

SANDIA LAB NEWS



VOL. 21, NO. 20, SEPTEMBER 26, 1969

Annual ECP Drive Starts Oct. 6; 'Fair Share' Continues as Goal

Annual drive for the Employees Contribution Plan starts Monday, Oct. 6.

Funds from the ECP are distributed to the Albuquerque United Community Fund plus nine other agencies. The ECP committee, headed by Lou Berry (5500), has announced the percentage allocations for the 1969 drive. Allocation of funds is based on the fund-raising records of participating agencies.

The 29 agencies of the United Community Fund will share 82.4 percent of the ECP funds. The American Cancer Society will receive 4.3 percent, Bernalillo County Heart Association 3.4 percent, Cerebral Palsy Association 1.2 percent, Muscular Dystrophy Association 1.5 percent, Arthritis Foundation 1.9 percent, Multiple Sclerosis Society 1.3 percent, Easter Seal Society for Crippled Children and Adults 2.2 percent, Cystic Fibrosis Association .8 percent, and (a new agency joining the plan this year) National Foundation — March of Dimes .5 percent. The reserve fund will amount to .5 percent and be distributed by the ECP committee in cases of emergency or special need.

The ECP committee reports that the National Foundation — March of Dimes agency which will become a part of the ECP on Dec. 1 makes the plan even more effective. Solicitations of Sandia employees by this agency will not be necessary. Sandians may make a "once and for all" contribution through payroll deduction.

Payroll deduction allows a small gift each month to add up to a significant contribution by the end of the year. During the years since 1957 when the ECP was

organized, the goal for individual employees has come to mean a "fair share" contribution—one hour's pay each month.

Basic message of the ECP campaign will be told to all employees through a series of group meetings. The meetings will start Oct. 6 after all employees receive letters urging their support from the ECP committee.

Currently there are 2845 employees who contribute a "fair share" each month. Average gift of the 5705 Sandians who contribute to ECP is \$51. Some 118 Sandians give one percent of their annual salary.

The agencies which use ECP funds have many, many times expressed their gratitude, citing specific cases where the funds made possible the answering of a desperate need — a wheelchair for a crippled mother, therapy for a handicapped child, care for stranded children, care for orphans, rehabilitation for alcoholics, plus many others.

Research in medical fields continues and major progress is being made. The nine other agencies participating in ECP support important medical programs on a national scale.

ECP contributors know the satisfaction of being part of this.

"When the payroll deduction cards are distributed, continue your fair share deduction," Lou Berry says. "If all Sandians made a fair share contribution, the total would be \$540,000 instead of the \$291,000 that is the current total. A fair share from all Sandians is a reasonable goal."

Message from The President



To All Employees:

If our community is to remain progressive and fully responsive to its critical human needs, then the Albuquerque UCF campaign to raise \$1,430,000 must succeed. Sandians, as responsible citizens, will contribute a significant share of this goal through our own Employees Contribution Plan. In addition to the 29 agencies of the local UCF, nine other national agencies supporting important medical research programs benefit from ECP funds.

I urge you to consider the need and to check the "fair share" selection on your payroll deduction card.

J. A. Humbert
President

'Worst Weather in the World'

Sandians Participate in Nuclear Calibration Test on Amchitka

"The worst weather in the world," says George Hansche describing Amchitka Island in the Aleutians. George, manager of NTS Instrumentation Department 9120, reports that all the Sandia preparations are complete for "Milrow," a site calibration underground nuclear test scheduled to be ready for detonation on Amchitka next month.

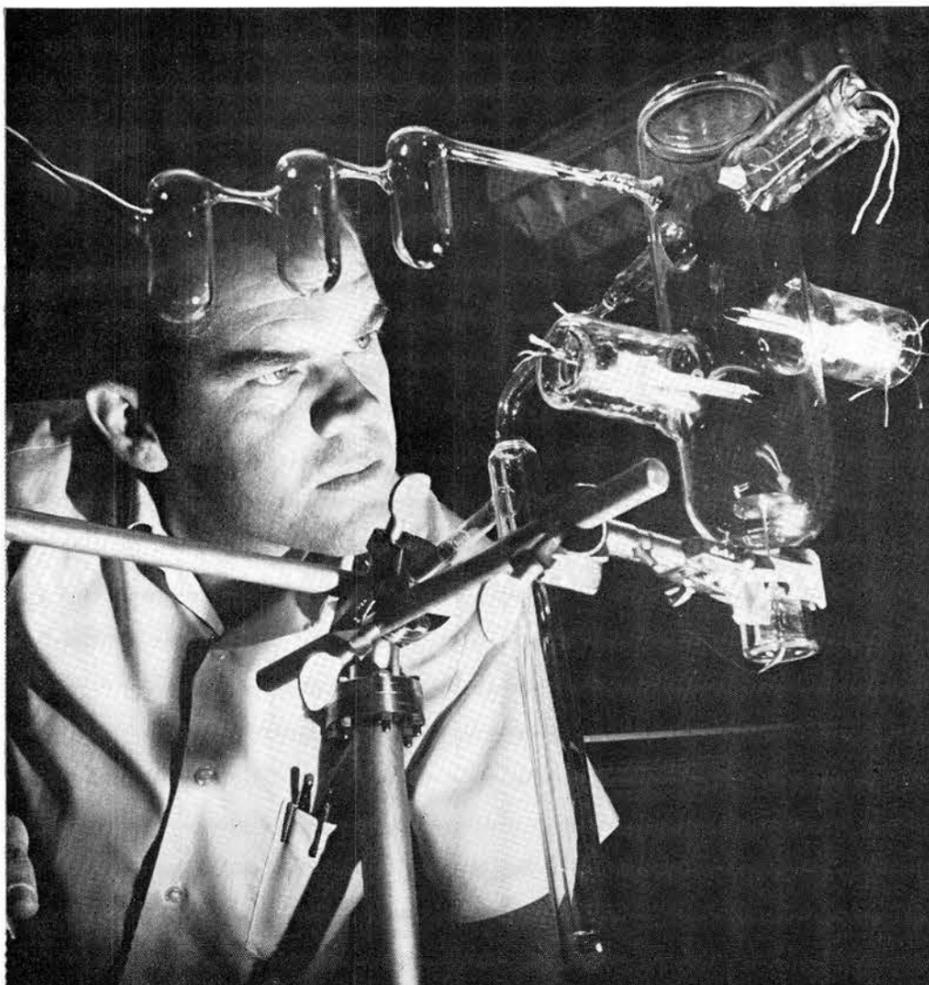
Sandia Laboratories is providing instrumentation for earth and underwater measurements of the shock wave created by the detonation. Sandia scientists will evaluate data collected by this means, and other Sandians will participate in a study of the effects on wildlife environment. One more group of Sandians will provide assistance in arming the nuclear device.

Ben Benjamin, supervisor of Instrumentation Fielding Division I, 9123, is Sandia's Test Group Director. Mel Merritt (9150) is the Test Effects Evaluation Scientist. Bill Perret (9111) is project scientist for the ground motion studies and Robert Bass (9111) is project scientist for the hydrodynamic measurements.

Two sets of Sandia instruments are now in place at the test site. The earth motion sensors are positioned on the surface at intervals from ground zero to 30,000 feet from the drill hole. These are connected to the recording trailer either by hard wire or RF telemetry link. Other ground motion instruments are grouted into position in a 4000-foot-deep satellite hole. These in-

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Thermionic Converter Offers Space Power Source



ELECTRON EMISSION rates of various metals can be measured using this plasma anode tube. Ed Burgess (5321) is studying the emission rates for different electrode materials. His contribution to the field of thermionic converters may make possible a new kind of nuclear space power source.

A Sandia advance in the field of thermionic conversion may pave the way for a breakthrough in space power systems. Provided certain heat-containing materials problems can be solved, the use of chemically vapor deposited (CVD) rhenium on thermionic emitter and collection plates (electrodes) should make possible nuclear space power generators that are twice as efficient as the SNAP generators now in use.

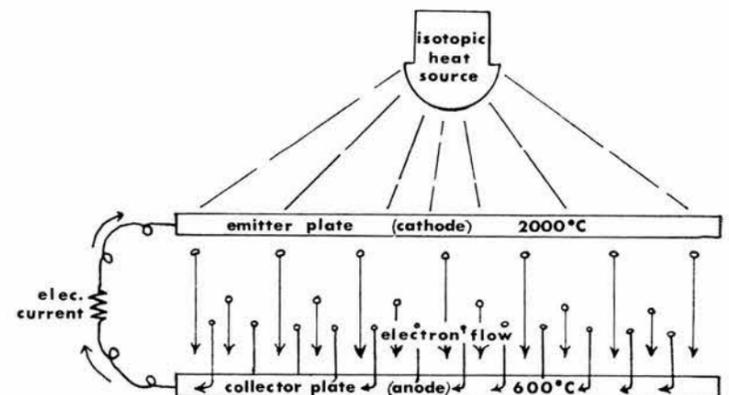
Ed Burgess, Space Power Research Division 5321, is credited with the theoretical development of the new kind of electrodes. He currently is studying the thermionic emission characteristics of various materials in alkali vapors.

In general terms, a thermionic converter works on the principle that electrons excited by a heat source can be emitted from one surface and collected on another cooler surface. Because the electrons are negatively charged, they tend to return to the original source and when the emitting and collecting plates are in some way connected, as by a wire, electrical current is produced. The amount of electrical current is a function of the amount of heat applied to the emitter plate and the subsequent emission of electrons, and the efficiency of the collector plate in absorbing the electrons.

The principle of thermionic conversion is at least half a century old. However, because of the lack of sufficiently high heat sources and the inherent inefficiency caused by electron space charge (a sort of overcrowding of electrons within a given area) thermionic conversion was generally

felt to be an uneconomical way to get electricity. Earlier materials used for the electrodes also were inefficient because they were poor emission sources and collector plates. In the mid-50's interest was renewed with the introduction of cesium and other alkali metals which overcame much of the problem of electron space charge. However, little further development took place until the present innovation by Ed.

Isotopic heat sources of sufficiently high temperatures are now theoretically possible (although materials capable of containing such heat sources are not yet in evidence). The problem of inefficiency of electrode materials has been largely solved by Ed's



concept of using CVD rhenium to coat the electrodes. CVD rhenium forms in a preferred crystalline orientation and thus tends to emit or accept electrons more readily.

As a source of electricity, thermionic converters would be more efficient than thermoelectric converters—presently used in space power systems—because their heat sources would operate at much higher tem-

(Continued on Page Two)



Jake Young



Manuel Chavez



Robert Stewart

MESSAGE FROM UNION PRESIDENTS

To All Employees:

These are difficult times for our community, its people and its United Community Fund agencies. The case loads of the service agencies are increasing. Our youth are restive and questioning. The crime rate is going up.

The 29 agencies of the UCF willingly and effectively conduct a coordinated effort to take care of the complex people problems of our community. The work of the character-building agencies such as Boy Scouts, Girl Scouts, YMCA and YWCA is outstanding. Their work must continue.

In addition, the Sandia Employees Contribution Plan enables us to contribute to the important programs of nine national agencies in a "once and for all" payroll deduction. We are solicited only once each year. We urge you to check the fair share option on your payroll deduction card during the forthcoming Employees Contribution Plan campaign.

Sincerely,

Jacob E. Young Jr.

President, Metal Trades Council, AFL-CIO

Manuel H. Chavez

President, Office and Professional Employees Union, Local 251, AFL-CIO

Robert L. Stewart

President, International Guards Union of America, Local 27



ECP Drive Workers Visit Albuquerque UCF Agencies

SANDIA'S ECP COORDINATORS recently visited two United Community Fund agencies. Above, they note methods and techniques used at the Albuquerque Hearing and Speech Center. The center offers hearing tests, lipreading instruction, auditory training, counseling, speech therapy and pre-school classes for speech and hearing handicapped children. At left, the group observes a handicapped child receiving therapy at The Rehabilitation Center, Inc. The center provides out-patient treatment for handicapped adults and children including physical therapy, occupational therapy, speech therapy, psychological services and professional medical direction. Vocational training is also offered to the severely disabled and mentally handicapped.

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THERMIONIC CONVERTER

peratures. The thermoelectric generators are limited to heat sources operating at about 1000°C while thermionic generators use heat sources operating at about 2000°C. Because the thermionic converter operates at a higher temperature, it has a higher theoretical maximum efficiency. Temperature difference between hot and cold elements of the converter is the key. In thermoelectric converters this difference is about 700°C, in thermionic converters it is closer to 1400°C.

In his current studies, Ed is investiga-

ting emission rates of electrons as a function of pressure of alkali vapor and the surface temperature of the electrodes. By working within a high vacuum system, vapor pressure and temperature can be controlled and study made of the thermionic emission efficiency of various materials.

The Space Research Division, under Read Holland, works as a research and support group for Space Power Systems Directorate 9500.

Continued from Page One

Nuclear Calibration Test on Amchitka

struments will determine the velocity and amplitude of the shock wave in the earth. Project officers for this activity are Dale Breeding and Harry Holmes (both 9123).

The second set of instruments is positioned on the ocean floor at various locations north and south of the island. These will measure water overpressures induced by the detonation. AC Defense Research Laboratories, Santa Barbara, Calif., specialists in underwater engineering, are providing the instrumentation for this project under Sandia direction. Sandia project engineer is John Dickinson (9123). Assisting on both measurement projects are Bob Holt and Larry Larson of Division 9123.

Leroy Paulson (7514) will be making

photographic measurements of any fault displacements and providing photographic coverage of wildlife environments.

Art McMullen (2624) is responsible for design of the RF telemetry system.

On-site data reduction will be provided by Tom Laney and Joe Lackey (both 7291).

Arming assistance for the nuclear device is provided by Bill Lemmon and John Fuqua (both 9123). Los Alamos Scientific Laboratory is responsible for the device.

Administrative support for the Sandia Test Group is the responsibility of Richard Andres and Charles Taft (both 4612).

Amchitka is located toward the western tip of the Aleutian Island chain. It is 42 miles long and three to five miles wide. It is approximately 1400 miles southwest of Anchorage and 800 miles east of Kamchat-

ka, Siberia. The nearest habitation is 178 miles to the east on Adak Island, and the next closest is on Shemya Island, 250 miles to the northwest. Both are U. S. military bases.

"Normal" weather on Amchitka is overcast skies, wind, rain or snow and storms. The highest temperature ever recorded on Amchitka was 65° with the lowest being 15° above zero. The average daily temperature is 39°, and precipitation is recorded 200 days of the year. Average wind velocity is 24 mph, and it comes from any direction you wish. The weather is extremely local, and conditions of fog, low ceiling, high winds and clear weather are often encountered going from one end of the island to the other.

SANDIA LAB NEWS

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CAROL JACOBS (8233-2) watches imaginative ideas of children take shape in "Play-dough." "This LEAP program is great," explains Carol.



HAZEL WILLYARD (8322-3) and Betty Barnhouse (8253-1) listen to Nursery School rhythm section. "I'm glad to see a program such as LEAP," says Betty, "where a 'once for all' contribution helps local as well as national agencies."



MRS. PATRICIA JULIETTE, RN (Valley Memorial Hospital), Sylvester Grigsby (8122), Carol Jacobs (8233-2), and Charles Landram (8335) comment on use of bedside cardioscope unit (upper left). "After seeing only the cardiac therapy and monitoring system in the hospital's Intensive Care Unit," comments Charles, "I was convinced that contributions for special equipment at the hospital would be money well spent. I was also impressed with the Stryker frame (an electrically operated bed used to change positions of a patient whose body must remain completely immobile). LEAP contributions earmarked for the hospital are being spent in a very wise fashion."

LEAP Target: 100% Enrollment

On Monday, Sept. 29, a campaign will get underway at Sandia Laboratories Livermore for employee contributions to local and national health and welfare agencies.

This year's contribution plan, however, differs from previous ones.

Under the new Livermore Employees Assistance Plan (LEAP), employees now have the opportunity to contribute to eight local and national health and welfare agencies in addition to the United Bay Area Crusade (UBAC) agencies. Twenty percent of employees contributions will be allocated to four local and four national agencies. Seventy-nine percent goes to UBAC which represents 180 agencies in the five-county Bay Area. One percent remains in reserve until year end and is then distributed according to the specific needs of a participating agency.

Meetings scheduled Monday and Tuesday, Sept. 29 and 30, for employees will explain LEAP, why the program was adopted at Livermore and how allocation of funds to the agencies was determined. In addition, a film entitled "To Build Together" explaining the needs of UBAC will be shown.



ALEC WILLIS (8335), father of a nursery-school-age son, appears to have grasped the idea of a young artist at work. "The nursery school," Alec says, "is a definite asset to the development of a child. It provides a diverse program of activities where children learn to play and interact with other children. By contributing to LEAP, children in less fortunate circumstances have the opportunity to attend this school."

LEAP Squad Leaders and Solicitors

Squad Leaders:

D. L. Werner (8120-8180), T. W. Mattson (8130-8150), G. L. Ludwig (8160-8170), W. J. Henderson (8210-8230-8261-8261-1), W. J. Young (8220), Mrs. K. C. Yung (8245-8251-8254-8262-8263), Mrs. L. M. Stamer (8252-8253-8243-8244), B. C. Odegard, Jr. (8310-8320), M. R. Birnbaum (8330-8340).

Solicitors:

Solicitors for supervision are: G. E. Brandvold, M. L. Glaze, D. J. Bohrer, O. H. Schreiber, J. F. Jones, W. T. Ryan, K. E. Finders, J. N. Rogers, C. S. Hoyle, J. L. Wilson, D. C. Stoner, R. A. Ware, K. J. Bennett, and for department secretaries, Mrs. J. F. Madsen.

8120: C. H. Stockley, Jr. (8121), R. S. Jacobsen (8122), M. C. Daley (8123), L. R. Myers (8124), L. A. Ceballos, Area 8 (8125), V. H. Pittman, 912 (8125), Mrs. H. M. Bond (8129-8129-1), M. A. LaGasca (8129-2).

8130: R. F. Schumaker (8131), R. W. Phillips (8133), O. C. Thomas (8135-8139). 8150: M. Soderstrand (8151), D. W. Putz (8153), H. B. Faires (8155), R. W. Gorman (8156).

8160: E. A. O'Brien (8161), C. A. Wackerly (8161-1), E. T. Cull (8162), D. B. Farmer (8163), J. G. Pergrossi (8164), H. E. Schoeppe, Jr. (8168).

8170: C. F. Lundbom, Jr. (8171) J. A. Jarrrell (8172), P. Hebert (8174), B. R. Sanders (8175).

8180: N. H. Cooley (8181-8184), E. J. Davis and K. L. Lange (8182), J. H. Burns (8183), J. A. Kersey (8183-1).

8210: Mrs. H. V. Petersen (8212-8212-1-8217), I. Troyky (8214), Miss M. C. O'Shea (8216-8216-1).

8220: H. O. Armijo (8222-8222-2), J. R. Grund (8222-1), R. W. Jackson (8223-8223-2), A. Cardiel (8223-1), W. D. Bonivert (8223-3), D. G. Irving (8223-5-8226-2).

8230: P. W. Dean (8231-8231-1), Mrs. M. C. Noble and Mrs. B. A. Reuland (8232), Mrs. C. J. Jacobs (8233-8233-2), W. E. Mitchell (8233-3), Mrs. M. A. Dremalas (8234).

8240: A. J. Derby (8243-8244), Mrs. B. I. Matter and C. T. Romano (8243-1), Mrs. G. A. Martin (8245-8245-4), J. N. Barnhouse, Jr. (8245-1), J. A. B. Hay, Jr. (8245-2).

8250: R. E. Wilhite (8251), L. A. Borello (8252-8252-1), C. F. Scholl (8252-2), D. M. Kasberg (8252-3), D. L. Osbourn (8252-4), T. J. Sage (8252-5), Mrs. M. E. Barnhouse (8253-8253-1), M. Monser (8253-2), J. C. Ludington (8253-3), R. L. Siglock (8254).

8260: Mrs. G. J. Ferreri (8261-8261-1).

H. V. McNabney (8262), Mrs. G. E. Patton (8263).

8310: J. P. Darginis (8311), L. H. Jones (8312), D. C. Beard (8312-1).

8320: V. K. Gabrielson (8321), H. G. Short (8322), J. G. Brazil (8322-1), J. S. Benapfl (8322-2), Mrs. H. L. Willyard (8322-3), R. H. Watkins (8323), J. D. Hankins (8324-8325).

8330: J. R. Smith (8331-8332), C. S. Landram (8335), R. C. Young (8336-8337).

8340: T. A. Dellin (8341), J. E. Hopwood (8342), J. A. Duggar (8343).

9100: C. A. Tarne (9125-1), R. W. Durkee (9132-1).

Union Representatives Endorse LEAP

BILL STADNISKY, senior business representative of International Association of Machinists and Aerospace Workers, District 115.

"The International Association of Machinists Union, called the 'union with a heart,' has participated in the United Bay Area Crusade in the past and in other worthwhile causes. Our International organization is one of the national sponsors for the Heart Association. We heartily endorse the LEAP program in the Livermore area, and want our bargaining union here at Sandia to contribute to the fullest extent. I believe there is much value in organizations working together."

AL ARELLANO, business manager, Sheet Metal Workers International Association, Local 216

"Although I feel places such as Livermore, Hayward and Castro Valley probably don't need help as much as the Oakland ghettos and other ghetto areas do, there are people in your vicinity who are needy — there's no doubt about that. The LEAP program is a good way to get employee contributions in that a part goes to help people locally."

ED LOGUE, business agent, International Association of Machinists and Aerospace Workers, Local 284

"I advise everyone to participate in the LEAP program. Not only the poor need assistance in Livermore. Others also have need to use the agencies. The Retarded Children's Association — now a UBAC-funded agency — has always had a top-notch program. But belonging to UBAC lets their people devote more time to the centers instead of running fund drives. Retarded children from Livermore-Amador Valley now receive care in the Valley. Formerly, the closest help was in Hayward."

LIVERMORE NEWS

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SANDIA LAB NEWS

SEPTEMBER 26, 1969

Charles Drummond Knows Meaning Of Community Help After Fire

Gratitude is a word Charles Drummond (8162) uses in its truest sense.

His expressions of appreciation go to Sandians and others in the Livermore community who helped him when he needed it most.

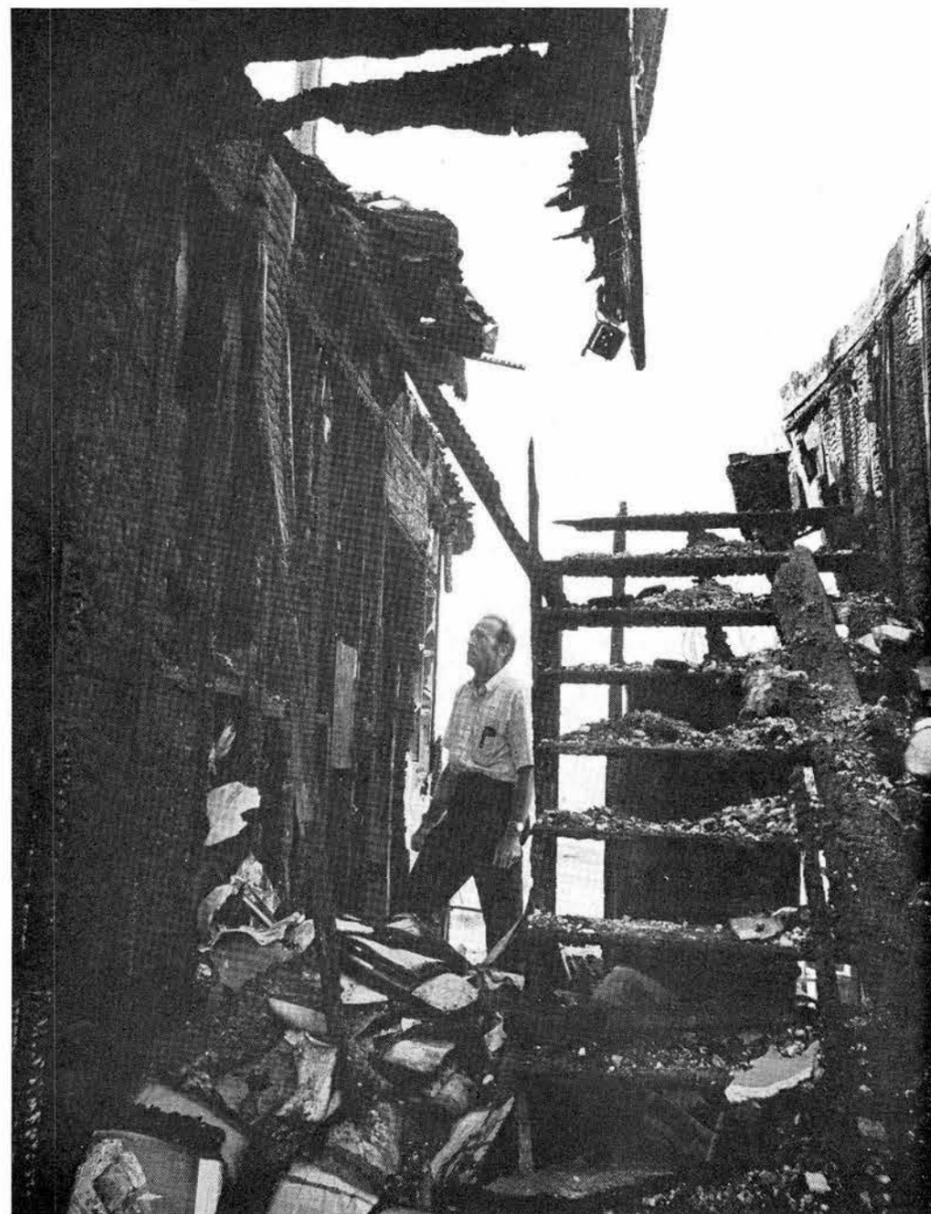
Fire recently destroyed the family home Charlie had worked seven years to complete. With it went all possessions.

Today, the Drummond family is together again in another home using the furnishings, clothing and services provided by people who came to their aid. Three agencies helped the Drummonds — Livermore's

Emergency Fund Center, the Salvation Army and the American Red Cross. All will receive funds from the contributions Sandians make to the Livermore Employee's Assistance Plan (LEAP).

"Frankly," says Charlie, "we were overwhelmed with the magnanimous expressions of sympathy over the death of our son and then the loss of our home and belongings from a devastating fire. Our heartfelt thanks go to each and everyone who helped."

Death claimed his 12-year-old son, Deanne, nine days before the fire.



CHARLES DRUMMOND (8162) stands amid ruins of his home recently destroyed by fire. Home and all possessions in it were a total loss. Through help of Sandians, other people in the Livermore community and three agencies supported by Sandia's LEAP contribution plan, the Drummonds are together again in another home.



OIL PAINTING PURCHASE PRIZE at the New Mexico State Fair art show went to Gordon Snidow (3417) for this Western scene "The Weighing Gate." In June, a preliminary charcoal sketch of the central figure won a second prize at the Fourth Annual Cowboy Artists of America Show. Gordon also took first place in the sculpture division at the Fair.

Montage of Photomicrographs Wins International Meet Award

A second place ribbon for a montage of photomicrographs of a borsic-filament reinforced aluminum alloy was awarded Phil Apodaca and David Schuster (both 5314) during the recent Second Annual International Metallographic Society meeting, held in San Francisco.

The 14 separate photos are a 25x magnification of the cross-section of the alloy after the sample was impacted from one side. The specimen shows dynamic tensile fracture and borsic filament damage.

The photos, taken using a metallograph, clearly show the tungsten cores, the vapor deposition of boron, and the silicon carbide outer coating of each fiber. Phil employed a technique to polish the sample that revealed the cracks; this is described in SC-Tech Memo 69-26 authored by Phil, David, and Wayne Cyrus (also 5314).

These experiments, related to the dynamic fracture characteristics of composite materials, are being conducted in cooperation with Ray Reed and others of Shock Wave Phenomena Division 5163.

Members of Photographic Services Division 3455 and Technical Art Division 3417 assisted in preparing the winning montage.



MONTAGE of photomicrographs showing impact damage to an alloy won second place for Phil Apodaca (shown here) and David Schuster (both 5314) during competition at the recent Second Annual International Metallographic Society meeting.

Authors

D. E. Amos (1722), "On Computation of of the Bivariate Normal Distribution," Vol. 23, No. 107, **MATHEMATICS OF COMPUTATION**.

F. G. Blottner (9341), "Electron Number Density Distribution in the Laminar Air Boundary Layer on Sharp Cones," Vol. 7, No. 6, **AIAA JOURNAL**.

R. B. Pope (1543), "Stagnation-Point Heat Transfer in Arc-Heated Helium and Argon," Vol. 7, No. 6, **AIAA JOURNAL**.

B. M. Butcher (5161) and C. H. Karnes (5165), "Dynamic Compaction of Porous Iron," Vol. 40, No. 7, **JOURNAL OF APPLIED PHYSICS**.

T. H. Martin (5245), "Design and Performance of the Sandia Laboratories Hermes II Flash X-ray Generator," Vol. NS-16, No. 3, **IEEE TRANSACTIONS ON NUCLEAR SCIENCE**.

W. J. O'Sullivan (5151) and J. E. Schirber (5150), Addendum to Experimental Determination of the Effect of Hydrostatic Pressure on the Fermi Surface of Copper: Zero-Pressure de Haas-Van Alphen Frequencies," Vol. 181, No. 3, **PHYSICAL REVIEW**.

J. W. Poukey (5243), "Expansion of a Plasma Shell into a Vacuum Magnetic Field," Vol. 12, No. 7, **PHYSICS OF FLUIDS**.

Albert Narath (5100) and H. T. Weaver

(5151), "Impurity Nuclear-Magnetic-Resonance Shifts and Spin-Lattice Relaxation Rates in Al:V, Al:Cr, and Al:Mn," Aug. 4 issue, **PHYSICAL REVIEW LETTERS**.

K. R. Prestwich and D. L. Johnson (both 5245), "Development of a 18-Megavolt Marx Generator," Vol. NS-16, No. 3, **IEEE TRANSACTIONS ON NUCLEAR SCIENCE**.

R. W. Rohde (5133), "Equation of State of Shock-Loaded Tungsten at 950°C," Vol. 40, No. 7, **JOURNAL OF APPLIED PHYSICS**.

W. S. Saric (9343) and K. J. Touryan (9340), "Incompressible Magnetohydrodynamic Entrance Flow in a Plane Channel," Vol. 12, No. 7, **PHYSICS OF FLUIDS**.

K. L. Shipley (9342), "Comparative Study of Diatomic Partition Function Calculations," Vol. 40, No. 7, **JOURNAL OF APPLIED PHYSICS**.

M. R. Scott (5222), R. C. Allen and G. M. Wing (both University of New Mexico), "Numerical Solution of a Certain Class of Nonlinear Two-Point Boundary Value Problems," Vol. 4, page 250, **JOURNAL OF COMPUTATIONAL PHYSICS**.

F. W. Bingham (5232), "Delayed-Coincidence Study of $0^+ + \text{Ar}$ Collisions at 50-200 keV," Vol. 182, No. 1, **PHYSICAL REVIEW**.

Supervisory Appointments



JOHNNY DUNCAN to supervisor, Radiation Projects Division 2564, effective Sept. 16.

Johnny joined the Electronic Components Development Division in 1962 where he did capacitor development work. In 1964 he transferred to Microelectronics Division to work in the fields of thin film technology and hybrid circuits. In 1965 he joined the Radiation Effects Division and has been studying radiation effects on small electronic components.

He has a BS degree in EE from Oklahoma State University and an MS, also in EE, which he earned at UNM while studying under the Technical Development Program. He has taken some post-master's work at UNM.

Johnny is a member of the IEEE. In 1957 he spent six months on active duty with an Army Reserve unit.

Johnny, his wife Kerin, and their two sons live at 9536 Shoshone Rd., NE.



BOB GREGORY to supervisor, Radiation Effects Division 2653, effective Sept. 16.

In 1963, Bob joined the Radiation Physics Division and has stayed with that group until his present promotion. He has been studying the effects of radiation on semiconductor materials and devices and investigating the electronic properties of defects induced in silicone by fast neutron, electron, and gamma ray bombardment.

As a visiting associate professor at Carnegie-Mellon University Bob holds a joint appointment with Sandia and C-MU. Under this arrangement, he spends about 80 percent of his time here and 20 percent at the University.

He has BS, MS, and PhD degrees in electrical engineering from the Carnegie Institute of Technology (now Carnegie-Mellon).

He is a member of the American Physical Society and is a member and past officer of the local chapter of IEEE.

Bob, his wife Margaret, and their two daughters live at 1614 Bayita Lane, NW.



GEORGE PERKINS to supervisor, Applied Research Division 2613, effective Sept. 16.

George first joined Sandia in 1958 and worked as a computer programmer until 1962 when he returned to school to get a PhD. Returning to Sandia in 1965, he was assigned to the Physics of Organic Solids Division where he studied the delayed fluorescence of X-ray excited anthracene crystals. Later he transferred to the Physics and Technology Division and did research on the formation and properties of thin film dielectrics and has also worked for a brief period in the Materials Research Division.

He has BS and PhD degrees in chemistry from UNM.

George is a member of the American Physical Society and the American Association for the Advancement of Science.

George, his wife Barbara, and their two children live at 3425 Florida NE.



DAVE WEINGARTEN to supervisor, Microcircuit Applications Division 2631, effective Sept. 16.

In 1957, Dave came to Sandia and the Electronics Development Division where he has pursued radar development and electronic component design. He has been with that division until his present promotion.

He has a BS degree in electrical engineering from the University of Wisconsin and has done graduate work at UNM.

From 1949 to 1953 Dave was a Navy electronics technician and served at the Key West and Great Lakes Naval Stations.

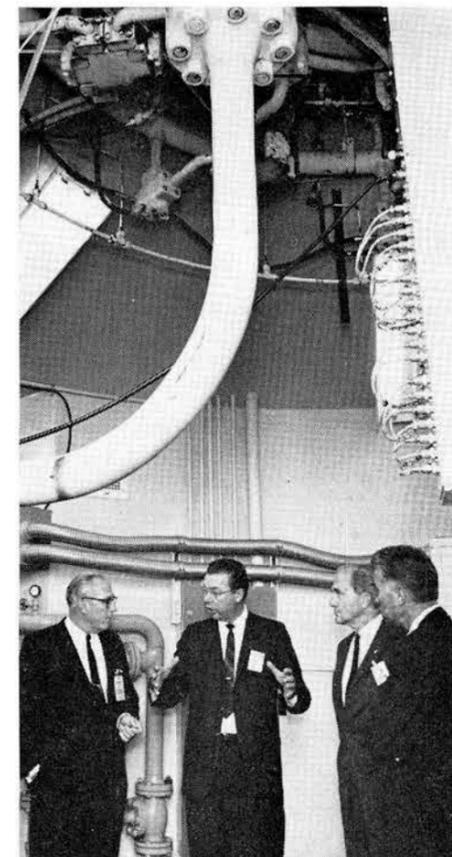
Dave, his wife Joan, and one child live at 12413 Placid N.E.

French Colloquium On Pressure Studies

Several Sandia technical papers were presented at the Colloque International Du CNRS on the Physical Properties of Solids Under Pressure, held Sept. 8-10, in Grenoble, France.

Jim Schirber (5150) was chairman of a session and presented an invited paper, co-authored with Bill O'Sullivan (formerly 5151), which was entitled "The Effect of Hydrostatic Pressure on the Fermi Surfaces of the Noble Metals." A second paper, which Jim co-authored, "Pressure Studies of the Fermi Surface of Thallium," was presented by scientists from the University of Maryland.

Rick Wayne (8331) presented "High Pressure Study of Very Weak Itinerant Ferromagnets: ZrZn_2 ." This paper was written with Roger Edwards (5131).



AEC COMMISSIONER Dr. Clarence Larson received a behind-the-scenes look at Sandia's underground centrifuge during a recent tour of facilities here. (Left to right) Dr. Larson; Max McWhirter, manager of Systems Environmental Testing Department 7320; H. C. Donnelly, manager, AEC/ALO; President John Hornbeck.

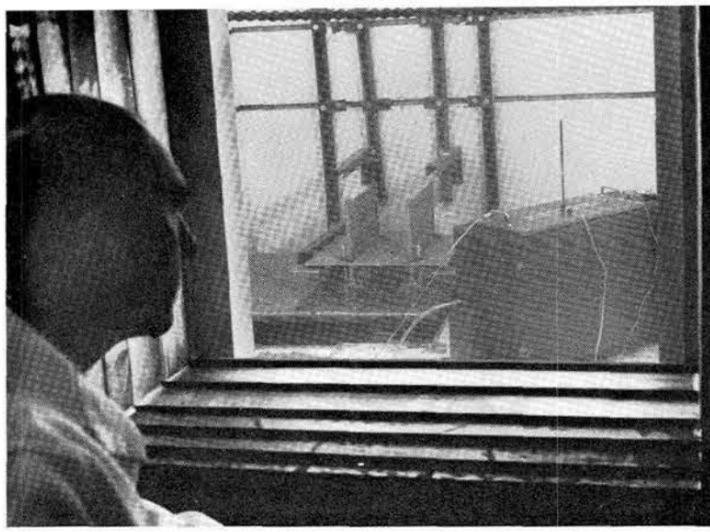
Sam Is Not Santa

A Sandian who drives a 1962 Olds station wagon and parks in the lot south of Bldg. 894 probably thinks Santa Claus came a little early this year. However, it's all a mix-up and the 17-inch Silvertone TV set he found in his car a few days ago really belongs to another Sandian who also drives a 1962 Olds station wagon and parks in the lot south of Bldg. 894.

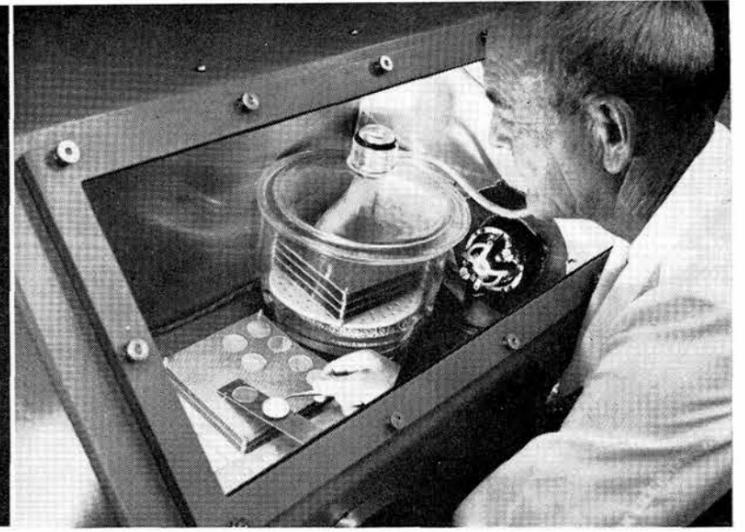
And, Sam Blaylock (4573) would like to have his TV back.

The snafu occurred when a TV repairman was supposed to deliver the set to Sam's car. He delivered the set alright, only it wasn't to Sam's car but to another just like it.

So if anyone has a twinge of conscience while watching "Laugh-In," he can return the set by calling Sam at 264-6275 or 1-865-7770.



MARCEL REYNOLDS (1742), project group leader, observes bacteria samples (inside portable oven) being irradiated by gamma rays from Sandia's Cobalt 60 source in Area V. The source is stored under the surface of a pool, raised for radiation-exposure experiments.



BACTERIA TEST SAMPLES in Sandia Laboratories sterilization study are prepared by sandwiching four bacteria-laden foils between two strips of aluminum. The samples are prepared in a heat and humidity controlled environment, then are removed and suspended in an oven prior to exposure to heat and radiation.

Numerical Systems IMOG Symposium Held at Sandia

About 100 members of the Interagency Mechanical Operations Group (IMOG) on Numerical Systems were at Sandia Laboratories last week attending a symposium on use of small computers for data acquisition and process control.

Three technical presentations were made by Sandians during the two-day meeting. Ron Hayenga (2451) discussed "Computer Applications in Test Systems." James Mason (2454) presented "Use of Control Computers with Commercially Available Measurement Systems." Glenn Elliott (2454) discussed "Time Sharing Systems and the Small Digital Computer."

Dick Bice (7000) welcomed the delegates to Sandia.

Gene Emerson (7624), chairman of the IMOG Numerical Systems Group, also served as chairman of the symposium.

Unexpected Safety Award For Sandians in Nevada

"It came as a big surprise to me" is the way Sam Moore, manager of Tonopah Test Range Department 7370, describes the Award of Merit received from the Nevada Industrial Commission for a "fine safety rating."

The letter from Ralph Langley, director, Department of Industrial Safety, cites Sandia for "maintaining an efficient experience rating in the field of industrial safety. Your name appears in the top 100 employers in this state (Nevada)."

The safety rating is based upon performance in the years 1965-68.

National Fire Prevention Week Will Be Observed at Sandia Oct. 5-11

Fire fighting demonstrations, films, posters and displays will highlight National Fire Prevention Week activities at Sandia Laboratories Oct. 5-11. The program is being coordinated by Plant Engineering Planning Division 4551.

Demonstrations of fire fighting techniques will be held for fire team captains, fire prevention film showings will be scheduled, posters and displays will be abundant throughout the Laboratories and fire prevention literature will be distributed. Fire drills and building inspections will also be held during the week.

Sandia is joining organizations throughout the nation in observance of Fire Prevention Week. The week marks the anniversary of the Great Chicago Fire in 1871, a disaster which took 250 lives, destroyed 17,400 buildings and cost \$168,000,000.

Statistics show that fires in the United States claim 7423 lives each year. A staggering \$2,116,000,000 in property destruction is incurred.

At Sandia Laboratories this year, the property damage resulting from eight fires amounts to \$446. Three of these were grass fires and one was a fire in a wastepaper basket. Largest single fire damage resulted from a blaze in Bldg. 904 which occurred after a control circuit transformer malfunctioned. This one cost \$363.

"The point is," says Vern Duke (4551), fire prevention engineer, "that fires do occur at Sandia Laboratories in spite of our comprehensive prevention program

A Clean Clean Spacecraft?

Heat Plus Radiation May Be Answer

Scientists in Planetary Quarantine Department 1740 believe they have discovered an improved method of spacecraft sterilization.

The new method, which involves the simultaneous application of heat and radiation, is being developed by a project group headed by Marcel Reynolds (1742). Division supervisor is Willis Whitfield; department manager is Jack Sivinski. Tom Burford (1700) had the original idea on which the studies are based.

The new sterilization technique results from the synergistic effect of combining heat and radiation — applied simultaneously they are much more effective in killing bacteria than when used singly or in sequence.

The technique has not yet been tested against a full range of bacteria, but in extensive experiments with *Bacillus subtilis*, a standard test control organism resistant to heat, the technique has shown two advantages over separate or sequential application of heat and/or radiation:

- (1) Sterilization time is greatly reduced — by two-thirds in some tests; and
- (2) Much lower levels of radiation and heat are required to kill the bacteria.

Limited tests on two other types of bacteria — *Bacillus pumilus* and *Streptococcus faecium* — have shown similar results.

In tests with *Bacillus subtilis*, the application of 150,000 rads of gamma radiation in conjunction with dry heat at 221°F kills the bacteria in about 12 hours. Without radiation, dry heat at 221°F for 40 hours is required to kill the bacteria.

Spacecraft are presently sterilized for 60 hours at 257°F (no radiation is used);

the synergistic effect of heat and radiation would thus reduce the temperature and sterilization time substantially if the new technique proves effective against a broad range of bacteria.

The new method would also be useful in those cases where it might be desirable to increase the level of heat and reduce the time needed for sterilization since a combination of 150,000 rads and heat at 257°F would kill the bacteria in about two hours.

The 150,000-rad dosage (a dental x-ray produces a radiation dosage of about one-half rad in tissue) is also significantly lower than the 5-million rads normally required to sterilize by radiation alone.

The reduced levels of radiation and heat are particularly important in spacecraft sterilization because many components — silver zinc batteries, tantalum capacitors, etc. — become less reliable after being subjected to prolonged, high levels of heat and/or radiation or they may cease to function altogether.

Components have become increasingly heat resistant, but even the modest decrease in sterilization temperatures from 257°F to 221°F should significantly improve reliability. The 150,000 rads of gamma radiation is substantially below the level at which component damage normally occurs.

The lower levels of heat and radiation

Plasma Papers Given at Bucharest Meeting

Two technical papers co-authored by Kenell Touryan (9340) were presented at the Ninth International Conference on Phenomena in Ionized Gases, which was held Sept. 1-6 in Bucharest, Romania.

The papers were entitled "Theoretical Investigation of Momentum and Energy Transfer Frequencies in Two Temperature Plasmas" and "Development of a Modified Chapman-Enskog Solution of the Lenard-Balescu Equation for Two-Temperature Plasmas."

Both presentations were made by the other author, Prof. William Everett of the University of New Mexico nuclear engineering department.

would also appear to make the new technique of potential value in the manufacture or processing of such consumer products as food, drugs, and medical supplies.

It is known, for instance, that high radiation levels — in the 5-million rad range — impart an undesirable taste to fish, and in some instances cause it to become mushy. Fresh fruit may likewise be affected — the texture and color of strawberries are altered after exposure to high radiation levels.

Radiation for the Sandia experiments is produced by a cobalt gamma ray source. Bacteriological samples are placed in a portable oven and are given varying doses of radiation by changing the distance between the oven and radiation source.

Exposure times are varied by removing the radiation source and withdrawing the foil-mounted bacteria samples. The samples can be safely handled immediately after being irradiated since gamma rays leave no residual radiation.

Future studies involve tests with a broad range of bacteria. Different environmental factors will also be investigated, and an effort made to determine why the combination of heat and radiation is so effective.

Sandia's Planetary Quarantine Department was established in 1966 to conduct various studies for NASA. The relationship with NASA grew out of Sandia's development of the laminar air flow concept, now widely used in industry for the control of airborne contamination. Inventor of the concept is Willis J. Whitfield, supervisor of the Planetary Quarantine Systems Support Division 1742 in which the new sterilization technique is being developed.

Aerothermodynamics Men At European Meetings

Two members of Sandia's Aerothermodynamics organization were in Europe this month attending technical meetings.

Bill Pepper (9324) presented a paper, "Parachute Design and Performance for Supersonic Deployment and for the Recovery of Heavy Loads," at the AGARD Aerodynamic Deceleration Systems Symposium held Sept. 15-19 at the Technical University in Braunschweig, Germany.

Warren Curry (9322) attended the Supersonic Tunnel Association meeting held Sept. 17-19 at the Swedish Aeronautical Institute (FFA) in Stockholm, Sweden. Randy Maydew (9320) is president of this association but was unable to attend the meeting.

Warren gave a talk on "The Electrically-Heated Mach 13.5 Addition to the Sandia 18-inch Hypersonic Wind Tunnel."

Congratulations

Mr. and Mrs. Burt Edwards (9223) a son, Gregory Milton, Sept. 12.



JUDY HAWBAKER (3428) displays posters.

and built-in automatic sprinkler systems and alarms. A truly successful fire prevention program can only be achieved through the cooperation of all employees."

Promotions

- Jimmy Ackerman (8245) to Stock Analyst
- Ernest Aguilar (9411) to Messenger (Computing)
- Lamberto Baca (7512) to Stockkeeper (Instruments)
- Cherry Lou Burns (3432) to Staff Member Administrative
- Richard N. Chavez (3428) to Mail Clerk (Carrier)
- Mary Davis (3512) to Investigator (Documents)
- Ernest Duran (3428) to Mail Clerk (Carrier)
- Kathleen Gabaldon (3255) to Typist Clerk
- Gabriel Garcia (7631) to File Clerk (Drawing Files)
- Jean Gentry (3256) to Secretarial Steno
- Eloy Giron (9411) to Computer Facilities Clerk
- Linda Sue Gurule (3523) to Service Clerk (Security)
- Paula Hammond (8156) to Secretarial Steno
- Evelyn Harris (3256) to Steno Clerk
- Rachel Hill (4140) to Secretary
- Linda Knowles (8341) to Secretarial Typist
- Stanley Landrith (4210) to Staff Member Administrative
- Eileen Leighton (8331) to Secretarial Steno
- Charlotte Marks (4333) to File Clerk
- Juan Montoya (9411) to Computer Facility Operator
- Sheila Mottern (3256) to Secretarial Steno
- Jose Ortiz (9411) to Computer Facilities Operator
- Richard Orzel (9411) to Computer Facilities Operator
- Gilbert Padilla (4251) to Staff Assistant Technical
- Martha Padilla (3256) to Secretarial Steno
- Melquiades Salazar (9411) to Messenger (Computing)
- Filiberto Sanchez (4517) to Oiler
- Ronnie Stone (7632) to Reproduction Service Clerk (Micro)
- Helen Temperly (4135) to Accounting Clerk
- Carol Trask (7340) to Secretary
- Mary Ward (7651) to Staff Assistant Drafting
- Dorothy Welch (2490) to Secretary
- David White (8222) to Laborer (Vehicle Operator)
- Shirley Wilson (8243) to Service Clerk (Purchasing)
- William Huntsman (3511) to Staff Member Administrative
- Signa Mathews (8243) to Order analyst



FREEZE-DRY EQUIPMENT, newly installed in Ceramics Laboratory 4222-1, represents a recently developed process for drying slurries of ceramic materials. The machine, operated by Joe Smith, can process several trays of slurry at one time, and uses a system of quick freezing and sublimation to extract moisture. It is capable of removing 50 pounds of water from each batch of material. Similar machines are used for production of freeze-dried coffee, strawberries and other food products. Use of freeze-dry processes for ceramics was first investigated at Sandia Laboratories by Ceramics and Surface Physics Division 5332.

Take Note

Entries are invited for the New Mexico Dachshund Club AKC sanctioned match Sunday, Oct. 5, at 1:30 p.m. on the Winrock East Mall, according to Bob Gray (2615). Classes are puppies, American bred, open, and junior handling with any pure bred dachshund eligible. Entry fee is \$1. Additional information is available from Bob, tel. 265-1363.

Academic Press has just published the first of a seven-volume series of reference books called "Methods in Microbiology." It includes a chapter on principles and applications of laminar-flow devices written by Jack Sivinski, manager of Planetary Quarantine Department 1740, Willis Whitfield (1742), inventor of the laminar-flow cleanroom concept, and others.

The book is described as a comprehensive reference work for a field which has developed rapidly in the past 20 years. Until now, many of the technical methods have been described only in scientific journals. Each chapter includes a brief discussion of the theoretical background to the procedures described.

Retiring at Livermore



Roy Adams, a staff assistant in Mechanical Design Drafting Section 8252-1, retires this month after more than 13 years at Sandia Laboratories Livermore.

He has been in the drafting organization the entire time and during the past five years has been assigned to the Environment Test Division. Previously, he was assigned to the preliminary design organization.

Mr. and Mrs. Adams have two children and four grandchildren living in the Bay Area. The Adamses will close their apartment in Livermore and move permanently to their home at 2630 Ortega Street, San Francisco, which they have owned and lived in on weekends for 10 years.

Roy says he is really looking forward to his retirement and already has a good number of things on the agenda. "First, my wife and I will be traveling quite extensively — we plan to travel at least one month out of each year. In October we'll be going to British Columbia, next year to Expo '70 in Japan, the following year to Italy, and in 1972 to Munich for the Olympics. That's about as far ahead as we've decided definitely."

In addition to a part-time job doing lab work for his son's optometry office, Roy will also be working to develop a few ideas he's been mulling around in his mind for some time. "I've never had the time before, but I'd like to apply for patents on several of my ideas. One involves low atmosphere growth of plants which may be adaptable to conditions found on the moon or other planets.

"So you see, it appears I'll be keeping pretty busy and certainly won't have much time to spare," he comments.



EARLY GRADUATION from the electronics apprenticeship program was granted to Bill Roady (4231-1), right, because he earned straight "A's" in theory and related subjects. Bill, who was graduated three months early, is now studying for his BS in electrical engineering at UNM under the Educational Aids Program. Jim Reck, supervisor of the Electronics Apprentice Section 4231-4, discusses electronics problems with Bill.

Applications Being Accepted for 1970 DSP Participation

University Relations Division 3134 is now accepting applications for Sandia's 1970 Doctoral Study Program (DSP). Candidates selected this winter will begin their programs under DSP support in September 1970. Under the program, a person selected remains on roll, at reduced salary, for the length of time (up to three years) required to obtain his doctoral degree.

To be considered, candidates must be MS-level employees of exceptional merit and ability whose personal characteristics, past job performance, and academic history give promise of outstanding success at Sandia at the doctoral level.

Although nominations to the DSP are made by Directors, each candidate must submit an application form and program schedule to Division 3134. Candidate applications and Directors' letters of nomination should be submitted as soon as possible to ensure availability of all required documents and information by December 1969. Application materials and additional information may be obtained from D. J. Hosterman (3134), ext. 4-5862. At Sandia Livermore, contact J. A. Smith (8214), ext. 2251.

Variable Annuity Unit Value	
September 1, 1969	1.564
August, 1969	1.664
Average 1968 Value	1.647

Heads Medical Services Department

Dr. Paul Mossman Joins Sandia Labs

Dr. Paul Mossman joined Sandia Laboratories Sept. 1 to head a new organization in the Medical Directorate 3300 — Medical Services Department 3340.

For the past six years Dr. Mossman worked in industrial medicine with the Arabian American Oil Company (Aramco) in Dhahran, Saudi Arabia.

"It was an exciting place," he says, "but I had to return to the States when my four youngsters started reaching high school age. Aramco provides excellent schools but they end after the ninth grade."

Dr. Mossman is also excited about working at Sandia. His specialty, preventive medicine, is being emphasized in Sandia's medical program.

After a number of years as a general practitioner, Dr. Mossman returned to earn a MPH degree in preventive medicine from the University of California in 1963. He practiced near Sacramento six years previously.

He was a medical officer in the U.S. Army in 1951-54 stationed in Germany. He earned his MD degree from George Washington University in 1949, interned at the New York City U.S. Marine Hospital and completed his residency in general medicine at San Mateo, Calif.

Dr. and Mrs. Mossman with their two sons and two daughters reside at 4808 Madison Ct. NE.



Dr. Paul Mossman

—heads Medical Services Department 3340—

Death



Anita Poteet, an order analyst in Purchase Service Division 4337, died Sept. 21 after a long illness. She was 52.

She had worked at Sandia Laboratories since October 1953.

Survivors include her husband, three daughters and 3 grandchildren.

So Be A Pretzel

Yoga A Fun Thing, Relaxing

It's difficult to convince anyone it's restful to stand on your head until they actually try it. On gravity alone, the head stand is bound to improve your blood circulation — at least in your head.

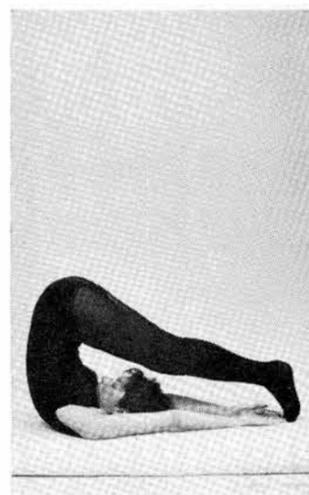
True followers of physical (hatha) yoga find it relaxing and feel that the necessary mental control leads to meditation (raja) yoga. Lou Sanchez (3256-4) started taking yoga lessons at the YWCA a year ago with some of her friends and is already sufficiently advanced to make the intricate stands and positions appear easy.

Lou says, "I had heard it was a good form of exercise. The movements are done very slowly and there are frequent rests. As a result, I've never felt any muscle strain or stiffness the following day. Yoga im-

proves your muscle tone greatly."

Despite appearances, you don't need any acrobatic ability to become expert at yoga, but you do have to practice. Lou does her yoga exercises for about 15 minutes in the morning and evening.

The "Y" yoga instructor is Dee Frauen-glass (wife of Harvey, 3412). The beginning class meets Tuesdays from 7:30-9:30 p.m. and the intermediate class meets Mondays from 7:30-9:30 p.m., both at the downtown Y (4th and Coal SW). A daytime class for women meets Thursdays from 9:30-11:30 a.m. at the Albuquerque Boys Club, 3333 Truman NE. All are 10-week courses which have just started and there may still be openings. For information call the YWCA, 247-8841 or 247-9372.



"The Plough"



Half head stand



Shoulder stand

25 Years



Ray Powell
3000



James Gravin
2000



John Hatcher
4511



Harold Rarrick
3312



Bill Ryan
8243



Harry Clay
4573



Robert Higgins
7600



H. C. Sealey
3520



Tom Dadian
8312



Mike Lettrich
8243



Norman Smith
4622



Frank Francis
5333



Franklin Loomis
7432



Robert Vermillion
4232



Edgar Frasher
2641



Kenneth Overbury
7251



Charles Wells
2492

15 Years



Henry Aira
4622



Jesse Bozone
7433



James Brewer
7424



Emilio Chavez
3520



John Malpas
4254



Walter Myers
4211



Herman Nieto
4573



Jerome Rynders
2355



Frank Suazo
4574



Pete Wakeland
9200



Howard Wicke
1721

10 Years

Robert Mcrmon 8121, Larry Larson 9123, Elsie Curkendall 1612, Juan Pacheco 4517, Richard Bem's 2454, James Gilbert 5332, David Davis 5525, Alfred Bouton 7283, and Bobby Allen 8253.

Service Awards

20 Years

Travel Trailer Club to Rally

It will be travel trailers "en masse" at the Oak Flats campground in the Sandias next weekend as several dozen of the pleasure craft on wheels converge on the site for the annual fall rally of the International Travel and Trailer Clubs of America.

Some 35 Sandians are members of the organization and many will be present for the two-day outing. Included are the Governor of the New Mexico chapter, Bill Albert (4252), and Lt. Gov. Jack Elder (4257) who also is the state representative to the board of directors of the international organization. Another Sandian, Bob Sylvester (5439), is past New Mexico director.

Purpose of the ITTC, which is an association of local clubs, is to coordinate activities of member organizations, to promote creation of campgrounds and to improve existing ones, to encourage safety and consideration for others while on the road and in campgrounds, and to review taxing and licensing laws.

Because the group has shown a regard for cleaning the camp areas after use, the U. S. Forest Service has granted the use of the Oak Flats area, previously closed to group camping.

In future months, the group will sponsor a "clean up-camp in" in the Sandias where members will spend the weekend cleaning up various camp sites.

Jim Leonard Wins (Again) SEGA Tourney

Jim Leonard (9521) walked off with another Sandia Employees Golf Association tournament championship recently. Jim has won at least one SEGA tournament a year since 1959, sometimes as many as four tourneys in a single year. The tourney, played Sept. 7 at Arroyo del Oso, drew 86 participants.

Jim shot an even par 72 to take the low gross honors. Tony Repetti (2615) won the low net trophy with 66.

Vic Sirwinski (2444), John Moyer (9251), and Frank Muller (7425) were other flight winners.

Art Littleford (2444) made his first hole-in-one during the tournament. He hit a five iron on the 173-yard, par 3 fourth hole.

Cal Brewster (9221) and Mel Vick (9425) were tournament co-chairmen.

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SANDIA LAB NEWS

SEPTEMBER 26, 1969

SHOPPING CENTER

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CLASSIFIED ADVERTISING

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

RULES

1. Limit: 20 words
2. One ad per issue per person
3. Must be submitted in writing
4. Use home telephone numbers
5. For Sandia Laboratories and AEC employees only
6. No commercial ads, please
7. Include name and organization
8. Housing listed here for rent or sale is available for occupancy without regard to race, creed, color, or national origin.

FOR SALE

MISCELLANEOUS

WOLLENSAK TELESCOPE, 15-20-30-40 power w/ leather case, tripod adaptor for spotting scope use, \$20. Siegrist, 299-3088.
SILVERTONE CONSOLE TV, 24" black and white, mahogany finish, six speakers, power tuning, cost \$297.95, sell for \$75. Stark, 299-5953.
12' ALUMINUM boat, V-type, \$90; 3hp Evinrude boat motor, \$50; girl's bicycle, 20", \$10; 3hp Clinton gasoline engine, \$20; chrome unicycle, \$20. Everett, 264-9133.
BROWNING 264 Magnum with 3-9x Leupold scope; 308 Norma Magnum with 4x Lyman scope. Boyes, 299-2569.
BALDWIN SPINET organ 54A, 93 keys, 19 stops, self-contained amplification system, dual speakers, two years old, \$1195. Stephens, 299-0325 after 5:30.
8-QT. PRESTO canner; wide and narrow mouth quart jars with ring tops. Drury, 898-0667 after 6.
CUSTOM INBOARD runabout, 12' LOA, 70hp, 6-cyl. engine, \$250 or trade for aluminum fishing boat and motor. Meikle, 299-4640.
POODLE PUPPY, silver beige miniature male, registered, excellent pedigree for stud and pet. Aronson, 268-7109.
DOUBLE BED incl. mattress and box springs, \$35; heavy duty work bench, 3 ft. x 8ft., \$8; lawn mower, 20" reel, \$18. Bemis, 296-1305.
TRAILBIKE, 1967 Honda w/ street and trail sprockets plus extras, \$250. Arthur, 299-1802.

PUMP AND TANK, 1/2hp Peerless pump with 40 gal. pressure tank and all piping and valves, \$50. Meyer, 344-3094.
LUDWIG snare drum with stand, case and practice pad. Poulsen, 268-7437.
BROWNIE UNIFORM, size 7 including belt, tie, hat and knee socks, \$3. Allen, 268-3654.
COMPLETE SKI RIG: 14' boat, 40hp Mercury, skis, rope, tilt trailer, \$490. Dowd, 268-7865.
FREE KITTENS, black, two months old, female. Frauenglass, 265-7372.
BICYCLE, 3-speed, 26", \$15. Billy Kinsley, 299-1226.
WALNUT DESK, \$10; 3 x 5 card files, \$1 and \$2; 4-drawer filing cabinet, \$8; man's 26" bike, \$15. Sluyter, 298-5844.
VOLKSWAGEN snow tires, \$25 for pair; Judson supercharger for MGTD, \$50. Hansche, 255-2878.
BROWN/BEIGE dining set, round table with formica top, 4 swivel chairs, \$50. Downs, 265-9923.
ANTIQUE GREY five drawer chest, bunk bed and springs with bunkie (custom built), \$35. Wilkins, 299-4926.
NMMI dress uniform, size 38, dress hat 7 1/4, dress shoes size 9; formal uniform with cummerbund, same size. Reed, 299-7425.
WONDER HORSE, \$10; deluxe car seat, \$8; kids redwood picnic table, \$3.50. Corll, 255-1186.
PORTABLE humidifier, Sears, 8 gal., \$37.50; 4-pc. corner sectional, needs upholstery, \$50; trade either for sofa/bed. Young, 296-1963.
TRAIL BIKE, 1967 Suzuki Bearcat, 120cc w/ street and trail sprockets, \$275. Allen, 299-9075.
RIDING and brood mare, \$175. Hansen, 898-3173.
"0" GAUGE Lionel train set, engine, cars, 60 pieces of track, 1 pair manual switches. Ferguson, 299-1097 after 5.
HOUSE TRAILER on lot in trailer park south side Conchas dam, 8 x 35 ft., 2 axle, elec. brakes, 2-bdr., sleeps 7, \$1095. Sherwood, 299-2169.
3/4 SIZE VIOLIN w/ bow, case, shoulder rest, mute and extra strings, \$60. Mazzi, 298-2438 after 5:30.
MOTORCYCLE, 1969 Suzuki 500cc, 1700 miles, asking \$845. Reule, 298-8986.
LADIES white hand knit coat, size 14-16, \$65; ladies blue hand knit suit, size 14-16, \$10. Carman, 299-3851.
TWO GONSET G-12-4 channel CB transceivers, 110-12 volt power supply. Will trade for small boat. Byrne, 282-3472.

26 GAL. AQUARIUM, full reflector, heater, filters, pump, plus 8 gal. aquarium, \$50 total; 15' Dorsett, 40hp Evinrude, electric start, shift, trailer, \$995. Wigley, 268-0916 after 5.
BASSINET w hood, skirt, and mattress, \$7. Puariae, 299-6377.
COFFEE and end table, formica tops, \$15 for both; baby stroller, \$10. Garcia, 256-7606.
MOBILE cruiser trailer, 8 x 40 ft., 2-bdr., furnished, AC, now located at Conchas Lake. Getz, 299-4865.
WIRE 60 ft. size 0000, 200 amp capability; also 150 ft. size 6, three conductor, 50 amp. capability. Souder, 282-3121.
VIOLINS, one 3/4 size, one full size. Copeland, 344-1133.
LAWN MOWER, Scott's Silent; loveseat feeding-a-bed; high chair; baby carriage; baby feeding table. Long, 296-5248.
WALK-IN CAMPER, fits narrow or wide bed pickup, contains built-in icebox and closet, \$500. Bluet, 264-5908.
GE REFRIGERATOR, 12 ft. auto-defrost. Ready, 255-8238.
WIG and wiglet, dark brown, 100% human hair, hand-tied, \$20 and \$7. Lloyd, 298-2437.
SEARS comb. TV-radio-record player, maple, \$175. Kent, 344-3821.
14' TRAILER, Northwest, sleeps 5; Sears all metal cartop carrier; reel type hand mower. Matsko, 299-2145.
DYNAKIT STEREO amplifier, Dynakit stereo pre-amplifier, Eico stereo tuner, Eico stereo tape deck, Garrard changers, Gray mono preamp. Gregory, 344-4419.
COMBO CRIB, 2 year size ideal for apartment or trailer, used six months. Bishop, 299-8782.
AKC REGISTERED pomeranian puppy, female, championship pedigree; 40 lb. practice bow, \$4; dwell meter, \$5. Stuart, 265-7315.
FOUR EARLY American spindle back chairs, hand rubbed fruitwood finish, \$30; Bundy B-flat clarinet, \$85. Wallace, 299-8991.
LARGE, rugged top carrier with cross support members and large pads, gutter mount, \$15. Myers, 256-0468.
BUNDY B-flat clarinet w lined case, one year old, \$120; single duals 2 ea. tires and rims, 10x 16.5, 5 lug, \$110. Hawn, 299-7835.
35 VOL. encyclopedia, dictionaries, yearbooks, and world atlas w bookcase, Britannica, \$275. Wag-ner, 282-3177.

OCTAGONAL pool table, \$40. Denman, 265-0472.
14' TEARDROP, 1955 trailer, stove, icebox, sleeps 6, no "head," \$895. Scott, 298-7133.
2 VW WHEELS and 3 tires; Hyde figure skates, size 11; 8 x 10 cabin tent. Wanted large wooden desk. Lane, 298-3366.
'69 YAMAHA 100, electric start, turn signals, lots of chrome, 2300 miles, \$350 w/ helmet. Randolph, 299-2057.
GUITAR amplifier, Silvertone 105 watts peak power, one 15" speaker, \$85; 5 ft. speaker column, \$30. Schreiner, 268-4159.
FREE PUPPIES, mixed but cute, available in two weeks. Smith, 296-1049.
FLUTE, Armstrong professional, silver, 2 years old, \$190. Binder, 299-2937.
GAS HEATER, portable, 12,000 BTU w 15 ft. of vent pipe, \$20. Burns, 255-3737.
REAL ESTATE
3-BDR. and den custom home on 1 acre in Bosque Park, all improvements including 4" irrigation well and pump, see to appreciate, \$28,500. Everett, 626-2544.
MOSSMAN blond brick and stucco, 3-bdr., fp in large LR, DR, pullman baths, carpeting, drapes, AC, large lot, FHA appraisal \$24,000. Cowham, 298-4249 after 5:30.
2-BDR. HOUSE, unfinished (new) barn, chicken house, 2 acres completely fenced, good well, South 10 highway. Bluet, 282-3897.
2-BDR. HOUSE, corner lot, 8' gate, \$11,750 terms or will discount equity for cash. Could be rezoned for duplex. Fisher, 265-0626.
LARGE LOT in restricted Loma del Ray subdivision, Horacio Place NE, Bischoff, 268-1782 evenings and weekends.
MOUNTAIN PROPERTY, 10 acres, north 10 and 3 acres south 10 (Ponderosa Pines). Constant, 296-1431 after Sept. 28.
CARS AND TRUCKS
'57 4-dr. Ranchero, \$50. King, 298-2991.
'63 SCOUT, full cab, bucket seats, positive traction, undercoating, radio, orig. owner, \$950. Downing, 299-6945.
RENAULT DAUPHINE 1962 4-dr., sun roof, recent minor overhaul, \$250. Kennedy, 298-4603.
'64 CLASSIC Rambler station wagon, orig. owner, \$1000. Tholburn, 268-2930.
'59 FORD Galaxie, R.H. AC, new tires and brakes, best offer. Hardin, 299-8654.

'67 VW camper deluxe, pop-top, split front seats, 34,000 miles, make offer. Aeschliman, 298-7846.
CHEVROLET step-van 1963, excellent for camper wagon, \$1000. Morrison, 855-6244.
'62 PONTIAC, 2-dr., less than 32,000 miles, AT, PB, PS, \$525. Garin, 298-7965.
'68 VW bus, 7-pass., 24,000 miles. Will consider older trade. Campbell, 268-8445.
'62 RAMBLER Ambassador 4-dr., PS, PB, Radio 2-tone paint, \$325. Bartlett, 299-4861.
4-WHEEL DRIVE 1964 Scout, V-8 motor, full cab, Brooks, 298-4354.
'66 CHEVELLE Malibu V-8 sedan, AT, AC, Troy, 299-9192.
'61 IMPALA hardtop, one owner, 50,000 miles, PS, PB, AT, R&H, below book, \$300. Browne, 344-9873.
WANTED
YOUTH motorcycle helmet; anti-sway attachment for equalizer hitch. Anderson, 299-5727.
BOY'S 24 or 26" bicycle, Sting Ray type, prefer Schwinn, Cericola, 298-2426.
BABY SITTING by reliable Sandia high student. Henning, 299-0318.
3/4 TON, 4-wheel drive, 4-speed transmission pickup truck, 6-10 years old. Souder, 282-3121.
RIDE from West Mesa area. Working hours 7:30-4:30. Gallegos, 842-5287 after 5.
SOMEONE to do weekly ironing for couple, vicinity 1200 block Alvarado NE, will deliver and pickup. Graff, 268-5291.
CARPOOL or pay-ride from general area southeast of Montgomery and Louisiana. Address 7209 Carriereau. Brown, 296-5772.
CRIB, full size; car seat suitable for use with folding seat backs. Wh'n, 268-0687.
TO JOIN car pool from Columbia and Silver to Gate 7. Gandara, 264-2664.
PICKUP, 6 cyl., 4-speed, 3-8 years old. Windham, 265-3031.
GIRL'S BICYCLE, 3-speed, 26". Schreiner, 268-4159.
SPRINGFIELD 1903-A3 or 1917 Enfield .30-06, preferably not remodeled. Maak, 282-3482.
FOR RENT
3-BDR., one bath, AC, central heat, range, drapes, carpet, w/led yard, attached garage, Los Altos area, \$135 mo. Patterson, 243-6219.



CLASSIC MELODRAMA, the kind that calls for hissing the villain, crying with the pretty girl who can't pay the rent, and cheering the hero, will be presented at 8:30 p.m. tomorrow night at the Club as entertainment for a dinner dance. Illustrating the idea are Peggy Stevens (5431) and the worst kind of villain. Sirloin steak will be served at 7 p.m.; dancing starts at 9 p.m. Call 264-4561 and make your reservations now.

Coronado Club Activities

'Melodrama Theatre' Tomorrow; Reservations Due for Lobster Dinner

Pick up your tickets now for the Coronado Club's "Melodrama Theatre" dinner dance tomorrow night. Egad, the villain is nefarious, the heroine is pretty and cries a lot, and the hero may or may not arrive in time! "The Great Western Melodrama" will be presented by the Albuquerque Melodrama Theatre at 8:30 p.m. Dinner (sirloin steak with the works) will be served starting at 7 p.m. Phil Graham and the orchestra will play for dancing.

Tickets (which should be picked up by 9 p.m. tonight) are \$3.50 for members and \$4 for guests.

Club manager Jim Noonan will part his hair in the middle for this one and wear a black suit.

New England Seafood Dinner

One of the Club's biggest events, the famous "New England Dinner," will be held on Saturday, Nov. 15. Live Maine lobsters, cherrystone clams, and a free

wine taste are all part of the festivities at a cost of \$6 per member, \$6.50 for guests.

Tickets must be picked up by Nov. 2. The early reservation deadline will allow the Club to order the right number of those lovely lobsters. A limit of 250 persons has been set for this affair.

Sol Chavez and the mighty Duke City Brass will play for dancing. Call the Club office now, 264-4561, make your reservations, and pick up your tickets by Nov. 2. It will be a tremendous evening.

Social Hours

Social hours are better than ever! Special prices are now in effect from 5 to 9 every Friday night. The buffet is spread from 6 to 8 p.m. and the band plays for dancing from 6 to 9 p.m. Then the TGIF crowd moves to the main lounge where Pat Reich and piano entertain with a sing-along from 9 until midnight.

Tonight Max Madrid will play for dancing while the Mexican food buffet is spread. The buffet costs \$1.25 for adults, \$1 for kids.

On Friday, Oct. 3, the seafood buffet will be the menu feature while Sol Chavez plays for dancing.

On Friday, Oct. 10, the Club's famous chuckwagon roast beef will be spread while Elton Travis and the Westernaires play the sagebrush shuffle.

In the meantime, the Tuesday social hours are in effect from 5 to 8 p.m.

Football Bus

The Club's free bus to University Stadium will leave the Club at 7 p.m. on Saturday, Oct. 4, when the Lobos face the University of Kansas. The bus will return to the Club after the game and social hour prices will be in effect for one hour.

Teen Go Go

These monthly bashes are becoming more and more popular, according to survivors. Member parents should pick up tickets for their youngsters by Oct. 10 for the Go Go scheduled Saturday, Oct. 11. "The Nautilus" will be wired into the bandstand about 7:30 p.m. and wail (amplified) until 10:30 p.m. The tickets are two-bits for members, 50 cents for guests.

Game Nights

For members who have not visited the Club on Wednesday evenings lately, it might be a good idea to check the Club calendar and take a look at the listing of prizes.

Pretty PhD

Stress Waves Through Materials Job Interests of Lynn Kennedy



"What's a pretty girl like you doing worrying about radially distributed stresses, propagation of stress waves, and tensile failure of materials?"

Lynn Kennedy doesn't recall having been asked that particular question, but it's theoretically possible. She is pretty, she does have a PhD in physics, and she does know about such technical things.

Lynn recently received her doctorate from Lehigh University. She already had a BA in physics from Pomona College and MA from the University of California at Berkeley. When she and her husband Jerry (9114) moved to Albuquerque, Lynn had completed the necessary course work for her doctorate, but had not started on her dissertation.

One of her husband's co-workers, Orval Jones, had a research problem that needed solving. Arrangements were made for Orval to be Lynn's thesis advisor and the finished dissertation was called "Elastic Strain Pulse Produced by the Sudden Applications of a Radially Distributed Stress to the End of a Cylindrical Bar." It was later published as SC Research Report 68-825.

Three years ago she came to work at Sandia in Division IV of Exploratory Systems Department II, 1220.

The lady physicist admits to not having much free time — the couple has two children — but she does enjoy sewing. Now

let's see, the tensile strength of a length of twisted cotton thread .5 mm in diameter passing through a piece of corduroy with a resistivity factor of .26 would be . . .

Events Calendar

Sept. 26-27—Broadway musical "Cabaret." UNM Popejoy Hall.

Sept. 26-28, Oct. 2-5—Edward Albee's "Tiny Alice." Oct. 9-12, "Mime, Music, Malarkey and More" by Bill Hayden and Judy Sierer. Old Town Studio, 242-4602.

Sept. 26-30—Taos fiesta and San Geronimo fiesta at Taos Pueblo.

Sept. 27-28—Aspenade at Cloudcroft.

Sept. 30—Santa Fe Community Theatre presents Eugene Ionesco's "The Lesson" at Old Town Studio, 1208 Rio Grande NW, tel. 242-4602.

Oct. 2—Concert by Albuquerque Symphony Orchestra, James Fields, pianist, soloist. UNM Popejoy Hall.

Oct. 4—YWCA charter bus tour to Quarai State Mounment, Gran Quivira National Monument, and Abo State Monument. For information, tel. 247-8841.

Oct. 4—Hike to see the maples in the Manzano Mountains. N.M. Mountain Club, leader Hans Baerwald, tel. 298-1526.

Oct. 4-5—Overnight backpack to the Stone Lions shrine in Bandelier National Monument. N.M. Mountain Club, leader Jack Hickman, tel. 298-3804.

Nine Staff Members Awarded Master's Degrees Under Sandia Labs' OYOC Plan

The first nine men to participate in Sandia's One-Year-On-Campus plan have completed the program, earning Master's degrees, and have assumed assignments within the Laboratories.

The men are Bill Bouma (1542), Purdue University; Ron Burghard (1642), Stanford; Jim Cooper (2652), Stanford; Lloyd Davis (2627), Stanford; Tom Downey (7524), Stanford; Art Gandara (7262), Stanford; John Long (9427), Stanford; Mike Murphy (1641), Stanford; and Jim Van Den Avyle (9522), MIT.

With the exception of Van Den Avyle, whose degree field was materials science, the graduates earned their degrees in elec-

trical engineering.

The men entered the program last fall with Bachelor's degrees. They attended school on a full-time schedule at a selected university. Majors and elective courses were selected in consultation with their supervisors, the OYOC administrator, and faculty advisors. Minimum requirements were core courses specified by Sandia and all other courses required for the Master's degree.

Currently, 20 new technical staff members are attending nine different universities under the OYOC plan. OYOC replaces Sandia's former Technical Development Program (TDP).

Sandia Safety Signals



Watch your auto driving habits

The average driver makes 2½ errors for each mile of travel, according to a recent random survey reported by Kemper Insurance Company. The sample, involving almost 11,000 persons, showed that the average driver, covering about 10,000 miles a year, makes about 25,000 driving errors in the process. Some of these are failure to look in all directions at intersections, placing hands in an unstable position on the steering wheel, shifting gears while turning corners, and following too closely.



MASTER'S DEGREES were recently earned by these nine men who completed Sandia's One-Year-On-Campus program. At center front is Art Gandara (7262) with Mike Murphy (1641), right. Others are from left, Jim Van Den Avyle (9522), Bill Bouma (1524), Jim Cooper (2652), Tom Downey (7524), Ron Burghard (1642), Lloyd Davis (2627), and John Long (9427).