

LAB NEWS

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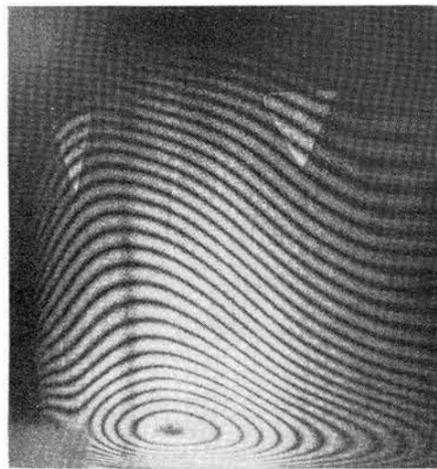
SANDIA LABORATORIES • ALBUQUERQUE NEW MEXICO & LIVERMORE CALIFORNIA

Seeing What Isn't There

Holography—A New Analytical Technique Developed at Sandia

A group of Sandians are photographing objects which never have existed. What's more, they photograph the objects in three dimensions.

By combining holography (laser photography) with conventional photography and computer technology, Matt Gubbels and Terry Leighley (both 7514) in conjunction with Division 9424 are taking pictures of objects which exist only in the circuits of a computer. After making the photograph (or, as it is called in holography, the hologram), the non-existent object can be viewed in three dimensions or reproduced in two dimensions for other analytical purposes.



TOPOGRAPHICAL MAP of the displacement of a surface under strain is provided by two-dimensional photograph of a three-dimensional hologram. Fringe pattern compressed together at bottom of photo indicates maximum displacement area.

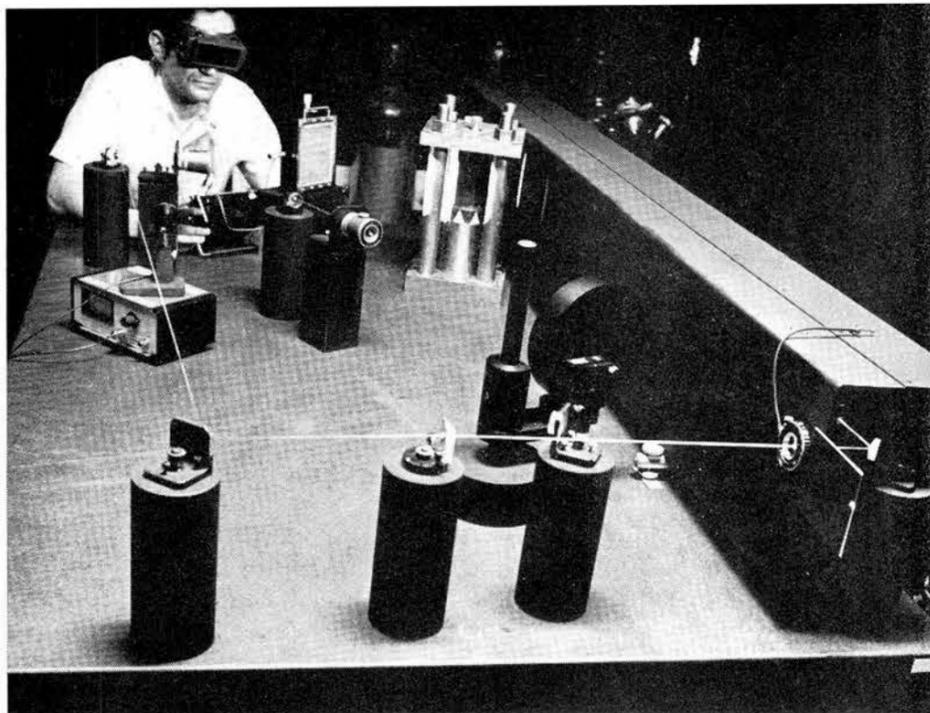
The technique, which has application in non-destructive and other test programs, is this: suppose an engineer sees the need for a component which has three dimensional curves. It may not be feasible or economical to make a prototype since objects having three dimensional curves are difficult to manufacture. Instead, the engineer programs into a computer all of the component's geometric attributes — curves, planes, etc. The computer then will construct the object in its "mind" and the result is displayed on a cathode ray tube.

This image is then photographed on conventional movie film. By programming the computer to display all perspectives of the object (i.e., different views as it is rotated on its axes), a complete photographic record of its configuration is obtained.

Each frame of the movie film (up to 200 frames) is then projected onto an eight-inch-square photographic plate by means of a laser. But because of the special projection technique the result is not a plate with 200 separate images but rather a plate which combines in one image all of the optical information on each of the frames. Thus it is possible to view the top, bottom, and all sides of the object simply by altering the point of view somewhat as one would do if the object itself were held.

The chief advantage of this method is that the engineer is presented with a permanent visual record of the object which he can study at length and not tie up valuable computer time studying images on a cathode ray tube. It is necessary, however, to illuminate the plate with laser light in order to obtain the three-dimensional effect. Techniques are being developed to allow illumination with ordinary white light.

Holography is based upon laser optics and classic interferometry. Coherent laser light is split into two beams. One beam,



THIRD DIMENSION of photography is made possible by use of a laser. Reference beam of coherent light is visible but scatter beam cannot be seen in this photo. Laser has made analytical tool of holography, previously only a scientific curiosity.

called the reference beam, is reflected from a mirror onto a photosensitive emulsion. The second beam, the object beam, is scattered from the object onto the same point on the plate. Since waves of light from the two beams are no longer in exact phase, an interference pattern is formed which is recorded on the plate. It is as if two pebbles are dropped some distance apart into a still pond; the waves emanating from each pebble would begin to interfere with each other at some point and the resulting pattern would clearly be differ-

ent from that of the original wave patterns. The result is analogous to the wave patterns recorded on a hologram.

An important use of holography is in non-destructive testing. It is possible, for instance, to obtain precise measurements of the very small displacement of the surface of bodies under strain, bodies through which a small amount of electrical current is passing, or bodies subjected to minute heat. By comparing holograms of a body under both unstrained and strained condi-

(Continued on Page Six)

AEC Awards Contract for New Isotopic Generator for Space Use

A contract to study the development of a new nuclear power system for space has been awarded to General Electric Company's Valley Forge Space Technology Center, the Atomic Energy Commission has announced.

Following the study, it is expected that modifications will be issued for further phases of the program to include development and fabrication of a prototype model.

Sandia Laboratories provides technical direction for the Systems for Nuclear Auxiliary Power (SNAP) program for the AEC. Jim Leonard of Isotopic Power Systems Division 9521 is Sandia's project director for the new power system.

When developed, the plutonium fueled

radioisotope thermoelectric generator (MHW-RTG) could supply power for a wide variety of missions — including orbital, lunar and interplanetary. The generator would be modular in construction and, through suitable combinations, would be able to produce power in the hundreds-of-watts range.

The General Electric Space Division is the organization that served as systems contractor for the SNAP-27 radioisotope generator that is now providing power for scientific experiments placed on the moon by the Apollo 12 astronauts in November. Jim Leonard was Sandia's project director for the SNAP-27 program also.

Traveling Man

Two Decades of Nuclear Testing Make Mel Merritt 'Effects' Expert

Nuclear testing tends to develop its own experts the same as any other technical or scientific endeavor. Sandia Laboratories' involvement in tests varies from shot to shot, but one man whose career reflects almost two decades of work in nuclear testing is Mel Merritt of Test Effects Department 9150.

Mel was Effects Evaluation Scientist for "Milrow," the recent underground nuclear calibration test on Amchitka Island in the Aleutians. If the one megaton shot had been fired at Nevada Test Site, Mel's job would have been somewhat easier since a large amount of effects data is available from previous nuclear blasts at NTS. With Milrow, there were the usual technical problems as well as others involving international politics, conservationists, seismologists, plus a great amount of travel — in one week alone Mel flew 12,000 miles! Mel is a native of Alaska and he finds Amchitka "a wild, beautiful place," but even such warm feelings barely made up for such extensive travel demands.

Although Mel officially became involved with the test in January 1968, earlier developments were to influence his actions as well as the reactions of others to the government's decision to hold a nuclear test on this remote island.

Foremost among these actions was Executive Order 1733, issued in 1913, which reserved the Aleutian Islands as a National Wildlife Refuge. The order contains a limiting clause — "the establishment of this reservation shall not interfere with the use of the islands for lighthouse, military or naval purposes" — which was interpreted as permitting later AEC and other non-conservation types of usage.

Examples of these uses were the occupation of Amchitka from 1942-51 by U.S. military forces (as many as 10,000 men at peak periods), and in October 1965 the

detonation of "Long Shot," a Department of Defense underground nuclear shot designed to provide data to differentiate between earth motions caused by nuclear explosions and those caused by earthquakes. Alaskans were wary about this blast in a seismically active area; they were still recovering from the 1964 earthquake and resulting tsunami (tidal wave).

When it became apparent the following year that the Nevada Test Site would not be suitable for underground tests of multi-megaton size, the search was started for a supplemental test area. Amchitka was one of three sites considered and a calibration shot was scheduled.

"Faultless, a high yield calibration shot, was fired in Central Nevada in January 1968, and from the test data it was possible to extrapolate how much damage would be caused to nearby cities by a larger shot," Mel says. "The situation was different in Amchitka. Our concern was ecological or biological damage, and in these areas it's not obvious what is tolerable and what is unacceptable."

The first open opposition to Milrow appeared in May 1969 in the form of a letter to Governor Miller of Alaska from the Alaskan Sportsmen's Council citing conservationists' considerations and the possibility of venting into the ocean, endangering the Alaskan fishing industry; a letter from Senator Gravel of Alaska to the U.S. Geological Survey inquiring about the possibility of triggering earthquakes; and an editorial campaign in a Kodiak newspaper suggesting that the test would create a serious tidal wave danger to Kodiak.

It became clear that as much information as possible should be released concerning all of the potential hazards related to the continuing program of underground tests in order to give the general

public a better understanding of the problem.

Thus, Mel's job took on a public relations function and, last June, Mel was a member of the AEC team, headed by former Commissioner Francesco Costagliola, that inspected operations on Amchitka and visited four Alaskan cities to meet with local citizens.

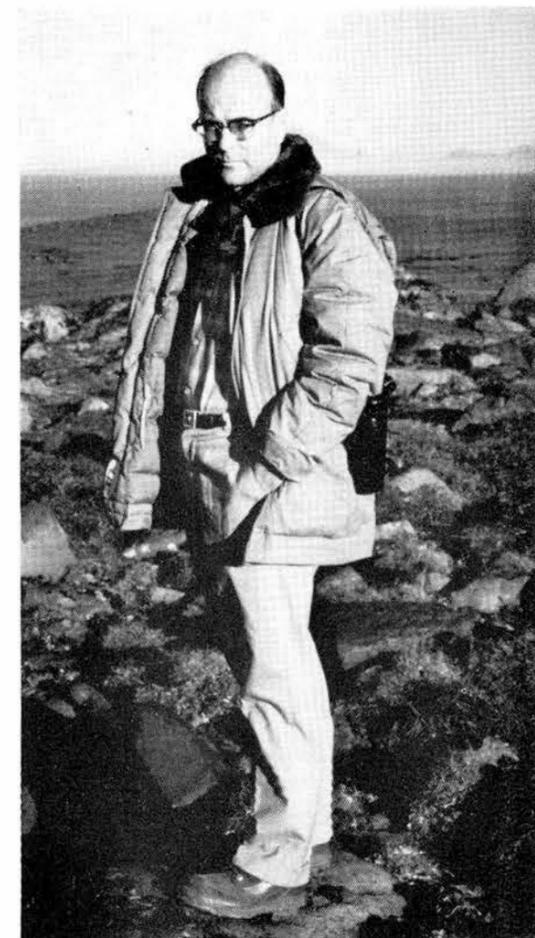
There was also a hurried trip to Washington in August to talk with Canadians who were worried about tidal waves. The tsunami which followed the 1964 Alaskan earthquake caused \$15 million damage to Port Alberni on the Canadian island of Vancouver. Later in the month Mel accompanied 20 Alaskan reporters on a tour of Amchitka, and several weeks later he escorted two Congressmen on a similar tour.

But September was the month that was! On the 12th, an earth tremor was recorded — it was the latest in a sequence which has continued since early in this century (the fourth quake this year of magnitude over 6 was recorded Oct. 31). The following day, some 60-80 Alaskan officials, VIPs, newsmen, and conservationists were taken on a tour of the Milrow site.

On Sept. 26 Mel participated in the public hearings before the Alaskan Legislative Council. Other guests and participants included five Hawaiians who were concerned about a possible tidal wave following any seismic disturbance. And then Mel made another quick trip to Washington to attend hearings of the Fulbright Committee.

It was also during September that the AEC published a report of the Ad Hoc Panel on the Safety of Underground Testing. This group of geophysicists, headed by Dr. Kenneth S. Pitzer, stated that there was no basis for eliminating the possibility

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MEL MERRITT at Amchitka

Abolish Electoral College?

Direct Presidential Vote to Be Future Election Reform Issue

During and after the last presidential election, considerable comment was heard about the necessity to abolish or reform the Electoral College. Some political observers maintain that the alternative which would have the best chance of succeeding is direct popular election. Such a plan is presumed to have presidential, congressional, and popular appeal.

Some of the arguments for and against such a plan are listed here. Since passage or rejection of such a reform plan depends largely upon public response, an understanding of the effects of direct popular election is essential.

Disadvantages of Direct Election:

—Effect on the traditional two-party system. Historian Clinton Rossiter, a critic of direct election, says the plan would mean an end to moderate party platforms which, under the electoral college, must be acceptable to a wide range of economic, geographic, and political interests. The direct election, he says, would substitute unrestrained majority rule and would lead to intemperate, radical positions by parties and candidates in an attempt to gain majority support.

Alexander Bickel, Yale professor of law and legal history, argues that splinter parties created out of sectional disputes would result from direct election and that one strong but minor party, or several weaker ones, could keep any candidate from getting a majority of the vote, thus necessitating runoff elections.

—Small states versus large states. Opponents to the plan maintain that small states would lose their electoral advantage over larger states. For instance, Nevada with a population of about 300,000 in the 1960 census, has three electoral votes. California, at the same time, had nearly 16 million people, about 53 times the population of Nevada. Yet California has only 40 electoral votes, only 13 times more than Nevada. Additionally, say the critics, large states would lose pivotal power, where the swing of a few thousand votes in California, New York or Illinois can turn an entire state's slate of electors over to a candidate.

—Minority groups would lose their ability to influence a state's electoral votes, and thus their political potency, because their votes would be engulfed in a national count. Also, states might seek to increase their number of voters and thus their political leverage by dropping voting ages, liberalizing requirements, etc. Direct election then could lead to federal standardization of voting qualifications. And in a close election, especially where fraud is suspected, nationwide recounts would be not only inevitable and expensive, but would create delay and uncertainty throughout the nation.

Advantages of Direct Election:

—Proponents argue that all other elected offices in the U.S. are by direct election and that the President—since he alone represents a national constituency—also should be elected by all the people.

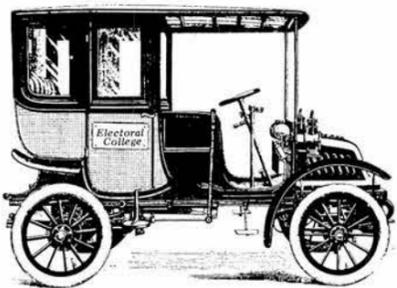
—One man, one vote. Under direct election, everyone's vote would have the same weight. Thus no one's vote would be reduced or magnified in weight because of the state in which he happened to reside.

—Protection of minority votes. While it is true that minority groups would lose their ability to influence a state's electoral

votes, proponents argue that since in a direct election each vote would count directly and equally in the national total no voter would be disenfranchised. This could have the effect of encouraging larger turnout of minority group voters.

—Other arguments for direct election. Localized corruption in a single large state would be far less likely to determine the outcome of a national election. Also, say proponents, splinter parties would no longer have the ability to shift the outcome in pivotal states or to throw the election into the House where a prospective president might be forced to make substantial concessions in order to win a majority.

Direct popular election is likely to be a major political reform issue between now and the presidential election year of 1972. If that election is close, the Electoral College could become the dominant issue, especially if the winner of the election should happen to receive fewer popular votes than the loser — as has happened.



ISA Schedules Instrumentation Meet At UNM Jan. 22

"The Systems Approach in Instrumentation Technology" is the theme of a one-day seminar to be held at the University of New Mexico by the Albuquerque Section of the Instrument Society of America. The seminar will start at 1:15 p.m. in the theatre of the New Mexico Union Building on Thursday, Jan. 22.

Bob Baker (2651) is president of the local chapter. Art Littleford (2444) is program chairman for the seminar.

Sandians presenting technical papers at the meeting include Glenn Elliott (2454) who will discuss "Time Sharing a Small Digital Computer in the Laboratory" and Dave Darsey (7524) who will present "System Calibration Using Complex Step Response Program."

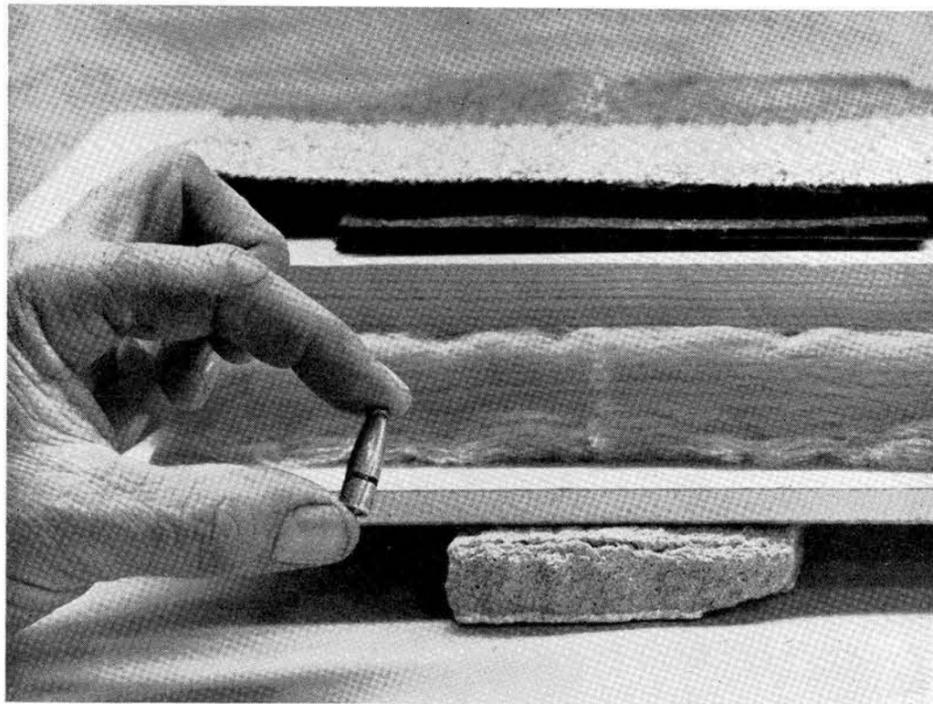
Other speakers will represent EG&G, Inc., Lovelace Foundation, The Bendix Corporation and Gulston Industries.

In addition to technical papers, the seminar will also include an exhibit of systems instrumentation.

Annual Meeting of Sandia Credit Union Scheduled Jan. 22

Business session of the annual meeting of the Sandia Laboratories Federal Credit Union will start promptly at 5:30 p.m. on Thursday, Jan. 22, according to President Doug Ballard (7361). The meeting will be held in the ballroom of the Coronado Club.

Following the business session, light snacks and beverages will be served. As door prizes, two portable television sets will be given away. Each member attending will receive a small gift.



SOMEONE fired a high-powered rifle into the sky at midnight on New Year's Eve. The bullet (above) fell earthward and penetrated the roof shingles, three layers of tar paper, a one-inch board, three inches of insulation, three-eighths inch plaster lath and one inch of plaster before dropping into the living room of a neighbor of Frank Lesperance (4513). No one was injured. The message is obvious and ominous.

New Carbon Composite Technology Subject for Annual ASME Symposium

The 10th annual symposium of the New Mexico Section of ASME and the University of New Mexico will feature what is probably the first major discussion of the new carbon composite technology. The meeting will be held Jan. 29 and 30 at the UNM Kiva.

Materials with high thermal and structural requirements are needed to meet the harsh environments associated with aerospace applications. Composite materials of carbon and graphite filaments have been found to exceed the capabilities of other likely materials.

As a result, a Japanese company is already building a plant whose annual production of 120 tons of carbon fiber will sell at about 1/20th of the present cost (extremely high cost has been a limiting factor). And in Great Britain, composites of carbon fiber laminates and aluminum or plastic honeycombs have been found to be ideal for carrying structural loads on aircraft. British engineers plan an exhibition

and symposium on carbon fibers in London later this year.

Gene Frye (5312) will be chairman of the session on composition and properties. Ralph Rayner (5312) and Doug Ballard (7361) will head the sessions on processing and fabrication techniques.

Sandia speakers include John McDonald (5300), "Composite Technology"; Barry Butler (5315), "Graphite Filament Structure"; Gene Frye, "Filament Wound Carbon Structures"; and O'Neill Burchett (7362), "Laser Holography of Carbon Composite Structures." In addition, Donald Green of Battelle/Northwest Laboratories will discuss two new nondestructive testing methods developed jointly by B/NL and Sandia Laboratories.

Ralph Wilson (4220) is ASME section chairman and Jerry Jercinovic (7630) is general symposium chairman. Registration forms are available from Roy Stradford (1525).

A Gift You Can't Buy — From a Loving Brother



Over the Christmas holidays Paul Thomson (4512) delivered a present to his brother. The brother admitted that the present was the best he ever got. The men were donor and recipient in a kidney transplant operation at the VA

hospital in Denver.

Paul was asked a year ago whether he would be willing to donate a kidney, and last March he flew to the VA hospital in Philadelphia where his brother, Walter, was a patient. As Walter's condition worsened, he was transferred to the VA hospital in Denver which is one of the leading hospitals in the country for transplant operations (more than 200 kidney transplant operations have been performed there, 85 percent of them successful). By September Walter's second kidney had been removed and he was using an artificial kidney machine.

"The operation was postponed three times," Paul says, "then on Dec. 21st the hospital called and asked if I could be there the next day. The operation was on the 23rd."

After surgery, Paul was placed in the "pamper" ward with nine other kidney transplant patients and one patient who had received a heart transplant. "The doctors and nurses worked as a team in this ward and all tried to boost our spirits," Paul says.

Paul arrived back in Albuquerque Jan. 2 and it will be sometime in February before he returns to work. He will fly to Denver next Monday for a check-up at the hospital. His brother is doing "wonderfully" but it will be about three months before he is released as an out-patient.

As to Paul's wife and three children, "they're all glad it's over."

"Everything has returned to normal," the Sandian says, "only now I have one kidney instead of two. Mainly, I have to watch out for any infection."

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Water Drops Analyzed In Shock Tube Tests

A cold-gas shock tube is being used in experiments at Sandia Laboratories Livermore by Bill Byroads and John Nielson of Pressure Test Division 8123 to study water drop breakup in a high-speed, high-density air flow. Results of these experiments (conducted for Dan Aeschliman of Experimental Aerophysics Division 9342) are useful in calculating the dynamics of a water drop during its passage through the flow field surrounding a high-speed object, for example, steam turbine blades or a supersonic aircraft.

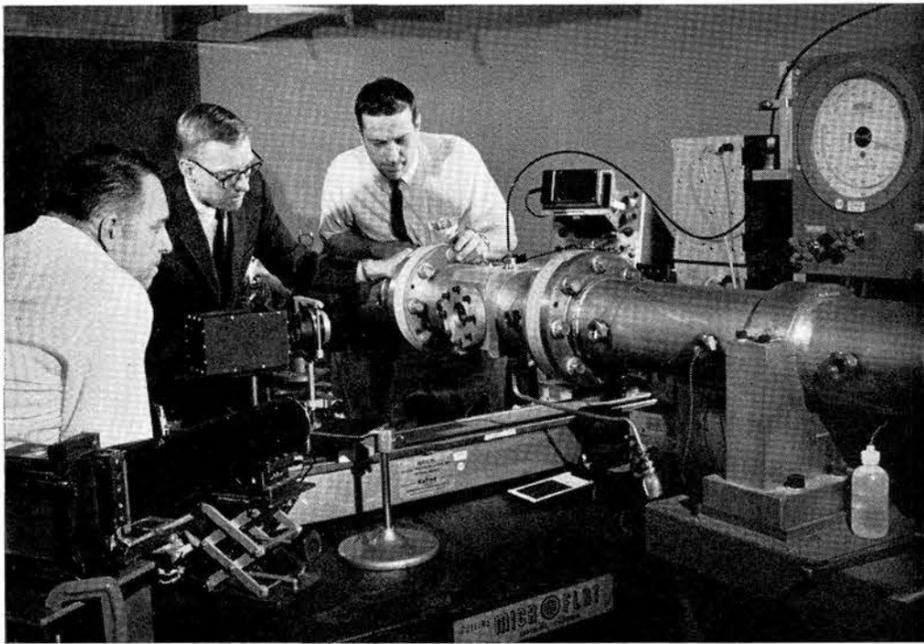
"The results obtained so far," says Dan, "are encouraging." The highest resolution shock wave and drop breakup photographs ever recorded have been obtained using a new light source that produces a nearly monochromatic 16 megawatt light flash of 2 nanoseconds duration. Object-plane resolution of 0.5 micron (about 20 millionths of an inch) has been achieved using the light source in conjunction with an optical system (see drawing) designed by Paul VanDyke of Photography Section 8231-3.

From these photographs Dan has been

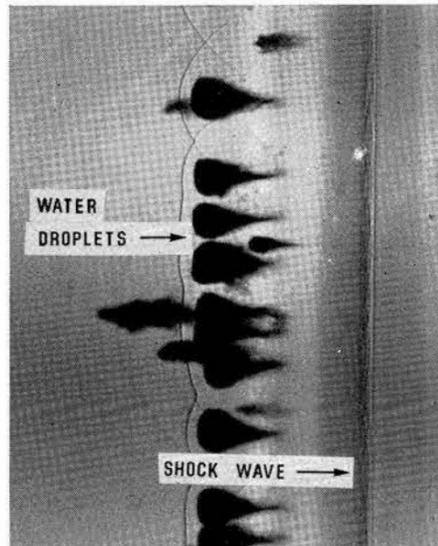
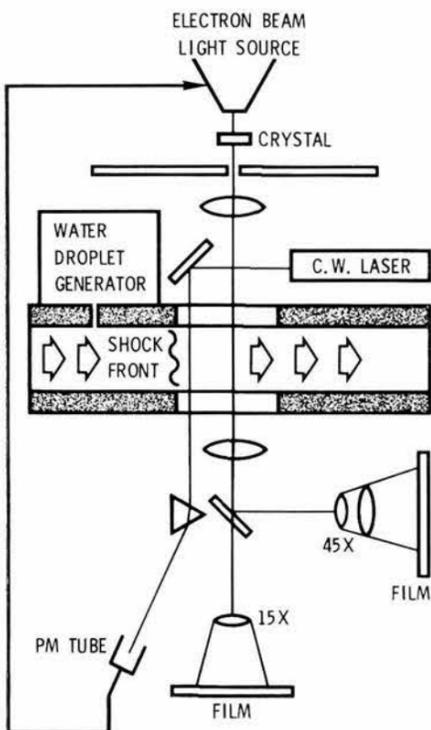
able to analyze and describe the breakup of small drops (5-2000 micron diameters) under different conditions of acceleration. Tests conducted recently, using a multiple spark light source produced precise time-dependent drop breakup data.

The three and one-half inch diameter shock tube, designed by Ralph Thompson (8122), is 22 feet long. It consists of a driver, center and driven sections. When the pressure of helium in the driver section exceeds a certain value, a diaphragm bursts and the sudden release produces a shock wave in the low pressure-driven section. Crystal transducers, situated at one-foot intervals, respond to the pressure rise and generate electrical outputs which are displayed on an oscilloscope. Shock velocity is then determined based on the time interval between pulses from adjacent transducers.

Water droplets are introduced into the shock tube by a "raindrop" generator. Mounted on the driven section of the shock tube above the lucite photographic windows, the generator releases uniformly sized and evenly spaced water drops.



DISCUSSING WATER DROP EXPERIMENTS in the cold gas shock tube facility are (l to r) Bill Byroads (8123), Dan Aeschliman (9342) and John Nielson (8123). Analysis of water drop breakup in a high-speed, high-density air flow relates to problem of rain erosion of surfaces of aircraft and missiles.



FIVE MICROSECONDS after shock wave impact, water droplets are distended. Photo (magnified 10x) was made with light exposure of two nanoseconds.

Congratulations

- Mr. and Mrs. Ronald Tremmel (8322), a daughter, Doris Deanne, Nov. 19.
- Mr. and Mrs. Rick Wayne (8331), a son, Keith Hoghton, Nov. 20.
- Mr. and Mrs. Lynn Zirkle (8151), a daughter, Holly Jean, Nov. 23.

LIVERMORE NEWS

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SANDIA LABORATORIES

JAN. 16, 1970



SAFETY AWARDS—Vice President at Livermore Tom Cook (8000), right, accepts Awards of Merit from the AEC and the National Safety Council for outstanding safety achievement by employees at Sandia Laboratories Livermore. Shown presenting the awards are, from left, J. F. (Jack) Burke, Director of Operational Safety Division, AEC/ALO, and James Riley, president of East Bay Chapter of the National Safety Council.

Safety Record

Livermore Earns AEC and National Safety Council Awards

Two Awards of Merit were presented to Sandia Laboratories Livermore recently for outstanding safety achievement.

One, by the Atomic Energy Commission, recognizes more than 1,350,000 injury-free man hours worked by employees during the period July 22, 1968, to March 31, 1969. The other, by the National Safety Council, recognizes over 2,000,000 man hours worked without injury from July 25, 1968, to July 28, 1969.

When issuing the AEC awards, E. J. Block, AEC Deputy General Manager, wrote:

"This is the eighth Award of Merit, plus an Award of Honor, Sandia Laboratories

Livermore has received. This is an accomplishment of which to be proud.

"Please extend the appreciation of the Commission, as well as my personal congratulations, to all those having a part in establishing this fine safety record."

Vice President Tom Cook (8000), in accepting the awards, noted that the Livermore safety record is a truly worthwhile accomplishment and thanked all employees for their contribution.

The plaques will be displayed alongside other safety awards in the lobby of Administration Building 911.

Livermore's no-injury record continued throughout the entire year of 1969.

Final Figures Announced For United Bay Area Crusade

The campaign chairman of the United Bay Area Crusade (UBAC) announced at a recent awards luncheon in San Francisco that contributions for 1969 totaled \$16,515,800. The figure represents an eight percent increase (or \$1,315,000) over 1968 contributions.

Through the Livermore employees' contributions, UBAC received \$24,054. Eight local and national health and welfare agencies and 180 UBAC agencies received the contributions.

Sympathy

- To Gene Aas (8323) for the death of his wife in Livermore, Jan. 2.
- To Len Bedinger (8254) for the death of his mother in Seattle, Wash., Dec. 19.
- To Carl Lundbom (8171) for the death of his wife in Livermore, Dec. 25.
- To Wayne Will (8124) for the death of his father in Philadelphia, Pa., Dec. 21.
- To Bobbye Goodman (8133) for the death of her father-in-law in New Westminster, Canada, Dec. 12.
- To Ron Wishart (8171) for the death of his mother in Manhattan, Kans., Nov. 28.

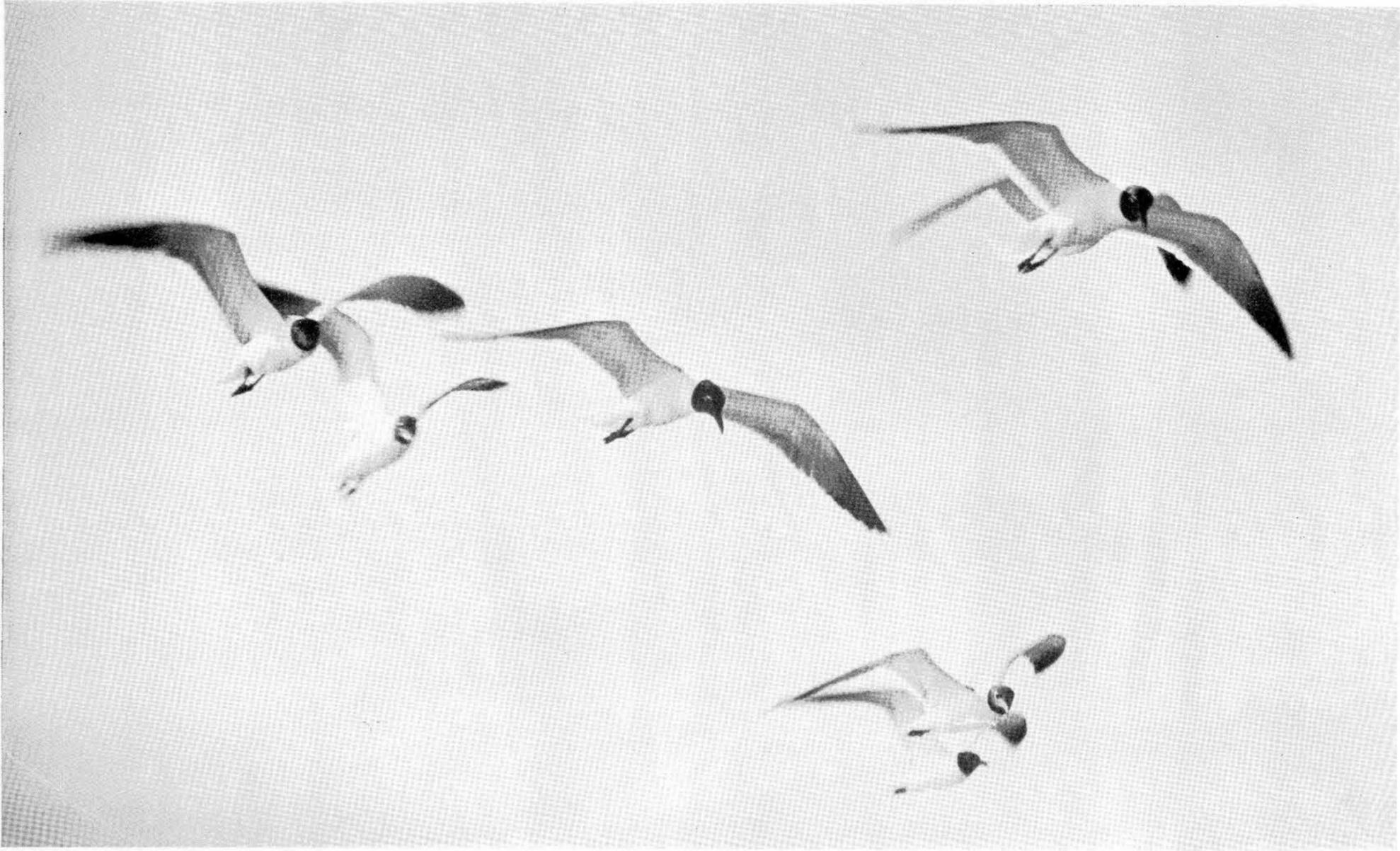
Broken Down TV's Restored to Society

A number of engineers at Sandia Laboratories Livermore are spending their evenings and weekends repairing out-of-commission television sets that have been donated for a worthy cause. The sets will be placed in the homes of poor children in the Livermore/Amador Valley through the local organization CAPE (Community Association for Preschool Education).

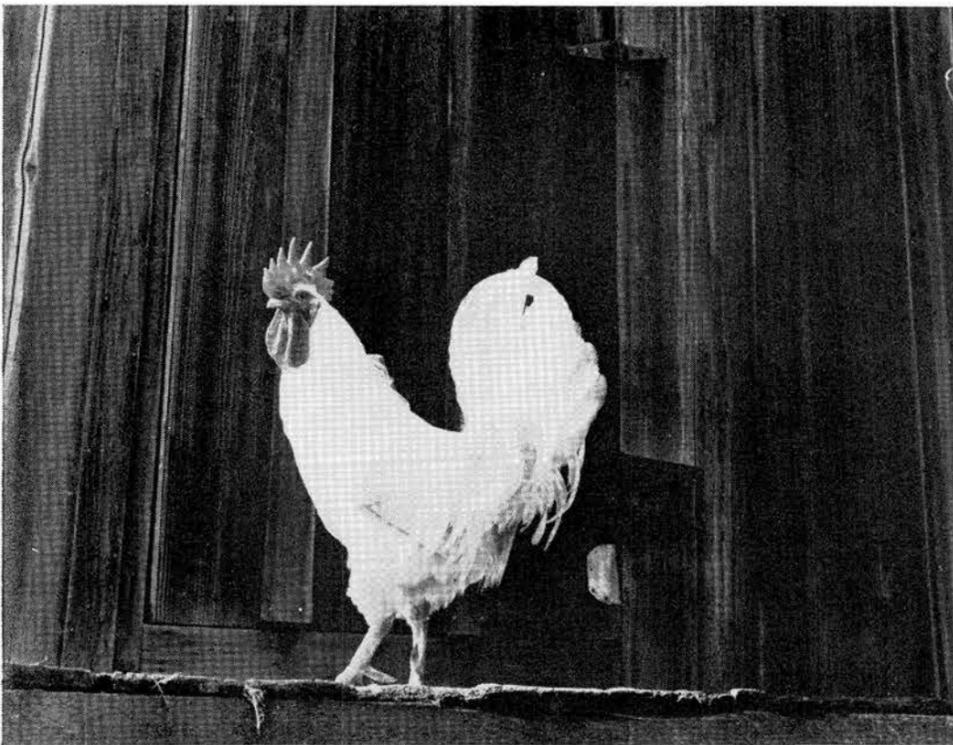
The project began in order to take advantage of the many excellent educational TV programs now available on Channel 9, the National Education Television (NET) channel in the Bay Area; the new educational venture, "Sesame Street," especially commended the project.

Designed "to prepare preschool children for elementary-school education," Sesame Street is produced by the Children's Television Workshop; it runs one hour daily over a 29-week period. The series made its debut recently over some 190 public-TV stations before what is believed to be the largest audience of preschoolers ever assembled before the tube — 12,000,000 — and is the most ambitious children's series ever created for educational TV.

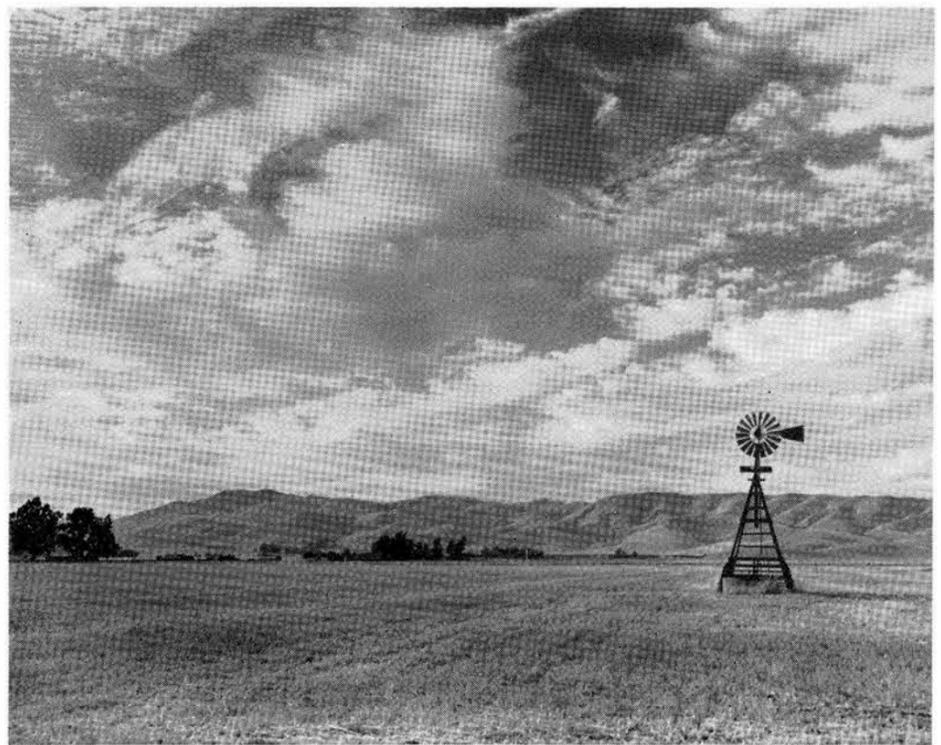
Anyone wishing to donate a repairable TV for this purpose should contact Jerry Jones, ext. 2801, or Jack Parry, ext. 2805.



FIRST PLACE, Joe Connell (7425)



HONORABLE MENTION, Don Osbourn (8254)



HONORABLE MENTION, Arlyn Blackwell (8350)



SECOND PLACE, Arlyn Blackwell (8350)



THIRD PLACE, Bill Gordon (8175)

Animals & Scenics

Photo Contest Winners Announced

The striking pictures on these pages are the work of Sandia's amateur photographers, winners in the first LAB NEWS photo contest, animals and scenics category. Winners in the people and abstracts category will be announced in a forthcoming issue.

Joe Connell of Quality Assurance and Advanced Planning Division 7425, with his superb photo of sea gulls, takes first place. Joe, who first started making photographs with a box brownie in 1937, is the immediate past president of the Enchanted Lens Camera Club. He and his wife Alice, a former employee, both enjoy the hobby and have devoted much time to developing an "artistic" eye and darkroom technique. Joe is currently experimenting with color developers.

Second place in the animals and scenics category goes to Arlyn Blackwell, manager of Mechanics and Aerothermodynamics Department 8350. Interested in photography for the past six or seven years, Arlyn pursues the hobby as a means of self expression. He finds people pictures — unposed and natural — the most challenging to a photographer, but his portrait of a tiger

placed second in the contest and his landscape with windmill earned an honorable mention. Arlyn is a member of the Livermore Camera Club.

"About 20 years ago my dad gave me an old Leica for Christmas," says Bill Gordon of Advanced Projects Division 8175, "and photography and its refinements have held my interest ever since." Bill's photo of Livermore hills and clouds was the third place prizewinner. He is currently taking a Famous Photographer's correspondence course.

The other honorable mention in this category goes to Don Osbourn, a draftsman in Electronic Design Drafting Section 8254-4, for his high contrast photo of a white chicken against a dark background. Don works primarily in 35mm format which requires meticulous darkroom technique. He took Photography courses at Santa Rosa Junior College five years ago as an introduction to his hobby.

The LAB NEWS says congratulations to the winners and "thank you" for all the fine entries that made the contest so difficult to judge. The winning photos will be on display in the lobby of Bldg. 802 and later at Livermore.

Take Note

A revised edition of "The True Position Dimensioning System" textbook is just off the press of the publisher, Central Scientific Corporation. The original edition, first published in 1965, was the work of a team of Sandians led by Bob Utter (3132) who wrote the programmed self-instruction textbook to help standardize drafting training within Sandia.

The book has since been used extensively at other AEC agencies. The revisions in the book make it correspond closely to the most recent version of the ASA Standard Y-14.5 on dimensions and tolerances.

An exhibit on the cultural scene in New Mexico is on display in the lobby of the Technical Library.

The exhibit is part of a program to bring to Sandians an awareness, tolerance, and understanding of the three cultures — Mexican, Indian, and Anglo — which are found in contemporary New Mexico. Earlier events were a lecture series and a tour of the Art Museum of New Mexico in Santa Fe.

The current exhibit, created by John Gardner (3421) and Gary Montague (3132), consists of a montage of scenes reflecting various cultural activities in the state. The scenes were taken from New Mexico publications.

The display will continue for about a month and will be followed by others in the same theme.

Many Sandians will remember the Rev. Frank H. Grubbs, who left his position as manager of Electronic Data Processing Department to study for the ministry.

He has been the rector of St. Alban's Episcopal Church in El Paso since last May and recently was promoted to the rank of Colonel in the U.S. Army Reserve. In 1964 — after entering Seabury-Western Theological Seminary — he was called to

active duty in Washington to study the feasibility of using electronic computers within the Selective Service System. He remains assigned to the Selective Service unit in El Paso.

Sandians who are interested in possible preservation of the Alvarado Hotel are invited to a panel discussion planned by the Albuquerque Urban Progress, Tuesday, Jan. 27 at 7:30 at the First National Bank, East Central and San Mateo.

Participants will include George Pearl, local architect who is a member of the Governor's State Cultural Properties Committee; Ruth Armstrong, past president of the Albuquerque Historical Society; a member of the City Planning Department, and (hopefully) a representative of the Santa Fe Railroad.

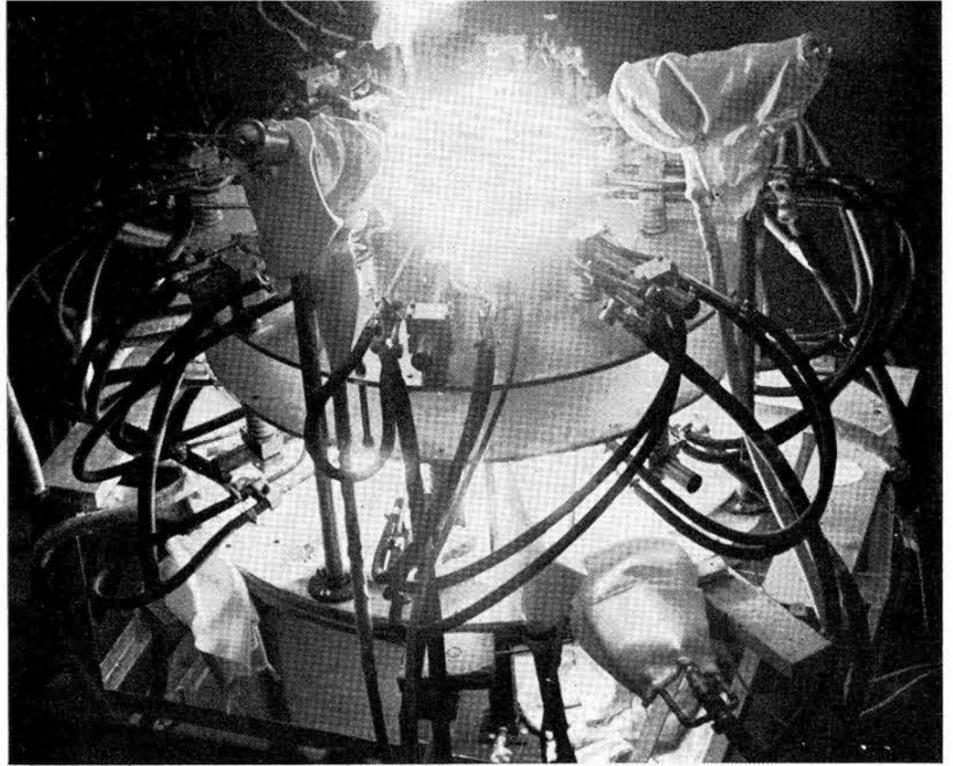
Ken Kavanagh (5165) will discuss "The Finite Element Method as a Basis for Determining the Mechanical Behavior of Solids" at the 5100 Staff Seminar on Tuesday, Jan. 20.

On Tuesday, Jan. 27, George Samara (5132) will present "High Pressure Studies of Phase Transitions in Solids."

The seminar meets at 8:30 a.m. in Bldg. 806, Rm. 201.

In observance of Freedom Week, Jan. 18 to 24, Bill Blair (7452) and Floyd Elder (4614) have placed posters on this subject on all 58 buses of the Albuquerque transit system.

Members of the Sandia High School class of 1960 are planning their 10th reunion next summer. Help is needed in compiling a current list of members and addresses. Contact Judy (Scholl) Roberts (2312), tel. 298-9163, if you are a member of the class or have addresses of other classmates.



HOT STUFF—Graphite heating array in the Radiant Heat Facility produces up to 5600°F for materials testing under simulated reentry conditions. Quartz cloth shrouds temperature measuring pyrometers. Hoses and pipes carry cooling water to the power connections.

Real Cool Outfit

Zap! And the Test Unit Sees 5600°F Instantly

The Radiant Heat Facility in Area III runs a heavy schedule of thermal testing of materials, components and assemblies. Usually, the test units are mounted inside an array of quartz infrared lamps and zapped almost instantaneously with temperatures up to 5000°F. This simulates the heating of a space vehicle reentering the atmosphere.

Another kind of heating element used in

the test arrays is assembled from graphite resistors. These arrays produce more heat and are longer lived than the quartz lamps but present more mechanical problems. The graphite arrays also allow more energy to be concentrated into a smaller area.

Recently, test engineers of the facility successfully solved the mechanics of building a large cylindrical graphite test array. Resembling something like a dozen octopi locked in mortal combat, the test array is composed of eight graphite resistors arranged around a cavity some 10 inches in diameter and 12 inches deep. Power of 1.5 megawatts enters graphite rods through copper tubes which also carry cooling water. The threaded graphite rods screw into receptacles in the graphite resistors — 3 x 12-inch blocks about 3/8 inch thick.

During a test, the array can produce temperatures up to 5600°F. It takes about 15 seconds to get to this temperature, but the test unit is shielded beneath the cavity until the proper temperature for the test. The shield is pulled back, like a shutter, and the test unit is thrust into the cavity riding on an air-powered piston. Oxidation of the graphite elements is reduced by releasing a stream of nitrogen gas through the cavity.

The graphite heating array will be used in a materials testing program of Division V of Exploratory Systems Department 1220.

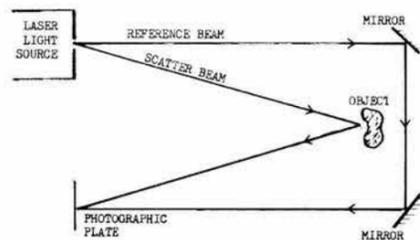
Designers of the array are Jack Barber, Bob Ault and Ned Keltner. Tony Astorga and Jim Brandolino assembled it. Jim Breitenbach contributed instrumentation for test samples, including design of a spring-loaded thermocouple. All are in the Radiant Heat Group of Division 7323 under Paul Adams.

Continued from Page One

HOLOGRAPHY

tions, the amount of surface displacement can be determined by measuring the difference in interference (or fringe) patterns. With the holographic technique, it is possible to make displacement measurements down to one-half of a wavelength of light or .00316 mm. In addition, the holograph provides a topographical map of displacement over the entire surface of a body. A conventional strain gauge, on the other hand, will measure displacement only at a specific point. "By the fringe counting technique, we can determine the actual displacement vectors and their relationship to the entire surface," says Matt. Another possible application of holography is the detection of faulty or inferior cold solder joints in components.

Although the principles of holography have been known since the interferometer was invented in the 19th century, it was of no practical use until development of the laser as a source of coherent light.



Today, however, holography is recognized for its potential as an analytical tool. Work in holography at Sandia, while not the only such work or even the most original, represents a significant advancement toward development of a practical tool out of what had been a scientific curiosity.

Continued from Page One

Nuclear Test Effects Expert

that serious earthquakes might be induced by large-yield nuclear tests. The Panel added that since Amchitka was near one of the earth's most seismically-active areas, "the hazard of inducing an earthquake must be considered to be greater at that location than at either Nevada site." Mechanisms causing earthquakes are not completely understood and the committee would give no assurance against the possibility that Milrow would trigger an earthquake of large magnitude in the Aleutians.

The nuclear shot was detonated on Oct. 2 and the results were as anticipated.

"I was insulated on the island from public opinion," Mel recalls, "but it was obvious that the pessimistic predictions were not coming true."

There were no after shocks — the area might already have been "shaken down" by naturally occurring seismic activity; none of the 3000 sea otters appeared to be hurt; the bald eagles were uninjured. "In fact," Mel says, "the eagles may be more endangered by the process of our leaving the island. About 60 of them have been living off the garbage dump."

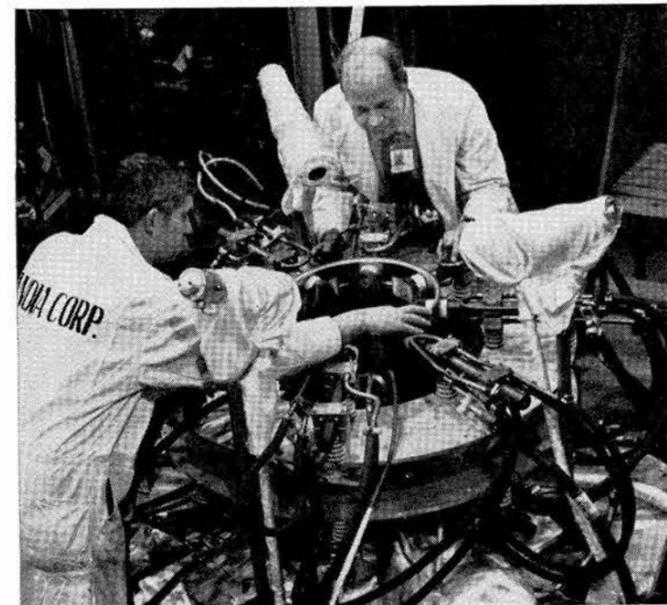
Even so, the people of Anchorage were divided in their opinions as evidenced by headlines in two competing newspapers: which said in effect: "Got Away With It!" and "Knew What They Were Doing."

It will be six months to a year before the formal report on Milrow is complete, but already Mel has returned to Amchitka for a follow-up look at the island and a meeting with Governor Miller's cabinet and a panel named by the governor. In an attempt to get pertinent information to the scientific community as soon as practical, a special session on the seismic results of Milrow was arranged for the national meeting of the American Geophysical Union, held in San Francisco in December. The Sandian was one of those presenting a technical paper.

As to Amchitka's suitability for tests of higher yield, the AEC has stated: "Data from Milrow will be extensively analyzed and the knowledge gained from these analyses will be carefully studied before any determination is made regarding further testing on the island."



JIM BREITENBACH operates control console of the Radiant Heat Facility in Area III.



TEST ENGINEERS Bob Ault, left, and Jack Barber ready the graphite resistor heating array for a test run at the Radiant Heat Facility in Area III.

Service Awards

20 Years



George Cooper
4117



Jerry Durrie
1521



Francis Patterson
7415

15 Years



Louis Baudoin
7654



George Cosden
4332



Robert Erickson
7451



Mary Geilenfeldt
4131



Jane Lord
3421



Donald Morrison
1720



Charles Puglisi
3251



Willard Randall
4513



Adeline Scharping
3256



Albert Schmedler
1611

10 Years

Louise Converse 8121, David Timmer 8168, Gordon Kibby 8223, Gerald Thompson 4371, Gertrude Cleary 3256, Kenneth Mitchell 8174.

Direct Approach Gets Prompt Response

Children continually ask questions and parents frequently give off-hand answers such as "Go ask your mother" or "Look in the encyclopedia." The discussion usually ends there.

Not so with Charlie Gillespie, 11-year-old son of Bob (3411) and Virginia Gillespie (3113). Charlie asked his dad, "How do you pronounce the Vice President's name?" Bob suggested that the boy write Spiro Agnew. End of conversation.

During the Christmas holiday, Charlie had a call from the Vice President's office in Washington. "We received your letter, Charlie," a feminine voice said. "Thank you for your interest. The Vice President's name is pronounced 'Spear-oh.'" Oh . . .

Events Calendar

- Through Feb. 1—Exhibition of Leonardo da Vinci models of both practical and theoretical scientific devices. Museum of Albuquerque, Yale Blvd. South, Tuesday-Saturday 10 a.m. to 5 p.m., Sunday, 1-5 p.m.
- Jan. 16—Community Concert series presents pianist Lili Kraus. Popejoy Hall.
- Jan. 22-25, 29-Feb. 1—Edward Albee's "Everything in the Garden." Old Town Studio, tel. 242-4602.
- Jan. 22-31—Albuquerque Little Theatre presents "Come Back Little Sheba." Tel. 242-4750.
- Jan. 23-24—Annual Jaycee track meet. Tingley Coliseum.
- Jan. 25—Hike to Helicopter and Kiva Mesa. N.M. Mountain Club, leader Bob Kyrilach, tel. 296-1725.
- Jan. 31-Feb. 1—Cross-country skiing in the Chama area. N.M. Mountain Club, leaders Marge Lenth, 268-0282, and Mary Dey, 256-1970.

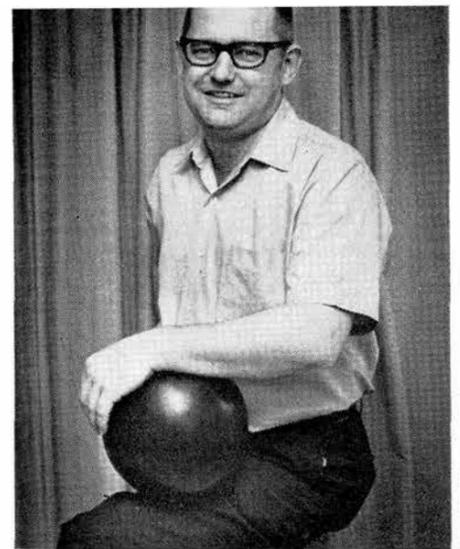
Speakers

F. G. Blottner (9341), "Finite Difference Methods for Solving the Boundary Layer Equations with Second-Order Accuracy"; A. E. Hodapp (9325) and E. L. Clark (9322), "The Effects of Products of Inertia on the Roll Behavior of Ballistic Reentry Vehicles"; T. A. Duffey (5162), "The Significance of the Material Description on the Transient Response of Elastic-Plastic Spherical Shells"; D. F. McVey and Irving Auerbach (both 9328), "Some Observations on the Influence of Graphite Microstructure on Ablation Performance," AIAA 8th Aerospace Sciences Meeting, Jan. 19-21, New York City.

M. R. Scott (5222), "Characteristic Functions for Certain Integral Operators Via Initial Value Procedures," Third Hawaii International Conference on System Sciences, Jan. 13-17.

J. E. Kennedy (5133), "The Dynamics of Imploding Cylinders in Flux Compression Experiments"; A. R. DuCharme (5331), "Stacking-Fault Energies on hcp Metals Based on Optimized Model Potential Theory"; D. A. Freiwald (5242), "Comparison of Theory and Data for Velocities in Hydrogen Filled Quasilinear Shock and Expansion Tubes with Perforated PBX Drivers," 1970 Annual Meeting of the American Physical Society, Jan. 26-29, Chicago.

M. R. Scott (5222), "A Method for Obtaining Bounds on Eigenvalues by Solving Non-Homogeneous Integral Equations," American Mathematical Society Meeting, Jan. 26-30, Miami.



HIGH ROLLER. Ken Jones (7615) rolled a 741 series in recent Labs competition to set a new high mark for a three-game series in Albuquerque this year.

City's High Score Bowled By Sandian

Ken Jones (7615) rolled a 741 series to dominate scoring in the Sandia Labs' 6th annual bowling tournament held recently. Ken's series was the highest score in a sanctioned Albuquerque meet during 1969. He won both the singles and the all-events competitions.

Other winners were:

Doubles — Dick Marmon (7532) and Ray Letourneau (1541).

Team competition — John Perea (2433), Harold Kindschi (4573), Bob Fleming (4233), Chet Laskowski (4213), and Henry Baisdon (4213).

Other leading performances were turned in by Jim Kennedy (5133) who bowled the highest single game and Bob James (3134) who rolled 30 closed frames.

Tournament directors were Dutch Eisold (7651) and Bob James.

John Todd Accepts Position in City Manager's Office



John Todd (3114) has taken leave of absence from Sandia Laboratories to accept a position as assistant to the Albuquerque City Manager. He will serve as liaison and coordination officer for the Police Department, Fire Department, Environmental Health Department and Municipal Courts.

A former FBI special agent, John is particularly interested in securing citizen involvement in the fight against the rising crime rate. He is a member of the City-County Metropolitan Crime Commission.

At Sandia since 1959, John has worked as a staff member and supervisor in security and, for the past year, as an analyst in Compensation Department 3110.

LAB NEWS

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Authors

C. W. Harrison (2625), E. A. Aronson (2625), and D. C. Chang (University of Colorado), "Tubular Monopole of Arbitrary Dimensions: The Radiation Field," Vol. AP-17, No. 5, IEEE TRANSACTIONS ON ANTENNAS AND PROPAGATION.

A. J. Russo (9343), "Radiation Pattern of an Open-Ended Waveguide Covered by Plasma Layers," Vol. AP-17, No. 5, IEEE TRANSACTIONS ON ANTENNAS AND PROPAGATION.

L. C. Bartel (5132), "Approximate Solution for the Strain-Induced Deviation of the Magnetization from Saturation in Polycrystalline Cubic Ferrites," Vol. 40, No. 10, JOURNAL OF APPLIED PHYSICS.

P. B. Bailey and G. E. Barr (both 1721), "Diffraction by a Slit or Strip," Vol. 10, No. 10, JOURNAL OF MATHEMATICAL PHYSICS.

SHOPPING CENTER

CLASSIFIED ADVERTISING

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

RULES

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

FOR SALE

MISCELLANEOUS

- LARGE, clear glass, punch bowl set w/cups, round platter & ladle, \$20; 3' live green plants, \$5 ea. Nelson, 345-0440.
- SELMER MARK 6 tenor sax, \$300. Roberts, 298-3062.
- BABY BED, double drop sides, mattress, \$15. McCammon, 255-6125.
- CHOCOLATE poodle puppies, toy, miniature, will consider trade for toy male. Hankins, 345-1381. after 5:30.
- 16' ARISTOCRAT Land Commander trailer w/refrig. & monomax toilet, heater optional, sleep 5 adults. MacDougall, 299-8496.
- PROJECTOR, 35mm slides, Argus 542 auto., remote control, 500 watts, 7 trays, \$45. DeLollis, 299-5384.
- 357 SUPER BLACK HAWK, 6 1/2" barrel, almost new, w/special holster, \$75. Gurule, 344-0130 after 6.
- 2 NEW Volkswagen tires, size 5x6x15 black, \$30. Smith, 299-7151.
- 2 STUDDER SNOW TIRES, 6:70x14, less than 1500 miles, \$40; wheel for Mustang. Weisenberger, 268-9142.
- POLAROID electric eye camera, model 101 w/flashgun, \$40. Parks, 296-2261.

- RECLINER, \$25; stroller, \$10; walnut coffee table, \$30; Sear's washer, nearly new, \$100. Husa, 298-3355.
- '67 HONDA 450cc, new tires, less than book price. Bowen, 255-8195.
- COLLIE, AKC, female, 22 ch. pedigree, \$75, terms to suit. Lotz, 296-2473 after 5.
- WINGBACK overstuffed chair; vanity dressing table w/mirror; 19" Westinghouse portable TV. Grimsley 268-1427.
- TWO new Weber carburetors, \$80 ea. can be adapted to any car for about \$10. McDonald, 265-2842.
- SERVEL gas refrigerator, \$30. Caster, 299-1239 after 5.
- APT. RANGE: steel bookcase; trailers; trailer parts; 25 different transmissions; concrete tampers; many other things. Saturday, 10 a.m.-2 p.m. only. Villella, 298-7955.
- SMALL miniature male poodle, silver, international champion lines, \$75. Roth, 877-4997.
- HEAD SKIS, 215cm. GS/competition, w/Cubco release bindings, Arlberg safety straps, \$80. Cotter, 255-0517.
- LENNOX furnace, counterflow, 80,000 BTU, inspect now while operating, available around Jan. 20. Atkins, 298-5762.
- CAMERA: Canon FT-QL w/case, 55mm, f1.2 lens, \$250; FL 35mm, f2.5 wide-angle lens, w/case, \$90; both items \$325; new, unused, warranty cards. Blair, 265-2361 after 6:30.
- PUPPIES, 3 wks. old, will hold your choice until weaned, mother is reg. beagle, father handsome stranger. Bartel, 298-5270.
- PORTABLE WELDER: radial arm saw; saddle; block & tackle; Go-cart engine; 250 amp aircraft generator. Patterson, 877-3158.
- BOY'S bicycles, 26" & 24". Thompson, 298-8954.
- SWIVEL platform rocker, brown nylon upholstery, \$25. Armbrust, 298-3666.
- TO GIVE AWAY TO GOOD HOMES: Terrier cross puppies, small dogs, 2 males, 1 female. Hamblett, 298-6052.
- 4-MONTH-OLD Cock-A-Poo male, all shots, good children's dog, \$25. Greenwood, 298-5268.
- NORMANDY FLUTE, \$95; Honda 160, \$225; Honda 350, \$550. Stathis, 268-4037.

- GE portable washing machine, 3 1/2 yrs. old, \$65; motorcycle helmet, 7 1/2, Bell 500, used 6 times, \$25. McDonald, 299-9269.
- TETHER BALL set; 2 long gutter sections & 1 downspout to fit. Pardee, 255-1998.
- MICHELIN tires, 2 size 215x14 w/new 40,000 mile warranty, will replace 8:55x14 through 8:85x14. Nokes, 299-8753.
- EDMUNDS scientific electrostatic generator, \$9; student microscope & slides, \$6; electric model rocket launcher, \$2. Guttman, 299-7031.
- AMPLIFIER, 2 12" speakers, reverberator, 80 watts, \$75. Moore, 256-2748.
- SOFA, Flexsteel, 84", white, \$100; chair, flexsteel, orange, \$25; Kenmore auto. washer, '62 model, \$50; chest, 3 drawer, maple, 42" long, \$45. Crumley, 299-5293.
- KENMORE washer, \$75; child's chest & mirror, \$12; buggy jump seat, \$5; net playpen \$10; wig, \$15. Sherman, 298-9644.
- COLEMAN floor furnace, 1 yr. old, half price; extra long single bed w/mattress & box springs, \$30; 4 chrome wheels for Volkswagen, \$50. Campbell, 268-8445.
- MOTORCYCLE, '66 Honda 305 scrambler. Phillips, 296-1322.
- THREE PC. sectional; dinette table, no chairs. Roybal, 299-0938 after 5:30.
- LIGHT OAK ranch style dining set for 6 w/small china & hutch, \$150; 2 chests of drawers, \$35 & \$15. Baldonado, 298-2863.
- ELECTRIC TRAIN layout, HO gauge, 4'x6.5', completely landscaped w/mountain, bridge & underpass, hinged from wall, \$30. Cover, 268-0921.
- \$30 STEREO headset, \$15; \$15 pr. of walkie-talkies, \$8; \$40 cassette tape recorder, \$25; \$30 cassette, \$20, all new. Breitenbach, 344-7584.
- QUEEN SIZE mattress & box springs, 6" foam, \$45; counter top electric cooking unit, 4-burner, \$30. Duvall, 299-8744.
- EARLY AMERICAN den furniture; World Book encyclopedias. Snidow, 298-6163.
- 21" ADMIRAL TV, \$25. Daniel, 268-8355.
- HONDA 68 350 scrambler, low mileage, \$550. Linn, 282-3986.
- DAUGHTER HOCKEY SKATES, size 7, \$10; men's figure skates, size 6, \$6; Chev. wheel, new 7:75-14 tire, \$10. Martin, 282-3794.

REAL ESTATE

- 4-BDR. HOME, NE, good income, now occupied, will trade equity. Downs, 282-5148.
- 3-BDR. HOUSE, pitched roof, 1 1/4 bath, 2-car garage, 5 1/4% GI w/\$105 mo. P.I.T.I. Robertson, 299-3934.
- 3-BDR. HOME, brick, shake roof, den w/fp, 1 1/4 bath, carpet, dbl. garage, lg. patio. Ryerson, 296-4479.
- CONTEMPORARY CUSTOM HOME, 3 bdr., family rm., LR, double carport, covered patio, circular fireplace, landscaping, assume 5/4% FHA loan, \$24,500. Moe, 255-6271.

CARS AND TRUCKS

- '58 FORD 2-dr., 6-cyl., 3-spd., \$150. Frazer, 296-2871.
- '65 VET. (conv. & HT) 327, Hurst shifter, new tires-dist.-carb., \$100 below book. Ledgerwood, 296-4108.
- '66 VOLKSWAGEN sedan, R&H, \$1000. Boyd, 268-8094.
- '69 MUSTANG, low mileage, not loaded w/extras. Cates, 299-4740 after 6.
- '61 FORD Galaxie 500, 4-dr., AT, white over grey, \$375. Summers, 298-2209.
- '67 CHEVROLET Bel-Air, 4-dr., AC, V8, 5 new Polyglass tires, 24,000 miles. Snelling, 268-5895.
- '48 PLYMOUTH COUPE, runs good but engine needs work, \$50. Leisher, 282-5258.
- '63 BUICK LeSabre, one owner, R&H, AC, PB, PS, 49,000 miles. Drury 898-0667.
- '68 OPEL Kadette, white cpe., new tires, one owner. Molly, 265-0227.
- '62 THUNDERBIRD, one owner, white w/blue interior, 41,000 miles; 5' toboggan. Bliss, 256-2628.
- '62 RAMBLER American, 4-dr., AT, PS, PB, AC, book \$490, price \$550. Lloyd, 298-2437.
- '59 FORD wagon, white, blue interior, OD trans., R&H, PS, tinted glass, \$295. Stark, 8212 Pickard Ct. NE, 299-5953.
- '63 VW MICROBUS. Hoagland, 282-3825.

- '63 VOLKSWAGEN sedan, engine completely rebuilt in July '69, \$695, Griego, 299-0426.
- '65 VW Notchback (not a beetle), white, radio, snow tires & wheels, \$1050. Sublett, 298-1004.
- '63 DKW, 4-spd., 24mpg, \$75. Webster, 298-8102 after 6.
- '64 SCOUT, 4wd, full cab, 283 Chevy motor, \$1125. Brooks, 298-4354.
- '69 TOYOTA Corolla, std. trans., radio, 7000 miles, \$150 below book. Roberts, 298-9163.
- '64 DODGE DART 270, R&H, auto., slant 6, \$200 below book. Netz, 282-3607.
- '64 INTERNATIONAL Travelall, V-8 engine. Fisher, 299-1778.

WANTED

- SKI BOOTS, girl's size 3. Randall, 299-0372.
- GUITAR, full sized classical; canoe, 13', lightweight; male kitten. Tiefa, 299-2763.
- SINGLE WOMAN age 25-30 to share apartment. Miller, 268-5423.
- NEED motor pool from El Dorado Acre, 2 1/2 mi. south from Los Lunas, to parking lot east or west of Bldg. 877. Skelley, Rt. 1, Box 1177, Los Lunas.
- TWO senior girls want ironing jobs. Wickham, 268-8805 after 2:30 p.m.
- REMINGTON model 700 BDL 30-06 w/iron sights, must be in excellent condition. Wilson, 282-3225.
- 10 GAL. AQUARIUM, cheap, leaks O.K. Barton, 255-5491.

FOR RENT

- 2 BDR. HOUSE, furnished, near shopping, bus, both bases & schools. Schmedeman, 877-1092.
- 3-BDR., 1 bath, AC, drapes, carpet, electric range, 1-car garage, very clean, near Base, \$135/mo. Patterson, 243-6219.
- CONVENIENT SE LOCATION, 3-bdr., carpeted, enclosed garage walled-in yard, not pets, ref. required, \$175, water paid. Campbell, 256-1015.



CASINO NIGHT at the Coronado Club Saturday, Jan. 24, offers a chance to break the bank with play money, but big winners will receive valuable prizes. Lady Luck is Sandy Kaufman (3256-2). The Westernaires will play for dancing.

Soul Session Tomorrow at Club

Casino Night Scheduled Jan. 24

Bargain hunters can have a big day tomorrow at the Coronado Club. Starting at 10 a.m. in the ballroom, the Club will hold a "garage sale" of its used or surplus items. Such things as drapes, carpet and patio furniture will be available. It's a first come, first served situation.

From 8 to 12 p.m. tomorrow evening, the Club will offer the best entertainment buy in the city. Rod King and the Knights, a big modern rock band, will make happy music while social hour prices prevail all evening. It's free to members, 50 cents for guests. These "soul sessions" have proved popular attractions—some 300 troopers crowded the ballroom for the November event. The dancing was something else.

Casino Night

The Coronado Casino Night, firmly established now as an annual Club tradition, will be held Saturday, Jan. 24, starting at 8 p.m. The \$1 donation for members (guests \$2) will buy you a bundle of play money and the opportunity to win real prizes at your favorite games of chance. During the evening a selection of sandwiches will be available while Elton Travis and the Westernaires play for dancing.

Social Hours

A group called the Good Times will be wired into the bandstand tonight from 6 to 9 p.m. Buffet feature will be the Club's special Mexican food at \$1.25 for adults, \$1 for kids. Happy hour prices are in effect from 5 to 9 p.m. Pat Reich and piano will entertain with a sing-along in the main lounge from 9 until 12 p.m.

On Friday, Jan. 23, seafood will be the buffet feature while Frank Chewie will play for dancing.

Chuckwagon roast beef will top the buffet menu on Friday, Jan. 30. Tommy Kelly and the smiling Irishmen will be on the bandstand.

Dance Lessons

It's not too late to sign up for dance instruction at the Coronado Club. Advanced and beginning groups will meet on Monday evenings for another nine weeks. Register at the Club office.

Three Present Reports At Plowshare Meet

Three Sandians participated in the American Nuclear Society's Plowshare Symposium on Engineering with Nuclear Explosives, held this week in Las Vegas, Nev.

Tom Brumleve (8184) discussed "Reliability Implications for Commercial Plowshare Applications" during the session on nuclear operations.

Jack Reed (9150) reviewed air blast effects, incorporating information obtained during the Schooner shot with previously available data.

Luke Vortman's (9111) presentation on "Close-in Air Blast from Underground Explosions" included a reanalysis of data from underground high explosive experiments to predict air blast effects.

"Night of the Iguana" Locale

Coronado Club Offers 4-Day Travel Package to Puerto Vallarta, Mexico

Puerto Vallarta, Mexico, is an unspoiled semi-tropical resort town rimmed by mountains and hugging the Pacific which reposes between white sand beaches and a lush jungle. It's about halfway between Mazatlan and Acapulco. You can spend four days there for \$149 with the Coronado Club.

The package trip is scheduled May 5-8 and includes the round-trip jet flight, taxi to the luxurious Posada Vallarta resort hotel, three nights at the hotel plus breakfast and dinner each day.

Facilities at the hotel include two restaurants, swimming pool, private beach, rooms with terraces and nightly dancing and entertainment in two cocktail lounges.

Additional attractions available in the area include deep sea fishing, beach boat excursions, small game fishing, a jungle tour, water skiing and scuba diving; horseback riding and jeep rentals can also be arranged.

A total of 141 persons need to make the trip to make it feasible as a package. As an extra attraction, a drawing will be held in-flight and the lucky winner gets his trip for free—his \$149 will be refunded. Frontier jet service will be first class and includes dinner and cocktails.

The trip will be discussed in detail and a movie will be shown at a sign-up night Tuesday, Feb. 3, in the El Dorado room at the Club, time 7:30. A \$25 deposit is required. Refunds can be made up to March 24.

In charge of the trip for the Coronado Club is Chet Fornero (4335), secretary of the board of directors. Chet has visited Mexico a number of times, primarily for the deep sea fishing.

"When the Club was offered this travel package, it was too attractive to turn down," Chet says. "This is a very good price. Rooms at the Posada Vallarta usually cost between \$30 and \$40 per day and that doesn't include meals. It's a great place to stay."

Chet says that reservations for the trip will be on a first come, first served basis. If more than 141 persons sign up for the trip, then a second excursion could be arranged May 11-14.

Any Sandia or AEC employee is eligible (including retired employees, spouses and dependents) providing he is a member of the Coronado Club. Club membership costs \$2.50 per month by payroll deduction, \$13 semi-annually or \$25 annually.

The trip is arranged for convenience and comfort. At the sign-up meeting, details about visas, baggage, check in, etc., will be explained. These details are very simple, Chet says. A vaccination certificate is no longer required in Mexico.

Anyone wishing to sign up for the trip prior to the Feb. 3 meeting may do so by placing the \$25 deposit at the Club office. The remainder of the fee must be paid by March 24.



PUERTO VALLARTA, a semi-tropical resort on the Pacific coast of Mexico between Mazatlan and Acapulco, is the destination of a four-day travel tour by the Coronado Club May 5-8.

Supervisory Appointments



LARRY HARRAH to supervisor, Physics of Organic Solids Divisions 5514, effective Dec. 1.

Larry has been with that division since he joined Sandia in 1966. A radiation sensitive plastic dosimeter which he invented and developed here is the subject of an AEC patent.

Before coming to Sandia, Larry was with the Air Force Materials Laboratory at Wright Patterson Air Base where he studied radiation chemistry and analytical spectroscopy. He was on active duty with the Air Force for his first three years there and, upon being discharged in 1960, remained at the Lab as a civilian until 1966.

He has a BS in chemistry and a PhD in physical chemistry from the University of Missouri.

Larry, his wife Madge, and their two children live at 3620 Holiday Ct. NE.



DICK ROHDE to supervisor, Metallurgy I Division 5531, effective Jan. 1.

Upon joining Sandia in 1967, Dick was assigned to the Dynamic Stress Research Division where he studied dislocation dynamics in shock-loaded metals.

Dick has a BS in ceramic engineering and a PhD in metallurgy from the University of Utah where he was a research fellow.

He is a member of the American Society of Metals and the American Institute of Metallurgical Engineers.

Dick, his wife Georgia, and their two daughters live at 12228 Yellowstone NE.



BILL PURCHASE to supervisor, Traffic Section 4363-2, effective Nov. 15.

Bill has been at Sandia since 1955 and has worked in the property and supply, plant accounting, purchasing, and traffic groups. He began as a graded clerk and in 1957 was promoted to staff assistant. In 1966 he was promoted to staff associate and a year later to staff member.

He has a BA in general business from the University of Albuquerque where he now teaches a course in purchasing. Part of his college work was done under the Educational Aids Program.

Bill was in the U.S. Navy for seven years and served as a storekeeper aboard the USS Badoeng Strait and the USS Pine Island.

He is a member of the National Defense Transportation Association.

Bill, his wife Addie, and their four daughters live at 2913 California NE.

SAFETY



is remembering
the job is not
done until the
clean-up