

LAB NEWS

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APRIL 24, 1970

SANDIA LABORATORIES · ALBUQUERQUE NEW MEXICO & LIVERMORE CALIFORNIA

Project Tugboat

Sandians Involved In Creating New Hawaiian Harbor

Conventional high explosives will be detonated off the island of Hawaii next week in an experimental attempt to create a new harbor for small boats and to provide data which can be applied to the use of other chemical or nuclear explosives for large-scale civil engineering projects. The experiment is named "Project Tugboat."

Jack Reed (9150) and Luke Vortman (9111) are responsible for making air blast predictions and measurements. Gerry Laurson, Bobby Holt, and Dean List (9123) are responsible for the air blast instrumentation system, and Mel Gallegos (7291) is in charge of on-site data reduction.

The new harbor will be in Kawaihae Bay on the northwest coast of Hawaii. The excavation will involve 12 charges of 10 tons each, buried 46 feet below the surface of the water and spaced 100-120 feet apart.

The first shot was planned for April 23 to excavate a section of the entrance channel 12 feet deep and 120 feet wide by simultaneous detonation of four charges in a row. The second shot, planned for April 28, includes four charges to be detonated at intervals of 100 milliseconds in an attempt to lessen seismic and air blast wave effects. These charges will also be in a single row configuration leading from the coral reef toward the shore and will complete the entrance channel. The third shot, on April 30, calls for the simultaneous firing of four charges in a square pattern to excavate a 240 x 240 foot-berthing basin at least 12 feet deep.

Calibration tests held last November showed that detonations underwater in fragmented unconsolidated coral produced

craters shallower and of larger diameter than would be produced in dry land. Material which would normally be thrown out and deposited around the lip of the crater either collapses or is washed back into the deepest portion. The explosive being used is an aluminized ammonium nitrate slurry. A breakwater will be added later this year to protect the resulting anchorage from erosion.

Jack Reed says, "We don't anticipate any air blast damage under normal weather conditions; however, an abnormal wind flow could cause window damage to a resort hotel about a mile and a half to the south. The shots could be delayed by adverse winds or a temperature inversion."

Pressure gauges have been placed in and around the hotel on Kaunaoa Beach, at the town of Kawaihae to the north, and at Puukohola Heiau, a historical monument.

Project Tugboat is sponsored by the Army Corps of Engineers and their Nuclear Cratering Group at Lawrence Radiation Laboratory in association with the State of Hawaii, which will operate and maintain the port for small boats.

Credit Union Closed Today

The Sandia Federal Credit Union is closed today as equipment is being moved into the new building. Business will resume at 8 a.m. Monday, April 27.

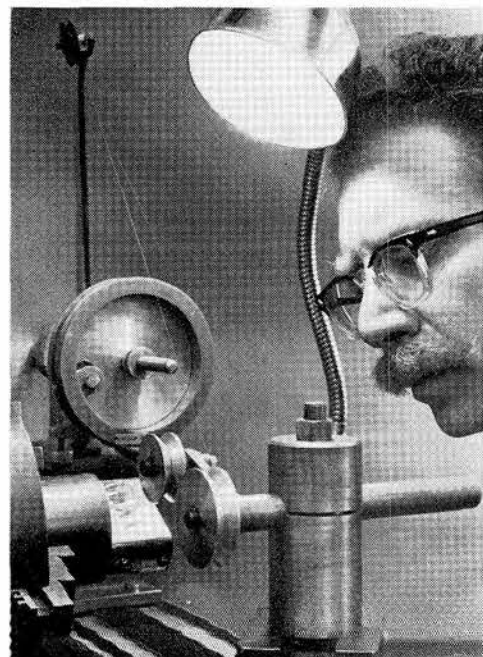
All employees are invited to grand opening ceremonies for the new building on Saturday, May 2, starting at 10 a.m. Refreshments will be served.

'Whiskers' to Adobes

Oldest and Newest Technology Found in Composite Materials

Composite materials can be as elementary as a brick made from adobe and straw or as intricate as the blade of a samurai sword with its layers of different types of steel, folded and beaten into what appears to be one piece of metal.

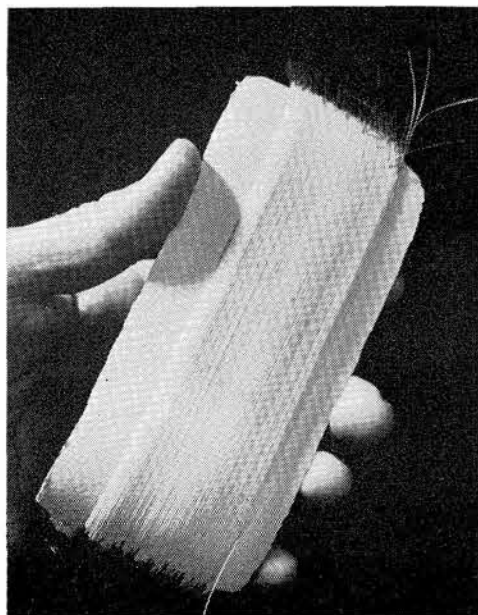
In present-day technical usage, a composite is defined as a synthetic assembly of two or more materials—a selected filler or reinforcing elements plus a compatible matrix binder—whose purpose is the attainment of specific characteristics and properties. For example, boron resin composites are now being used in helicopter blades where they exhibit very high stiffness and strength with very low weight.



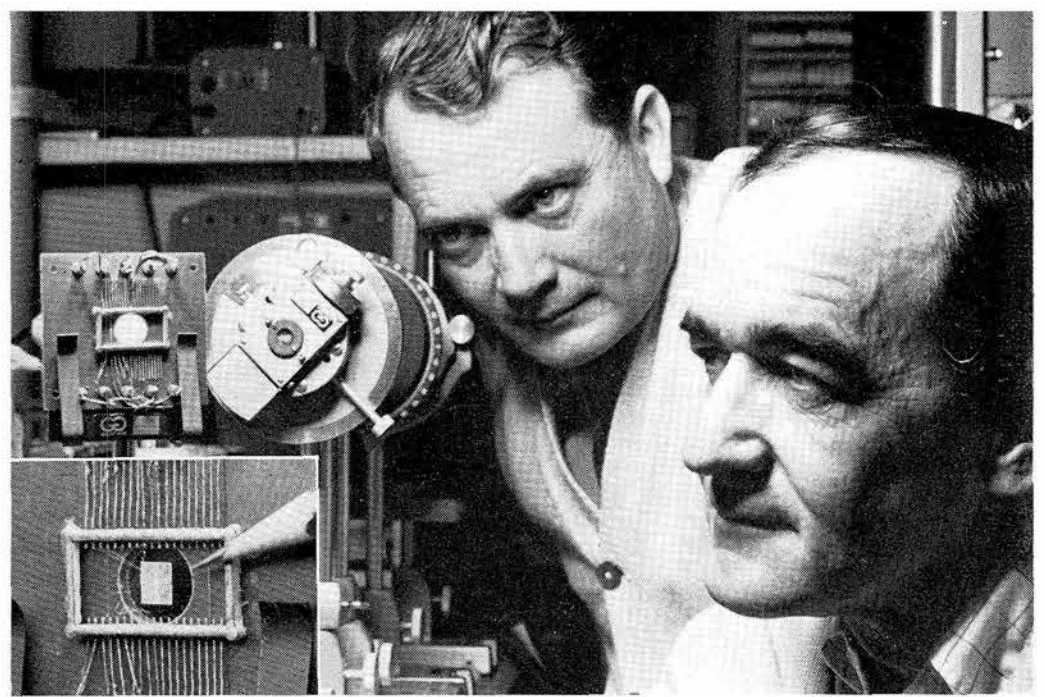
MARVIN MOSS (5314/1224) is winding a fine beryllium filament onto magnesium foil (at lower left). Sections of the finished product can then be stacked and compressed by diffusion bonding.

Marvin Moss (5314/1224), together with David Schuster (5314) and staff assistant Wayne Cyrus (5314), has been working in development of high strength metal matrix composite materials for several years. The effort is now part of a broader and more extensive composites program in Department 5310. Marvin lists these techniques of fabrication as the most current:

1. Bind fine high-strength filaments into suitable matrices by plasma spraying. Examples are aluminum or magnesium sprayed onto layers of boron, beryllium or tungsten filaments.
2. Infiltrate a bundle of wires with liquid metal by suction and allow to solidify.
3. Pre-cast filaments with a binder, arrange them in a desired form and compact through a combination of pressure and heat.
4. Bind the filament between two foils



ALUMINUM sprayed on tungsten wires makes it possible to realize more nearly the inherent strength of the tungsten.



"PATENTLY GOOD" seems appropriate for this invention (see inset in lower left) by Cecil Land and Ira McKinney (both 5153). The ferroelectric ceramic electro-optical device has possible application as a solid state shutter, information display screen, or high density computer storage and logic element.

Patent Granted to Two Sandians For Ferroelectric Ceramic Device

A patent for a ferroelectric ceramic electro-optical device has been granted to the AEC in the names of its inventors Cecil Land and Ira McKinney (both 5153).

Principle of the invention is a newly-discovered effect in which a light beam, passing through a ferroelectric ceramic, is scattered either in a narrow beam if the ferroelectric domains of the material are polarized perpendicular to the surface of the plate, or is scattered in a broad cone if the domains are polarized parallel to the surface. As a result, if polarization is perpendicular to the surface, the material appears transparent and if it is parallel the plate appears opaque.

Essentially, the device provides selective polarization of small areas of ferroelectric plate to create the conditions of opacity or transparency (or degrees of either). The invention has application as a solid state shutter, an information display device, and a high density storage and logic element.

The device is comprised of: (a) a thin, optically uniaxial ferroelectric ceramic plate or layer, (b) a means for varying light transmittance properties through polarization of portions of the plate, (c) a means for passing ordinary light through the plate, and (d) a means for sensing the level of the transmitted light.

Polarization switching is done by applying an electric potential across electrodes attached on opposite sides of the plate. Photomultiplier tubes or photodiodes are used to sense the amplitude of light transmitted through the device.

Important advantages of the invention over earlier electro-optical systems are that it can be operated at room temperatures; transmittance changes or optical displays are visible under ordinary light; and the perpendicularly switched ferroelectric domains do not revert to their original orientation unless the appropriate voltages are applied.

of matrix material. The resulting monolayer tapes can then be stacked and consolidated by pressure. In one application, filaments of 5-mil beryllium in a magnesium matrix in tape form are compressed by diffusion bonding; the resultant composite is free of porosity.

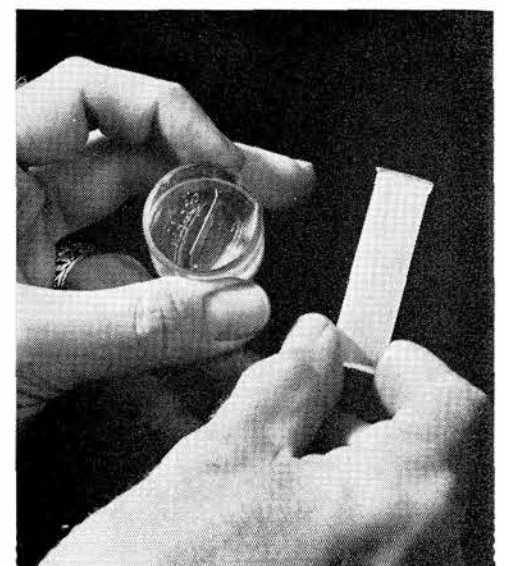
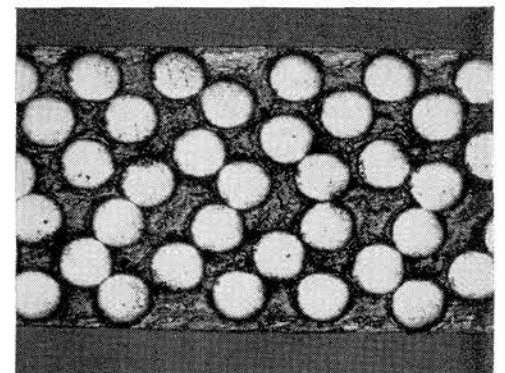
"Composites are needed," Marvin says, "because conventional materials do not meet the unusually stringent demands we face today. Only modest improvements are expected in the development of alloys. Composites, on the other hand, have a high potential for achieving special characteristics such as high strength per pound, high stiffness per pound, high strength in specific directions, and special electrical, thermal, and magnetic properties."

Reinforcing fibers can be either metallic or ceramic, and continuous (wires) or discontinuous ("whiskers," chopped wire, or even flakes). The matrix may be organic (resins) or metallic.

Designers find composites attractive in a number of applications. Where high strength is needed in one direction, composite material can be so fabricated—often at great saving in weight and bulk. No easy way has been found to realize the high potential strength of a metal in bulk form; however, the use of fine filaments of the same metal produces tremendous increases in strength. And, among the non-metals, micron size whiskers of materials such as aluminum oxide have strengths of up to two million pounds per square inch because of their crystallographic perfection. The trick is to engage numbers of these filaments in such a way as to take advantage of their combined strengths. This is the technology that Marvin has been developing over the years and which now shows considerable promise.

"High strength-low weight materials are a classic goal in materials technology. The aerospace and aircraft industries have an obvious interest, but consumer goods too can benefit from use of these materials," Marvin says. "How rapidly composites en-

ter the picture depends upon the cleverness of designers in using their unique properties and our ability to produce them economically."



MONOLAYER tapes of composite materials can be bonded into structural forms for a variety of uses. Enlargement shows cross-section of top edge of seven layers of 5 mil beryllium wires sandwiched between 1 mil sheets of magnesium.

Livermore Secretaries for Long Minis, Short Midis

National Secretaries Week, this week, recognizes the vital role secretaries play in today's business world. Always important to secretaries is the subject of dress—including skirt length. So we asked a few Sandia secretaries the question: Do you favor the mini or the midi skirt?



ANN POLLARD (8156) — "I'm for the mini—the conservative mini. Most girls in the business world are for it because they have greater freedom of movement. Another advantage is that the men are totally for the mini. The mini is also less expensive to make because it takes much less fabric for an outfit. Even if designers go completely to the midi, I think I'll stick with the conservative mini. Right now, anything is in and I'd like to see it continue that way."



KATHY KIMBRELL (8121/8125) — "Mini skirts are more flattering than midi as long as they're not too short, which can be just as unflattering. It's important for a secretary to look comfortable, but her skirt should be an appropriate length. The midi dress doesn't do much for a girl—at least I haven't seen one so far that does. Of course, they've been in fashion before, and I'll probably get used to them."



BARBARA WALTERS (8232) — "I have strong opinions about mini and midi because I prefer my outfits just a hint above the knee. Personally, I don't go along with fashion crazes and trying to keep in style. If you want to be provocative wear a mini, and if you want to be a bit old fashioned wear a midi. It's always a laugh for me to take out some of my old school photographs and see my skirts at mid-calf."



SUZANNE FRANSEN (8122/8129) — "Manufacturers aren't concerned with what the shoppers want, but with profits and economic growth. I enjoy wearing the mini because one of woman's personal attributes is her legs, and if worn with discretion the mini can be an asset to her appearance. Either the mini or the maxi down to the floor is for me, but I don't care for the in-between midi."



CHRIS IMLER (8321) — "The mini is much more attractive, although the short-short, micro-mini is not appropriate for the office. A secretary can be just as poised in a mini or maxi. The maxi might be great if you didn't live here in California where the climate is mild, but it would be difficult to keep clean."



TONNI NUNLEY (8162) — "I probably look better in the midi length, but the mini on a young girl is really cute. Actually, I'm not built for either, so I wear my skirts just above the knee. Each girl should temper the style to the way it looks best on her. On a short girl the midi looks like a little girl dressing up in her mother's clothes, but on a tall girl it looks great. And, the mini is safer—at least for driving a car or walking up steps."

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Adjustable Steps Designed

"It was that first step," recalls Don Smith of Plant Engineering Design Division 8254, "that convinced me we needed adjustable steps for our mobile offices. So I came up with a design."

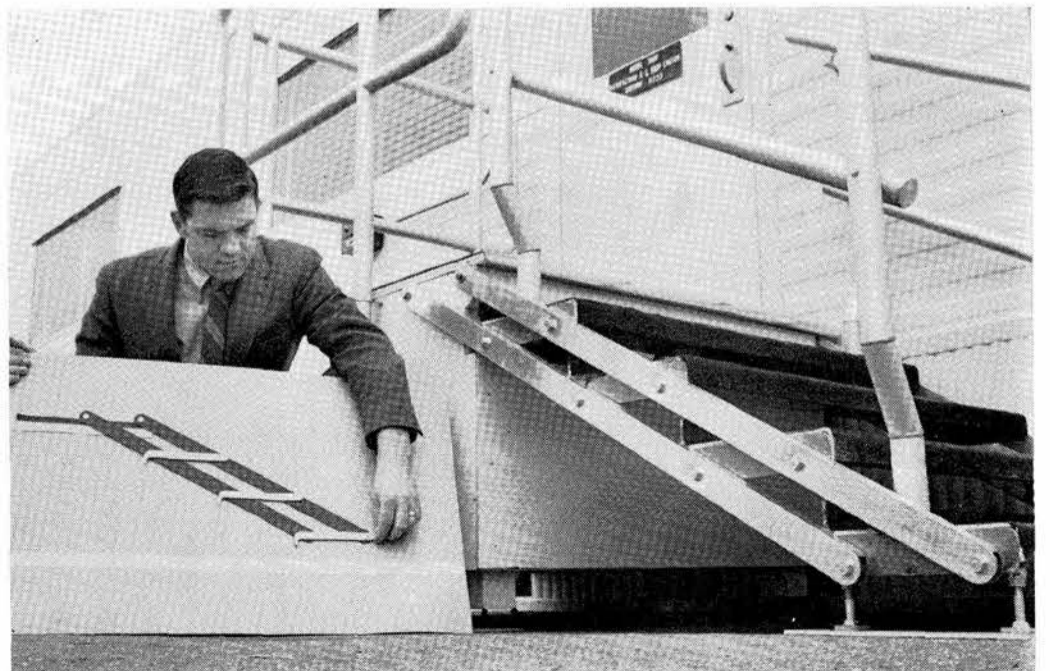
That "first step" Don talks about is the bottom step of a wooden staircase leading into a mobile office. Some of these mobiles are located on former lawn or graded areas adjacent to permanent buildings. Despite efforts to provide a firm, temporary foundation, the weight of office partitions, desks, safes and people combined with California rains cause the multi-unit offices to settle. But the stairs don't. And then doors won't open.

"Sawing off an inch or more from the bottom of the staircase," says Don, "was the only means we had to keep the platform at the top of the stairs level with the door of the mobile office. It wasn't the best

approach. Steps of different sizes are serious tripping hazards. And modifying the steps was time-consuming, expensive and inconvenient."

With Don's adjustable steps, a one-to-seven step staircase can be assembled to reach a platform one to five feet from the ground. The ends of each step are bolted to two parallel aluminum bars running from the top of the platform to the bottom step. If one step is moved up or down, the parallel bars make the other steps move likewise. Handrails also adjust automatically with the steps to remain parallel to the incline of the staircase. Both the platform and bottom step have adjustable footings. Railings around the platform can be removed to ease furniture moving.

Don still advises, however, to "watch that first step!"



WORKING MODEL OF ADJUSTABLE STEPS shows design principle Don Smith (8254) used to solve problem of keeping a staircase and platform level with a mobile office that has settled. New design eliminates time-consuming modifications required on wooden staircases.

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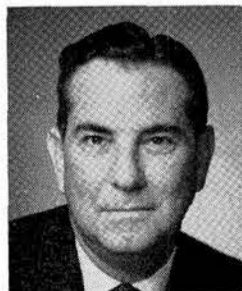
Matt Connors & Lorena Schneider

are Staff Writers in Livermore

Bill Laskar is Photographer

Norma Taylor / All The Rest

Death



Sidney Wagner, a systems analyst in Engineering Systems and Procedures Division 8163, died suddenly April 4. He was 50.

Sid joined Sandia Laboratories Albuquerque in December 1952 as an inspector in the Electrical Inspection Division. From 1955 until 1959, he was assigned to various quality assurance organizations in Albuquerque. In May 1959, he transferred to Livermore working first in Product Control Division and later in engineering systems and procedures.

Survivors include his widow Christine, daughter Susan, and son John.

Retiring



WILLARD McCORMICK
Switches, Relays & Rolamites 2321



L. J. UNDERWOOD
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PAT DONOVAN
KAFB Operations 7264-3



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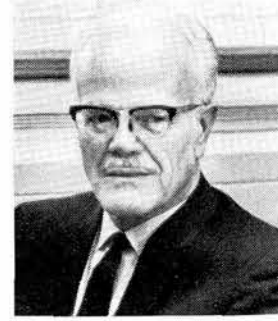
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Office Machine Repair 4516-2



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Instrument Service 7512



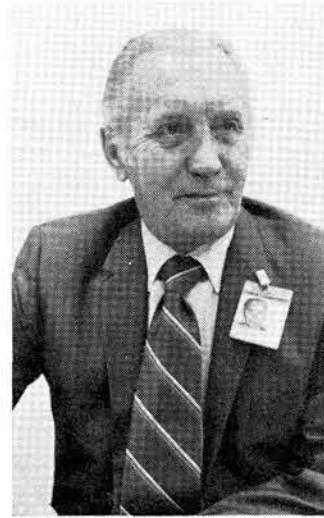
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Systems Analysis 1711



BILL DICKSON
Planning 4551



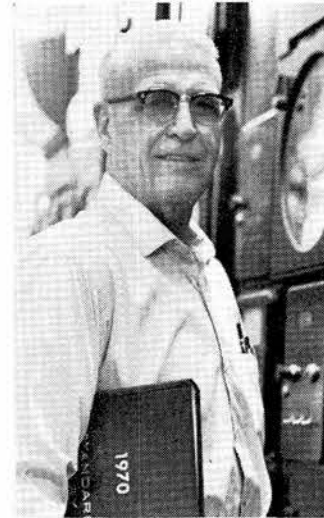
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FRANKLIN LOOMIS
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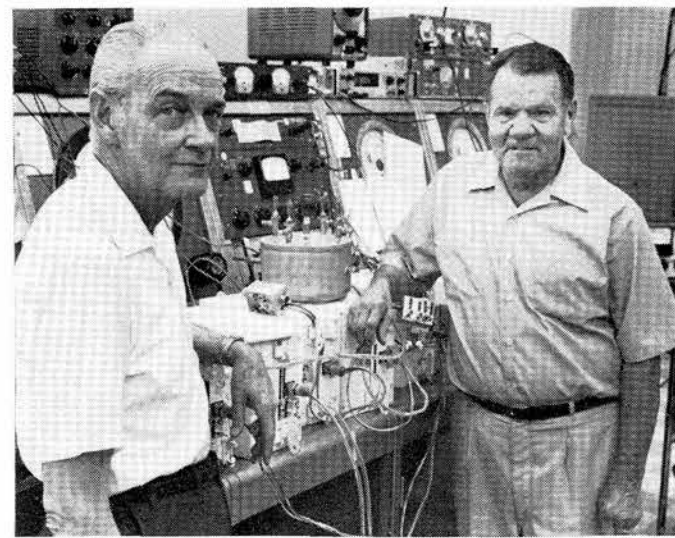
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JOSEPH WYNN
Plant Systems 4511



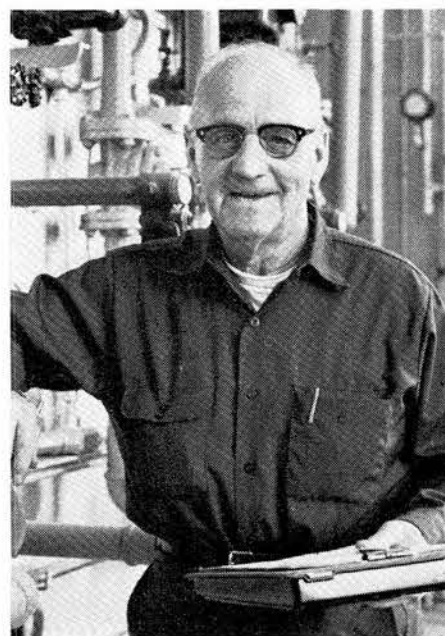
TOM BANKS, JR.
Sensor Development 9232



ROBERT CULLEY ANDREW IMRISEK
Transducer Evaluation & Calibration 7511



MARVIN BROWN
Patrol Division 3522



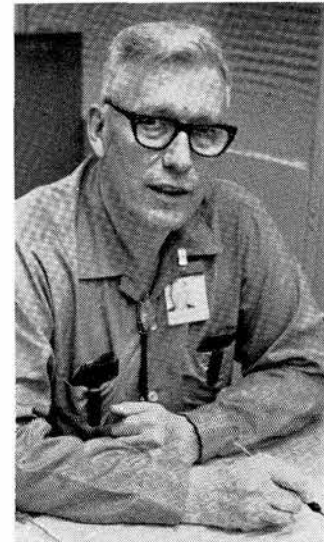
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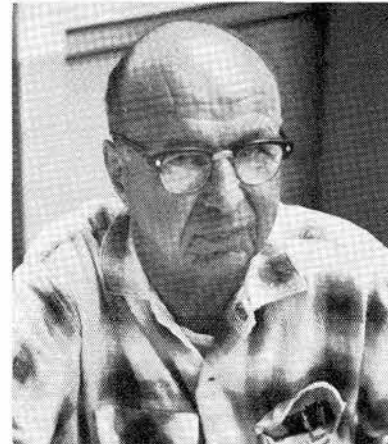
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Medical Services 3340



ETHEL LONNER
Secretarial Services 3256



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Quality Operations 2491



JACOB ISOMA
Explosives Assembly 4232-4



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Instrumentation Fielding 9124



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Buyer 4364

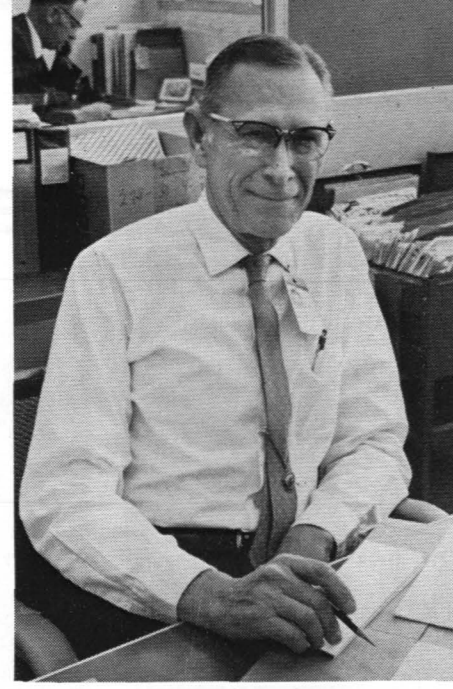
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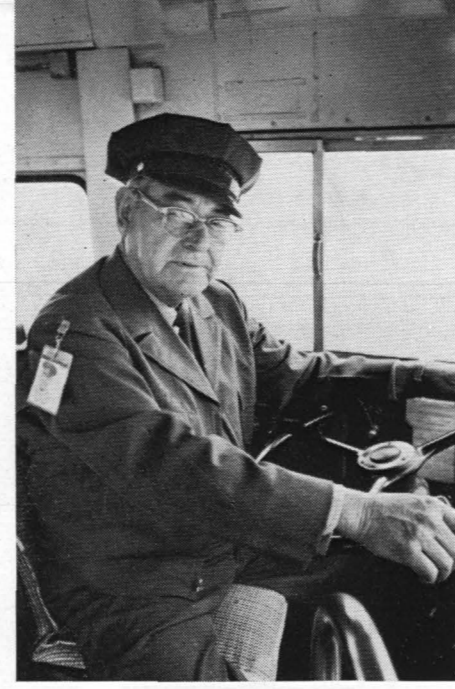
RICHARD SANCHEZ
Labor Support & Grounds
Maintenance 4575



JOE WOODLEY
Project Design Definition 7611



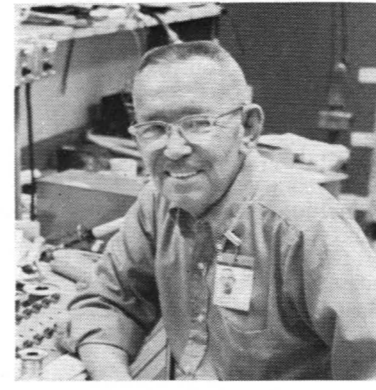
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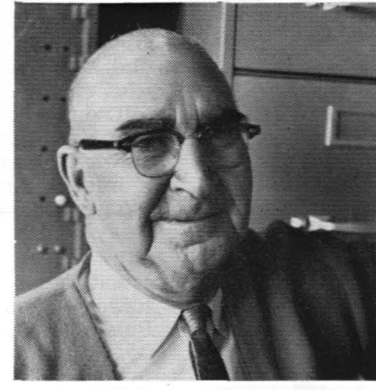
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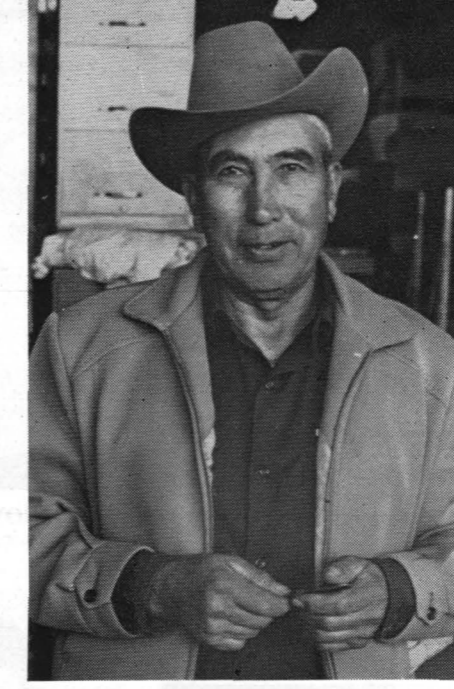
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Access Control 3521



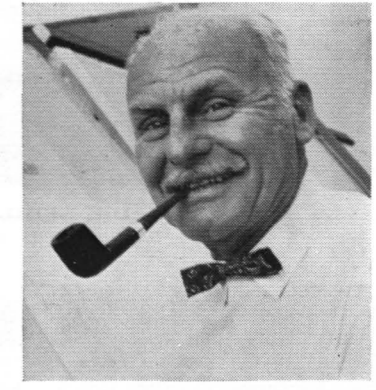
RICHARD PASS
Data Playback 7293



ANDRES SANCHEZ
Labor Support & Grounds
Maintenance 4575



JOSE VALDEZ
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LOU FAIR
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Patrol Division 3522



LAURENCE MEISSEN
Machine Shop 4253



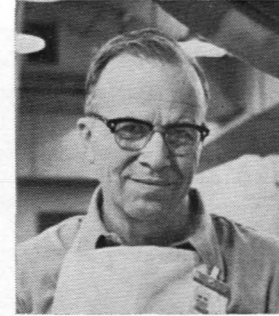
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Plant Maintenance 4312



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Patrol Division 3523



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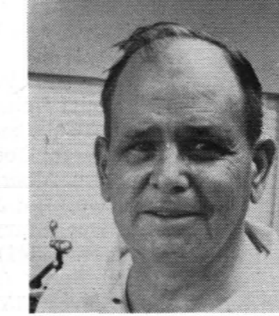
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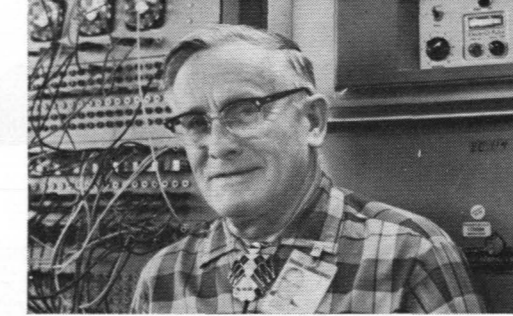
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VIRGINIA TRAVIS
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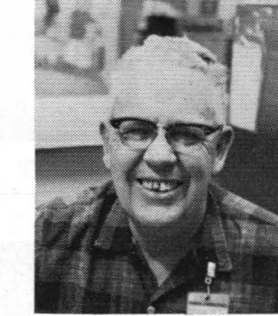
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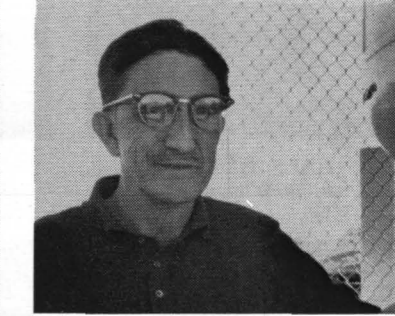
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JIM O'CONNOR
Receiving & Shipping 4623



JAMES DILLARD
Receiving & Shipping 4623



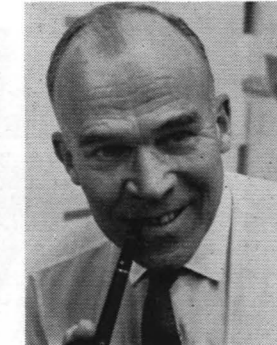
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General Stores 4613



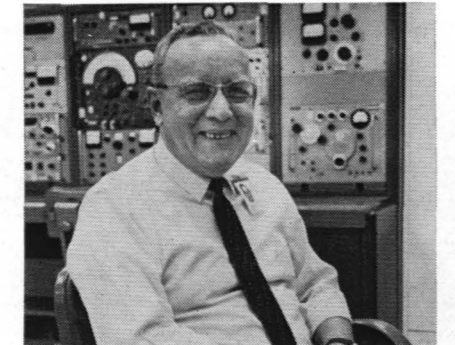
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Secretarial Services 3256



HAZEL VANCE
Data Engineering & Development 7291



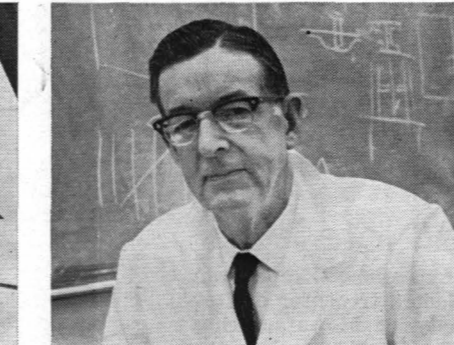
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DEAN WISE
Supervisor, Instrument & Electronics
Standards 4231-3



EDWARD SZYPER
Radiation Effects 2653



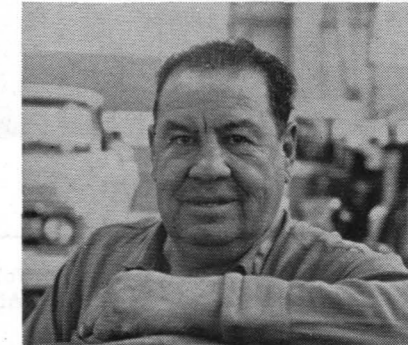
VERNON ARNOLD
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EDWARD DLOUHY
Design & Drafting 7651



ARTHUR STARZ
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Laboratories 4222



FLAVIANO SANCHEZ
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AMADOR LOVATO
Stock & Material Control 4212



BERTA GUEST
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Evaluation 7533



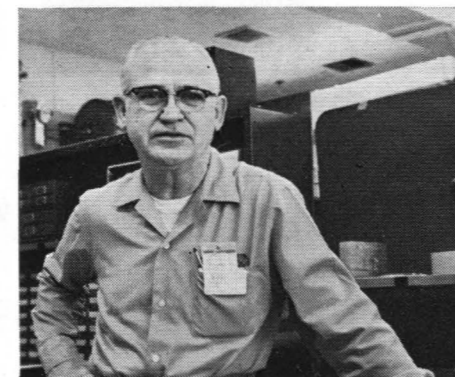
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PAUL KERLEY
Tube Development 2614



ALICE SIMON
Design Information 7633



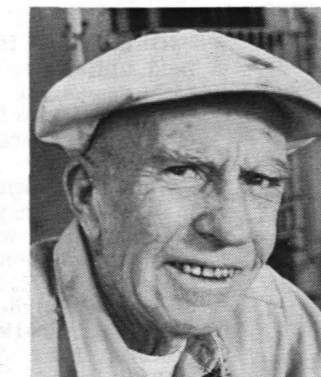
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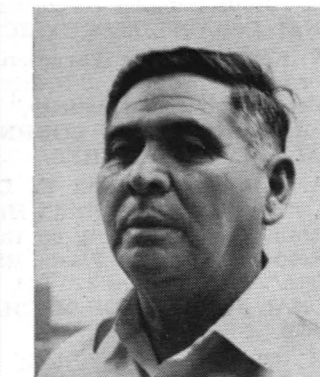
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Patrol Division 3523



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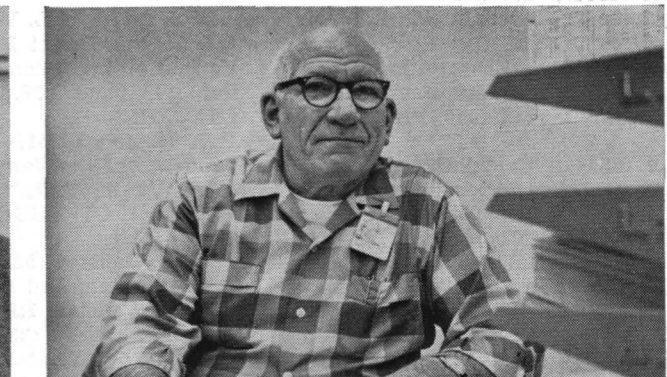
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Motor Pool 4573



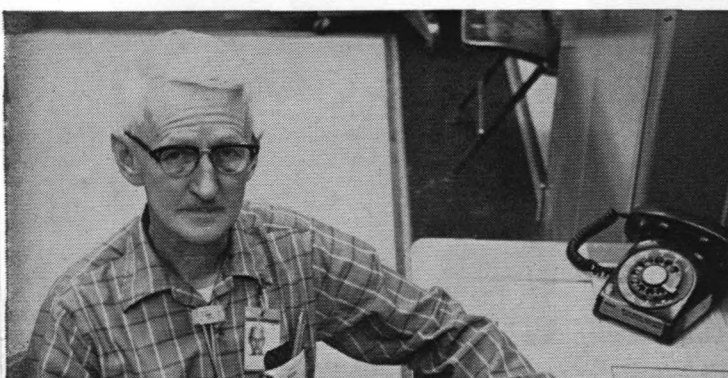
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Material Services 4614



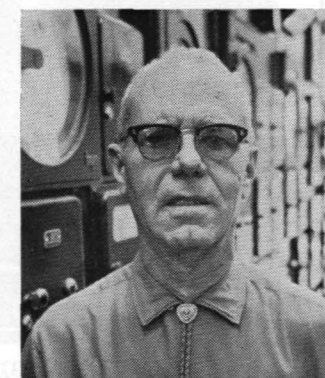
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Employee Training &
Education 3132



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Purchase Service 4337



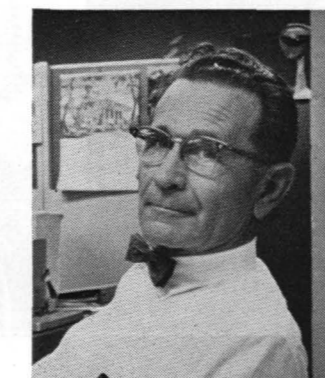
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Development Laboratories 4221



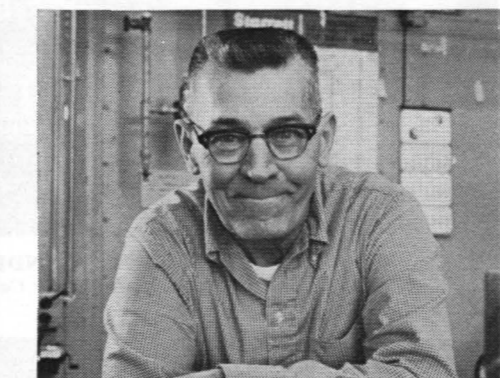
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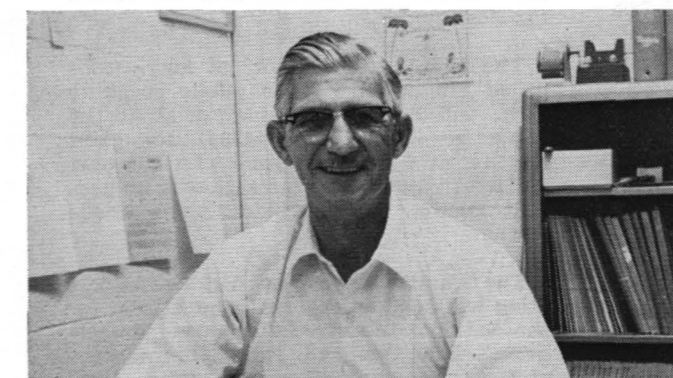
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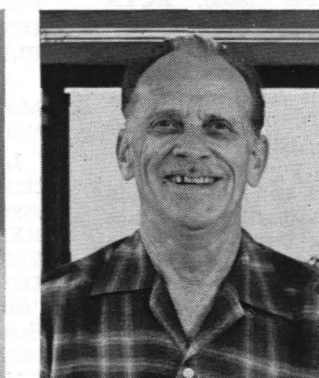
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Metals & Assembly 4232



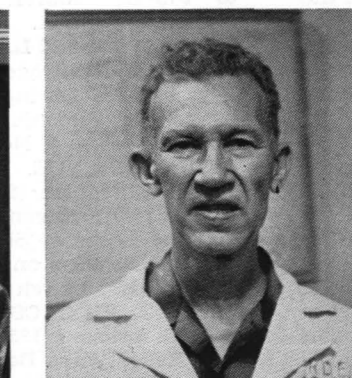
DAVID HAKE
Supervisor, Maintenance Apprentice Program 4515



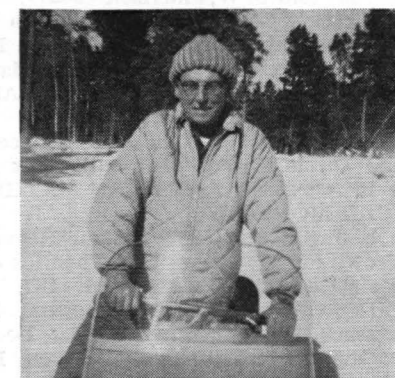
GLENN HAUGHNESS
Supervisor, Vacuum
Standards 7531-1



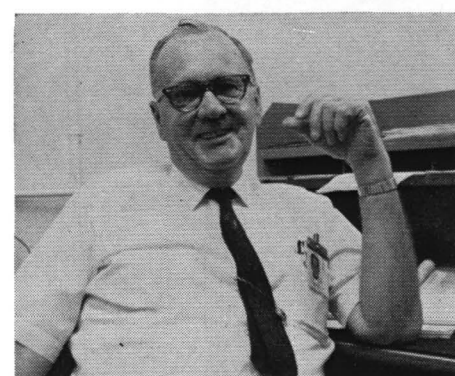
CLYDE HOWARD
Devices Testing 7523



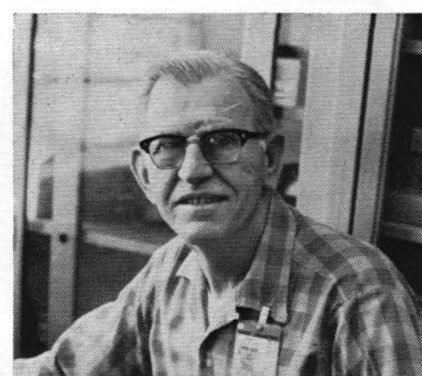
BUD LITZ
Plant Maintenance 4512



ROBIN KELLEY
Patrol Division 3524



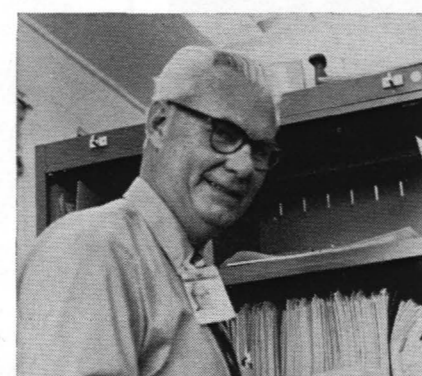
J. W. WINDSOR
Product Acceptance 7414



WILFRED BACCHUS
Product Engineering 2615



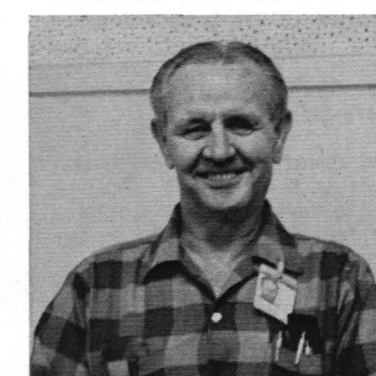
DENNIS BACA
Electromechanical
Components 7433



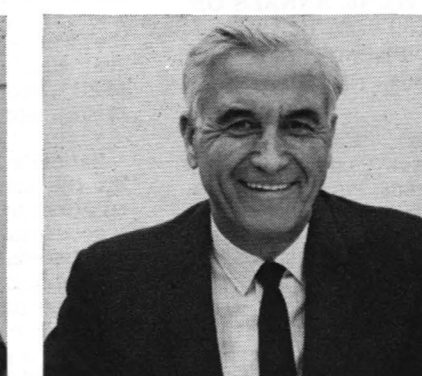
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Specifications 7616



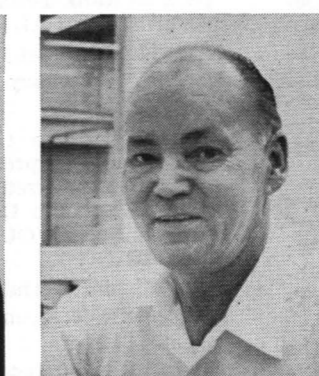
EVELYN BUCHANAN
Vouchering 4135



MAX ROBERSION
Supervisor, Plant Modification 4513



LAWRENCE LOWE
Supervisor, Inspection Calibration 4213



LOUIS ZELNIO
Shop Loading & Subcontract
Liaison 4211



FAYE DOBBS
Access Control 3521



JOE HEASTON
Stockpile Systems Test & Evaluation 7422

Retiring



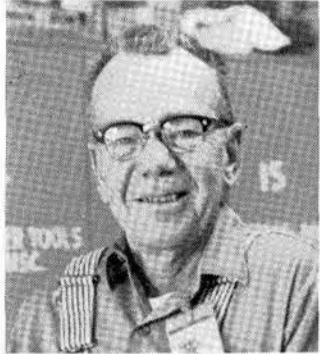
CARTER HOWARD
Computer Operations 9411



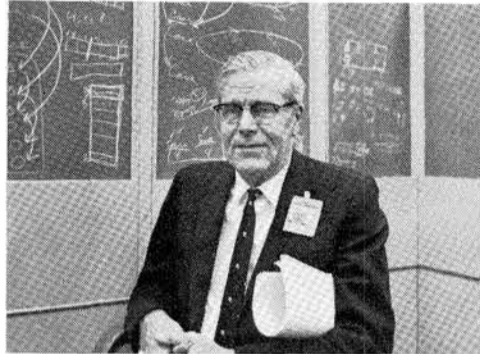
SADIE SEDILLO
Janitor Service 4574



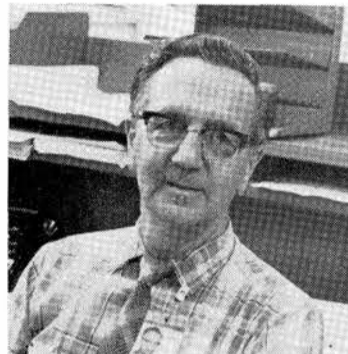
RUDY VINOVIH
Purchase Service 4337



DALE EASTON
Plant Maintenance 4512



JACK COLQUITT
Administrative Systems 4116



KELLEY FOSMO
Material Services 4614



VELMA METHANY
Janitor Service 4574



RICHARD POE
Data Playback 7293



MARY RAY HOUSTON
Technical Libraries Operations 3421



JOE GORDON
Quality Operations 2492

Top Science Students Tour Sandia Today

Science Youth Days have been underway yesterday and today, and some 150 science students from high schools in Albuquerque and nearby communities are touring facilities at Sandia Laboratories.

The tour is presented to encourage young people to pursue science and engineering careers. Arrangements were made by Community Relations Division 3433.

The itinerary includes viewing of displays in the Exhibit Center, an address by Otmar Stuetzer (1220), and visits to the scientific glass laboratory, rolamite laboratory, Hermes II, and the Annular Core Pulsed Reactor.

ECP Committee Reorganized

The ECP (Employees Contribution Plan) committee has been reorganized with eight new members plus a new chairman. Jack Merillat (3120) has been named chairman of the committee.

New members include Jack Sivinski (1740), deputy chairman; Ken Sutton (3250), deputy chairman; Harold Sherwood (4121) treasurer; Joe Laval (3433), executive secretary; Albert Angel (3520), IGUA representative; Jim Jorgensen (2623), 2600 representative; Mary Pasko (7415); and Alan Toepfer (5241). Carryover members include Lou Berry (5500), past chairman; Anthony Chaves (7512), OEIU representative; Marian Jacot (3251) new hire coordinator; and Harry Welch (4517), MTC, AFL-CIO representative.

The committee handles the distribution of the ECP funds. Members represent employees and the committee has urged anyone with questions or suggestions to contact them. "We want to know how you feel about the distribution of ECP funds and we encourage you to contact us," says Joe Laval.

Take Note

Oscar Schroll of Explosives Components Division 2342 was elected treasurer of Region 7 of the Society of Manufacturing Engineers (SME). The election took place in Phoenix on April 3. Region 7 consists of 24 chapters in 11 western states with nearly 6000 members. Oscar is a past chairman of the Albuquerque SME chapter.

Three "pros" in the nuclear test effects field will appear during the opening technical session of the May 7-9 meeting of the New Mexico Section, American Society of Civil Engineers, to be held at Los Alamos Inn.

Walt von Riesemann (1541) will be chairman of the session starting at 10 a.m., May 8, which will include the following talks: "Prediction of Ground Motion from Underground Nuclear Detonation" by Mel Merritt; "Building Response to Underground Detonation" by Dee Ellett; and "Airblast Effects" by Jack Reed. All are in Test Effects Department 9150.

The other technical sessions will feature speakers from universities, LASL, and private industry. Tours will be conducted of the Omega West Reactor and the Meson Physics Site.

The Free Lance Orators, a long-established Sandia noon-hour public speaking class, will hold an evening social at the home of Oletha Cox (4335) tomorrow starting at 6 p.m. Everyone who has ever participated in the organization is invited. Call Oletha, 264-6659, for more information.

The Sandia Employees Bridge Association will conduct regional competition for the National Industrial Recreation Association's 1970 Duplicate Bridge tournament at the Coronado Club on Thursday, April 30, at 7 p.m. The tournament is open to all employees and their families. High scores will be submitted for national competition for a top prize of a two-week Caribbean cruise. O. J. Foster (3123) is coordinating the competition. Association officers are Joe Harris (7291), president, Les Dye (4141), vice president, and Barbara Shaw (5400), secretary-treasurer.

Sandia's first staff baseball team will hit the sandlots in a couple of weeks in an effort to win honor and fame—and have a good deal of fun—in competition in the city baseball league, slow-pitch division.

Donna Lewis (4333-1) will manage the 20 or so gals who have signed up for the team. She said that if additional girls sign up, a second team can be formed. Any interested Sandians should contact her at 264-5050, or contact Employee Services. (No males need apply.)

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K. R. Miller and Harvey Frauenglass (both 3417-4), "Coated Mylar Speeds Production of Animation Cels at Sandia Labs," October issue, TECHNICAL INFORMATION BULLETIN.

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R. L. Kruse (on leave of absence), "On the Circle Group of a Nilpotent Ring," February issue, AMERICAN MATHEMATICAL MONTHLY.

E. J. Shipsey (5232), "Some Remarks on Projection Operators and Theories of Dissociative Attachment," Vol. 187, No. 1, PHYSICAL REVIEW; "Thermal Energy Dissociative Attachment of I_2 : Deduction of the Curve Crossing Point from Experimental Measurements," February issue, JOURNAL OF CHEMICAL PHYSICS.

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R. C. Hughes (5114), "Spin-Lattice Relaxation in the Linear Heisenberg Chain: (TMPD-TCNQ)," Vol. 7, page 895, SOLID STATE COMMUNICATIONS.

E. L. Hollar (5522), "Manganese Glass-

Molybdenum Metallizing Ceramics," Vol. 47, No. 5, pages 493-497, AMERICAN CERAMIC SOCIETY BULLETIN.

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W. B. Gauster (5220), "Electron Dilation in Germanium and Silicon," Vol. 187, page 1035, PHYSICAL REVIEW.

C. P. Skillern (3311), "Lead Exposures from Burned Lead-in-Plastic," November-December issue, AMERICAN INDUSTRIAL HYGIENE ASSOCIATION JOURNAL.

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S. W. Key (5162), "A Variational Principle for Incompressible and Nearly-Incompressible Anisotropic Elasticity," Vol. 5, 1969, INTERNATIONAL JOURNAL OF SOLIDS AND STRUCTURES.

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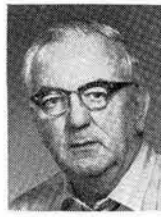
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Service Awards 20 Years



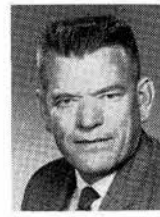
Frank Anderson
7451



Kenneth Campbell
4213



Woodrow Littrell
3524



Raymond Opperman
2614

15 Years



Joann Flinchum
5231



Clara Gearhart
3421



Grant Johnson
4212



Douglas LaCoss
2611



Harvey Long
4612



Ralph Richards
1912



Jack St. Clair
7372

10 Years

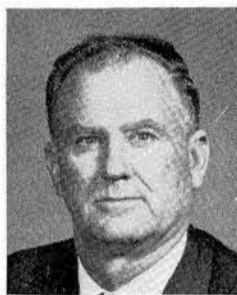
Robert Salazar 5538, Kenneth Gels 8172, Allen Danielson 8252, Fay Towe 3256, Fay Spellman 3417, Alice Smith 3421, and Glen Howard 7452.

Events Calendar

- April 24-25—The Music Theatre's production of "Pajama Game." Menaul High auditorium.
- April 29-May 2—Melodrama "The Fireman's Flame." UNM Rodey Theater, tel. 277-4402.
- April 30—Albuquerque Symphony Orchestra, Robert Facey, guest conductor, and Benno Rabinoff, violin soloist. Popejoy Hall.
- May 2—Santa Fe Baldy via Windsor trail. N.M. Mountain Club, leader Harry Wyeth, tel. 299-1327.
- May 3—Environmental awareness films. Museum of Albuquerque, south Yale Blvd., 2 p.m., free.

Honorary Degree for Willis Whitfield

Yet another honor is slated for Willis Whitfield (1742), inventor of the laminar air flow clean room principle. Hardin-Simmons University in Abilene, Texas, will present him with an honorary Doctor of Science degree.



The presentation will be made May 18 during the commencement program.

In a letter to Willis, Hardin-Simmons President Elwin Skiles wrote: "I want you to know the enthusiasm with which this action has been taken by the official bodies of the University. We are extremely proud of you because of your many accomplishments in your profession, in civic affairs, and in church life. We feel that we are honoring the University as we bestow an honor upon you."

Willis received a BS degree in physics and math from Hardin-Simmons in 1952 and did graduate study in physics at George Washington University. He has been with Sandia for 16 years.



RACY PAIR of Sandians, John (2451) and Karen (5150) Shane are active in the Rio Grande chapter of SCCA. John drives number 7 in Formula V competition while Karen pilots the family van in road rallies.

Car and Track

Couple of Sandians Share Skill and Fun of Racing

When John Shane (2451) races his Formula V car, he knows he has a competent pit crew, reliable timer, and adoring cheering section. He knows because he's married to her.

Wife Karen (5150) not only is a one-girl retinue but when the Shanes are entered in road rallies, she's the driver while he navigates. Their trophy shelf contains more rally than Formula V racing prizes, she points out.

The Shanes are among a number of Sandians active in the Rio Grande chapter of the Sports Car Club of America (SCCA). Besides offering race driving courses (which drivers must pass to qualify for sanctioned races), SCCA sponsors local, regional, and national races and rallies.

John has been racing his Formula V — which he built from a kit — for about two and a half years. Formula V (that's "Vee," not five) is classed as a single seat, open wheel car with unmodified VW engine and gear train, tube steel frame, and fiberglass body. Although one of the smaller cars in competition, its speed ranges up to 110 miles per hour.

Other Sandians who are SCCA Formula V drivers include Bill Denison (7411), Dave

Nokes (2452), and Bill Kampfe (7325). Dan Talbert (1221) is regional executive for SCCA and Dick Kromer (2454) is assistant executive. During the years 1966 and 1967, Bill Denison won the Midwest Divisional Formula V Championship.

The Shanes enjoy the rallies more than the races — he because it's more fun than racing (though no less demanding) and she because it's a sport they can do together. "A typical race weekend consists of towing the car up to 500 miles to the track, a day of car inspections and practice runs and then, finally, maybe two hours of intense racing," John says. Rallying, on the other hand, may take the entire weekend but isn't quite so frantic.

The car they use for rallies is a Ford van. When not in use at a rally or ferrying the racing car, the Shanes use it as a camper or to haul the family motorcycle out to the boondocks.

John has a license to race in national competitions, while Karen has partially completed requirements for a novice license. "I took the race driving course mostly for fun," she says, "and also because it is educational. But I think I'll leave the actual racing to John."

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7. Include name and organization
8. Housing listed here for rent or sale is available for occupancy without regard to race, creed, color, or national origin.

FOR SALE

MISCELLANEOUS

- GUITAR, Dimentel w/case, \$95 new, sell for \$55. Kohl, 268-3754.
- ELECTRIC GUITAR w/case, "Supro" single pickup, \$100. Sharp, 877-2275 after 5:30.
- OFFICE MODEL, Std. Royal typewriter, 15" carriage. Jones, 255-6190 after 5.
- SOLID-BODY electric guitar, dbl. pickup w/vibrato tailpiece, amp, cord, plastic case & strap, \$50. King, 299-8976.
- CARBURETORS, twin SU w/air filters, including manifold for 544 Volvo engine. Graeber, 298-0662.
- BED; dresser; refrigerator; stove; couch; dining table; washing machine; cab-over camper. 7415 Guadalupe Tr. NW. Chacon.
- SWAN 400, 406 & 410 control heads, AC & DC power supplies, mobile antenna, microphone, 2 element beam. Muchow, 299-1813.
- DINETTE SET, formica table w/leaf & 4 upholstered swivel-base chairs, \$100. Pitts, 255-5221.
- SEAR'S 8" table saw w/table extension, motor & stand, \$65. Linnhorst, 298-3595.
- 12-TON hydraulic jacks completely rebuilt, \$22.50; 1/2-ton hydraulic jack, rebuilt, \$12.50 firm. East's, 299-7728.
- GE IRON, teflon bottom, temp. control, dry ironing excellent, steam ironing poor, \$3. Tomlinson, 296-2245.
- SILVERTONE guitar, concert style, \$20; Webcor turntable mounted on plywood base, cartridge included, \$15. Smith, 298-9092.
- MOBILE HOME, '67 Nomco, Shelby, 898-2019 after 6.
- 14' FISHING BOAT, Lone Star fiberglass; 12" wood pliner, Boice-Crznz, Waldorf, 344-1017.
- 4-SPEED transmission for Corvairs '61 - '65. Markowitz, 898-2991.
- GOLF CLUBS, MacGregor Champion's, 8 irons, 3 woods, putter, bag, \$90. Bircher, 268-0726.
- DINING TABLE, Duncan Phyfe, dbl. pedestal, mahogany, foldout leaf, 6 matching chairs, table 40"x60" closed, \$85. Barnum, 298-2865.

- HEAVY DUTY camper jacks. Newton, 255-2074.
- DOUBLE BED, box springs & mattress, dresser & night stand. Tucker, 255-5957.
- DIRT BIKE, 250cc, Greeves "D" model, 225 lbs., 28 HP. Snelling, 268-5895.
- FRIGIDAIRE washer w/tangle-free agitator, \$50. Clabaugh, 299-0721.
- DRUM SET; 2 boy's bicycles: cast iron, white, wall mount lavatory. Barber, 299-4287.
- 400CC MAICO Motocross, new, ridden only few hours, \$1150. Jewett, 256-3739 after 6.
- SEA KING 12' aluminum cartop boat, Sea King 8hp motor, canopy, cartop carrier, wheels, oars, \$295. Forsman, 299-5570.
- LARGE MIRROR, \$3; ranch oak twin bed frame, \$10; child's upholstered platform rocker, \$3. Emery, 299-1675 after 5:30.
- USED 30" electric range, \$50; will consider trade for what have you. Hedman, 299-2077.
- '66 YAMAHA 60, less than 2000 miles, extras, \$150. Smith, 299-7151.
- SUNBEAM portable hair dryer, \$10; chrome foot-stool, \$5; Western books; oil painting of Indian Chief from Geromino, \$125. Smith, 299-1096.
- HORSE, 2-yr.-old mustang, very gentle, \$70 or will trade for various items. Treon, 282-3835.
- OSCILLOSCOPE, RCA, 5MHZ, 3" screen, very portable, \$55; sweep generator, Heath 16-52, 200 MHZ, variable marker, \$25. Stoker, 299-7221.
- SKIN DIVING EQUIPMENT; 2 tanks & harness, 3 stage regulator, extras, made by Aqua-Lung. Vance, 255-8032 after 5.
- DOUBLE BED, springs & mattress, solid hard-rock maple headboard, \$50 or best offer. O'Bryant, 268-9049.
- AGFA 35mm camera, f2.0 lens, wide angle & telephoto lenses, light meter, tripod, flash, \$35; Polaroid swinzer camera, \$5. Klett, 298-7892.
- WEDDING DRESS, size 10, & veil, full length, chapel train, sabrina neckline, lace & taffeta, \$35 cash. Kenna, 298-6059.
- AMPEX MICRO 85 stereo cassette tape deck w/ speakers, stereo microphone, & some tapes, \$200 new, sell for \$100. Schuler, 296-2271.
- 12V BATTERY, used, guaranteed. Dietzel, 298-3295.
- TELESCOPE, 3" Unitron refractor, Altazimuth mtg., 48 to 170 power, new \$265, asking \$160. Mason, 296-8390.
- BICYCLE, girl's 24", heavy duty tubes, basket, carrier, \$12. Moriarty, 296-1369.
- TABLE SET; 2 step tables, 1 end table, mahogany finish, \$20; end table mahogany finish, \$5; trunk, 34"L, 23 1/2"H, 20"D, \$10. Stark, 299-5953.
- ALUMINUM SKI BOAT, trailer, new 33 Johnson, ski equipment, all for \$375, 1201 Madeira SE, Apt. 107. Lewis, 268-3835.
- ALUMINUM sliding glass door, frame & screen, \$30. MacGibbon, 6408 Kiowa NE, 256-3107.
- CATS FOR FREE, 3 kittens about to be weaned & their Siamese X mother; mother has shots. King, 298-2991.

- HOUSEHOLD GOODS: Moving, name it — 3 39" beds, box springs mattresses; lawn roller; den furniture; skates, appliances, other. Savage, 256-7263.
 - FOSTORIA, Love Song pattern, 6 goblets, never used. Bertholf, 299-8549.
 - ACCORDION, 12 bass, Princtti, Summers, 298-1001.
 - FREE, 3-yr.-old Dachshund, very good w/kids. Cotch, 268-8095.
 - MAPLE TABLE, 42x48 + 12" leaf, \$20; 30" Miami-Carey range hood & vent fan, \$20. Dalphin, 265-4029.
 - 1500 POUND helper springs, \$8. Fenn, 255-5995.
 - DRAFTING TABLE, \$10; 3 file cabinets, 28x24x15, \$20; 28x18x15, \$10, 28x15x14, \$10. Dean, 299-3281.
 - RANCH OAK sofa, \$49; glass animal collection, \$10; auto race track on board, \$19; auto luggage carrier, \$9. Winblad, 344-3109.
 - COUCH, hide-a-bed, king size, neutral color. Rakocy, 256-0433 after 6.
 - REG. SORRELL quarterhorse gelding, good breeding, \$300; lg. daveno, folds into bed, lt. green, \$35. Olson, 298-3795.
 - ONE-WHEEL TRAILER, \$25. Daniel, 298-4213.
 - WESTERN SADDLE, Riley, 256-0719.
 - RIFLE, M/99F Savage w/Redfield 2 3/4" power scope, recoil pad, sling & swivels, hard vinyl foamed-lined case. Farley, 299-9148.
 - PONTOON BOAT, needs work on pontoons, sleeps 4, self trailering, full canvas top, \$25. Bentz, 299-3448.
 - POWER MOWER, 3hp Briggs & Stratton engine. Haliday, 265-2643.
 - WINFIELD CHINA set; stainless steel garbage disposal, new; baby bed. Best, 299-5627.
 - LANE cedar chest, \$45; Argus C4 w/case, flash, 3 rolls color film, \$25; Westinghouse refrigerated air conditioner, \$95. McIntire, 298-6145.
 - BICYCLE, boy's Sear's Spyder, 20", 5-sp., gear-shift, hand brakes, right size for 8-11 year-old, \$35. Moore, 299-3758.
 - JUNIOR GOLF CLUBS; baseball shoes; ice skates; unfinished chest; games, toys; cyclo-teacher; clothing; make offers, 1852 Betts NE. Binder, 299-2957.
 - DOUBLE BED, complete, \$40. Bemis, 296-1305.
 - OVER-HEAD CAMPER, \$475 or best offer. Sanchez, 255-2006 after 5:30.
 - SOFA BED, brown durable upholstery, 84" long, \$50. Smith, 299-6873.
- CARS AND TRUCKS**
- 1968 JEEP COMMANDO, V6 engine, low mileage. Radio and tire rack. Siddens, 298-8923.
 - '67 DODGE VAN A-100, freight doors side & rear, insulated, slant 6 engine, \$1200. Bentz, 299-8362.
 - '66 DODGE Coronet 500 conv., 2-dr., V8, PB, PS, factory air, sport console, floor shift AT, bucket seats, R&H, low mileage, \$1325. Skelton, 268-7759.

- '66 DATSUN sedan, R&H, 4-sp., new oversize tires, \$800 firm. Kubiak, 268-2501 after 7.
 - '63 PONTIAC convertible, full power, AC, leather interior, bucket seats, seat belts, low mileage, \$1050. terms. Brown, 344-2986.
 - '63 RAMBLER 6-cyl., OD, 4-dr., '660", 56,000 miles, new tires & battery, turquoise & white, \$600. Whitlow, 296-7249.
 - '63 CHEV. Impala 4-dr. sedan, 327 V8, AC, AT, PB, PS, \$600. Burnett, 298-1078.
 - '61 CHEVROLET Parkwood wagon, one owner, \$300. Fenimore, 11108 Brentwood Hills, NE, 298-8052.
 - '59 BUICK conv. Invicta, 325 HP, 401 cu. in., 4-barr. engine, new brakes, PS, PB, AT, \$395. Bassett, 898-1840.
 - '60 DODGE 1/2-ton pickup w/shell, radio, 4-sp., 6-ply truck tires, 6-cyl., \$499. Chavez, 268-0137.
 - '63 GMC pickup, \$750. Corll, 255-1186.
 - '64 FORD Country Squire, 6-passenger, PS, PB, air, \$950. Fisher, Bosque Farms, 1-636-2864.
 - '64 FORD 1/2-ton, SWB, 3-sp., 6-cyl., \$725. Benson, 268-9727.
 - '66 DODGE Sportsman van, 225 C.I.D. engine, heavy duty trans., 6-ply tires, windows all around, extra seats, NADA loan value. Chavez, 299-5102.
 - '50 pickup; Corvair, good for dump bunny; also Dune Buggy, make offer. Best, 299-5627.
 - '68 CHEVROLET station wagon, V8, AT, PS, factory air. Kluehertz, 298-8057.
- REAL ESTATE**
- 2 1/2 ACRE HOME SITE 2 miles N. Hy, 10, mountain view, utilities available. Harris, 296-5944.
 - FLAT Greenwood Hills lot on 7000'-high cul-de-sac, clear city view, 4/10 acres, \$12,900 including assessments, terms. Levy, 299-6286.
 - MOBILE HOME LOT in Meadow Lake, all utility hook-ups in, some fruit & shade trees, landscaped, fenced, storage shed. Lerke, 296-3236.
 - MOUNTAIN hunting & fishing cabin in Manhattan Nev., water & elec., 3 lots & garage, will trade for N.M. real estate. Brin, 282-3834.
 - HOUSE, 3-bdr., den, 1 3/4 baths, carpeting, newly redecorated, lg. screened porch, assume 4 1/2% mort. equity or refinance at appraisal. Hawley, 255-0332.
 - ONE-BDR. DUPLEX, SE Heights, \$11,950, completely furnished, \$5200 down, \$70/mo., including int. Chavez, 298-5091.
 - 2-BDR. black stucco, dbl. garage, 12 miles E of Albuquerque on U.S. 66, \$3500 down. Brooks, 298-4354 after 6.
 - 6-BDR., den, utility rm., 2 baths, attached garage, NE Heights, \$20,250. Morgan, 299-8726 evenings.
- WANTED**
- 1963, 1965 MGB, Sprite, MG Midget, or Spitfire, body must be in good condition. LaBarre, 299-3569.

- TRADE city lot for truck camper or car. Chavez, 298-5091.
 - 80 THRU 10 MTRS mobile antenna plus mount. McClure, 898-4472.
 - TRAILER, 2-wheel luggage type, will consider one-wheel type. Hueter, 242-1620.
 - CAMPING TRAILER, sleep at least four. Wehrle, 255-4667.
 - BABYSITTING by reliable school girl in Cedar Crest area. Downs, 282-5148.
 - RIDE, Lomas & LaVeta to Bldg. 800. Byrum, 268-2916.
 - HALIBRAND quick change rear end for early Ford. Abrams, 344-8252.
 - CHILDREN'S play house. Eldredge, 268-7396.
 - 17' ALUMINUM CANOE. Schuster, 299-1072.
 - CUBCO ski bindings & steel ski poles. Curry, 298-5028.
 - CLEAN, low mileage economy car. Fisher, Bosque Farms, 1-636-2864.
 - '66 or '67 F-100, V8, 4-sp., short, wide box. Wentz, 298-2630.
 - PORTABLE ping pong table; M-1 carbine. Parsons, 299-4548.
- FOR RENT**
- GARAGE, single, near UNM, on alley, \$10/mo. Hueter, 242-1620.
 - UNFURNISHED HOUSE, 3-bdr., 1 1/2 baths, family rm., dbl. garage, corner Shoshone & Eubank, \$180/mo. Wentz, 298-2630.
 - HORSE PASTURE, lush grass, running stream, inside National forest boundaries, 1 hr. away, corral, camping privileges, \$15/mo. McKinley, 296-7015.
- LOST AND FOUND**
- LOST—Gold stud earring for pierced ear, Rx glasses, man's yellow gold ring w/red stone, Spanish gold drop earring, shoe buckle, black glass case, yellow gold "Cross" pen, yellow gold heart w/baby picture, white nylon scarf, man's black umbrella. LOST AND FOUND, tel. 264-2757, Bldg. 832.
 - FOUND—Rx safety sunglasses, partial dentures, gold & pearl dangling earring. LOST AND FOUND, tel. 264-2757, Bldg. 832.

**NEXT DEADLINE
FOR
SHOPPING
CENTER ADS
12 NOON
MAY 1**



SOUL SESSION

Coronado Club
 Tomorrow Night 8:30-12:30
 Happy Hour Prices

Mary Ann Bishop (1641)

Coronado Club Activities

Marty, Make It to Soul Session, —Man, It's Something Else

Remember Marty? He didn't have a thing to do on Saturday night. Well, Marty, here's what you ought to do. Along about 8 p.m. tomorrow head for the Coronado Club. It's Soul Session, man, and it's great. Rod King and the Soul Knights break loose about 8:30 p.m. with music hot and cool. Rod plays a great combination of rock and roll with standard jazz. The kids love it. The old timers love it. Did you ever see the sagebrush shuffle combined with the frug? It's something else and so are the miniskirts. Happy hour prices are in effect all evening and pizza is available from the kitchen. And the best part of it, Marty, is that Soul Sessions are free to members, only 50 cents for guests. See you there.

Sanado Formal Ball

Sanado Woman's Club closes a successful year Saturday, May 2, with the annual formal Presidential Ball with installation of new officers. The ball starts with cocktails at 6 p.m., dinner is at 7 p.m., officers are presented at 9 p.m. and dancing to the Top Hats follows.

Latin Fiesta

It's Ole! — all the way! Fiesta time comes to the Coronado Club once a year with Mexican food, mariachi entertainers, and Sol Chavez and the mighty Duke City Brass. Mark Saturday, May 16, as a date to remember. Tickets (\$3.50 for members, \$4 guests) should be picked up by May 11.

Social Hours

Tonight the Club's famous chuckwagon roast beef will be the buffet feature while the smooth big band sounds of Gappy Maestas and the orchestra fill the ballroom. The buffet costs \$1.75 for adults, \$1.50 for kids.

The TGIF crowd gathers at the Club right after work on Friday evenings and enjoys the special prices until 9 p.m. The buffet is spread from 6 to 8 p.m. and the band plays for dancing from 6 to 9 p.m. Then the troops move to the main lounge where Pat Reich and piano entertain with a sing-along until midnight.

On Friday, May 1, Frank Chewiwie will hold the bandstand while the kitchen staff wheels out the seafood buffet.

Survival Instruction

"Emergency Survival in the Southwest" will be presented by Tom Harrell (4364) at the Coronado Club Monday, May 4, at 7:30 p.m. Members, families and friends are invited to attend to learn tips on coping with emergency situations in the deserts and mountains of the Southwest. Tom is an instructor on hunter safety for the State Department of Game and Fish and also a licensed professional guide.

Noon Hour Fashion Show

Rosario Ayers will present a fashion show of summer styles from Winrock merchants during the noon hour on Thursday, May 7.

Sanado Art Show

The Winrock mall will be the scene May 6-8 of an exhibit of paintings by the Sanado Art Group and the Sanado Art Associates. Chairman of the show is Sharon Gauerke.

Western Interstate Nuclear Board Schedules Initial Meeting Here

Representatives from 14 states will be at Sandia Laboratories April 27-29 to attend the first meeting of the Western Interstate Nuclear Board.

Delegates will begin arriving Sunday and include the Alaskan Secretary of State, directors of numerous state economic development offices, university professors, and chairmen of nuclear energy development offices in Arizona, California and Idaho. New Mexico will be represented by Bruce Van Domelen (2345), the Governor's Science Advisor.

According to Bruce, "The board was formed by the western governors to bring the benefits of nuclear technology to the citizens of the west and to provide western states with an independent capability to assess nuclear developments."

The New Mexico state legislature passed a measure in 1969 enabling New Mexico to become a member of the Western Inter-

state Nuclear Compact. The member-states have allocated funds to support the group's work and Federal funds will be available for special projects.

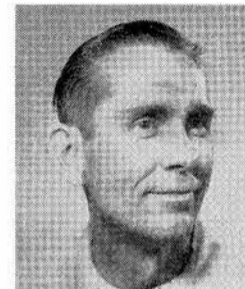
All sessions will be held at Sandia except Monday afternoon when the group flies to Los Alamos Scientific Laboratory for briefings on underground nuclear engineering, radiological hazards and controls, and the Los Alamos Meson Physics Facility (LAM-PF), and a short tour.

Monday morning briefings at Sandia will be on SNAP 27 and aerospace nuclear safety, readiness plans and programs, and reactors. Tours will follow.

During the meetings Tuesday and Wednesday, the board will establish its projects and programs for the year.

Credit Union Statements

As part of its normal audit procedure, the Supervisory Committee of the Sandia Laboratory Credit Union recently mailed statements to members with account numbers from 13,000 through 13,999, and from 14,000 through 14,999. If your account number is in either of these series and you have not received your statement, please notify Karl Waibel (4117), Committee Chairman.



Death

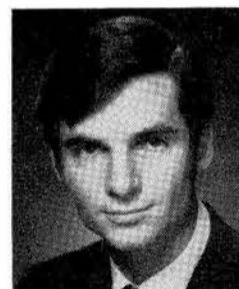
Robert Pegue of Electronics Division 4231 died April 11 after a short illness. He was 44.

He had worked at Sandia Laboratories since September 1950.

Survivors include his widow and three children.

Start Next Semester

Nine Selected for Doctoral Study



Ron Young (8337)

Nine Sandians were named last week by President John Hornbeck as participants in the Doctoral Study Program (DSP). The DSP permits full-time study at certain universities for an initial period of 12 months, following which extension of this period

may be granted.

Sandia pays the cost of tuition and normal school fees, and the participant receives a reduced salary while attending school. Each of the candidates submitted a plan for his doctoral program as part of the qualifications for selection. The men will start their academic work under DSP in the fall of 1970.

Two of the men—Jimmie Smith (9424) and David Caskey (9424) — are already working on their doctorate under educational leaves of absence. Smith is attending the University of Texas working on his thesis, "Numerical Solutions of Three-Dimensional Turbulent Boundary Layer." Caskey is also at the University of Texas studying computer science. His thesis is

"Machine Recognition of Hand Printed Characters."

Others selected for the DSP include:

Richard Berlnt (9425), UCLA, computer science, "Computer Programming Systems"; Marcus Bunting (1731), Northwestern, operations research, "Application of Operations Research Methods to Solve Defense Related Problems"; David Larson (9513), Purdue, ME, "Effect of Ablation Products in Radiating Shock Layer During High Speed Atmospheric Reentry"; Donald Longcope (1222), Stanford, applied mechanics, "Area-Mechanics of Composite or Anisotropic Structures."

Robert Reese (1544), Lehigh, structural mechanics, "Structural Synthesis and Optimum Shell Structure Behavior"; Melvin Scott (5222), University of Vermont, applied mathematics, "Invariant Imbedding and the Calculation of Eigenvalues"; Ronald Young (8337), University of California-Berkeley, ME, "Dynamic Response of a Class of Problems Using Finite Elements."

With these nine Sandians entering the Doctoral Study Program, the total is now 35 participants. Fourteen were selected in January 1968 when DSP was initiated and 12 more were selected in January 1969. Of these, seven have completed their programs.

The DSP is administered by Don Hosterman of University Relations Division 3134.

May Is Savings Bonds Month

\$18.75 is a pretty good deal for a \$25 gift.



Take stock in America
 Buy U.S. Savings Bonds & Freedom Shares

And Glenn Fowler (9000), State Chairman for U.S. Savings Bonds, suggests you take advantage of the new 5% interest rate on Series E Bonds.



SELECTED to pursue PhD degrees under Sandia's Doctoral Study Program are (first row, from left) Marcus Bunting (1731), David Larson (9513), and Robert Reese (1544). In the second row are Donald Longcope (1222), Melvin Scott (5222) and Rich Berlnt (9425). The men will start their advanced education programs next September.