining and Technology campus, will coincide with the New Mexico State Science Fair.

Papers to be given include: Invariant Imbedding Approach to One Dimensional Wave Reflection by Crawford MacCallum (5150); Fundamental Studies on Propellant Combustion by Arthur Whittaker (5153); Free Radical Decay in Polyethylene by Irving Auerbach (5151).

Reflection and Refraction of Stress Waves at Grain Boundaries by H. S. Levine (5150); Studies Concerning the Migration of Radiation Damage in Organic Materials Using Electron Spin Resonance Technique by Frank K. Truby (5150); Fall of Small Particles or Heavy Molecules Through the Upper Atmosphere by Harold L. Davis (5150).

A Technique for Studying Transient High Stress Piezoelectricity by R. A. Graham (5132); Some Characteristics of Piezoelectric Ceramic Strain Gages by R. P. Reed (5131); Ultrasonic Joining in Atomic Energy Applications by L. E. Null (1121).

Craters in Sand and Plaster from Small Sub-surface Explosions by Warren E. Taylor (2411); A Ferrite Piezomagnetic Stress Transducer by Cecil Land (7223), and The Piezoelectric Response of Quartz Beyond its Hugoniot Elastic Limit by W. B. Benedick and Frank Neilson (both 5133).

In addition, H. D. Sivinski (7311-1) will discuss some environmental problems to be encountered in space travel on a "Man in Space" colloquium.

5150 Staff Aides Conducting Tech Research Seminar

Sandia's Research Seminar is known to most engineers and research men, but few employees outside of Physical Sciences Research Department 5150 know about the organization's Technician Research Seminar.

This series is designed especially for the 15 Technical Staff Aides of 5150. In fact, Staff Members are not invited to participate or even to attend the seminars.

"We got the idea when several of us attended the regular Research Seminar and found that many of the terms being used were not specifically defined. In fact we were 'snowed'," explained Jim Hudson (5151), who helped set up the seminar.

His co-chairman, Dave Barham (5153), added, "We felt it would be of more value to present a seminar of our own, which would include sufficient scientific background to make the experimental programs understandable."

The program has a two-fold purpose: to better enable the Staff Aide to understand how his work fits into the overall job of the Department and the Corporation; to help individuals to gain a better understanding of their project through the preparation required in order to present it to others.

Department 5150 is one of the organizations in which programs are carried out by two-man teams—a senior Staff Member, with a PhD degree, and a Staff Aide, either a Technical Institute graduate or skilled specialist. At present 16 independent research programs, in a variety of scientific fields, are being pursued.

Since last November, when the seminars started, the talks have averaged two a month. The talks are close to an hour in length, include usage of visual aids such as blackboards, slides, and models, and are followed by a question and answer period. They are held in Bldg. 813.

The subjects have been of specific nature such as Free Radical Acceptor Mechanisms (Larry Larson), and Paramagnetic Resonance Studies of Transition Metal Chlorides (Bob DeZeeuw), as well as of more general nature, such as Ferroelectricity (John Smalley), and High Temperature Studies (Les Balint).

The current series of talks includes: March 16, Don Schreiner, "The Mossbauer Effect"; March 23, Orrin Smith, "Hydromagnetics"; March 30, Agnes Crosthwait, "X-Ray Diffraction," and April 6, Jim Freese, "Gas Phase Chemical Kinetics."

Library Central Record Files Provide Easy Access to Bits or 'Torrents' of Information

Ask anyone in the Central Record Files at Sandia or Livermore Laboratories for a single memo or all written material on a specific Sandia program and they can probably find it for you.

The information might not be in one place; part of it might be in one folder of information, and the rest scattered through dozens of document files, but the Central Record people of the two locations strive to accumulate in their files a complete technical history of weapons programs from birth to obsolescence.

Realizing the need of engineers and scientists for such information, the Central Record group has undertaken the gigantic task of combing, cataloging, and correlating the vast amount of weapons information pouring daily into both libraries.

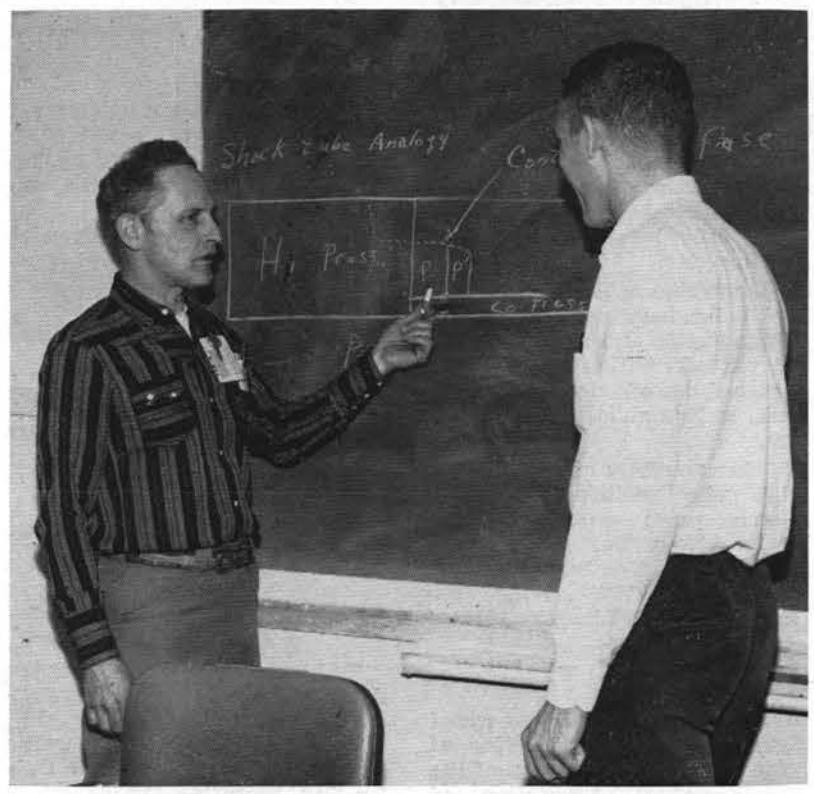
Included in the files making these historical records are official documents, informal reports, correspondence, minutes of meetings, drawings, sketches, photos, change orders, etc.

Information Warehouse

To make this warehouse of information usable to engineers and scientists, an elaborate system has been set up as an approach to the problem of knitting together all information relating to any par-

(Continued on Page Three)

ROWS OF SUBJECT FILE FOLDERS characterize Sandia Laboratory's Central Record Files. Betty Ridinger (right) is cataloging incoming documents while Linda Wrhel places individual documents in their correct places in the proper subject folders.



RESEARCH SEMINAR for Technical Staff Aides of Physical Sciences Research Department 5150 recently included talk by Orrin Smith (left) on "Hydromagnetics." Jim Hudson (right) is co-chairman with Dave Barham and helped originate seminar.

'Neutron Flux' Talk Presented to UNM Research Society

Kent C. Humpherys (5432-1) gave a talk before members of the Phi Sigma Honorary Biological Research Society at the University of New Mexico last week.

Title of his paper was "Methods of Making Neutron Flux and Sprectra Measurements in a Reactor." He previously read the paper at the Bio-Assay and Analytical Chemistry meeting held in Santa Fe last fall.

Ordnance Magazine Prints Article by R. W. Henderson

"Making Nuclear Weapons," an article by R. W. Henderson, Vice President, Weapon Programs, appears in the current March-April issue of **Ordnance.** The magazine is published by the American Ordnance Association.

In the article, Mr. Henderson describes the high order of quality control necessary in the production of atomic armament.

Editorial Comment

Complacency Is A Danger

During these days of trials and tribulations one can find reading material aplenty on the dangers communism poses to the world's free people. It is easy to become indifferent to such writings because of their great quantity. However, for a rapid return to the seriousness of realities one has only to be jolted as a Sandia employee was recently jolted by an after-dinner speaker at an out-of-state meeting.

This orator discussed most eloquently, persuasively and lengthily the fact that our country has little, if anything at all, to fear from the Soviets because we are so much stronger, both economically and militarily, than are the Russians. His message was: The Soviet Union is incapable of moving against the United States in any way; it has neither the resources, weapons nor intention to attack the United States.

The man who advanced this thought is a popular, locally well-known writer and is a public speaker of some renown. He has winning ways with his audiences and is most personable, entertaining and erudite. He was a good salesman and successfully peddled his philosophies to some of his audience. Others were not buyers of his wares.

Concern may be felt over the fact that any listeners at all were convinced.

The dangers of such an appealing doctrine are easily apparent. In these days, when persistent cold war rumbles give worry to the most optimistic, good news is sought with eagerness. The attractive morsel "Have-no-fear-we-are-in-no-danger" is as appealing a falsehood as can be found by persons looking for good news.

It makes one think. How many Americans are living with this false sense of security as a result of listening to fluent, but ill advised, speakers? How many people believe the eloquent and persuasive messages of such speakers? Are there many other capable, respected orators who are helping anesthetize American people?

Let's hope that audiences hearing these speakers are made up of thinking people. Made up of the kind of people who understand what's happening, people who have read history and people who are planning for the future. Such utterances must be countered with realistic, factual information. It would be even better if a speaker with such a message were not provided with a soap box.

This is not a witch-hunt call. This is not a call for hysterical action. In this campaign we are concerned with educating loyal, honest, well-meaning, but ill-informed fellow citizens.

We recommend that the thinking American arm himself with facts. Let him know and be able to explain the American competitive enterprise economy and let him be able to contrast it to the sort of economic system communists have planned for us. Let us be able to report the inroads on freedom made by communism in its relatively short lifetime.

Let us be Americans who understand the threats of our enemies. Let us put our faith in those of our leaders who are in a position to measure the ability of the enemy to carry out these threats.

We should not live in cowering fear for we are strong, but neither should we become complacent, negligent and vulnerable.

Radio Hams' Rescue Efforts Help Locate Stranded Sandia Family

Charles K. Lee (1443) and his family were stranded recently when their car became mired in the remote Tent Rock area north of Albuquerque. Numerous Sandians helped in the rescue operation.

Corporation employees who helped were members of the Caravan Club's Radio Amateur Emergency Service, which supported the Bernalillo County Emergency Council, and the Albuquerque Citizens Radio Association.

Chuck, his wife Helen, their daughters 9 and 13, and another 13-year-old Albuquerque girl, drove to the Tent Rock formation, 10 miles from Cochiti Pueblo, one afternoon with the intention of returning home about 6 p.m.

After exploring, they decided to drive back on a different road (indicated on their out-dated map) which was supposed to join an improved road to Ponderosa in six miles. Instead, after traveling that distance, their car became hopelessly stuck in the mud.

The adults and three children continued to follow the old road on foot until 11 p.m. when they bedded down on pine boughs in the mountains. The next morning they again walked six or seven miles until sun-softened deep snow made it too difficult for the children to continue. Helen and the girls remained at a dry spot while Chuck walked another three hours. He finally found the improved road and within 15 minutes a rescue helicopter spotted him and dropped a note saying that the others had already been found and a truck would be along shortly to pick him up.

Unknown to Chuck, when the family failed to return, friends became alarmed and notified various rescue units in the area after determining four possible places the Lee's might have taken their afternoon outing.

Eddy D. Cooke (4231), R. W. Russell (7321) and four other members of ACRA began searching east of the highway for the missing family shortly after midnight after receiving word of their plight from Civil Defense units. The Caravan Club combed the area west of the highway.

Duane Arlowe (7213) and Tom Martin (1322) of RACES found the car tracks about 4 a.m. but their vehicle became stalled in a snow drift before reaching the missing auto.

Meanwhile, ACRA had set up a mobile headquarters at Santa Domingo Pueblo and in the morning relayed information from the helicopter, hovering over the search area, to Bernalillo and Albuquerque.

Other members of the Caravan Club who participated in the search were: Andy Anderson (2413), Leon Day (7234), Carl Franz (1321), Ken Johnson (4232), Jim Steuber (7232), Willy Petty (2344) and Bob Lindsey (1422).

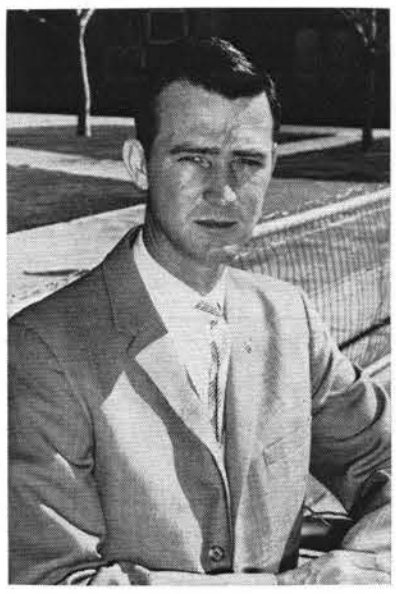
Wicke Gives Talk

H. H. Wicke (5421) was one of the speakers at a meeting of the Southwestern Section of the Mathematical Association of America held in Tucson, Ariz., last week.

Topic of his talk was "Set Functions and Their Determining Collections."

'Hap' Holliday Is New Coronado Club Manager

Millard "Hap" Holliday took over duties as Coronado Club manager upon the recent resignation of John Ulling. Mr. Ulling, manager of the club since June, will go on leave of absence from the Anderson-Dunham Company, Coronado Club concessionaires, for health reasons.



Millard Holliday
—new Coronado Club manager—

No stranger to New Mexico, the new Club manager is a 1951 graduate of the University of New Mexico. For the past year he has been in charge of cafeterias and employee clubs for the Lockheed Missile and Space Division in Van Nuys, Calif. His duties also included supervision of other Lockheed facilities at several locations.

Hap has spent 12 years in the club management field including periods of managing the Towne House in Santa Fe and the Air Force exchange at Manzano Base.

He is married, has three children, and resides in Albuquerque at 3317 45th St., Sandia Base.

Paper Accepted

A technical paper by H. G. Baerwald (5132) has been accepted for publication in the International IRE Convention Record, 1961, Circuit Theory Section. His paper is entitled, "A Limit Theorem on Passive Reactance Two-Ports with Constraints."

Livermore Skiers Elect

The Sandia Ski Club at Livermore has elected four Sandians as officers for the 1961-1962 season. The club, which includes LRL personnel and local residents, installed Bob Schaefer (8165-2) president, Clarence Loveless (8165-1) vice president, Jim Wright (8155-2) treasurer, and Barbara Reitz (8233-2) secretary.

Congratulations

Born to:

Mr. and Mrs. Jack Burt (4411-1) a son, Matthew Cole, on March 12.

Mr. and Mrs. G. W. Dyckes (1112) a son, Bruce Alan, on March 16.

Mr. and Mrs. J. A. Beaudet (2544) a daughter, Margaret Rose, on March 17.

Mr. and Mrs. Dennis B. Hayes (5112) a daughter, Denise Elizabeth, on March 21.

Mr. and Mrs. Alfred A. Riedel (1411-1) a daughter on March 24.

Mr. and Mrs. David Barham (5153) a son, Michael David, on March 15.

Mr. and Mrs. Ed Mills (2341-5, St. Louis) a son, Jonathan, on March 21.

Sympathy

To Lila M. Ness (3126-3) for the death of her mother in Albuquerque March 19.

To Lois Swayze (4131) for the death of her father-in-law in Dallas, Tex., recently.

To Lee Hollingsworth (8120) for the death of his mother in Turlock, Calif., March 17.

To Marie Blythe (3311-2) for the death of her mother March 21.

WORKING BEHIND THE scene for the "Grand Premiere" of the Albuquerque Ballet Company are "Jerry" Jercinovic (2640) and Dixie Baca (1424), officers in the Ballet Guild of New Mexico.

Sandians Who Serve

Premiere Ballet Program Climaxes Year of Work for Three Sandians

This is another in a series of articles describing the community activities of Sandia employees.

When the Albuquerque Ballet Company has its "Grand Premiere" at the Civic Auditorium on April 8 and 9, three Sandians, in particular, will be sitting in the audience with wishes fulfilled.

They will be seeing results of a year's work by the Ballet Guild of New Mexico in which they serve as officers. Leo M. "Jerry" Jercinovic (2640) is vice president of the group, Dixie Baca (1424) is secretary, and Joe Muench (1442) is a member of the Board of Directors.

The Ballet Guild was incorporated in February 1960. Its main purposes are to build up a scholarship fund for dancers to continue their education, give musicians and artists a chance to display their abilities in local performances and to stimulate interest in the ballet.

Guest artists for the Grand Premiere will be Alan Howard, who has been with the Ballet Russe de Monte Carlo for 10 years, and Grace Doty of the Pacific Ballet Co. They will perform the Pas de Deux from "Coppelia," "Raymonda" and "The Nutcracker Suite."

Featured production number will be "Swan Lake." Jerry, Dixie and Joe each has a daughter who will perform solo parts in the ballet. Leanne Jercinovic and Linda Muench will portray the Black Swan on alternating nights, and Carlota Baca will dance the role of Odette on Sunday night.

Music for the ballet will be provided by the Albuquerque Civic Symphony directed by Maurice Bonney.

Both performances will begin at 7:45 p.m. For further information contact Dixie at ext. 53238.

Joyce Seaburn (4111)

N. Mex. Industrial Photographers to Hold Meeting April 8

Organizational meeting of the New Mexico Industrial Photographers Association will be held Saturday, April 8, at White Sands Missile Range. Election of officers and adoption of a constitution are planned.

Program will include talks by Eastman Kodak representatives.

All industrial photographers in the state are urged to attend. Additional details are available from Elliott Harris (3462), ext. 41256.

Take a Memo, Please

THE SAFE WORKER does not depend on luck. When you gamble with safety, you are betting on your very life.

Sandia Corporation
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Lab News Camera Records Science Fair Highlights

SCIENCE FAIR EXHIBITS — Several thousand spectators studied exhibits of high school and junior high school students at the Northwestern New Mexico Science Fair last week. Sandia Corporation's Community Relations Section assisted the University of New Mexico in presenting the Fair. Sandia also provided numerous exhibits and a closed circuit television coverage of the awards banquet.

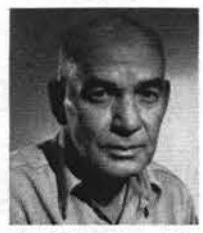
JOYCE YUCKER, from Highland High School (Albuquerque), won the right to go to the National Science Fair with her chemistry entry. The exhibit demonstrated preparations of L-Cystine from human hair, and included an explanation and diagrams of the process. Also shown was the atomic structure of the molecule.

FIRST PLACE—Wind Tunnel Display won top honors for boys in the Northwestern New Mexico Regional Science Fair held at the University of New Mexico last week. Doug Elder, Sandia High School (Albuquerque), designed and constructed the exhibit. He will go to the National Science Fair in Kansas City, Mo., May 9-13.

ONE-TENTH of the documents and cross reference cards relating to the POLARIS missile program are shown by Pat Hinrichsen (8233-2) at Livermore Laboratory. The Central Record goal is to develop the files to the point where a complete technical history concerning the development of each weapon can be readily found.

R. L. Boase, Heating Plant Supervisor, To Retire March 31

R. L. Boase, supervisor of Heating Plant Section 4514-2, will re-



tire March 31 after 12 years at Sandia.

Mr Boase's future plans are indefinite, but he will "take life easy." He and his wife intend to look around before deciding whether to stay in Albuquerque.

A visit with their married daughter in Flagstaff is high on their list.

Mr. Boase will devote as much time as possible to trout fishing.

SCIENCE FAIR WINNERS, Doug Elder (left) and Joyce Yucker, received their awards at the banquet on Saturday night. Dr. Harold Enarson, University of New Mexico, made the presentations.

Continued from Page One . . .

Library Central Record Files

ticular Sandia weapons program.

Both Central Record File Section 3421-3, headed by Roy Smeltzer at Sandia Laboratory, and Section 8233-2, headed by Earle Paxton at Livermore Laboratory, strive to keep all their historical records in one location for easy accessibility.

"With the large volume of incoming information, one big problem is finding enough space to store it," said Roy in Albuquerque. "We expanded our facilities recently by 800 square feet." At Livermore space requirements are also high on the priority list, according to Earle.

In a typical month at Sandia Laboratory 3500 pieces of correspondence (memos and informal reports) may be received, an average of 2500 product drawings, 75 manuals, TM's and SC documents, and over 5000 engineering papers (engineering releases, change orders, numerical indices, waivers, commercial part drawings, etc.).

HELP IS GIVEN engineer M. G. "Red" Young (7523), center, by Sondra Golden and Section Supervisor Roy Smeltzer in locating a document in Sandia Laboratory's Central Record Files, Bldg. 880.

Placing a piece of weapons information into the file system can be difficult. Incoming information is likely to have more than one category. It may even be an integral part of a number of weapons systems, requiring a cross reference card under each category.

The problems involved are not unique. Libraries across the nation are faced daily with the myriad problems of cataloging torrents of documents.

The file folders may be studied in the reading areas by persons having the need to know or, if the borrower knows specifically which items he wants, the information will be delivered. All material is checked out by an authorized Central Record File clerk and signed for by the borrower.

No Classified Loss

"We've had good luck with this system," said Roy Smeltzer. "In six years only one document has been temporarily misplaced by a borrower. When you consider we have about 7000 subject file folders containing about three-quarter million documents, both classified and unclassified, that's not bad!"

It is the aim of the Central Record Files organization at both laboratories to give faster, better service, and to make accessible vital weapons information by proper cataloging.

Hypnotist Returns to Club April 1; Activities for Month Announced

A return engagement of mass hypnotist Frank Peterson has been scheduled at the Coronado Club Saturday, April 1, at 8 p.m. Admission is 50 cents for club members, 75 cents for adult guests and 25 cents for children.

Hypnotist Peterson uses an advanced form of hypnosis by inducing the somnabulistic state of hypnosis without first inducing hypnotic sleep. His show includes audience participation, but persons will be affected only if they voluntarily take part in the feat.

Dance Classes

Basic and advanced dance instruction classes for Coronado Club members will begin in the ballroom on Tuesday, April 4. Beginners will start at 7 p.m. and advanced students will meet at 8:30.

Charles (3452) and Holly (4131) Balistrere will teach Latin rhythms and Gail (3463) and Jennifer Ward will instruct American dancing. Both types will be offered in each class.

Cost is $6 per person for the 10-week course. Registration will be held at 7 and 8:30 p.m. on April 4.

Ladies Bridge

An all-day bridge session for the ladies on Wednesday, April 12, will begin at 9:30 a.m. with coffee and rolls. They will play until 11:45 and then buy lunch "through the line" at the Club. Play will resume about 12:30 p.m.

Price for the entire day is $1.25, excluding lunch. For reservations, call Mrs. Kramm, AM 8-5078, by noon on April 10.

George Davies will play for the Saturday night dance on April 8 from 9 to 1. Tickets are $1 for members, $1.50 for guests.

Lee Sprague will provide music for dancing at the club tonight from 5:30 to 8:30, and next Friday night Tommy Kelly will play. Social hour is from 5:15 to 6:45, and the $1.75 buffet is served from 6 to 7:30 p.m.

Supervisory Appointments

C. HERMAN MAUNEY to supervisor of Section 7164-1, Warhead Electrical Systems Division.

Herman has been working in the Systems Development organization since he came to Sandia in July 1953.

During this period of time he was on military leave of absence for 18 months. He was stationed at the Ballistics Research Laboratory at Aberdeen Proving Ground, Md., during his Army tour of duty.

Herman received his BS degree in electrical engineering at North Carolina State University and has completed all of his course work for obtaining a Master's degree in business administration from the University of New Mexico.

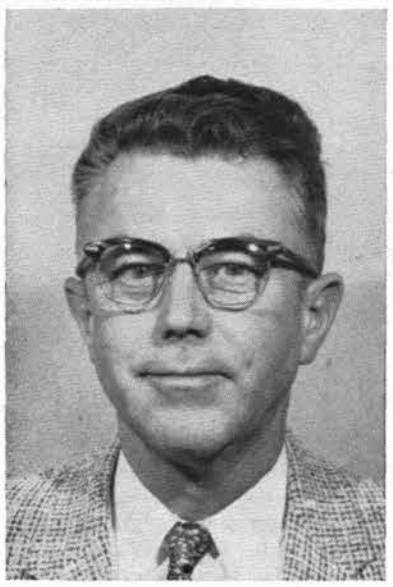
He is a member of Tau Beta Pi, Phi Kappa Phi and Eta Kappa Nu, honorary societies.

G. HAROLD MILLER to supervisor of Heating Plant Section 4514-2, Pipefitting and Plant Operation Division.

"G.H." has been an operator in the steam plant since he came to Sandia in August 1949. For the previous three years he had been working in the home construction field in Albuquerque.

From 1934-46 G.H. was with the American Viscose Corp. in Meadville, Pa., in the chemical lab and in the refrigeration and air conditioning department.

He has studied chemistry at Allegheny College, the University of New Mexico and the Pennsylvania State University and University of Pittsburgh extension schools.



E. H. Dopking

E. H. Dopking Files For School Board Post Re-election

Elliott H. Dopking (8123-3) is the second Livermore Laboratory employee to file for re-election to the Livermore Elementary School Board. The other Sandian, Joseph F. Sladky (8144-1), will also be a candidate for one of the four open positions to be filled on election day, April 18.

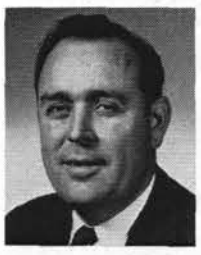
Elliott has been president of the school board since July and will have completed six years service with the school board when his term expires this spring.

Before coming to Sandia Elliott was a senior photographer for four and a half years at the Lawrence Radiation Laboratory. He joined the Livermore Laboratory photography organization in 1958.

During World War II Elliott was a photographer in the Air Force, serving in the U.S., South America and South Pacific.

Elliott is married and has a daughter in high school.

BILLY JOHNSON to supervisor of Test Section III, 7321-3, Component Test Division.



Bill has been working in environmental testing since he came to Sandia in April 1957.

Before that he was a power sales engineer for an electric power company from 1949-57 working in both New Mexico and Texas.

In 1949 he received his BS degree in electrical engineering from Texas Technological College. He has completed some requirements toward an MS degree at the University of New Mexico.

During World War II, Bill served five years with the Army Signal Corps, stationed part of the time in the China-Burma-India area.

He is a registered professional engineer in New Mexico.

Ellen C. Foster Dies March 17

Ellen C. Foster, a Corporation employee for nine years, died at

Ellen C. Foster

her home March 17.

She was a document clerk in Division 3461.

Funeral services were held March 21 in Albuquerque to be followed by interment in Marion, O.

Survivors include her husband, Leroy (2563), six children and 10 grandchildren. Two of the children, John Foster (2322) and Martha Carlmark (7322), work for Sandia Corporation.

Efficient Reading Course Open for New Enrollments

The second eight-week session of the out-of-hours course in Efficient Reading will begin Tuesday noon, April 4.

Enrollment is open to all employees: however, those who were unable to attend the first session because of space limitations will be given priority when they re-enroll.

All students interested in taking the course must fill out an enrollment card at the 3132 Training Division office in Bldg. 813 by noon, April 4.

Class sessions are held on Tuesdays and Thursdays from 12:10 to 12:50 p.m. in Room 2, Bldg. 300. No textbook is required. For further information call the instructor, Lee Garner (3423-1), at ext. 26136 or 42252.

AEC Employees Plan Spring Party April 28

The AEC Steering Committee for Employee Activities has announced a Spring Party to be held at the Western Skies Hotel Saturday, April 28.

This is the first activity planned for AEC employees in the Albuquerque area since the Manager, ALO, approved the Steering Committee charter. Phil Carlin is chairman of the group.

Arlen Asher's Quintet will provide music for dancing from 9 to 12 p.m. Additional "surprise entertainment" will be featured. Tickets are available from local representatives at $1 per couple, and guests are welcome.

Old Rolling Stock Primary Interest of Unique Railroad Club of New Mexico

Members of the Railroad Club of New Mexico are avid camera bugs. This is good, for it's a memorable scene when a steam locomotive is about to leave the roundhouse.

The club is composed of members who love railroads—large or small, and the older the better.

The club, organized two years ago, includes Sandians Vernon Glover (7521-1), John Eckhart (7250), Bruce Weston (7223) and Joe Calek (7524). They record their findings in a monthly newsletter which contains notices about forthcoming trips and usually a historical article on New Mexico railroads by one of the members. Through the years there have been about 80 railroad lines in this state, so they have plenty to write about.

Historical Sources

Sources for information about these now-demolished lines include early copies of Poor's or Moody's Manual of Railroads of the United States, old time tables, libraries, correspondence with locomotive manufacturers, and gossip with "old timers" living in areas through which the line used to pass.

One California railroad fan, tracking down the Cuba Extension from San Ysidro to Marion, N. M., drove to La Ventana, hired an Indian guide, hiked six miles northwest and finally found two steam locomotives, vintage 1901 and 1887, standing on a siding. Railroad fans still argue whether the Cuba Extension was a separate company or merely a nickname for the Santa Fe, San Juan and Northern Railroad.

Club Trips

One club trip was on the portion of the Atchison Topeka and Santa Fe, since discontinued, running from Carlsbad to Pecos, Tex. The speed limit was 20 mph due to age of the rails—much of it dating back to 1895. Around midnight several members accompanied the conductor on his regular foot check of the Delaware Bridge (flash floods often leave the bridge under water).

Vern Glover's research into short lines uncovered such gems as the Alamogordo and Sacramento Mountain Railway (1898-1908) running the 31 miles from Alamogordo to Russia; Dawson Railway Company (1901-08), Dawson to Tucumcari, 132 miles; and the Rio Grande and Pagosa Springs Railroad (1895-1914), from Lumberton to Edith, Colo. Members have never been able to locate the road bed of the latter.

The only two-foot narrow gauge line in New Mexico was the Silver City, Pinos Altos and Mogollon Railroad. During its one year of existence (1906-07) ore was carried from Pinos Altos mines to smelters in Silver City. Derailments occurred almost daily since only hand brakes were used and the grade reached six per cent. Two deaths caused by one crash brought on the demise of this line.

Need Information

Club Secretary Glover notes, "We're always on the lookout for any information about old lines. Since New Mexico reached statehood at such a late date, early official records are mostly nonexistent. We have to rely on private sources of information."

Vernon Glover
—Early New Mexico Railroads—

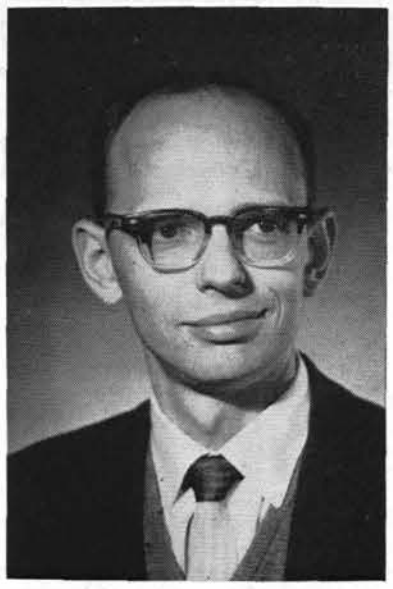
Just how close these rail fans get to the source may be indicated by this notice in an issue of the club's newsletter: "note to trainwatchers—be especially careful around lines laid with welded rail. You just can't hear those trains coming."

Help! Help!

The LAB NEWS is badly in need of the first printed issue of the SANDIA BULLETIN, Vol. 2, No. 32, dated Dec. 22, 1950. If you have a copy, please send it to Division 3432, Bldg. 829.

Lee B. Klaus Is First Livermore Lab Graduate in Educational Aids Plan

Lee B. Klaus (8115-2), Livermore Laboratory's first college graduate under the Educational Aids Program, will participate in commencement exercises at San Francisco State College in June. He completed work for his BS degree in January.



L. B. Klaus

Lee has been studying for two and a half years under Sandia's Educational Aids Program, majoring in chemistry and minoring in production management. Although the degree has taken him seven years studying part time to complete, Lee said it would have taken him considerably longer without Sandia's help.

Of the total 134 credits Lee earned, he obtained 72 from San Francisco State, 38 under the Educational Aids Program. During two semesters' work, Lee was given limited time off from work to attend classes. Commuting was one of the tedious aspects of the undertaking, since the round trip from Livermore to the school is 104 miles.

Before coming to Sandia in December 1958, Lee was employed by Precision Technology, Inc., a former Livermore firm. He headed an experimental group in explosive segment assembly.

Lee served with the Air Force as a flight engineer for three and a half years during the Korean conflict.

D. J. Jenkins Will Give Education Talk To Monroe P-TA

"Education and International Survival" is the title of a talk to be presented by D. J. Jenkins, manager of Personnel Research, Training and Education Department 3130, Tuesday, April 4.

The talk will be given at a meeting of the Monroe Junior High School Parent-Teachers Association and was arranged under the sponsorship of the Bernalillo County Council of P-TA's.

The public is invited to attend the meeting which will begin at 7:30 p.m. at Monroe Junior High School.

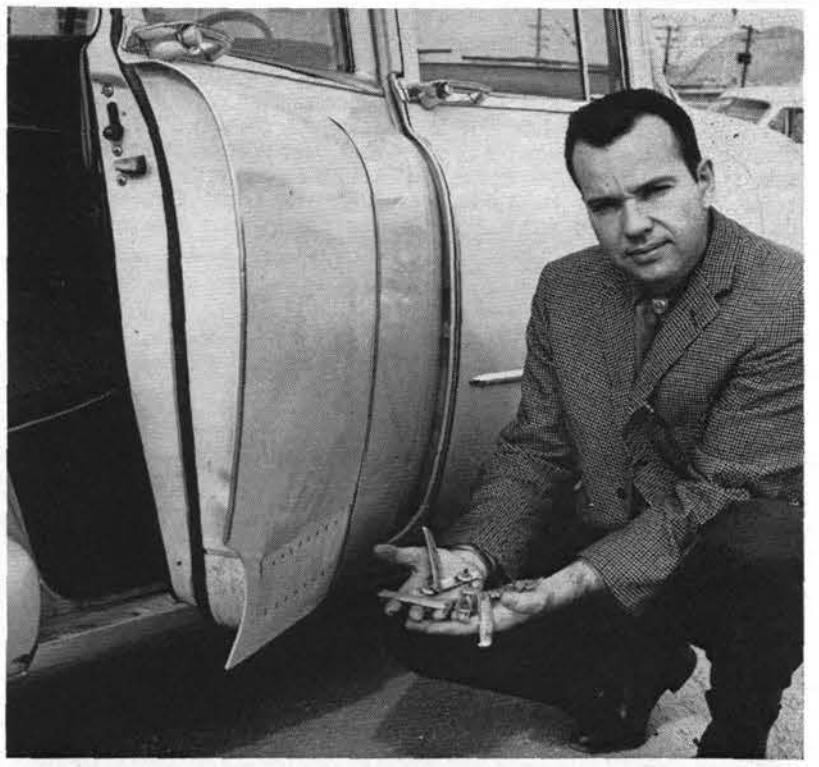
Communism Authority Will Talk at UNM; Public Is Invited

Dr. Fred Schwarz, executive director of the Christian Anti-Communism Crusade, will speak at the New Mexico Union ballroom, Thursday, April 6, at 7:30 p.m His subject is "Communism and the Conquest of the U.S."

Australian-born Dr. Schwarz is the author of many pamphlets and books on anti-communism, and has traveled all over the world speaking on that subject.

"International Communism," one of the most popular Sandia Corporation booklet rack offerings, was primarily a presentation of Dr. Schwarz's ideas to the House Un-American Activities committee. More than 20,000 of these booklets were distributed by Sandia

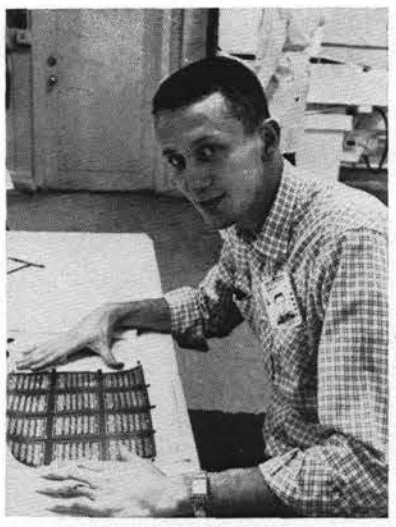
The public is invited to the free lecture. For further information contact R. G. Hogan (7122), ext. 49269.



"NOT AGAIN!" said Bob Stromberg (1322) when he discovered some careless driver had backed into his car, even before he had finished repairs from a similar mishap in December. Both accidents occurred in the lot west of Bldg. 800 and neither driver left his name although liability insurance should cover the damage.

James Carmody

Fidelino Carrillo



Robert Swanson

John Hager

Sandia Electronic Apprentices Complete First Year of Program

This month Sandia Laboratory electronic apprentices completed the first year of a four-year program.

For the eight men participating in the program, the milestone represents completion of some 2000 hours of both on-the-job and classroom training.

"And it hasn't been easy for the apprentices," says Dave Watt, supervisor of Electrical Division 4233. "Sandia's apprenticeship programs are based upon high standards. In addition to on-the-job training and classroom theory, the men are required to take additional courses in the Out-of-Hours educational program and grades in all areas must be maintained at a satisfactory level.

Total training consists of 8000 hours including what amounts to 48 credit hours of classroom theory. In addition to specific training assignments in various Sandia electronic shops, classroom subjects include algebra, geometry, trigonometry, physics, mechanical drawing, plastics, DC and AC theory, power supplies, amplifiers, vacuum tubes and other electronic theory instruction.

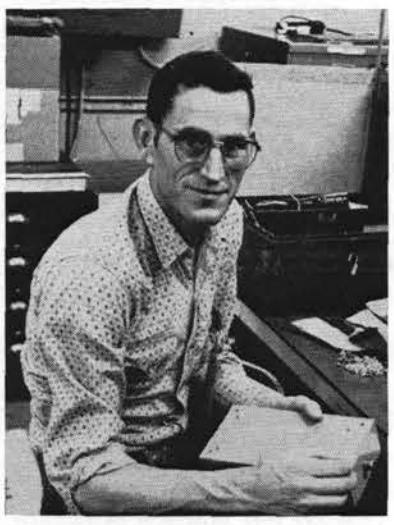
In the shops, the men will concentrate on electronic fabrication but will be given an understanding of related skills—printed circuitry, coil winding, machine shop and sheet metal work, and equipment repair and calibration.

"There is always a demand for highly skilled craft technicians," Dave says. "We provide wide practical experience and top-notch classroom instruction. This way we hope to grow our own."

"It's hard work," one of the apprentices said, "but it's worth it. We feel we are helped by the personal interest instructors and shop supervisors show in our work. It is an opportunity that we hope to make the most of."

Members of the electronics apprenticeship class are Edward Amador, James Carmody, Fidelino Carrillo, John Hager, James Lujan, Alvin Plant, Louis Sanchez and Robert Swanson.

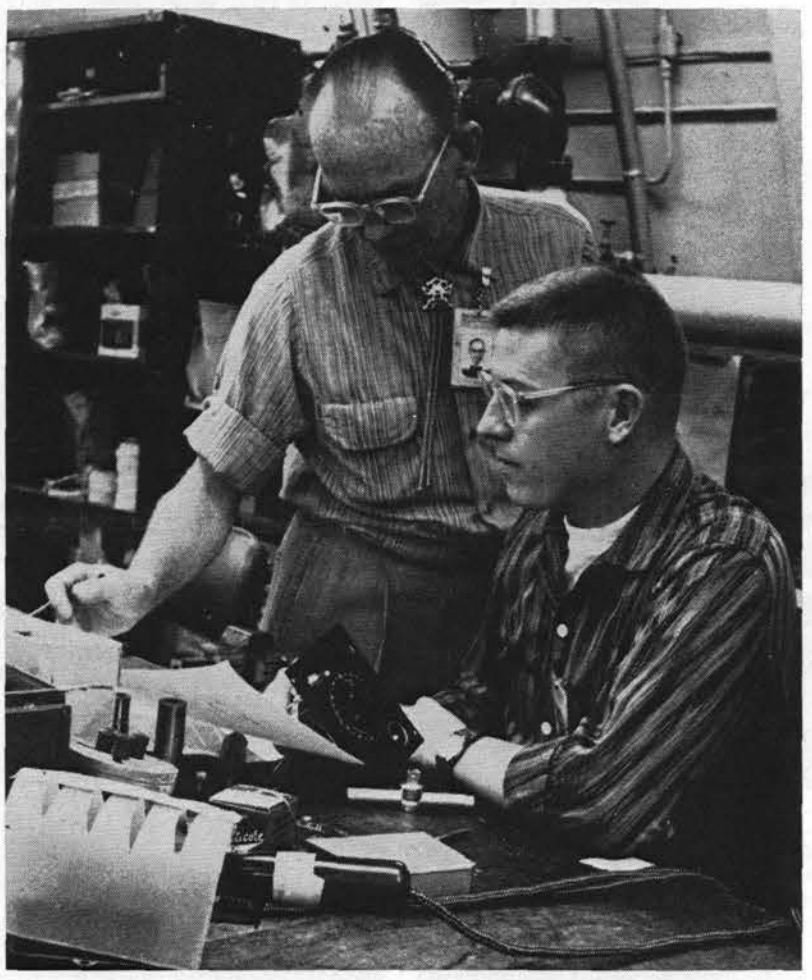
Edward Amador



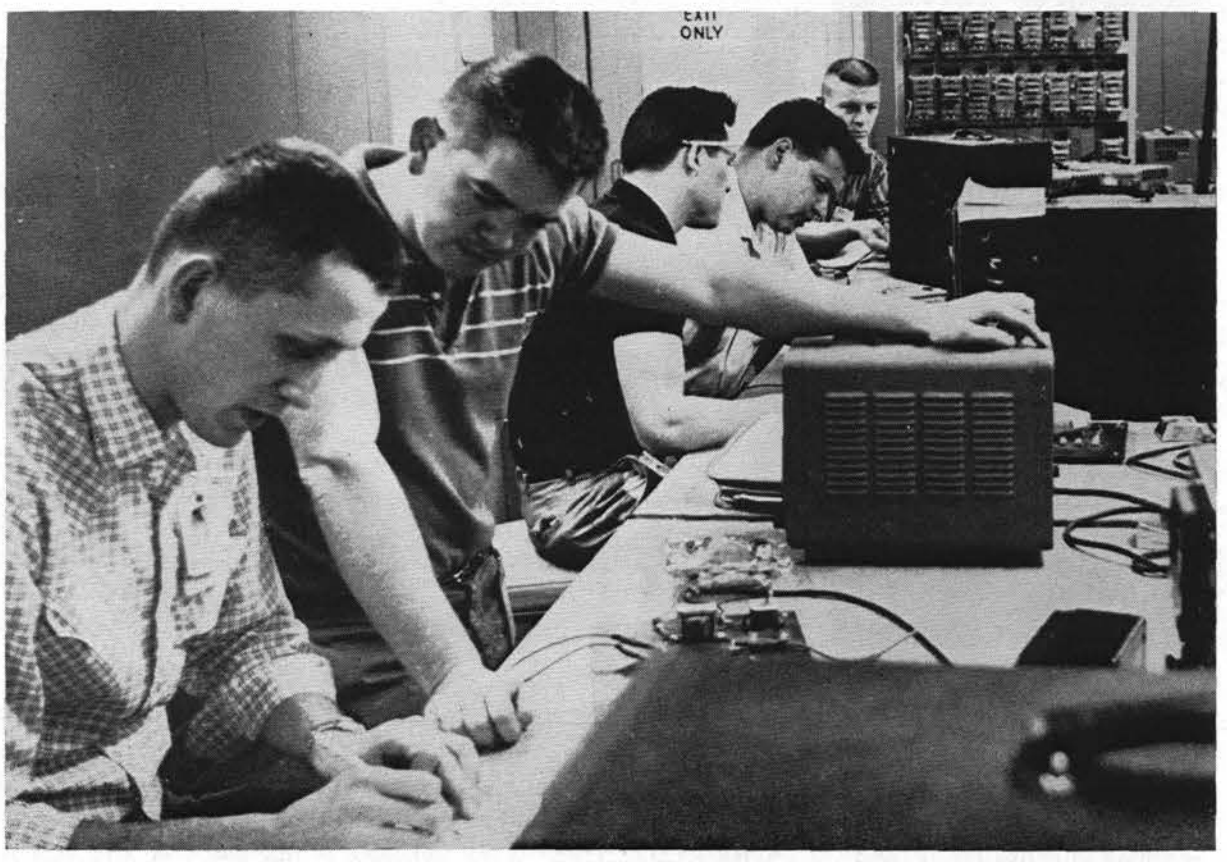
Alvin Plant

Louis Sanchez

James Lujan

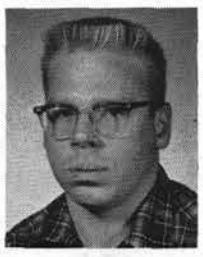


PRACTICAL EXPERIENCE *gained on the job makes up large* **portion of apprentice training. E. M. Hopkins (left), supervisor of Assembly Section 4233-1, explains assembly and layout of a power supply to John Hager, one of Sandia Lab's electronic apprentices.**



LABORATORY PROJECTS *augment theory in* **Sandia's electronics apprenticeship program. Class** *above is working on power supply programs. Section* **3132-2 under W. L. Miller arranges the course.**

National Fellowship Awarded R. O. Heinz For Advanced Study



Richard O. Heinz (on leave from 1424) has been awarded a Woodrow Wilson National Fellowship for graduate study in the 1961-62 academic year.

Dick will receive a BS degree in mathematics at the University of New Mexico in June and will return to Sandia for summer employment. In the fall he intends to continue study toward a Master's degree in electrical engineering at the University of California, Berkeley.

Before coming to Sandia in September 1957, Dick attended DeVry Technical Institute in Chicago and the University of Illinois, where he received a BA degree in English Literature.

He completed 36 credit hours of study at the University of New Mexico under Sandia's Educational Aids Program before taking a personal leave of absence last September to complete his study.

F. E. Abbott Second In Local Toastmasters Annual Speech Contest

Frank E. Abbott, Chief of the Administrative Branch, SAO-AEC, placed second recently in the annual speech contest for Albuquerque Toastmaster clubs.

Eleven clubs entered their best speakers in the contest, which was held by American Legion Toastmaster Club No 415 at the Alvarado Hotel.

Frank represented the Beta Aloosters after winning their annual speech contest and being named Toastmaster of the Year for that group.

Sandia Research Papers Will Be Presented At Washington Meet

Two technical papers written by Sandians in Physical Sciences Research Department 5150 will be read at the American Physical Society meeting in Washington, D.C., April 23-26.

"The Behavior of Plasma in Rotating Mirror and Cusp Magnetic Geometries" will be presented by authors J. R. Banister and R. D. Jones.

Mr. Banister also worked with H. L. Davis on the second paper to be given, entitled "Fall of Small Particles or Heavy Molecules Through the Upper Atmosphere."

Welcome Newcomers

March 13-24

Albuquerque
- **Norman E. Dell 4413
- Ida Darner 2632
- *Shirley R. Fleming 3126
- *Reba K. Garrison 4623
- *Frances E. Gross 4333
- Phyllis A. James 7535
- *Ralph D. Lovvorn 3464
- **Allan W. Ness 4411
- Buddy R. Osborn 3464
- Elizabeth A. Posey 3126
- *William E. Price 7118
- *Katherine K. Reilly 3126
- D. Jack Rider 2341
- *Nellie S. Sanchez 3461
- Anita V. Smith 3126
- Garnet E. Stoner 3126
- *Martha E. Williams 3241
- Betty J. Winkler 3126

Georgia
- Carl W. Childers, Chamblee 7322

Montana
- *Joseph B. Losinski, Bozeman 7523

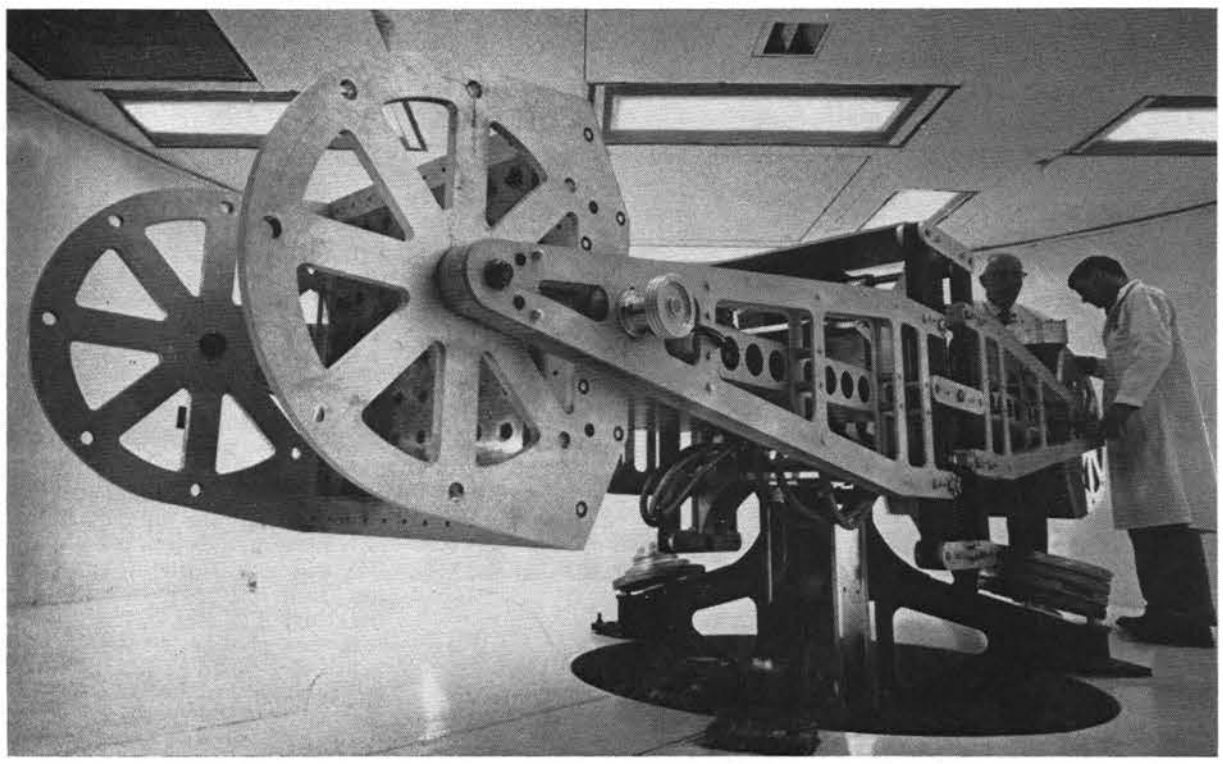
Texas
- *Harry C. Hardee, Jr., Dallas 7224
- *Philip L. Stanton, Austin 1314

New Hires at Livermore—Feb. 16-Mar. 17
- **Harold R. Baldwin, Livermore 8225-2
- Marie J. Brenton, Livermore 8213-5
- Hollis R. Easton, Livermore 8126-1
- Phillip M. Johnson, Seattle, Wash. 8151-2
- Frances M. Johnston, Livermore 8212-3
- Gilbert R. Marguth, Minneapolis, Minn. 8123-1
- Ward E. Mitchell, Fremont, Calif. 8123-3
- Everett W. Moore, Jr., Cedar Rapids, Iowa 8114-3
- Carl W. Schoenfelder, Wharton, N. J. 8115-2
- Gilbert G. Oliver, Livermore 8232-4
- John J. Waters, Palo Alto, Calif. 8233-2
- Roger K. Woodbury, Los Angeles 8115-1
- Grace M. Worth, Castro Valley, Calif. 8212-3

Returned from Leave
- Joyce L. Kleve, Newark, Calif. 8225-1
- Karen D. Lucas, Livermore 8212-3

*Denotes Rehired
**Denotes Temporary Rehire

Shock Lab 'Torture Tests' Prove Sandia's Products



CENTRIFUGE sunken in the floor of Bldg. 860 is used for sustained acceleration tests of components. H. G. Page (left) and D. J. Adkins mount a test unit at far end which will be balanced by weights or another unit on the foreground arm of the centrifuge. The machine is capable of developing 150 g's of acceleration on test units weighing up to 200 lbs. Rate is 270 revolutions per minute.

Shock is the business of Section 7322-3 of Sandia's Environmental Test Operations Department. Not the Saturday afternoon matinee or the late late TV show kind of Hollywood shock, but scientific shock with a lot of acceleration for good measure.

Carl Endres, section supervisor, serves as guide through Sandia's Tech Area I shock and environmental testing laboratory.

The torture machines are numerous.

Buried under the floor of Bldg. 860 in a concrete pit is a 12-ft. centrifuge capable of whirling two 500 lb. test units at a dizzying rate up to 270 revolutions per minute. On the main floor of the building are several chambers which bake, freeze, saturate with salt, fog or produce rapid changes of atmospheric pressure.

Over in Bldg. 882 are more machines which produce different kinds of shock up to 5000 g's. These are drop testers and actuators, machines designed to give Sandia-designed weapon components the kinds of shock they could undergo during operational handling or delivery.

"It is much too expensive, if not impossible, to test all components under actual field conditions," Carl says. "Instead, precisely controlled laboratory testing is performed. In our laboratories we try to duplicate the effects on components of the environments that a weapon might be called upon to endure—from catapult launch, riding in jet aircraft, missile launch, storage in arctic or desert conditions to storage over a long period of time in a humid climate. Nothing is left to chance."

Men of the section operate the test equipment and perform the test sequences on the weapon components. Test engineers of Component Test Division 7321 work with design and development engineers in writing specifications for the tests.

"For instance," Carl says, "we might need to test a small component to 100 g's, (100 times the force of gravity) for a duration of 20 milliseconds. This would be a job for the six-in. actuator. This machine, powered with compressed air, shoots a piston and thrust column assembly in a cylinder at speeds up to 100 ft. per second. Such abrupt velocity changes produce the necessary shock."

The kind of shock pulse wave produced is also important. For example, on a drop-test machine, the carriage containing the component can be impacted on a rubber pad to produce a "half-sine" shock pulse. Impacting on a lead cone will produce a tri-angular shock pulse input to the component, or a honeycomb impact area will give a square wave shock pulse to the component.

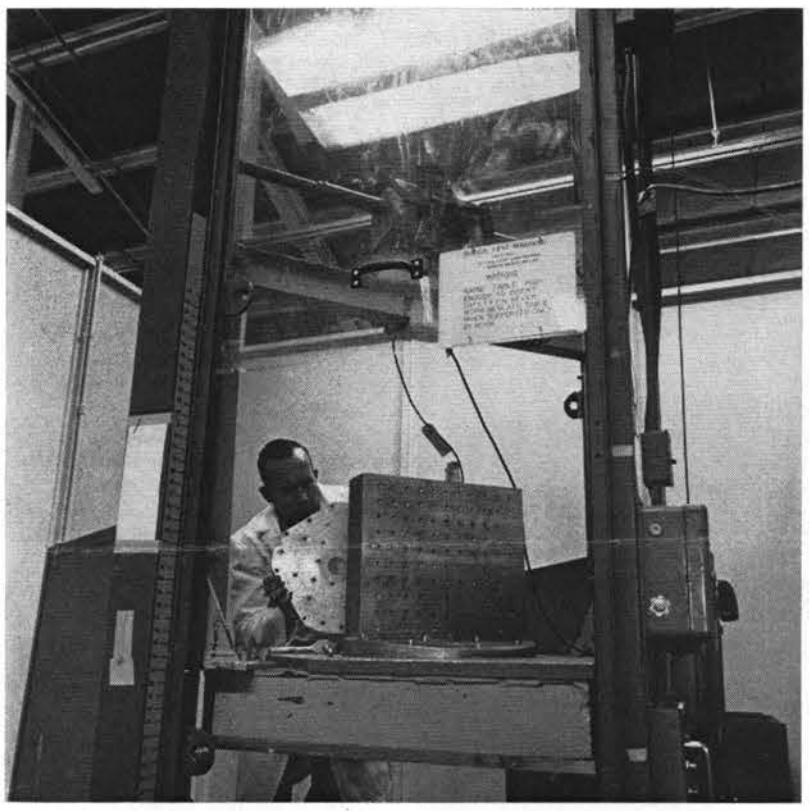
These terms describe the pattern of the shock pulse applied to the component. Each type produces different intensities and different kinds of damage. The component reacts with characteristic internal vibration to the shock waves and each is important to the test engineer.

"We must be able to say with a certainty that a component will perform successfully in a given environment," Carl says. "Reliability is the goal."

Component testing is only a part of the overall environmental test program of nuclear weapons. Sub-assemblies and complete systems also undergo the rigors of shock, temperature, vibration and static testing.

In addition to the environmental testing machines pictured on this page, many others in Tech Area I and Area II work day and night to prove the products of Sandia Corporation.

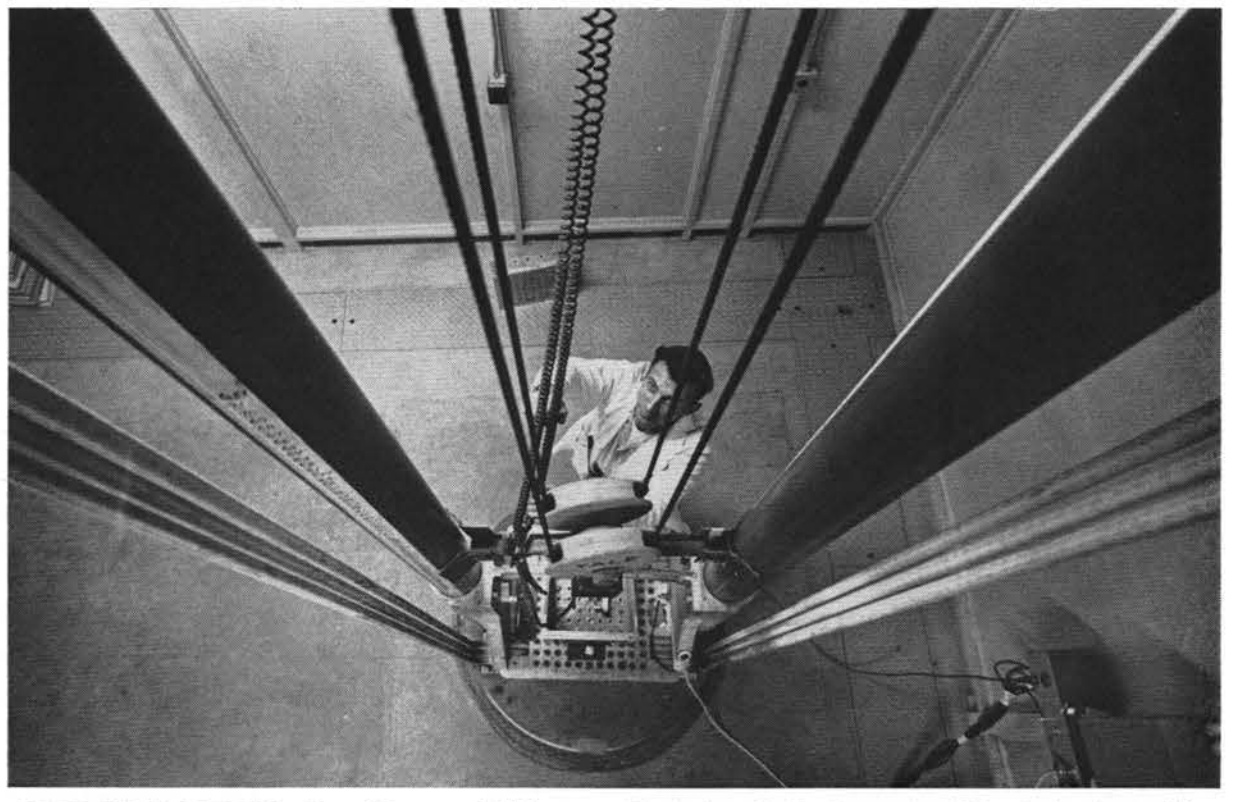
"If they survive these torture tests," Carl says, "we know they're good."



"OLD SAND POUNDER" is the oldest drop testing machine at Sandia Laboratory. Here E. W. Upchurch readies the machine for a test. The machine will give a 150-lb. test unit a velocity change of 30 ft. per second. It has been used at Sandia for over 10 years.

BLURRED CARRIAGE in this drop will impact on rubber to produce a half-sine shock pulse input to the component secured to the carriage. Operator is K. R. Ludwick. This Barry drop tester features a catch mechanism which will prevent successive bounces.

COMBINATION temperature-mechanical shock apparatus is readied for use by B. B. Conklin (in chamber) and R. O. Brooks. Test units can be heated to 500° F. or frozen to minus 100° F. and then shocked from the actuator tube running from the chamber to the floor. Machine can produce from 300 to 500 g's shock.

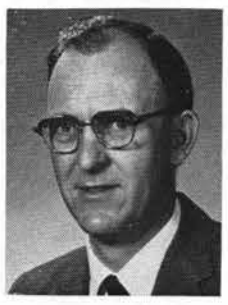


"THE GUILLOTINE" is the nickname of this new drop machine undergoing evaluation by Stan Kurowski. The machine is expected to give a 400 lb. test unit shocks up to 2000 g's in two milliseconds. Carriage can reach a velocity of 70 miles per hour at the moment of impact.

Sandia Service Awards

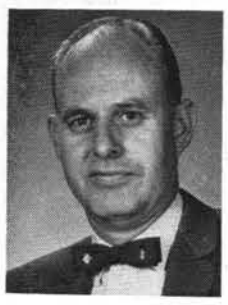
15 Years

John J. Dawson
1414
April 1, 1946

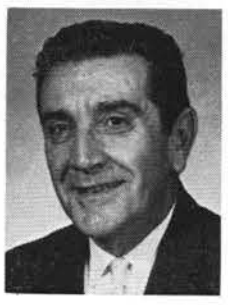


William E. Boyes
1440
April 4, 1946

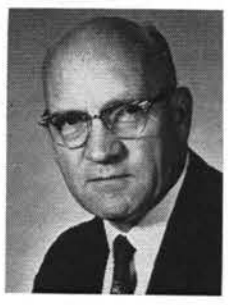
Alfred A. Young
7231
April 5, 1946



Charles H. Boal
3462
April 8, 1946



John Stamm
2642
April 8, 1946



J. L. Hollenbeck
4611
April 11, 1946

10 Years

April 1-14

Milton O. Jones 8124, Mildred C. Knight 2300, Gene W. McClendon 2644, Carl H. Nylander 4412, Joe M. Sanchez 7532, Webb E. Shafer 2622, Vern N. Sowards 4254, J. B. Sweatman 4232, Frances H. Voorhies 3321, Maynard Cowan, Jr. 5131, Howard L. Davis 7321.

Geraldine O. Hickey 2420, Jose A. Saavedra 4574, Alvarado S. Torres 4221, Fred R. Callahan 2444, S. Berenice Henry 3423, Santiago Otero 4212, Marcel C. Schiess 1111, Howard W. Pumphrey 7133, John M. Hart 4321, Audrey C. Boxx 4234, Harold L. Brint 3451, Warren H. Curry 7134, John P. Ford, Jr. 1321.

Genevieve G. Gillespie 4131, Paul K. Goen 7147, Howard H. Sander 5432, Rudolph S. Stefoin 2444, Alexander S. Abergo 4612, Mildred M. Hinds 2321, Clyde H. Green 4511, Catherine E. Norton 3423, John K. Wichelns 4325, Charles J. Kaspar 4542, Frank J. Maloney, Jr. 8163.

Radio Amateurs Plan Parts Auction April 4

All radio hams are invited to an auction sponsored by the Radio Amateur Technical Society on Tuesday, April 4, at 7:30 p.m. at the Carpet Center, 6313 Lomas Blvd. NE.

Hams are asked to bring any equipment which they would like to sell and/or money. For further information call John Kanode (7312), ext. 37165, who is program director for the radio society.

Sandians Invited to Play in Socorro Golf Tournament

The fourth annual Socorro scratch golf tournament will be held Saturday, April 8, starting at 8:30 a.m.

All members of the 1961 Sandia Employees Golf Association are eligible to participate in the tournament. Entry fee is $2 and green fees, payable at the Socorro golf course, are $2.50.

Prizes will be awarded for medalist, low four-ball and two-ball teams and runners-up, best positioned drive, closest shot to hole, and any holes-in-one. Team scores will be based on handicaps.

Wendell Nelson (4152) is defending champion. For further information contact Fred Silva (7521), ext. 22134, or Jim Arnold (7322), ext. 54152.

W. J. Whitfield Will Present Tech Paper

"Dust Monitoring by the Dry Slide Settling Technique" is the title of a technical paper to be presented by W. J. Whitfield (2564-2) at an American Society for Testing Materials meeting in Philadelphia, Pa., on April 5-7.

Library Talk Given

Lee F. Parman, Technical Library Division supervisor, spoke before a seminar on Self-Organizing Systems held at the University of California campus in Berkeley last week.

His talk, "Problems of Organizing Information in a Technical Library," was mainly devoted to a description of various classification and cataloging systems.

Environmental Testing Papers to Be Presented At IES Meeting

Several employees in Sandia's Environmental Test Operations Department 7320 have prepared technical papers for presentation at the annual meeting of the Institute of Environmental Sciences, April 5-7, in Washington, D. C.

E. H. Copeland and W. H. Sieger are co-authors of a paper entitled, "Uniformity in Shock Testing." Another dually-written paper is "Water Entry Testing Using Rocket Sleds" by D. L. Krenz and D. W. Bauder.

"Two-Phase Shock Tests of Long Elastic Bodies Performed in a 26 in. Diameter Air Gun" will be presented by R. I. Butler.

INDIVIDUAL TROPHIES were awarded members of the 44-45-46-5100 basketball team, champions of the Sandia Lab league, last week. In the first row, from left, are David McGillivray (4413), Gil Baca (4516), Jim Hudson (5151), Lou Sanders (5151), and Phil Loeper (4412). In the second row are Tom Sheldon (4411), Jim Freese (5153), John Brane (4413), Jim Sanchez (4573), Julian Lovato (4411), and Jim Tichenor (4224). The trophies are provided by Sandia Corporation, Division 3122.

SHOPPING CENTER • SHOPPING CENTER • SHOPPING CENTER • SHOPPING CENTER • SHOPPING CENTER

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

MAPLE YOUTH BED, $25; chest of drawers, $5; Hollywood bed frames and headboards, $10 set; clothesline poles, $10. Kohut, AX 9-9092.

3 BDR HOME, 1½ baths, pitched roof, corner lot. $11,900; down payment $500 plus closing, monthly payments $100. Kaczar, AX 9-4885.

3 BDR HOME, 1¾ bath, pitched roof, corner lot, walled yard, garbage disposal, carpet, custom drapes. Culp, AX 9-4649 after 5 p.m.

COLLIE puppies AKC registered, male, sable or tri-color, $60; go-cart, "Bug" West Bend engine, slicks, $150. Lotz, AM 8-8489.

FISHING BOAT, 13 ft. redwood fiber glassed, round bottom, 1 yr. old; handles motors up to 7½ HP. Smith, AX 9-0574.

BEDROOM SET, double dresser, chest of drawers, double bed, mattress, innerspring mattress; see at 621 Florida SE. Rivera, AM 8-0667.

NATIONAL HFS, superhet, super-regen receiver, continuous 27-250 megacycles, $70; Ruger single-six .22 magnum, trade for .22 L.R. equivalent. Poe, ext. 45234.

CHROME kitchen table and 4 chairs w/yellow formica top, $25. Wrhel, 10230 Propps Dr. NE. AX 9-4849.

MOUNTAIN CABIN, 12 x 18, 2 lots, elec., $300 down, 25 miles from Sandia Base. Ogden, CH 3-4723 after 5:30 p.m.

POLAROID land camera, model 150, w/case and flash, $50. Stephenson, AX 9-3914.

COMPLETE DINING SET, buffet, china cabinet, table, 6 chairs, $90. Pope, 816 Val Verde SE, AL 5-6702.

SEWING machine, mahogany cabinet, $45. Stephenson, AX 9-9114.

8 ROOM ROBERSON, $18,500, $1000 down, corner lot, screened porch, fireplace, 1¾ baths, other extras. Weir, 2117 Martha NE, AX 9-1160.

FURNITURE: day-bed, desks, vacuum cleaner, love seat, matching chair, sheet stainless steel, bench top. See at 2722 Santa Monica SE. Weidman.

K-22 S&W REVOLVER, 6-inch barrel, target hammer grip, adapter and holster, almost new, $65. Rechner, DI 4-9776.

TV 21" table model, Airline, $77.50; freezer, 7 cu. ft., chest type, $65. Gomez, AL 5-0361.

EARLY American solid maple china cabinet w/5 drawers, glass door hutch, $95. Stamm, DI 4-7431.

SCINTILLATOR, Detectron model D5-222, original cost $250, trade for small car top boat or house trailer. Howard, CH 3-9689.

'58 LAMBRETTA 125 motor scooter. Sandgren, AX 9-5007.

RED SORREL MARE in foal; palomino yearling, filly; 2½ yr. old palomino gelding; will trade for hereford yearlings. Jolly, TR 7-2474 after 6 p.m.

'55 FORD Fairlane, 4 door sedan, V8, stick shift and OD, R&H, good tires. Buchanan, CH 2-1865.

35 VOLUMES Encyclopedia Americana, bookcase, 7 volumes Land and Peoples, $100. Radman, ext. 35273.

RETINA III-C camera; Zuni squash blossom necklace, bracelet and cuff links; old type Navajo squaw dress; table radio. Southwick, AL 5-3312.

2 BDR HOME, garage, wash and utility room, 2 water wells, extra large lot. Gabaldon, 1208 Cerro Vista Rd. SW, CH 2-7075.

LAWN MOWER, hand powered, Sears best, one yr. old. $15. Lieber, 2133 Altez St. NE, AX 9-7539.

'56 OLDSMOBILE, hydromatic, 4 dr. R&H. Benton, 435 Lafayette Place NE, AL 5-4466.

'58 BOAT, fiberglass, 15-ft., remote control, cover, floating cushions; Mastercraft trailer; 35 hp Johnson, 2 pressure tanks, used 40 hrs. Swain, 298-5018.

DINETTE SET, chrome, pearl gray table 30"x52" including 10" extension, four red chairs, $25. Clark, 9913 Leyendecker NE, AX 9-4819.

'57 VOLKSWAGEN deluxe sedan, sky blue, leatherette interior, radio, wsw, new battery, 31 mpg in town,$1045; Cushman motor scooter, $95. Johnson, AX 9-8980.

TWO WHEEL TRAILER w/camping boxes, well built. Morrison, AL 6-0378, 1116 Truman SE.

HALLICRAFTER Receiver, model S-77, $40. Hoke, 9605 Euclid NE, AX 8-2384.

OLD NAVAJO Indian drums, tomahawk, bracelets; sell or trade for German luger, old knives or old coins. Smitha, AX 9-1096.

20" BICYCLE, girls, Schwinn Tornado, puncture proof tubes, basket, $25. McCullar, AX 9-0638.

FRAME HITCH including ball; fits 1960 Oldsmobile or Pontiac, $8.50, Asturias, AX 9-4173 after 5:30 p.m.

3 BDR HOME on half acre, South valley, garage, utility room, screened back porch, below FHA appraisal. Smith, AM 8-1349.

.38 SPCL. combat masterpiece w/holster, 4 boxes ammo and spare oversize grips, $60. Cranston, ext. 42185.

FORMALS, net and lace, champagne colored full length, $35; turquoise ballerina length, $10; antique walnut hall mirror, $35. Ewing, DI 4-8826.

SECTIONAL, two piece, curved, turquoise and brown, foam rubber cushions; coffee table; white floor lamp. Preston, AX 9-1948.

GOLF equipment; 4 woods w/covers, 2-9 irons, wedge, 2 putters, bag, cart, 13 tubes, assorted balls, $150. Seeley, AX 8-2402.

HEATHKIT VTVM, model V-1A; grid-dip meter, model GD-7A, $25. Sharp, AX 8-2702.

BINOCULARS, Stellar, w/case, 7 x 35 wide angle, center focus, almost new, $35. Platt, AL 5-1973.

40 ACRES in Manzano mountains, pine oak, juniper country; borders national forest, electricity on property, $90 acre, cash. McKinley, AM 8-4779.

2 HEAD BOARDS for twin beds. Krahling, AM 8-8126.

BABY SITTING. Edmundson, AL 5-9259 evenings.

NEXT

DEADLINE

FOR SHOPPING CENTER ADS

Friday Noon, April 7

WOOL CARPETING and pad, 60 yds., from 2 bdr AEC housing, 2 yrs. old; 12 x 19, 8 x 9, 2½ x 18 and pieces, $300. Hansen, AL 6-9886.

ALTERNATOR, complete 12 volt system; ideal for mobile ham rig; cost $255 new, make offer. Gatlin, AM 8-8151.

TV 24" Admiral, blond, console, $75. Geilenfeldt, AL 6-6801.

CHAIN SAW, portable; see at 1809 Marble NW after 5 p.m. Sanchez, AL 2-2514.

WASHER-DRYER combination, Bendix, mixing valve leaks, $15. Bradley, AX 8-2263.

PIANO, Bremen spinet, blond finish, $100 cash and assume payments. Farner, AX 9-6007 after 5 p.m.

CAMPING ICE CHEST; .22 Remington sportsmaster, model 512; 30-30 Winchester rifle, model 94. Schuette, AL 6-4071.

SAW, 9" tilting arbor, 6 months remaining guarantee, cost $95 new, $65 cash; or trade for sabre saw. Shock, TR 7-3728.

RABBIT, (Buck) large black and white, $3; ideal for Easter or breeding purposes. Smythe, 1603 Yakima Rd. SW.

CARPET and pad, beige wool, 9 x 14 ft., $20. Woodall, ext. 35279.

KINSMAN ORGAN, 5 months old, terms. Johnson, AX 9-6912.

ROLLAWAY BED, 48 inch, $25. Buehler, 8306 Morrow Rd. NE, AX 9-4329.

STEREO-TAPE RECORDER, ¼ track, 2 and 4 track stereo play; 2 Karlson speaker enclosures, 14W amplifier, 8000 ft. tape, $250. Browning, AX 9-6384.

LAWN MOWER w/metal handle, $8; English bicycle w/gear shift, $20. Rychnovsky, AX 9-2850.

'53 FORD Custom, 4-dr., V-8, R&H, overdrive, $295. Ezell, AL 6-4220.

COLT SINGLE ACTION Frontier .22 cal. revolver, $35. Heathkit 40 watt transmitter, $15. Laskar, AX 9-1024.

'60 OPEL, 30 mpg, $1425. Slowikowski, AL 5-4244 after 4:30 p.m.

DINING ROOM SUITE, blond, 4 upholstered chairs, buffet, $100. Judd, AL 5-6762.

GUITAR, KAY chord, exceptional tone, $48; rocking chair, maple, antique, with contour seat, $60. Galbreath, DI 4-4306.

2 INNERSPRING chaise lounge cushions. Calvery, AM 5-0351.

'53 CHEVROLET Bel Air sport coupe, new tires, good transportation, R&H, $350. Shoemaker, TR 7-2053.

3 BDR HOME, double garage, fireplace, air conditioning, rugs, drapes, low down, asking $18,500, open 4017 Alta Monte NE. Brown, DI 4-6831.

WORKBENCH, large, $20; 3 16" wheels, $5; Sq. dbl. tubs and stand, $6; hay pickup bumper, $6. DeRuyver, 2901 Christine NE.

'58 EDSEL, white Ranger hardtop, power brakes, steering, low mileage, asking $900. Norton, BU 2-3165.

WASHING MACHINE, wringer type, $30; aluminum elbow for evaporative cooler, $5. Quigley, AL 6-6622.

EASY IRONER, $50; Kenmore automatic washer, needs minor repair, $20; maple bed, $12.50. Bachand, AX 9-5167.

CAMPING TRAILER, 15 ft. aluminum, $450. Alvarez, 2014 Second NW, CH 2-3821 after 5:30 p.m.

'50 STUDEBAKER Champion, good tires, new generator and fuel pump; baby bed and wardrobe chest. Dollahon, 7400 Euclid NE, AX 9-8107.

'61 FORD Galaxie, 4-dr HT, gold and white, PB, PS, factory air, 1600 miles, sacrifice. Strawderman, AX 8-0545.

ZENITH trans-oceanic clipper portable radio, any reasonable offer takes. Knight, 10120 Propps Dr. NE, AX 9-2700.

REAR SEAT for jeep; extension bed for jeep. Matthews, DI 4-0593.

ROBERSON, by owner, 3 bdr, paneled den, garage, air conditioned, 1¾ bath, 4¾% GI, walled yard. Elkins, 2108 June NE, AX 9-1126.

3 BDR, den, 1¾ bath, stove, washer, air conditioner, fireplace, screened patio, drapes, $14,400, $500 down. Thunborg, 1837 Britt NE, DI 4-2089.

TWO CITIZEN'S band 3 element beams, Hygain model 113-B, used only once for test, new $63, sell $40. Hopkins, DI 4-4925.

1½ TO 5 ACRES, south 217, $495 per acre; 5 - 40 acres, Torreon, $200 per acre, your terms. Kurowski, BU 2-3431.

O'KEEFE-MERRITT gas range, chrome top w/clock and vents, $100. Ortiz, 817 Hidalgo Cr. NW, CH 2-7989.

FREEZER, Ward's deluxe model, 15 cu. ft., upright, 2 yrs. old. Walker, AM 8-3022.

CAMPING TRAILER, new canvas, sleeps 5, $495. Martin, 1201 Lafayette Dr. NE, AL 5-7763.

'49 DODGE pickup, steel bed, 1951 engine, $250; 1957 Pontiac station wagon, 4-dr., $950. Murray, DI 4-5289.

REFRIGERATOR, Frigidaire, 7 cu. ft., $90. Sanchez, ext. 36232.

'50 CADILLAC, overhauled Oct. '60, new seat covers, $450 or best offer. Campbell, 243-0852.

'58 FORD Fairlane, white HT convertible, standard shift, one owner, $850. Benson, AL 5-9081 after 5:30 p.m.

DINING ROOM TABLE, arm chair, 5 regular chairs, blond, one year old, three table pads, $125. Padilla, 2721 Charleston NE, AX 9-0460.

'57 PLYMOUTH Suburban, 6 cyl., 40,000 miles, $595. Suttman, AX 9-6754.

3 BDR HOME w/den, WB fireplace, A/C, bath & ¾, carpeted, patio, near base, schools, shopping. Renegar, AX 9-2233.

HOT WATER HEATER, 30-gal. table-top, electric, 1 year old, 10-year guarantee, cost $150, sell for $75 or best offer. Fleming, AX 9-6833.

BASS REFLEX Cabinet, dual port, limed oak finish w/12-inch three-way speaker (Knight KN 800), $85. Goen, AL 6-6385.

GAS RANGE, apartment size. Pardo, AX 9-7214.

'58 MGA, will consider trade. Sayers, AX 9-1833 after 5.

3-PIECE SECTIONAL, foam rubber, $85; 7-drawer kneehole desk, $30; 2 occasional chairs. Libby, 299-5948.

WANTED

YOUNG MOTHER would like small child to care for during the day for working mother. Ridlon, AL 6-2590.

TRICYCLE, 16". Coleman, AL 5-7480.

RIDE or join car pool from Candelaria and Betts to Gate 4, 5, or 6. Minser, AX 9-1364.

WISH TO rent good fishing boat for week end trips. Hansen, AL 6-9886.

RIDE or car pool vicinity Indian School Rd. and Girard to 880. Torres, AL 5-7124.

RIDE TO Bldg. 880 from 1512 June NE, Princess Jeanne Park. Skaggs, AX 9-7453.

CAR POOL from San Pedro and Constitution NE. Malone, AL 5-3766.

CAR POOL from Louisiana and Candelaria NE. Troy, AL 6-4958.

RIDERS from San Pedro and Comanche NE. Peres, AX 9-9119.

TO JOIN carpool, vicinity of Louisiana and Bellrose NE, to Bldg. 802. McRae, AX 8-0844.

CHILD CARE in my home, day or night, NW valley. Cano, DI 4-1105.

CONCRETE MIXER complete with motor for back yard jobs. Brathovde, 3515 Monte Vista NE, AM 5-0783.

FOR RENT

2 BDR, living room, large kitchen, garage, gas range, refrigerator, water and garbage paid, newly decorated, SE Heights. Knott, AX 9-2232.

ROBERSON, 3 bdr, 1¾ bath, fireplace, garage, 2 years old, unfurnished, 11205 Arvada NE. Allen, AX 9-9075.

TWO BDR, near Sandia base, wall to wall carpet, garbage disposal, adults only, $75, water paid. Flowers, AL 6-1656.

UNFURNISHED 2 bdr house, 9005 Cordova NE, $87, water paid. Farner, AX 9-6007 after 5 p.m.

UNFURNISHED 2 bdr house, stove, refrigerator, near University, north of Nob Hill, water paid, $90. Bencoe, AX 9-4673.

EFFICIENCY APARTMENT, new, single occupant, furnished, utilities paid, patio, $72.50, 109 Edith SE. Roth, CH 3-0522 evenings.

LOST AND FOUND

LOST: Long blue scarf, clip-on sunglasses, brown bone handle pocket knife, 3 keys on ring with license plate, 4 keys on square ring, Tupperware containers, chrome pocket knife with "Sohio" "Merit Award - Tokdo," 7 keys in brown leather case. Lost and Found, ext. 26149.

FOUND: Ray Ban type sunglasses, man's ring with 3 stones, black bone pocket knife, key found in south parking lot, 3 keys on small clip, silver loop earring for pierced ear. Lost and Found, ext. 26149.

LIVERMORE FOR SALE

'57 TR-3, must sell before Apr. 10, make offer. Forrest, HI 7-1044.

'59 FORD, V-8, two-tone, two door sedan, automatic transmission, R&H, WW tires, 18,000 miles, $1545. Knudson, Ext. 2274.

'55 CHEVROLET, burgandy, '57 Corvette engine, 4-barrel carb., Duntov cam, WW tires, R&H, interior chromed, best offer. Cortez, VI 6-5322.

ZENITH Record and Radio Combination, 4-speed, table model, $35; Zenith Console Radio all-band, $10. Wallen, HI 7-2406.

3-BDR HOUSE, two baths, wall-to-wall carpeting, draperies, coppertone kitchen, built-in range, oven, refrigerator, freezer, garbage disposal, insulation, $21,500. Glaze, HI 7-4167.

REFRIGERATOR, Westinghouse, $35; 15 cu. ft. Freezer, chest, $100. Henderson, HI 7-4417.

ELECTRIC RANGE, Kenmore, large 41", two ovens, broiler, deep well, eight speeds, storage drawers beneath both ovens, $125. Dadian, HI 7-5254.

FREEZER, 4 cu. ft., $50; '56 Johnson outboard, 10 hp, $100; 10-gal. insulated water can, $10. Mohr, JE 8-4335.

Chemical Culprits Captured with Advanced Methods

Livermore Laboratory is using "fingerprints" to track down the culprits that cause malfunctions in delicate weapon components.

The culprits, in this case, are bits of foreign matter which sometimes accumulate on sensitive electronic and mechanical devices, causing them to fail during laboratory and field tests.

To discover the chemical makeup of these intruders, they are "fingerprinted" by spectrophotometric equipment in the chemistry laboratory operated by Organic Materials Section 8115-2.

Own Fingerprint

Every element has its own fingerprint—a characteristic absorption pattern or wave length emission resulting from exposure to particular areas of the electromagnetic spectrum.

Spectrophotometers shoot electromagnetic energy into samples of the foreign matter. As the sample is rotated through a chosen range of the spectrum, the energy coming out on the other side is measured and recorded by photoelectric cells, resulting in a fingerprint of the material.

By comparing this with a file of known fingerprints, the substance can be identified.

Use Spectrum

The spectrophotometers at the laboratory cover most of the electromagnetic spectrum, from infrared to X-ray energy.

At one end of the spectrum are the invisible cosmic rays and X rays with extremely short wave lengths. At the other end, also invisible but with far longer wave lengths, are radio broadcast waves, microwaves, and infrared rays. In the middle of the spectrum is visible light, which extends from violet to deep red.

"We have four types of spectrophotometers at the lab," says Charlie Arthur, one of Livermore Laboratory's chemists.

Burn Samples

"One is a flame spectrophotometer. To use it we actually put a torch to the sample and burn it. While it's burning, we compare its color and intensity with known colors and intensities. That tells us what it is. We can identify 24 elements this way.

"We use our infrared spectrophotometer for plastics and resins," Charlie said. "It shows the molecular makeup of organic materials best, and we can easily detect unwanted materials, such as water. If water gets into the uncured ingredients of some plastics it can ruin the final product. This machine can measure the amount of water in a sample as low as 50 parts in 300,000—about the equivalent of a few granules of sugar in a cup of coffee."

"For both liquids and solids we use a third spectrophotometer which operates in the ultraviolet to near infrared range. We can get more accurate results with this machine in the visible range than with the others."

"We also have an X-ray spectrophotometer," Charlie said. "Here the sample is exposed to an X-ray source which makes it give off rays. Since every element has its own characteristic wave length, the rays identify the material. We frequently use the X ray in corrosion studies since we only need a few milligrams of a sample.

"Sometimes the machine is used to identify crystalline materials, solid substances in which the molecular structure has a fixed geometrical shape, such as a cube. We bounce the X rays off the sides of the molecules, then photograph the resulting pattern with a special camera. By comparing patterns we can identify the material," Charlie said.

"Each machine supplements or verifies the other. With them we can scan most of the spectrum," Charlie explained. "However, each one is better suited for certain applications, and right now there is no one machine that can do the job done by all four combined."

At times the lab's members have to build special equipment or assemblies for special jobs, or to expand their facilities for more complex and advanced problems brought to them by the engineering groups.

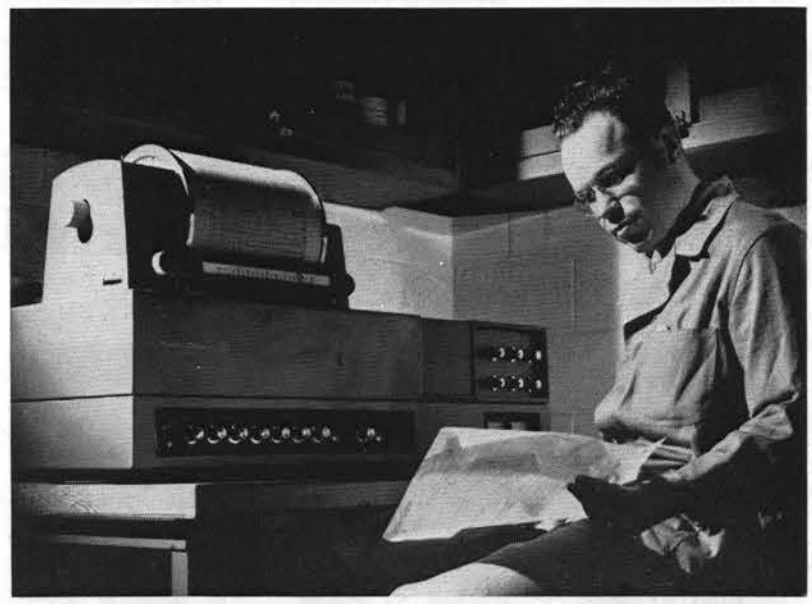
New Design

Lee Klaus (8115-2) is currently working on an assembly of his own design known as a "baby mass spectrometer." Most commercial models of this machine sell for $40,000 to $50,000, but by using a new application of a standard testing system Lee expects the Livermore version to cost about $2000. It will analyze gaseous materials to aid in evaluating sealing processes.

Other laboratory investigations include studies of metallic and nonmetallic finishes, corrosion, high temperature resins, experimental plating, and metal cleaning techniques.

The laboratory supervisor is Ray Gott. Working with him besides Lee and Charlie are Bob Kelly, Hal Brumfield, Dez Brown, and Jack Brierly.

"We hope to expand our facilities in the future to increase our capabilities in applied research," Ray said.



BOB KELLEY (8115-2) studies a "fingerprint" made by the infrared spectrophotometer. Spectrophotometers are used to identify foreign elements or impurities which might cause malfunction.

HIGH VACUUM system, recently completed at the Livermore Laboratory chemistry lab, is operated by Charles Arthur (8815-2). The system was designed to determine the hydrogen, nitrogen, and carbon contents of organic materials present in test samples.

X-RAY SPECTROPHOTOMETER, operated here by Lee Klaus, can identify most any substance from only a few milligrams.

GENERAL ANALYTICAL chemistry techniques are needed for solving many problems at Livermore Laboratory which cannot be handled by spectrophotometers. Making investigations are Dez Brown (8224-2), left, Lee Klaus, rear, and Charlie Arthur, all of Organic Materials Section 8115 - 2.

Sandia's Safety Record

Sandia Laboratory	*Livermore Laboratory*
HAS WORKED	HAS WORKED
1,330,000 MAN HOURS	4,657,000 MAN HOURS
OR 38 DAYS	OR 1867 DAYS
WITHOUT A	WITHOUT A
DISABLING INJURY	DISABLING INJURY