



AWARD OF HONOR—A plaque commemorating Sandia Laboratory's safety accomplishments between August and November last year was presented recently to Sandia President S. P. Schwartz (r) by L. W. Otoski, Sandia Area Office Manager for the AEC. The award recognized 3,741,124 continuous man-hours of work without a lost-time injury.

## AEC Recognizes Sandia Laboratory's Safety Record with Award of Honor

The Atomic Energy Commission Award of Honor recently was presented to Sandia Laboratory for having completed 3,741,124 continuous man-hours of work without sustaining a disabling injury.

The achievement was attained last year in the period from Aug. 14 to Nov. 24.

In forwarding the plaque for presentation to the Laboratory, AEC General Manager R. E. Hollingsworth stated that the Commission relies on such safety accomplish-

ments to maintain its leadership in industrial accident prevention.

He said, "We have long been aware of Sandia's interest in safety, as evidenced by its having received two Awards of Merit, five Awards of Honor, and the Best Record Trophy for the outstanding achievement of completing 14,936,169 man-hours without a disabling accident from July 16, 1959, to Sept. 6, 1960.

"Please extend the appreciation of the Commission and my personal congratulations to the employees concerned for these fine evidences of their continuing interest in good safety performance."

L. W. Otoski, Sandia Area Office Manager, in turn presented the award to S. P. Schwartz, Sandia Corporation President, at a luncheon program in the Coronado Club.

In accepting the award, Mr. Schwartz remarked, "The real credit for earning this award rests directly with all Sandia employees. Such accomplishments can only be achieved by individual effort and group cooperation. This award is evidence that accidents don't have to happen and can be prevented if we are all aware of our safety responsibilities and practice them.

"This award evidences good safety performance for a specific period of time; however, for the whole of 1964, much is left to be desired. We can't be satisfied with a 'part-time' safety effort that reduces accidents for three months out of 12, but must work in all our operations so that safety becomes a way of life with each of us."

### AEC Seeks Bids to Improve Sandia Electrical System

Bids on work to improve the electrical distribution system in Tech Area I were opened yesterday by the Albuquerque Operations Office of the Atomic Energy Commission.

Work completion is expected in 115 days. The project calls for installation of a new master transformer unit, associated switch gear and underground distribution circuits, as well as some modification and relocation work.

### Sandia Men Named Members of Albuquerque Junior Chamber Board



Mr. Seligman



Mr. Winklejohn

A. L. Winklejohn, Aerospace Nuclear Safety Division III, has been elected state director of the Albuquerque Junior Chamber of Commerce, and L. J. Seligman, Instrumentation Systems Division, has been elected to the board of directors.

In his new capacity, Mr. Winklejohn will serve as the link between state and local Jaycee organizations. He will serve a one-year term of office.

As state director, he becomes a member of both the Albuquerque and State of New Mexico boards of directors. He will sit on the local board with Mr. Seligman, who was elected to fill a one-year term.

Mr. Seligman worked until recently in Electrical Properties and Dielectric Materials Division. He joined the company in March 1960 and has been affiliated with the Jaycees for little more than a year.

## Number of Employees Enrolled in Out-of-Hours Classes Nears 1600

Enrollment in Sandia Laboratory's Out-of-Hours Educational Program now stands at 1568 and is expected to top 1600 before the end of the semester, according to Technical Training and Education Division which conducts the program. Out-of-Hours enrollment has increased steadily in past years but has not reached 1600 before. It will probably do so when registration is completed in two new first aid courses which will be starting soon.

Seventy-one courses are being taught this semester. Classes are held during the noon hour or after work and are instructed by qualified Sandia employees, experts in their subject matter. Most of the instructors hold advanced degrees and many have had university teaching experience.

Twenty-six university level courses are being conducted with an enrollment of

736 employees. Eighteen technical institute level courses have an enrollment of 297. Nine trades level courses have 136 employees enrolled, and four clerical courses have 203 students. In addition, 14 special courses have 203 employees enrolled. These are company-oriented courses designed for employees of a specific organization.

All Sandia Out-of-Hours courses are company-oriented and designed to meet the specific needs of employees. In many of the university level courses, the subject matter — such as Physics of Thin Films, 263B—borders on the advanced edge of the science.

Out-of-Hours courses are offered only when the needs of the employees and the Corporation cannot be met through existing offerings at local colleges or in the public school system.

SANDIA CORPORATION

# LAB NEWS

PRIME CONTRACTOR TO THE ATOMIC ENERGY COMMISSION / ALBUQUERQUE, NEW MEXICO / LIVERMORE, CALIFORNIA



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### Sandia Evaluated Safety

## AEC Launches Space Reactor Into 700-Nautical-Mile Polar Orbit

The Atomic Energy Commission launched a compact nuclear reactor power system from Vandenberg Air Force Base, Calif., Apr. 3.

The 970-lb. device, designated SNAP-10A, was boosted into a 700-nautical-mile polar orbit by an Atlas-Agena vehicle.

The objective of the flight test is to establish the feasibility of operating a nuclear reactor power system in space.

The SNAP-10A system was developed under the AEC's SNAP (Systems for Nuclear Auxiliary Power) program. The purpose of the program is to develop reliable, long-lived sources of electrical power for satellites and space vehicles, and for other uses on land and in the sea.

Atomics International, a division of North American Aviation, Inc., Canoga Park, Calif., is prime contractor to the AEC for the space power system.

The AEC has assigned Sandia Corporation the responsibility of evaluating operational safety aspects of nuclear power sources for use in space. Sandia's Aerospace Nuclear Safety Department under V. E. Blake, Jr., conducted ground and flight tests on the SNAP-10A reactor, including

an 800-mile suborbital reentry flight demonstration test of a non-radioactive model of the SNAP-10A from Wallops Island, Va., to a point southwest of Bermuda in May 1963.

Sandia's independent safety assessment of the reactor was sent to the AEC in Washington, D. C., for formulation of safety criteria for this flight.

SNAP-10A includes a nuclear reactor and power unit. Heat produced by nuclear fission in the reactor is converted directly into 500 watts of electricity by thermoelectric elements. The power will be used for the spacecraft's extensive test instrumentation and to test an ion propulsion engine developed by the Air Force.

The reactor is cooled by a liquid metal alloy of sodium and potassium. Enriched uranium-235 is combined with zirconium hydride to form the fuel.

A radio command from the ground initiated the start-up of the nuclear power system after it was placed into orbit. The reactor was controlled during start-up by rotation of selections of a beryllium reflector surrounding the reactor core.

The reactor reached full power about 24 hours after launch and the reactor system went into self-controlled operation about 48 hours later. Once the reactor is stabilized at a desired power level, the reactor system uses no moving parts. It has been designed to operate for one year.

Future space, lunar and planetary missions will require power supplies up to many thousands of kilowatts, with lifetimes up to several years and with near-perfect reliability. The only practical device which can meet requirements for relatively large amounts of power in space exploration is a nuclear reactor. The SNAP-10A system technology can be applied in nuclear space power units that have no moving parts and are capable of producing up to tens of kilowatts of power.

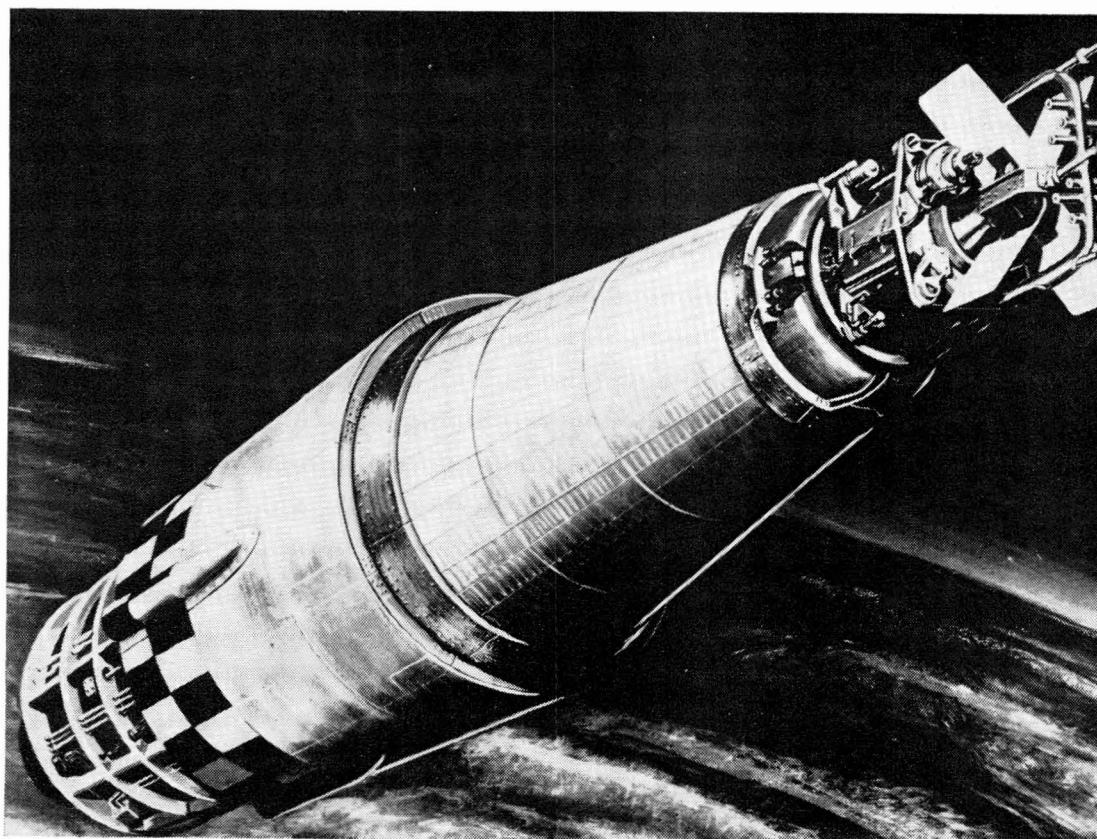
### Bldg. 892 Modification Bids Received by AEC

An Albuquerque firm, Jack B. Henderson Construction Company, has submitted the apparent low bid on a work project in Tech Area I.

Specifications call for the construction of a mezzanine on the east high bay of Bldg. 892 to be occupied by Advanced Manufacturing Development Department. Project engineer is C. M. Morrisett, Building and Design Facilities Division II.

Henderson's bid of \$26,807 was the lowest of five received.

SPACE REACTOR—Artist's concept of the compact SNAP-10A nuclear power system now orbiting in space shows the reactor (top, right) and the thermoelectric converter-radiator (center) mated to an Agena vehicle (lower left). The reactor will power spacecraft instrumentation, and an ion engine to be tested by the Air Force as a secondary payload. SNAP-10A is being developed for the Atomic Energy Commission by Atomics International, Canoga Park, Calif. SNAP (Systems for Nuclear Auxiliary Power) is an AEC program to develop reliable, long-lived power sources for use in space, on land, and in the sea. Sandia performed a safety evaluation of the SNAP-10A system.



## (Editorial Comment)

# Discriminatory Practices Banned

The following two government regulations further implement Sandia Corporation's policies regarding discriminatory practices.

The first stipulates that the AEC shall neither "sponsor, support, nor financially assist, directly or indirectly, any conference, convention, or meeting held under circumstances where participants are segregated or treated unequally because of race."

The directive provides that AEC public information programs, educational activities, and services of a like character shall be available to all persons on an equal basis.

The other Commission regulation prohibits discrimination in programs or activities receiving financial assistance from the AEC.

An application of the Civil Rights Act of 1964, it provides that ". . . no person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance."

The regulation applies to the extension of financial aid by way of grant, loan, or contract other than a contract of insurance or guaranty.

## Sandia Speakers

G. L. Morrisroe of Facilities and Supplier Evaluation Division, "A New Method of Computerized Management Control," American Society of Tool and Manufacturing Engineers' annual engineering convention, Mar. 29-Apr. 2, Cleveland, Ohio.

D. C. Wallace of Crystal Physics Division, "Some Recent Work in Lattice Dynamics," Research Seminar, Mar. 4, Oak Ridge, Tenn.

D. P. Brautigam of Maintenance Control Division, "Use of Project Planning Network at the First Line Foreman Level," 1965 National Plant Engineering and Maintenance Conference, Mar. 8-10, Detroit, Mich.; "An Analysis of the Application of Labor Standards to Maintenance Craft Activities," ASME-AIPE Plant Engineering and Maintenance Conference, Apr. 26, Philadelphia, Pa.

Katheryn E. Lawson of Crystal Physics Division, "Optical Absorption Spectroscopy of Transition Metal Complexes," Third Annual Carver Fellow Lecture, Carver Research Foundation, Mar. 22, Tuskegee, Ala.

L. S. Nelson of Aerospace Sciences Division, "The Combustion and Explosion of Zirconium Droplets Ignited by Flash Heating," Argonne Laboratories Seminar, Mar. 4, Argonne, Ill.

R. C. Marsh of Advanced Manufacturing Development Division, "Proposed Tentative Test Method for Lead Testing High Efficiency Particulate Air (Hepa) Filters," ASTM F-1-X subcommittee, Feb. 25, Washington, D. C.

M. McWhirter of Shock Division, "Mechanical Shock Testing at Sandia Corporation," Mountainair Rotary Club, Mar. 11, Mountainair, N. M.

H. H. Wicke of Applied Mathematics Division, "Concerning Spaces Having Bases of Countable Order," American Mathematical Society meeting, Apr. 12-15, New York City.

E. J. Sherry of Systems Analysis Division II, "Some Inequalities for the Heat Operator," American Mathematical Society meeting, Apr. 12-15, New York City.

R. T. Meyer of Plasmas and Kinetics Research Division, "Flash Photolysis and Time Resolved Mass Spectrometry: Decomposition of Methyl Iodide," National American Chemical Society meeting, Apr. 4-9, Detroit, Mich.

J. O. Wear of Plasmas and Kinetics Research Division, "Transference and Solvation Phenomena of  $MgCl_2$  in Water-Ethanol Solutions," National American Chemical Society meeting, Apr. 4-9, Detroit, Mich.

T. D. Harrison of Quality Control Engineering Division, "Computer Applications in Quality Control Operations," 21st Conference of the Rochester Society for Quality Control, Mar. 23, Rochester, N. Y.

C. W. Harrison, Jr., of Advanced Electronics Systems Division, R. W. P. King, Sandia consultant and Professor of Applied Physics at Harvard University, and Keigo Iizuka of Harvard University, "Self and Mutual Admittances of Two Identical Circular Loop Antennas in a Conducting Me-

dium; Theory and Experiment," National Academy of Sciences, Apr. 23, Washington, D. C.

J. G. Eberhart of Inorganic Materials Science Division, "The Solution of Equations by Successive Approximations," Alchemist Club of the College of St. Joseph, Mar. 30, Albuquerque.

E. L. Devor of Value Engineering & Cost Reduction Division, "The Barriers to Acceptance of Change," 1965 ASTME Engineering Conference and Tool Exposition, Mar. 31, Cleveland, Ohio.

A. D. Andrade of Model Shop and Inspection Division and J. W. Dini of Materials Application Division, both Livermore Laboratory, "Preventing Breakdown of Photosensitive Resists on Copper," California Circuits Association and Stanford University Symposium on Printed Circuits and Packaging, Mar. 24-25, Palo Alto, Calif.

E. L. Chavez of Solid State and Thin Film Devices Division, "Bonding to Metallic Films and Solid State Devices," California Circuits Association and Stanford University Symposium on Printed Circuits and Packaging, Mar. 24-25, Palo Alto, Calif.

F. M. Smits of Radiation Physics Department, "Radiation Effects in Semiconductors and Semiconductor Devices," Pittsburgh Section of the IEEE-PTGED, Mar. 11, Pittsburgh, Pa.

## Lab News Editor Since 1950

# R. S. Gillespie Assumes New Duties In Sandia Technical Information



Robert S. Gillespie, editor of the Sandia Corporation Lab News since November 1950, transferred last week to supervisor of newly-created Technical Information Division III.

In his new position, he will be responsible for coordinating reviews of Sandia Corporation technical information for release to the public, for publication of Tech Notes, for liaison with AEC Technical Information Division, and for information support to the Interservice Data Exchange Program (IDEP). He will coordinate the Sandia Corporation Reprint Series.

The Division will provide writing and editing support for a variety of management and technical reports, and handle the request correspondence from outside agencies (more than 6000 per year) seeking Sandia Corporation unclassified technical information.

Bob has headed the Lab News since its beginning as a printed industrial publication. Through the years he has guided the paper on a course of excellence, achieving many awards and honors in industrial publication competitions.

In June 1957, Bob was installed as



## Sandians Are Judges For Regional Science Fairs in New Mexico

A number of Sandia Laboratory employees aided science education recently by serving as judges for student entries in three New Mexico Regional Science Fairs.

For the regional event held at the University of New Mexico Mar. 26-27, the following Sandians served as judges:

W. B. Estill, J. C. Eberhart, L. K. Jones, Jean Antoine, D. M. Mattox, Albert Goodman, G. E. Seay, W. B. Pepper, C. A. Coonce, Osborne Milton, Ann Shiver, E. J. Gilbert, J. E. McDonald, S. C. Levy, M. M. Robertson, G. W. Stone, G. J. McClure, B. H. Van Domelen, R. C. Hildner, P. B. Bailey, R. D. Driver, and W. D. Weart.

D. E. Irvin, supervisor of Community Relations Division which provided support to the state Science Fair effort, participated in the awards program and made the final presentation of awards to the two regional winners selected to attend the National Science Fair.

At the Regional Science Fair, held Mar. 29 at New Mexico Military Institute at Roswell, R. G. Elsbrock, C. A. Hall, and J. A. Corll served as judges. M. A. McCutchan, supervisor of Technical Training and Education Division, was the featured speaker at the awards program. His subject was "After High School, What Then?"

Serving as judges at the Regional Science Fair held at New Mexico Highlands University Mar. 27 were R. C. Heckman, L. S. Nelson, L. F. Shampine, and J. O. Wear.

AMONG SANDIANS serving as judges during recent Regional Science Fairs were (from left) W. B. Pepper, C. A. Coonce, and Ann Stiver. They are evaluating a junior high student exhibit on dial selective communication.

## Sandia Authors

G. W. Arnold and F. L. Vook, both of Crystal Lattice Defects Division, "Production of Defects in InSb by X-Rays," Mar. 15 issue, *Physical Review*.

E. H. Beckner of Electro Physics Research Division, "Plasma Depolarization and Heating in the Collision of Polarized Plasmas," April issue, *Physics of Fluids*.

D. E. Munson of Deformation of Materials Division and E. R. Gilbert of Argonne National Laboratory, "High Temperature Deformation Kinetics of Copper with Special Reference to Multi-Step Reactions," February 1965 issue, *Transactions of the Metallurgical Society of AIME*; with J. E. Flinn of Argonne National Laboratory, "Stress Dependence of the Transition Behavior in Multi-Mechanism Creep Reactions: With Special Reference to Zinc," November 1964 issue, *Philosophical Magazine*.

John L. Gardner of Technical Libraries Division, "The Library as a Partner in Scientific Creativity," March issue, *Library Association Record*.

D. P. Brautigam of Maintenance Control Division, "Application of Lift Trap Recovers Valuable Space," April issue, *Plant Engineering*.

R. A. Graham of Dynamic Stress Division, F. W. Neilson of Advanced Systems Development Department II, and W. B. Benedick of Dynamic Stress Research Division, "Piezoelectric Current from Shock Loaded Quartz—A Submicrosecond Stress Gage," May issue, *Journal of Applied Physics*.

K. C. Weir of Graphic Arts Department, "Reproduction Centers and Self-Service Copying Equipment," May issue, *Reproduction Engineer*.

P. A. Nicovich of Design Definition Division B, "Zero Tolerance at MMC? Practical—If Properly Applied," April issue, *Graphic Science* magazine.

## SANDIA CORPORATION LAB NEWS



ALBUQUERQUE, NEW MEXICO • LIVERMORE, CALIFORNIA

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## Welcome Newcomers

Mar. 8-Apr. 2

**Kansas**  
Richard C. Basinger, Lawrence .....5253

**Ohio**  
Bruce J. Hodgins, Cleveland .....5612

**Texas**  
T. Patrick Conlon, Jr., Port Arthur ....4224

**Washington**  
Peter J. Chen, Seattle .....1116

# LIVERMORE NEWS

## New Test Facility, Offices Completed for Livermore Area 8

Occupancy of the Bldg. 976 Explosive Component Environmental Facility at Area 8 has begun, after nearly nine months of construction. Completed at the same time was additional office space in Bldg. 973 to accommodate Area 8 personnel.

The new test facility occupies about 2050 sq. ft. It contains four test chambers, or cells, for subjecting explosives to environments of shock, vibration, acceleration, and temperature extremes. Each cell is capable of fully containing an explosive detonation of up to 10 oz. of HE. The venting system gradually releases the pressure, gasses, and other by-products resulting from a possible explosion. In conjunction with the test chambers, the building contains a data center and a mechanical equipment room.

F. J. Maloney, supervisor of Area 8 Hazardous Test Division, summarized the difference between the existing HE Firing Facility and the new Environmental Facility this way: "The Firing Facility is used to test

explosive components that are deliberately detonated. In the Environmental Facility, we will be testing the reaction of explosive components to certain environments.

There is considerable work to be done before the new facility becomes operational. Installation of an instrumentation system is the biggest job remaining. A system of controls and safety interlocks similar to that in the Firing Facility has been designed and will be installed in the Environmental Facility before tests begin. The facility should be operational about Sept. 1.

The expansion of Bldg. 973 adds about 1540 sq. ft. of office space for Area 8 use.

Construction of both projects was awarded under one contract to Payne Construction Company of Oakland, low bidder at \$150,446. Sandia project engineer was Len Bedinger of Plant Engineering Division. L. R. Myers of Area 8 Hazardous Test Division worked with Len in the design and construction of the Environmental Facility.



TONY LUNA, Livermore Laboratory's only gardener, faces spring with determination. At this season, his contribution is most notable. In the weeks to come, Tony will be busy improving the appearance of the grounds.

## Anyone Want to Change Jobs With Livermore Laboratory's Tony Luna?

Springtime is of great significance to Tony Luna. At that season his contribution to Livermore is most notable. It is in the spring when Tony's job is the envy of many of the desk weary. But, as Tony will attest, the pleasures of the season are deceptive.

Tony is a gardener, a nurseryman of many years experience. He is the only gardener employed at Livermore Laboratory.

Close-cut lawns and shrubs are the hallmark of the institutional landscape; they denote the orderliness of business and convey a feeling of confidence and permanence. But there is little to indicate the labors required to maintain this stately appearance. In the spring the lawns begin to grow faster,

requiring more attention; plants that have deteriorated during the winter must be revived or replaced; and damage to plants by winter winds and rains must be repaired. All this is Tony Luna's province.

In one day, Tony may mow hundreds of square feet of lawn, trim long hedges, prune a variety of trees, diagnose and treat ailing plants, fertilize, spray insecticides on shrubs, and, if time permits, remove weeds from the many cultivated areas around Laboratory buildings or parking areas.

Spring is not an easy time for Tony, in spite of the apparent enjoyment of working outdoors. He is a devoted gardener who takes pride in his work, but there are times, such as in spring, when an inside job looks as appealing to him as his does to many of us.

### Livermore Notes . . .

On Mar. 18, Livermore Laboratory was host for a meeting of AEC integrated contractors who discussed product change incorporation. About 50 attendees reviewed methods and problems of design and manufacturing agencies relative to effectivity of change orders. C. R. Barncord, manager of Product Development Department, was chairman. Meeting arrangements were made by Sid Wagner of Engineering Practices Division.

Ray Raty won the first-place trophy in the straight handicap tournament, sponsored by the Sandia Employees Golf Club, Mar. 6, at the Hayward Golf Course. He scored a low net of 68. The "best ball foursome" award was won by Gene Aas, Tom Dadian, "Mo" Houk, and Bernie Kraemer.

The Sandia "Oldtimers" basketball team captured a first-place trophy in Livermore's "C" League by winning 13 of the 14 games played. The eight-man league, sponsored by the Livermore Area Recreation District, began last November. Games are played at the Livermore High School gymnasium. Sandians on the winning team are Gib Magruth (captain), Bob Bedford, Dave Bray, Ken Marx, Tom Meagher, and Ralph Morrison.



OVERSIZE VENT for exhausting overpressure, gasses, and other HE-detonation byproducts is described by L. R. Myers (kneeling) to F. J. Maloney (left), supervisor of Area 8 Hazardous Test Division, and L. B. Bedinger of Plant Engineering Division. This is one of four similar cells used to subject HE components to specific environments of shock, vibration, acceleration, and temperature extremes. Although components are not intentionally detonated, they are tested in these enclosures so any blast will be contained.

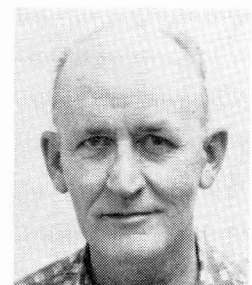
## Second Boat Charter Follows Success of Dance Ticket Sales

Because so many were unable to obtain tickets for the Apr. 23 Spring Cruise-Dance on San Francisco Bay, the Livermore Dance Committee has chartered the boat again for Friday evening, June 11. As before, capacity is limited to 350 persons, with tickets at \$2.50 each.

Tickets go on sale Apr. 12. However, between Apr. 12 and 14, those who were unable to purchase tickets for the first cruise will have an opportunity to buy early. After Apr. 14, tickets will be available on a first-come, first-served basis to anyone at the Laboratory.

Details of the second cruise-dance will be posted on Laboratory bulletin boards.

## Death



Ned Tootle, a Livermore Laboratory employee for nearly seven years, died in an automobile accident on Mar. 26. He was 51 years old. His wife, Emaline M., died in the same accident.

Mr. Tootle was a service clerk in Material Services Division.

Among the survivors are three sons, John J., Frederick L., and Herbert R., and a daughter, Mary E., all of Livermore.

## Forty-Year-Olds to Compete in SCLL Softball Contests

A new threat to SCLL intramural softball team standings arose last month with the formation of a powerful new team, the "Forty-Plus." Consisting of members all over 40 years old, the team plans to compete against the regular intramural softball teams formed by SCLL departments. Each player on the new team has had city league or semi-professional softball experience.

A similar group formed a basketball team last season and successfully challenged all comers to become season champions.

Forty-Plus team member Jack Wilson summarized the plans of the new team: "The strategy we'll use is very basic. We intend to hit only home runs to avoid all that fast running!"

INTRAMURAL THREAT — Employee Services recreation director Jim Henderson (holding box) appears somewhat in doubt about the potential of Livermore Laboratory's new "Forty-Plus" softball team. Team members shown are (standing) Joe Buchler, Jess Floyd, Al Alford, Jim Henderson, Jack Wilson, Roy Maxwell, Clarence Loveless and Bud Pearson. Kneeling are Mike Lovato, Mo Roberts, and John Neuberger. Absent for the picture were Lyle Hake, John Bryson, Jack Renaud, Wes Hodges, and Leo Gutierrez. Jess Floyd has been active in organizing the team.



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LAB NEWS

APRIL 9, 1965

# LASER - Interferometer Measures to 1.6 Millionths Inch

There are probably few instruments that have affected modern physics as profoundly as the interferometer, invented by A. A. Michelson over a half-century ago. With this optical instrument, he disproved some previous theories in physics, and, among other things, paved the way for Einstein's theory of relativity. He also provided an evaluation of the length of the meter bar in terms of light waves. The latter was the basis for the modern length standard based on the wavelength of light. The interferometer has found use in many different areas of optics and physics.

Livermore Laboratory has added to the conventional interferometer the high-spectral-purity characteristics of the gas LASER (Light Amplification by Stimulated Emission of Radiation) in the development of a rugged, stable, length-measuring instrument with resolution to within about 1.6 millionths of an in. This resolution, which approaches that of the National Bureau of Standards, was previously possible only under the most stringent laboratory conditions. Since length is the basic dimension studied and controlled in almost all research, development, and production work, the LASER interferometer can be expected to find application at all levels of industry.

### How an Interferometer Works

Michelson described the term "interferometer" as denoting any arrangement which separates a beam of light into two parts and allows them to reunite under conditions to produce optical interference. An interferometer operates by splitting a beam of light so that part of the beam travels a fixed distance to a viewing point and the remainder travels to a moveable reflecting surface before being reflected back to the viewing point. When the portions of the original beam are recombined, the result is a regular alternation in light intensity, or "interference pattern." The number of these regular alternations is related to the distance that the moveable reflector has traveled.

The basic Michelson interferometer consisted of a light source, a beamsplitter, a fixed mirror, and a moving mirror. The beamsplitter was a half-silvered mirror, i.e., a very thin deposit of silver on glass, which divided the light beam into equal parts of transmitted and reflected light. Conventional interferometers, based on the Michelson design, used mirrors to control the paths of beams of light. Because the mirrors are difficult to keep properly aligned, and conventional light sources are relatively impure, usefulness is limited, and measurements are restricted to distances of only a few inches.

### Adding the LASER

The new LASER interferometer, basically similar to the Michelson design, consists of an optical circuit using a modified Kosters double-image prism and a trihedral corner-cube prism; a helium-neon gas LASER light source; and a solid-state elec-

tronic network for fringe detection, counting, and readout. (Interference or diffraction of a light source will produce "fringes," which are colored bands associated with light.) The LASER is the most important factor contributing to stability and ruggedness of this design.

Sandia engineers Jack Foster and Jay Gilson are the co-inventors of this instrument. Although Jay no longer works on the project, Jack has been responsible for continuing studies with the interferometer, and sees extensive industrial and laboratory uses for the improved device. He is combining his work on the interferometer at Sandia with his doctoral program at the University of California.

"The usefulness of past interferometers has been limited by their almost continuous need for sensitive, delicate adjustment," Jack commented. "The unique stability of the present interferometer is due largely to the LASER's allowing use of the modified Kosters prism, which replaces the beam-splitter and mirrors of the typical Michelson instrument. For the first time, all critical reflecting surfaces are 'locked in' for a fixed arrangement. This means that periodic adjustment and realignment is virtually eliminated."

All interferometers are limited by the purity or singleness of the wavelength (color) emitted by the light source. The continuous-output gas LASER used with the present instrument produces an intense, powerful light of a purity greater than ever before obtained. It is this purity that makes the optical arrangement of the LASER interferometer practical, and makes distant measurements possible.

### History

Diffraction fringes produced by both a narrow obstacle and a slit were observed by Grimaldi in 1665. At about the same time, Hooke tried to define colors of thin films by means of a wave theory of "wave propagation through subsidiary wavelets."

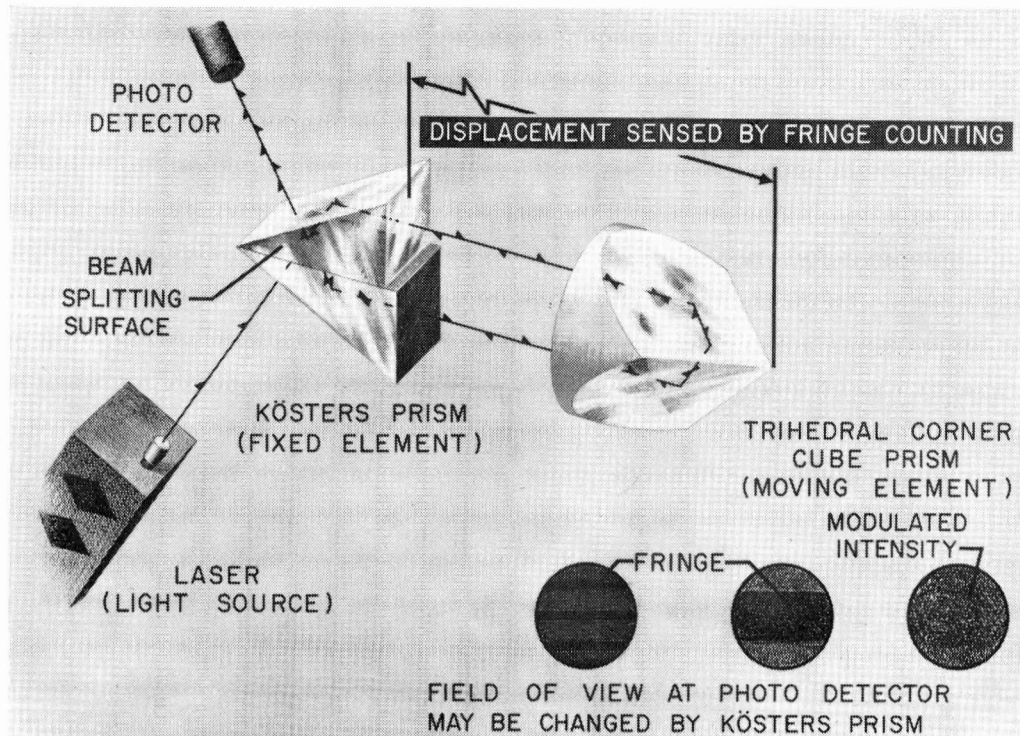
Newton's publishing of his *Optiks* in 1704 culminated more than 38 years of research in light phenomena. In it he discussed refraction, dispersion, and the discovery of the color spectrum; a reinvestigation of Grimaldi's experiments on diffraction; and a study of interference colors of thin films, especially the phenomena now called Newton's rings.

In 1802, Thomas Young proved by simple experimentation that light is subject to interference and is propagated as a wave form. In spite of many attacks on the validity of Young's experiments, they became the prevailing theory for light propagation and diffraction.

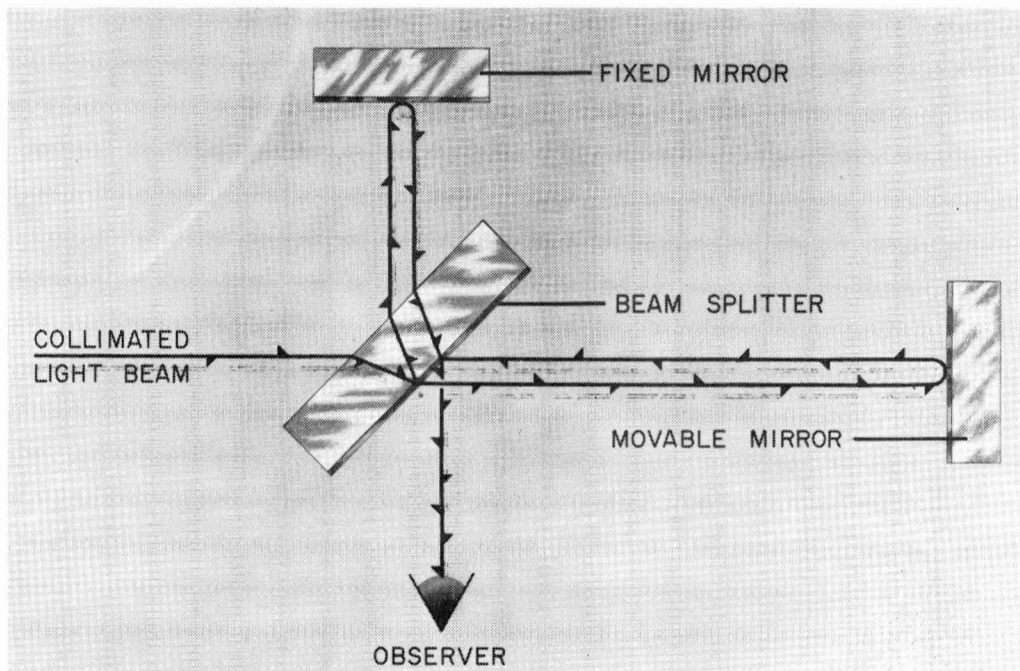
It was in 1881 that Michelson first described his interferometer, making extensive use of light-wave theories.

### Application in Industry

Once a production model of the interferometer is completed, perhaps the most fruitful application can be made by the machine-tool industry. There is a need for super-accurate machine tools capable of resolving movement of 10 to 20 microinches. The interferometer can provide even greater resolution than this and, in addition, with a direct, digital system far less complicated than present techniques. No analog-to-digital conversion is required to make the instrument compatible with con-



SCHEMATIC REPRESENTATION of the prototype interferometer at Livermore Laboratory shows the standard Kosters prism, modified by the deposit of a reflecting layer of thin metal on one-half of its base. The two surfaces of the reflecting layer serve the functions of both the stationary and the moving mirrors present in the Michelson interferometer. The LASER interferometer measures the change in displacement between the Kosters prism and a trihedral corner cube prism by standard fringe-counting techniques with a resolution of  $1.56 \times 10^{-6}$  in.



A SCHEMATIC DIAGRAM of the Michelson interferometer.

trol units of numerically controlled machines.

The LASER interferometer can be used wherever highly accurate length measurements are required, so utility is not restricted to industry. It is also a superior laboratory tool.

In engineering metrology, for example, the most pressing need for measuring accuracy is in the area of continuous-length standards, and it is probable that this is the first use to which the new instrument will be put.

## ECP Giving Reaches \$61,449 at Close of First Three Months

Members of the Employees' Contribution Plan have given a total of \$61,449 to the United Community Fund and seven other agencies since the new contribution period began last December. As the February checks—totaling \$17,744—were mailed recently, the following distribution had been made:

	Feb.	Year to-Date
United Community Fund	\$14,550	\$49,885
American Cancer Society	851	2,949
Bernalillo County Heart Association	745	2,566
Nat'l Arthritis & Rheumatism Foundation	266	920
N. Mex. Society for Crippled Children & Adults	532	1,840
Cerebral Palsy Ass'n of Bernalillo County	142	489
National Multiple Sclerosis Society	231	831
Muscular Dystrophy Ass'n of America	248	847
Reserve Fund	177	605
	\$17,744	\$61,449*

\*This total includes cash contributions and specific donations made at the beginning of the ECP drive. During the last contribution year, Sandia Laboratory employees contributed \$182,428.

## Re-elect Two Employees To Posts in Local Red Cross Chapter

Two Sandia men have been re-elected to positions with the Bernalillo County Chapter of the American Red Cross.

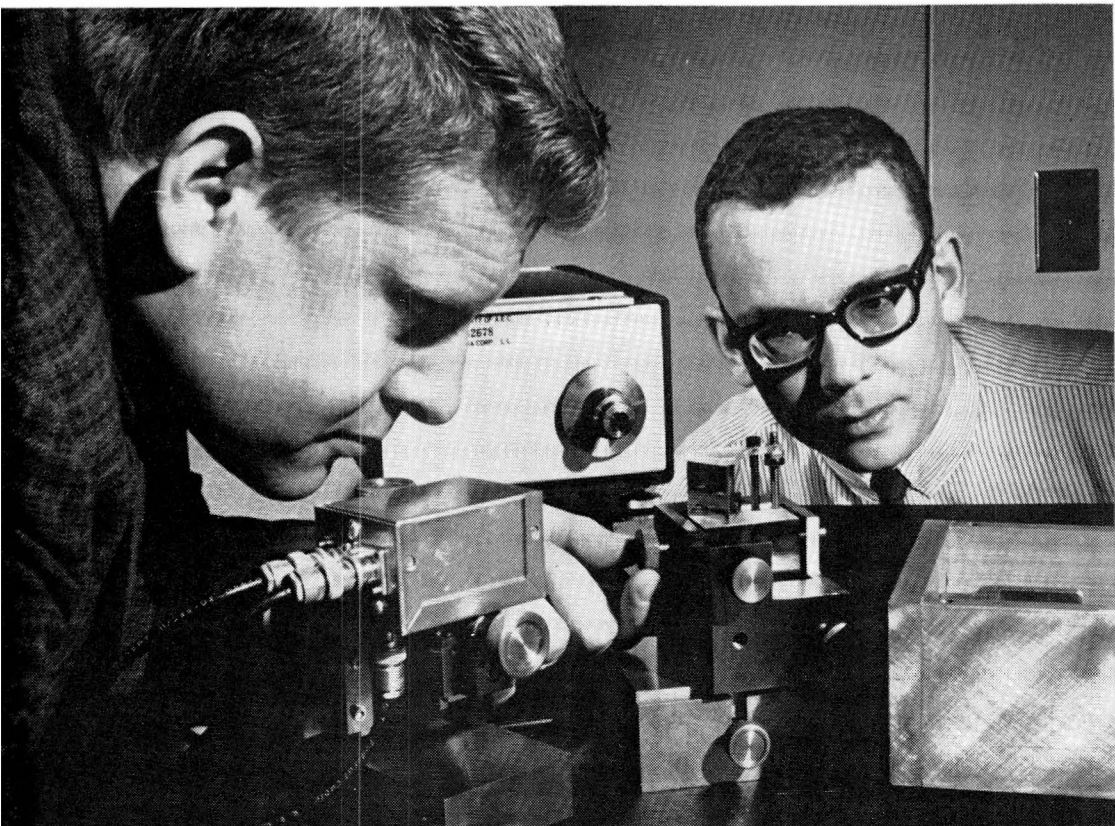
They are R. J. Hansen, Director of Development Shops, who begins his third year as chapter chairman, and J. W. Galbreath, Manager of Public Relations and Employee Publications Department, who was re-elected to his second three-year term on the board of directors.

Other Sandians on the 44-member Board are Kathryn Lawson of Crystal Physics Division and R. A. Bice, Vice President.

## Ski Club Dance

Coronado Ski Club members and guests will celebrate the end of the ski season with a "Black-and-Blue Ball" in La Cana Room of the Coronado Club on Apr. 23.

Tommy Kelly's orchestra will play for dancing starting at 8 p.m. Snacks and other refreshments will be served. Admission will be \$1 each. Dress will be informal.





### D. P. Dickason Named AEC/SAO Post Formerly Held by F. E. Abbott

Donald P. Dickason has been appointed Assistant Area Manager for Administration and Security in the AEC's Sandia Area Office. The appointment was effective Mar. 29. He has been director of the Storage Division in the Commission's Albuquerque Operations Office since July 1960.

The Sandia Area Office administers the Commission's contract with Sandia Corporation.

Mr. Dickason succeeds Frank E. Abbott, who recently was appointed Director, Requirements and Facilities Division, AEC/ALO.

Mr. Dickason joined the AEC in Los Alamos in 1947 and served in several positions during the organization of the Los Alamos Protective Force. He was promoted to Chief, Protective Force, in 1951 and was Chief, Security Branch, Los Alamos Area Office, from 1952 until 1960.

Prior to joining the Commission, Mr. Dickason served in the U.S. Army Air Corps from 1942 to 1946. He was a troop carrier and bomber pilot, serving overseas in the China-Burma-India Theater. He is a native of Richwood, Ohio.

### Coronado Club to Have Western 'Hoedown' on Program Tomorrow

The Estancia Valley Boys will play for a real Western hoedown at the Coronado Club tomorrow from 8-12 p.m.

For a change of pace, the Vern Swingle combo will offer music in a different vein for dancing on Saturday, Apr. 17.

Tonight's social hour will feature a Mexican buffet and music by the Rex Elder combo; on Apr. 16 there will be a chuckwagon roast beef and shrimp buffet and music by the Jerry Lee combo.

Watch for the club's annual Hofbrau evening on Apr. 24.

## Training Supervisor Named Member of U.S. Manpower Group

U. S. Secretary of Labor W. Willard Wirtz has appointed M. A. McCutchan to a regional committee of the National Manpower Advisory Committee. Mr. McCutchan is supervisor of Sandia's Technical Training and Education Division.

The national committee was created to make recommendations on policy and program necessary to carry out purposes of the Manpower Development and Training Act of 1962 (Public Law 87-415, as amended).

According to Secretary Wirtz' letter, "The regional committees will consist of 10 members, and will be composed of representatives of labor, management, agriculture, education, training, and the public in general." Mr. McCutchan was recommended to Secretary Wirtz for appointment as a training representative on the Mountain States Regional Manpower Advisory Committee to participate as an adviser in the affairs of the manpower development and training program.

Mr. McCutchan has been with Sandia's training organization since June 1959 and has headed a division for the past four years. Last fall he served on an advisory committee (appointed by the superintendent of Albuquerque Public Schools) to determine the need for a Technical-Vocational Institute in the City of Albuquerque.

He was appointed by the governor to the State Manpower Advisory Commission and has been its chairman for about a year.

### Professional Men Discuss Bacteria Control by Laminar Air Flow

Scientists, engineers, and physicians of the Rocky Mountain Chapter of the American Association for Contamination Control met in Albuquerque last week to discuss control of bacteria by laminar air flow methods.

Among the main speakers were Dr. Lawrence B. Hall of the National Aeronautics and Space Administration, Dr. John Whitcomb of the Lovelace Foundation, and Milton McKenzie, an officer in the National Contamination Control Association.

Laminar air flow is a concept developed at Sandia Laboratory. It involves the use of a steady, uniform flow of filtered air to clean an enclosure.



MAKING WAY for a new addition to Sandia Laboratory's steam plant, workmen remove the east wall of the existing building. The project will add 161,000 cu. ft. of space to the three-story steam plant to house a new 1000-lb.-per-hour steam generator. Also installed will be a 5000-barrel fuel oil storage tank and transfer facilities. Total cost of the project will be \$815,000. Completion is expected about Sept. 1, according to Plant Engineering project engineer Carl G. Whitcomb.

## Accidents Involving Vehicles on Company Business Decrease in '64

Accidents involving Sandia Corporation vehicles last year hit the lowest mark in three years. Personnel Benefits and Services Department noted in a recent annual accident report.

Although the statistics do show an improvement, the total of 50 accidents still tells its own story. Accidents cause injuries and loss of property. There is much room for improvement.

Vehicles included in the report were those owned by the AEC, rented vehicles, or private vehicles with mileage charged to the company. In the past year, they logged slightly over 4,330,000 miles.

The largest single cause of accidents was improper backing, and 15 such cases were reported last year. Eight others were caused by improper parking, idling, or starting.

Thirty-three of the accidents involved more than one car. The frequency rate for all vehicles dropped from 15.4 in 1963 to 11.5, a 25.3 per cent improvement.

The three-year study of accidents depicted two other significant trends.

The number of accidents involving AEC vehicles in 1964 was the lowest of the period covered in the report, but the proportion of single-car accidents has increased steadily each year—from 16 of 54

in 1962 to 22 of 67 in 1963 to 17 of 50 in 1964.

The following tables give pertinent statistics:

Accidents—Type			
	1962	1963	1964
Multiple vehicle .....	38	45	33
Single vehicle .....	16	22	17
Total .....	54	67	50

Frequency Rate			
	1962	1963	1964
Passenger vehicles .....	10.8	11.9	10.7
Other vehicles .....	15.2	20.0	12.6
All vehicles .....	12.7	15.4	11.5

Accident Causes-1964			
Improper backing .....			15
Striking stationary object .....			11
Improper parking, idling, or starting .....			8
Following too closely .....			5
Failure to yield right-of-way .....			4
Unknown circumstances .....			3
Losing control of Vehicle .....			2
Improper passing .....			1
Improper lane change .....			1
			50

### William C. Garcia Gets New Reserve Rank

William C. Garcia of Security Information and Education Division was promoted to Chief Petty Officer in the U.S. Naval Reserve on Mar. 16. He is a member of a security group. Bill has been in the reserve since 1959. Previously he saw active duty in the Navy, Army, and Coast Guard.

SANDIA CORPORATION EXHIBIT, designed by Ben Russo and Community Relations Division, will be installed in the New Mexico Pavilion at the New York World's Fair Apr. 21. With 35 mm slides, taped narration, and large color transparencies, various Sandia Corporation activities will be presented to visitors at the Fair.



# Supervisory Appointments

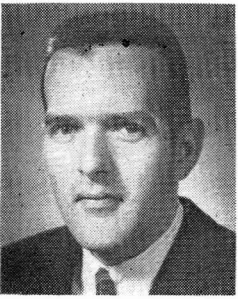


**CLIFFORD S. SELVA** to manager of Nevada Test Site Management and Support Department, effective Apr. 1.

Cliff was with Sandia for nine months in 1953 and returned in April 1955 to work on weapons projects. In 1961 he was promoted to supervisor of an Electric Systems Division.

Previously he was with Westinghouse Electric from 1947-53 in Los Angeles and from 1953-55 in Forth Worth as a consulting engineer for the aircraft industries.

Cliff has a BS degree in electrical engineering from the University of Southern California and is a registered professional engineer in New Mexico. He is a member of the Institute of Electrical and Electronics Engineers.



**WILLIAM K. PAULUS** to supervisor of Data Systems Development Division, Advanced Data Systems Development Department, effective Apr. 1.

Bill has been assigned to the same department since he was hired by Sandia in July 1958.

Before coming here, he received both BS and MS degrees in electrical engineering from Yale University. He worked one summer in the computer systems group of IBM's product development department in Poughkeepsie, N. Y.

Bill is a member of the Systems Science Committee for the Institute of Electrical and Electronics Engineers. His memberships in honorary societies include Tau Beta Pi and Sigma Xi.

## First Annual Sandia Lab ABC Bowling Tournament Starting May 8-9

First Annual Handicap Bowling Tournament for Sandia Laboratory employees will be held May 8-9 and 15-16 at the Holiday Bowl. Team events, singles, doubles, and all events are scheduled.

Deadline for entries is Apr. 15. ABC-sanctioned bowlers use their highest 1964-65 ABC averages as of Mar. 31, 1965. Handicap will be 75 per cent based on 200.

Tournament directors are R. M. James of Systems Programming and PERT Analysis Division and R. J. Eisold of Design Definition Division C. For entry blanks, contact either of the directors or Benefits and Services Division, tel. 264-7775.

Entry fees are \$12.50 for team events, \$5 for doubles, and \$2.50 for singles. Teams may be composed of any five Sandia Laboratory employees or AEC Sandia Area Office employees. There will be 100 per cent return on all prize money, according to the directors, with a prize ratio of one for every eight entries.

## Service Awards

15 Years



Frederick Palkovic  
4518  
Apr. 10, 1950

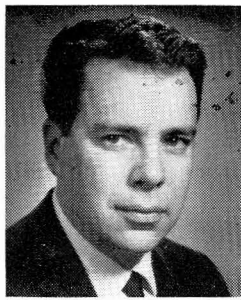


Benton W. Jolliffe  
2122  
Apr. 17, 1950

10 Years

Apr. 9-23

Richard W. Koppel 2133, John L. Kay 4541, L. W. Mecklenburg, Jr. 1524, Myron R. Schellhase 1543, James G. Hawley 9232, Muriel B. Milligan 9413, Robert L. O'Nan 1423, John N. Hansen 2221, Lorna F. Peterson 3300, Marian B. Schooley 3126, Allen B. Church 7263, Charles J. Mauck 7263, and Charles E. Simpson 7332.

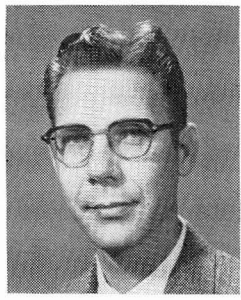


**ROBERT C. COLGAN, JR.** to supervisor of Employee Publications Division, Public Relations and Employee Publications Department, effective Apr. 1.

Since signing on at Sandia in February 1959, Bob spent four years in Public Information Division before being assigned to Industrial Photographics Division.

He is a 1951 graduate of the University of New Mexico, where he earned a BA degree in English and history. He also has done graduate work in psychology at UNM.

After college, Bob joined the Albuquerque Public Schools as a classroom teacher. He advanced to director of educational television in 1954 and from 1956-59 served as director of public information for the school system.



**THOMAS L. PACE** to manager of Test Projects Department, effective Apr. 1.

Tom has been with Sandia two different periods: from 1946-51 and again from 1954 to the present. His work was in the Field

Testing organization until the recent creation of the Aerospace Programs organization. Tom was promoted to division supervisor in 1962.

In 1953 he received his BS degree in electrical engineering from Lamar State College of Technology in Beaumont, Tex.

During World War II, he served two years in the Navy.

Tom is a member of the Institute of Electrical and Electronics Engineers and the Inter-Range Instrumentation Group.



**ROBERT E. DUNLAP** to supervisor of Technical Information Division II, Technical Information Department, effective Apr. 1.

Bob was with Sandia from 1952-58, and from 1958-62 he worked on a part-time basis in

Technical Information Department. He resumed full-time duties working with technical information in 1962.

Before joining Sandia, he was an economic analyst with Pan American Airways, a copper mine foreman, and a rancher. He also was in the Air Force for four years during World War II.

Bob has a BA degree in philosophy from the University of California at Berkeley.

## Ticket Order Blanks Available for Dodger Home Baseball Games

Ticket order forms for 1965 Albuquerque Dodgers' baseball games are available in Benefits and Services Division.

The Texas League team is offering two types of ticket plans—season box seats for all 70 home games or general admission ticket books for 10 games. Season boxes are \$90, which saves the purchaser the cost of 18 games. Ticket books are \$10, a savings of \$2.50.

Persons wanting tickets should send the completed order blanks directly to the Albuquerque Baseball Club or to T. J. Jorgensen, Purchasing Department II. Purchasers will be billed by the club.

PAGE SIX

LAB NEWS

APRIL 9, 1965

# Your Emotions And Physical Health

Part IV

This final article in the series on emotional ailments gives advice to those who ask, "What can I do about them?" This series was based on findings of the American Medical Society and was presented in the hope that it helps the readers to a better understanding of their emotions and health.

By S. P. Bliss, M.D.  
Sandia Corporation Medical Director

The question is asked over and over, "What can I do? What can be done to solve my emotional problems?"

First, you must keep in mind that determining the causes of many illnesses in which there are emotional factors takes time, patience, skill. A complete physical check-up must, of course, be made. A physical examination is necessary to eliminate the possibility that the disease is organic. Other kinds of information are also needed. The doctor needs to know many details about the lives of his patients and their emotional responses to various life situations. With this knowledge, he can help them become aware of those fears and worries that may have caused or contributed to their illness.

Because of the new knowledge about the emotional factors involved in many types of illness, there is less reason than ever for neglecting to consult a physician at the first warning signs of trouble. Pains and ailments of whatever origin can now be treated with greater hope of success than ever before if brought to the early attention of your doctor.

More and more doctors, aware of the connection between certain physical ailments and the emotions, are able to discover these conditions and to treat them successfully. This is done by helping the patient understand and live with them peacefully and without conflict.

Keep always in mind that it is definitely unwise and unhealthy to keep emotional tensions bottled up. Instead, look for the most reasonable way to work them out. For some people, just talking over their problems fully and freely with a sympathetic friend or advisor helps to clear the air. It can often help to relieve any feelings of guilt one may have about his own disagreeable thoughts and feelings when he discovers similar ones in others.

## Women's Bowling Tourney Set May 1-2 at Coronado Club

Application blanks are available for the Third Annual Women's Handicap Bowling Tournament from Benefits and Services Division, tel. 264-7775. Deadline for entry is Apr. 21.

WIBC-sanctioned bowlers are eligible to enter. Handicaps will be computed at 70 per cent of 200. Trophies will be awarded for singles, doubles, and all events. The tournament is open to Sandia Laboratory and AEC Sandia Area Office employees.

The tournament will be played May 1-2 at the Coronado Club.

lets and hobbies which substitute physical

Sound health habits and creative out- or mental activity for emotional "stewing" are important for everyone. But just talking or taking refuge in hobbies must not be allowed to take the place of earnest efforts to correct the underlying maladjustment.

One must try constantly to seek positive, constructive ways of reacting in dilemmas—as distinguished from negative or destructive reactions.

When people reach a better understanding of their common emotional stresses and are able to come face to face with them instead of trying to ignore them, we will begin to see a reduction in those illnesses that strike out at people through their own inner conflicts.

## Take Note . . .

W. A. Scranton, Unit Development and Product Control Division, is an amateur magician pledged to abandon all sleight-of-hand tactics.

At least this is the case while he's secretary-treasurer of Ring 90, International Brotherhood of Magicians. He will be installed next month.

Elected last month with Mr. Scranton was Miller Cravens, Jr., Advanced Systems Research Department II, who will become new president of the organization. Both terms are for one year.

\* \* \*

E. C. Neidel, Electronic Development Division, is serving as a member of the Technical Paper Selection Committee of an international symposium.

The papers will be presented at the Sixth Annual International Electronic Circuit Packaging Symposium in San Francisco Aug. 23-24.

At the meetings, Mr. Neidel will moderate a session on "Packaging Microelectronic Systems." The symposium is sponsored by Electrical Design News.

## Sandia Base Branch Post Office Dedicated

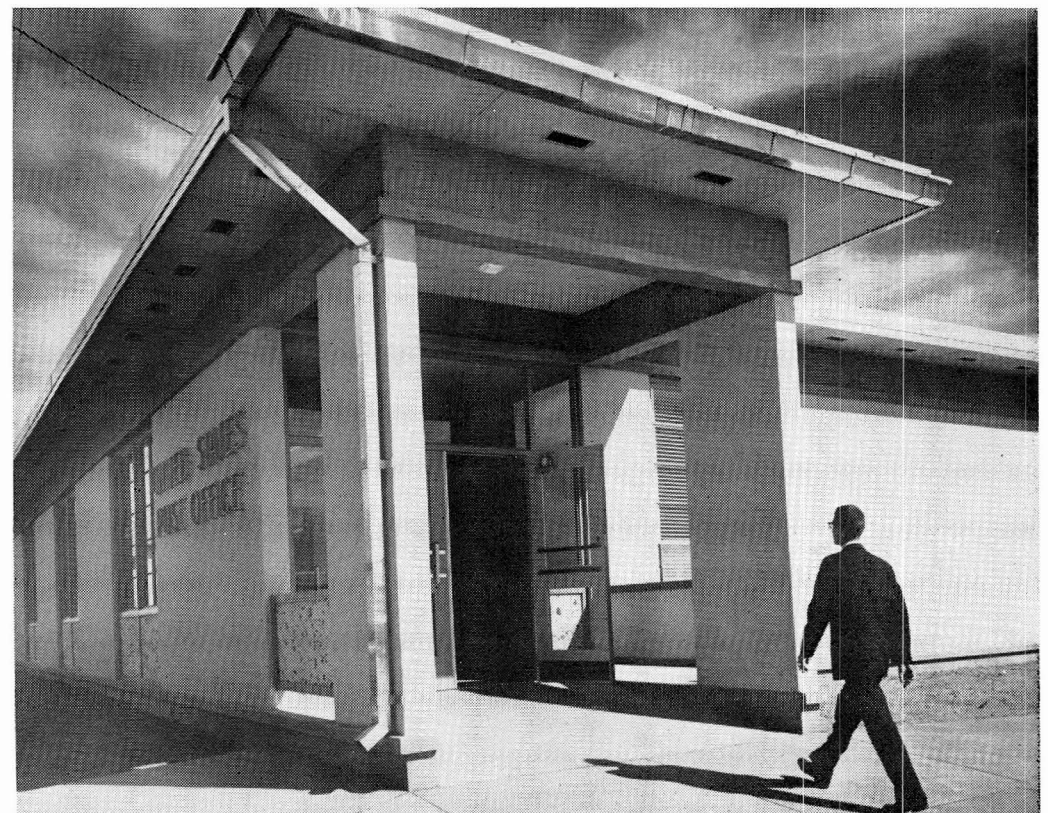
Dedication ceremonies for the new Sandia Base Post Office were conducted Apr. 1.

Taking part in the program were Col. Virgil V. Laughlin, USA, Sandia Base Commander; Charles Bruton, regional post office comptroller; and Richard Pino, Postmaster for the City of Albuquerque.

Branch Supt. Blaine T. Mellott said the 5300-sq.-ft. cinderblock structure was erected at a cost of about \$150,000. His staff moved into the building, east of the Base Exchange at the intersection of F and 1st Streets, Mar. 11.

Among the new facilities are 547 post office boxes, which will be made available to Sandia Corporation employees and the general public. Rental charges range from \$1.70-\$6 per quarter.

NEW POST OFFICE—A late-afternoon customer enters the new U.S. Post Office branch on Sandia Base, which was dedicated last week. Boxes in the new building at F and First Streets may be rented by Sandians.



## Slenderized Table

# Tests Abilities of Ping-Pong Players

Bob Neiman and the Sandians of Crystal Lattice Defects Division in Bldg. 803 had a problem. They loved to play ping-pong, but there wasn't enough space to set up a standard table. The noon hour seemed to be the ho-hum hour.

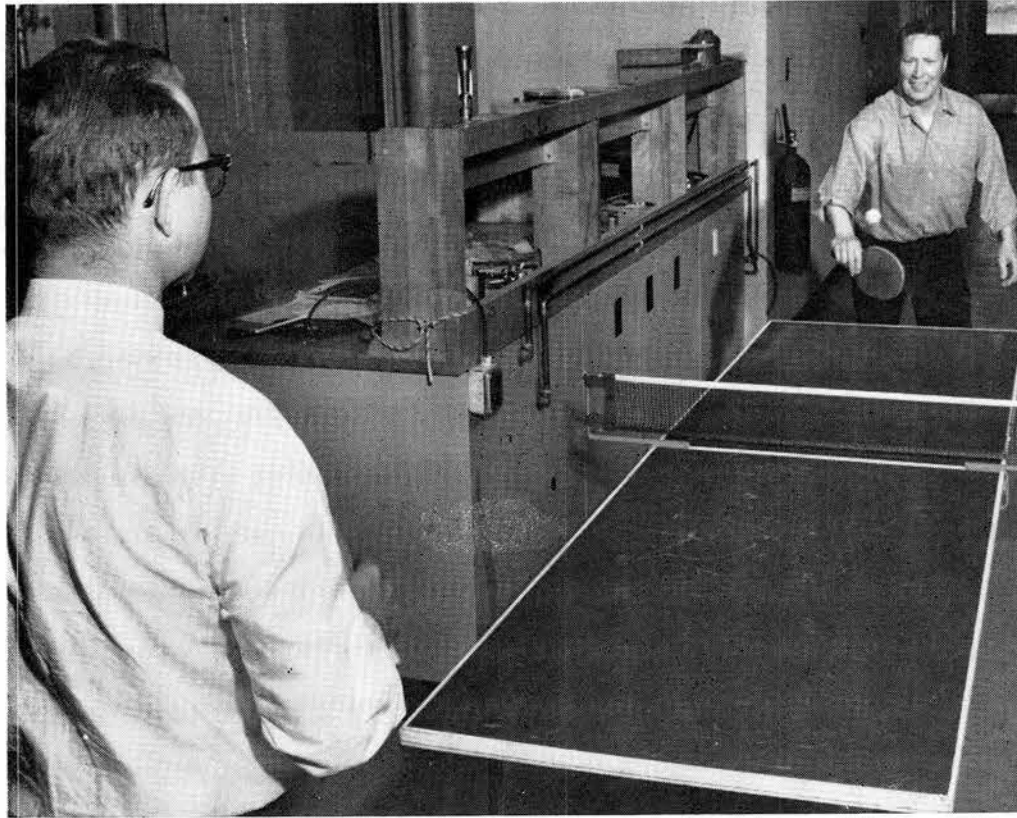
Now Bldg. 803 crackles with excitement. They play a fast-paced precision kind of ping-pong which calls for the utmost in skill. Instead of a regular table, 60 in. wide, they play on one only 30 in. wide. The length is the standard nine ft.

The table is set up in the hall during noon hours. It is disassembled and stored out of the way at all other times. Bob built the table out of surplus plywood and some steel pipe. He got an old

table tennis net from Benefits and Services Division and adapted it for his table. Benefits and Services Division also supplied paddles and ping-pong balls.

"The table works fine," Bob says, "and it is much more difficult to play on than a standard table. We're practicing for the annual table tennis tournament now. After playing on our table, a game on a regular table is a cinch."

**BREAKS SPACE BARRIER**—Bob Neiman, on far side of table, built this half-width ping-pong table out of surplus materials to use for noon hour recreation in Bldg. 803.



**TOASTMASTER OFFICIALS**—New officers of Sandia Toastmasters Club 765 are (l to r) Pete Hernandez, Ordnance Test Projects Division; Hal Goddard, Development and Systems Division; and Lew Hanchey, Aerospace Nuclear Safety Division IV. Hal is shown eyeing Pete's "Outstanding Toastmaster" award, while Lew holds the trophy he won in the club's 1964 speech contest.

## Toastmasters Offer Speech Course

New officers of Sandia Toastmasters Club 765 last night began an eight-week "Speechcraft Course," which runs through May 27.

Sessions will be conducted each Thursday in the Cocina de Carlos restaurant, 4901 Lomas NE, at 6:30 p.m. Educational vice president Lew Hanchey said cost of the refresher course in public speaking is \$5, plus meals.

Mr. Hanchey said he would continue to take enrollments through Thurs., Apr. 15.

The new officials, in addition to Mr. Hanchey, are Hal Goddard, president; Pete Hernandez, administrative vice president; A. D. Thornbrough, treasurer; Mel Meford, historian; Bill Clement, sergeant-at-arms; and Joe Gonzales, secretary.

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LAB NEWS

APRIL 9, 1965

## Congratulations

Mr. and Mrs. R. W. Martin (7255), a son, Robert Joseph, Mar. 8.

Mr. and Mrs. D. S. Pitts (2543), a son, Randall Steven, Mar. 17.

### SHOPPING CENTER

### SHOPPING CENTER

### SHOPPING CENTER

### SHOPPING CENTER

### 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 Corporation 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

- TENT TRAILER, Montgomery Ward Vacationer, sleeps 4, 60 sq. ft. living area, 35.6 cu. ft. storage area, \$275. Chavez, 299-2718.
- UNIVERSAL gas range, four-burner w/oven and storage, white, flexible connector, \$15. Halpin, 299-9309.
- CAMPING TRAILER mounted on 8 ft. trailer, sleeps 2, license and lights, camper removable from trailer, spare wheel, \$150. Taylor, 298-0426.
- FREE—African Bermuda sod, you dig. Graham, 725 San Pedro SE, 268-8967.
- ROBERSON, 3-bdr., den, fireplace, pitched roof, double garage, drapes, carpeting, AC, evergreen landscaping, below \$18,500 appraisal, make offer, Meyer, 298-4825.
- ROLL MAGAZINE adapter 120 square, \$10.50; camera gadget bag, \$4.50; supermatic barrel \$10.50; pistol bag, \$1.50. Alvino, 255-6339.
- ALFALFA HAY, \$1.15 per bale at 7950 Coors Blvd. SW, \$2000 below FHA appraisal, 3-bdr., den, 2 fireplaces, near downtown. Roth, 242-4636.
- SMALL DINETTE table with 2 or 4 chairs. Marshall, 298-4206.
- '63 VOLKSWAGEN. Burright, 1228 Muriel St. NE, 299-7386.
- BRIDE w/forged steel bit, \$15. Taylor, 256-3774.
- GAS RANGE, 36", automatic oven; refrigerator, 12 cu. ft.; power mower, 2 1/2 hp, all late models, plus furniture, Nichols, 247-2564.
- DOG HOUSE 33 x 44", new roof and paint, \$5. Price, 256-6373.
- GELDING, large buckskin dun, for experienced rider, \$250. Ercius, 898-0543.
- BICYCLE, Silver King, 26", boy's, heavy duty frame, all chrome trim, two speed gears, white sidewall tires, completely reconditioned, \$20. Burbank, 299-1460.
- BRICK 3-bdr, double garage, draperies and carpeting throughout, fireplace, foyer, electric family kitchen, patio, sprinklers, landscaped, 1404 Georgia NE. Seay, 298-7227.
- 2 FIREPLACE screens, gold color, draw curtains; hospital bed. Rodriguez, 298-9962.
- 8" CEILING exhaust fan with jack for flat roof, \$15; horizontal sliding aluminum window, 36" x 60" w/frame, screen, \$15. Stamm, 255-2288 after 5.
- ELECTRIC RANGE, \$60, 30" Westinghouse Embassy model, 5 years old, will deliver. Mecklenburg, 344-6793.
- 20' TRAVEL trailer, sleeps six, self-contained, butane refrigerator, flash hot water, holding tank, shower. Barth, 282-3134.

- '57 PONTIAC parts, motor, windshield, etc. Need windshield for '49 Chevy., buy or trade. Tatum, 877-0997.
- BABY CRIB, \$15; stroller, \$5. Isidoro, 877-4440.
- POWER MOWER, 21", 3-speed, self-propelled Yard Man, used one season; fertilizer spreader. Grant, 299-8492.
- TIRES, used Royal WW 8:50 x 14, \$4 and \$6; Atlas WW 7:50 x 14, \$3. Burns, 255-3737.
- LAMBRETTA motor scooter, 1959, 150 LVD, 2 seats, make offer, Jones, 298-3429.
- POOL TABLE, 4' x 7', complete w/balls and cues, new cost \$240, will sell for \$150. Crumley, 299-5293.
- CLEMSON 18" hand mower, rubber tires. Armbrust, 298-3666.
- GE REFRIGERATOR, \$30 or best offer. Davis, 298-6944.
- 3-BDR. and den, custom, detached garage, CFA, AC, 1/2 acre, fruit trees, at FHA appraisal. Richardson, 344-4324.
- REFRIGERATOR, left hand door, small-medium size, Sears, manual defrost, \$25. Williams, 255-4109.
- SUZUKI motorcycle, Sports 80 Model K11, take over payments; tape recorder; barbells. Best, 247-3914 after 5:30.
- BRONZE MEDALLION, under appraisal, 3-bdr., 2 1/2 baths, den w/fireplace, electric kitchen, carpeted, AC, coral, tack room, 1/2-acre fenced, Trail Acres. Roberts, 344-3780.
- CAMP STOVE, 3-burner, Ted Williams, \$15; Frigidaire refrigerator, 11.4 cu. ft., large freezing compartment, \$20. Thayer, 299-3127.
- BASSET PUPPY, 7 1/2 months old, tan and white, female, purebred, \$50. Wickham, 3501 Ross SE.
- '55 NOMAD Chevrolet station wagon, new tires, \$350. Hutton, 256-0504.
- EARLY AMERICAN maple: sofa rocker, chair, end tables, two lamps, footstool, two wall plaques, candle holders, bowl. Bentz, 299-3448.
- WOMAN'S SHOE roller skates, size 6; trailer hitch for Falcon or Comet; Hoover vacuum upright. Berger, 298-4234.
- '56 FORD 2-dr. sedan, \$275. Martinez, 298-0886 after 4 p.m.
- 2 CHOICE lots on Pecos River and State Road 63, 1/2 acre each. Collins, 268-3612 from 6-9 p.m.
- '57 FORD 4-dr.; 12 ft. fishing boat. Williams, 299-3828.
- STARCRAFT aluminum "Walk Thru" boat w/ electric starting, 30 hp Evinrude, tilt trailer, water skis, cushions, running lights, spare tire. McAvoy, 256-3215.
- REFRIGERATOR, Servel gas, \$5; single garage door and hardware, \$25. Aaron, 282-3124.
- ONE-WHEEL trailer, \$10; Onan power plant, 12 volts, 35 amps, \$25; Harvey Wells TBS-50 Bandmaster deluxe transmitter, \$15. Snyder, 299-7845.
- BABY FURNITURE, including bed, playpen, wardrobe, carbed, and sterilizer. Rose, 298-6238.
- CORRALES ADOBE, 3-bdr., 2 baths, studio, 3 fireplaces, beamed ceilings, brick floors, 3 secluded wooded acres, \$45,000. Brown, 898-1322.
- MAKE OFFER on asking price of \$16,900, 3-bdr., den, 1 1/4 baths, many extras, near schools, park, bus, shopping, 10805 Claremont NE. Van Deusen, 299-4328.
- SMALL HOUSE, 14' x 34' with bath, one year old, ready for occupancy, you move, \$700. Gonzales, Rt. 1, Box 1541, Camino 7 SW.

- 3-BDR. 1 1/4 bath, AC, FAH, walled yard, 1 1/2 years old, Mankin Foothill Estates, \$16,500; 2 white studio couches, \$50. Ruppert, 298-2431.
- '63 CHEVROLET II, 4-dr., R&H, AT, white w/blue interior, \$1200. Law, 242-9321.
- FRENCH POODLE, male, 7 months old, w/papers and all permanent shots, good with children, make offer. Rea, 299-9315.
- BOAT, MOTOR and trailer: 14' Lone Star Commander, Sea King tilt trailer, \$350; E/W 25hp electric start Johnson, \$550. McCoy, 299-5533.
- 2 ACRES land in South Valley. Tucker, 877-9405.
- LADY'S GOLD ring, single stone, 2 1/2 carat diamond, \$1500 (jeweler's appraisal \$1900). Nelson, 345-0440.
- '59 BUICK 2-dr. hardtop, AT, R&H, tinted glass, \$600. Ganzerla, 247-9924 after 5.
- STEREO SPEAKERS: Jensen TF-3 system Electro-voice Esquire 200 system, both are 3-way systems in matched enclosures. FM tuner, EICO HFT-90. Warnke, 268-1877.
- CAMPING TRAILER, 1962 17' fan, self contained, loaded with extras, sleeps 6. Cleveland, 298-0218.
- JUDSON SUPERCHARGER for a 40hp Volkswagen, complete with all parts including installation instructions, used 3000 miles, \$55. Kubiak, 255-2555.
- BOY'S SLACKS and sport jacket, size 9, cost \$24, sell for \$12. 24" boy's bike, \$5. Pliner, 256-1907.
- 4-BDR., 1 1/4 baths, carpeted, covered patio, AC, \$700 plus assume GI loan. Priddy, 298-3626.
- CAMPER for short, wide box truck, homemade, \$75. Schwiner, 255-9262 after 5 or Sunday.
- TRAILER HITCH, adjustable, load-leveling, \$11.50; maple twin beds, \$32.50; registered 3/4 Arabian yearling colt. Galbreath, 898-0644.
- VACUUM CLEANER, Electrolux, \$25. Sisson, 299-7133.
- CAMPING TRAILER, sleeps 4-6, foam mattresses, \$450; Amana chest-type freezer, 17.4 cu. ft., \$125; boy's bicycles, 24" and 20". Brewer, 298-6018.
- '63 FORD station wagon, V-8, AT, R&H; 6 ft. aluminum sliding glass patio door, complete. Calvery, 255-9545.
- '58 ZUNDAPP 250cc cycle, rebuilt transmission and engine, \$185. Jackson, Casa Blanca Trailer Park, 11101 Acoma SE.
- ALLSTATE Vespa motor scooter, will sell or trade for standard model typewriter. MacGibbon, 268-9134.
- CHINA, 7 place settings, Noritaki, Belmont pattern, \$20. Hayes, 256-3812.
- 3-BDR., built-in range and oven, pitched roof, make offer on equity and take over 4 3/4% loan, payments \$61 including taxes and ins. Ganzerla, 247-9924 after 5.
- KENMORE electric hot plate, 2 burners with 3 heats per burner, cost \$16, sell for \$5. Hill, 243-3493.
- ROTO-TILLER with Briggs & Stratton 4hp engine, \$65; saber saw attachment for 1/4" drill, with blades, \$5. Henneke, 298-4232.
- '60 RAMBLER Classic 4-dr. sedan, R&H, Dale, 242-4065 after 5 weekdays.
- '48 CHEVROLET business coupe, \$50. Miller, 265-0029.
- 2 ACRES Ponderosa Mt., 10 miles south on highway (off US 66), \$1800 (\$500 down, \$25 payments) or \$1600 cash. Guest, 1538 Van Cleave Rd. NW, 345-0077.

- SCHWINN BICYCLE, girl's 20" w/training wheels, also scooter, both for \$12.50. Sheard, 2912 Mesilla NE, 298-3373.
- ICE CREAM table w/2 chairs, black wrought iron, glass top, \$20. Norton, 268-6308.
- MOTORCYCLE, 1961 BSA, 350cc, custom windshield, mirrors, saddlebags, 11,000 miles, \$390. Lewis, 299-7217.
- 3-BDR., carpeted LR, DR, hall, built-in electric kitchen, disposal, pitched roof, garage, walled-in backyard, near NE schools. Jackson, 298-0346.
- FLASH ATTACHMENT for Argus slide camera, \$4.50. Roberts, 268-9619.
- COLORADO mountain cabin, 1 1/2 miles below Vallejo dam, on Los Pinos river, fireplace, gas heat, electric appliances, 2 baths. Vogt, 299-2551 after 5.
- SEARS floor wax and polisher, \$10; Olympic portable TV, \$20. Davis, 299-8698 after 5.
- '64 FORD 500 XL and 1963 Falcon Futura convertibles, priced below book, very low mileage. Salazar, 344-2815.
- HEATHKIT amplifiers Model EA2; W3M; preamp WAPT; speaker unit SS-1; two Carlson enclosures; one Collaro record player. Carli, 256-2781.
- '62 CORVETTE; 1963 Chevrolet convertible; 1964 Dodge convertible. Must sell one, make offer. Dahlgren, 298-4390.
- PISTONS, valves, hyd. lifters, and cam for 283 Chevrolet; engine parts for PV444 Volvo; child's tricycle; baby carbed. Wilson, 298-0049.
- SILVERSTONE electric guitar w/case, amplifier, \$50. Stanton, 255-8481.
- NYLON RUG, foam rubber pad, 12' x 15', lavender, \$55; Danish brown lounge sofa, blue/silver fabric chair, corner table, all \$30. Duvall, 299-8744.
- TWO 6:00x16 6-ply, two 6:00x16 4-ply used tires, \$12.50; aluminum screen door, 3' x 6'8", \$7.50. Wahlenmaier, 255-9953.
- SMALL 2-cycle engines: Power Products, 2hp, \$10; Clinton 2 1/2hp, \$15. Adams, 268-5943.
- 2 SETS picnic tables and benches, redwood 1 x 4's on aluminum frames, \$10 per set. Bertrand, 268-4191.
- 3-BDR., DEN w/fp., 1 1/4 baths, double garage, pitched roof, Bellehaven, drapes, nylon carpeting throughout, AC, GE built-ins, \$19,500 Feil, 298-5104.
- GIRL'S 24" Sears bicycle, chrome fenders, thorn-proof tires, \$12. Tischhauser, 298-1407.
- SCALETRIC roadrace track, complete set Atlas HO roadrace, cars and power pack. Campbell, 299-4830 after 5.
- 14' ALUMINUM runabout, 35hp Lark electric, Magnolia Craft trailer w/spare, skis, ropes, jackets, cushions, \$750. Glover, 298-7302.
- 20 ACRES, 12 miles south on Highway 10. Romero, 344-0302.
- OR RENT trailer, 1964, 10' x 50', American Homecrest, 2-bdr, washer, AC carpeting LR and hall, front kitchen. Simpson, 298-1277.
- PAY OUR equity, assume low payments on GI loan, 3-bdr, Mankin close to schools and shopping. Evans, 298-0867.
- 3-BDR., family room, 1 1/4 baths, attached garage, 2 1/2 years old, \$16,000, Leaving town. 10208 Eden Ct. NE, Brewster, 299-8731.
- '63 TR4, red, wirewheels. Hudson, 9905 Bellamah NE.
- GAS RANGE, 6 burners, 2 ovens, \$25; refrigerator, self-defrosting, separate freezer, \$70; neutral wool rug, 13' x 14", \$30. Bushnell, 298-9631.
- FLOOR FURNACE, vent pipe, 44,100-63,000 BTU, \$35; single garage door, wood, hardware, \$25; will trade for .45 automatic or 30.06.

#### WANTED

- COASTER WHEELS and go-cart frame, any type or size. Netz, 282-3607.
- BABYSITTING in my home. Also, girl to live-in, kitchen and living room privileges, near university, must have references. Perkins, 268-0125.
- SMALL, used, electric concrete mixer; extension ladder; old axe; tow chain; clean, used, 2 x 6", 2 x 8", and 2 x 10" planks. Collins, 268-3612.
- CAMOUFLAGE jacket and trousers, size medium or large, also want stuffed owl or reasonable facsimile. Wilson, 282-3225.
- RIDE from vicinity of Solano and Indian School Road to Bldg. 840. Crawford, 256-2303.
- RIDERS from vicinity of Pajarito and Coors Road to Sandia Base. Bewley, 877-4877.
- CHILD'S SWING set in good condition. Sluyter, 299-6861.
- RIDE from 3706 Chapalla NE to Bldg. 836. Rodriguez, 298-9962.
- OLD HUNTING knives, any condition; European daggers; law officers badges. Will pay cash or trade Kentucky rifle. Smitha, 299-1096.
- 4' WIDE tailgate for GMC pickup. DeRuyver, 299-0396.
- CHILD'S SWING set in good condition. Cummings, 298-6042.
- RIDE from Cochiti and California SE to vicinity of Bldg. 806. Langston, 268-6933.
- TO TRADE 26" boy's bicycle for 20" girl's bicycle. Benavidez, 255-9946.
- JOIN or start carpool from vicinity Glenway Park to Area III or V. Sifre, 344-4680.
- CHILD CARE in my home at 729 Shirley NE, Princess Jeanne Park. Heavirland, 298-8976.
- CAMPING equipment or jeep. Rose, 298-6238.
- BOY'S BICYCLE, Schwinn 26", in good condition and at reasonable price. Dodd, 299-6330.

#### FOR RENT

- 2-BDR HOUSE w/kitchenette apartment, large walled yard, patio, garage. 4912 Pershing SE, Bentz, 299-3448.
- TRAVEL TRAILER, 15', sleeps 5, reserve now for vacation use. Colp, 268-8035.
- 2-BDR HOUSE, fireplace, AC, convenient shopping, available May 1, \$100 month, water paid. Newman, 256-3295.
- 2-BDR. FURNISHED, AC, apartment, near Sandia, no pets, two children acceptable, 8322 Trumbull SE, \$80 month, Villaella, 256-9729.
- DELUXE 1-bdr. furnished apartment 1 1/2 years old, electric kitchen, carpeted, automatic heat, AC, storage, \$90, 10104 Comanche Rd. NE. Stone, 298-4620.

#### LOST AND FOUND

- LOST—Man's sunglasses; 5-year pin; Phi Mu Epsilon key; car and house key on chain; Elgin wrist watch; 5 keys on ring. LOST AND FOUND, tel. 264-2757.
- FOUND—Thunderbird drawing; ignition key; pen-knife on chain, crucifix, man's tan coat. LOST AND FOUND, tel. 264-2757.

#### LIVERMORE FOR SALE

- 16' ALJOA travel trailer, sleeps four, four-burner apt. size range and oven, combination icebox/elec. refrigerator, \$750. DeSelm, 538-8296.



OFFICERS of CAP Squadron II plan training flights for three newly-acquired T-34 high-performance aircraft. From left are H. H. Wicke, Safety Officer; R. T. Dillon, Squadron Commander; Austin Glover, Operations Officer; and H. H. Patterson, Check Pilot.

## Volunteer Sandians of CAP Perform Vital Aviation Mission

Eighteen Sandia Laboratory pilots are members of a unique service organization—the Civil Air Patrol. CAP activities are vital to aviation in the United States. Any downed aircraft in the country is the object of a concentrated search by CAP pilots until it is located and the passengers rescued. In addition, the CAP flies missions for the state government locating lost hunters, patrolling highways, locating wrecked automobiles, or other missions not of a law enforcement nature. The CAP is staffed with civilians and is financed by private, state, and federal funds. The Air Force provides the aircraft and liaison officers.

In addition to search and rescue operations, the organization has important activities in youth education. The CAP cadet program for high school youngsters provides an introduction to aviation, orientation flights, and an insight into the military operations of the Air Force. CAP cadets, both boys and girls, contribute to CAP activities as observers during search operations and also handle some administrative duties.

The CAP also operates on the ground with communication units and land vehicles, important activities during the search for a downed aircraft or an emergency such as a flood.

The CAP came into existence on Dec. 1, 1941, just before the attack on Pearl Harbor. Originally part of the Civil Defense organization, the CAP later became an auxiliary of the Air Force. During the war, the CAP made distinguished contributions to the defense of the nation, particularly during the early months of 1942

### Naval Reserve Cruise Far From Routine for Sandia's Rod Golding

Rod Golding, Ceramics and High Temperature Materials Division, got more than he bargained for on a Naval Reserve training cruise to Jamaica last month.

When a helicopter from the USS Randolph plunged 700 ft. into the sea 26 miles offshore, Rod participated in a dramatic rescue mission. After his ship, the USS Haynsworth, steamed into the area to help, Rod was called to swim out and attach a tow line to the downed chopper.

He then rode in the foundering helicopter as the Haynsworth towed it to Montego Bay, Jamaica, for beaching.

Four crewmen aboard the helicopter escaped injury and were quickly plucked from the water.

Rod, who is assigned to Surface Division 8-106-M in Albuquerque, was recently promoted to chief petty officer. He said the salvaged aircraft was valued at \$2.5 million.

when coastal shipping came to a near standstill as a result of enemy submarine operations. Civilian pilots in their light aircraft patrolled the Atlantic seaboard. They are credited with sinking two submarines and contributing to the destruction of many others. With this effective work, the CAP helped bring the submarine menace under control.

Nowadays, the CAP is assigned less hazardous missions, but members exhibit the same dedication to a job. Some missions require long hours of patient search. CAP ground teams travel miles over rough terrain in any kind of weather to effect a rescue.

In Albuquerque, Richard T. Dillon is commander of Senior Squadron II, a group of 50 pilots who make up one-tenth of the senior CAP membership of New Mexico. The group averages 12 missions a year and participates in statewide missions. The group meets once a week, and training activities are continuous.

New Mexico Wing Headquarters recently acquired six surplus T-34 aircraft from the Air Force and is currently checking out pilots in these higher performance planes. The aircraft used earlier included Piper Cubs, an L-5 Stinson and Cessna 150.

"We can use 20 aircraft," Dick says, "including 10 member-owned planes. All pilots maintain proficiency in all types of CAP aircraft. This requires from two to four hours of flying per month."

CAP members buy all gas and oil used for training, and maintenance work on the aircraft is provided by volunteers. Equipment such as the surplus aircraft, communications gear, and land vehicles is donated by the Air Force. Federal funds are used for most search and rescue operations, and state funds provide replacement parts, some maintenance, and finance state missions.

Pilots of Squadron II also devote their volunteer time to the cadet program. On some weekends, pilots fly as many as six hours while giving flight orientation to cadets.

H. H. Wicke is Safety Officer for the Squadron; H. H. Patterson is Check Pilot; R. E. Knutson is Finance Officer; Zachary Ortiz is Supply Officer; and Austin Glover is Operations Officer.

Other Sandians who are pilots in the group include C. L. Carpenter, W. J. Denison, A. F. Hutters, H. D. Knudsen, J. R. Lockner, Harry Mason, T. D. McConnell, V. H. Osterby, J. W. Keisur, Paul E. Phipps, Wesley W. Roberts, and C. S. Selvage.

"Squadron II is currently looking for new members," Dick says, "particularly for people who could assist us in the administration of the unit, perform observer duties, and participate in the cadet training program. Anyone interested is invited to call me at 255-4904."

## Transit System Seeks Opinions On Need for Local 'Bus Pools'

A group of Chrysler Corporation employees in suburban Detroit have come up with a simple, yet effective, plan to combat traffic congestion.

They own and operate a \$7500 bus. The 21 people ride to and from work each day in the comfort of a 27-passenger bus—leaving the driving to one of their own members on a rotating basis. For the privilege of being able to relax and forget traffic cares, each member buys stock in the non-profit bus corporation and then chips in \$11 monthly to cover operating and maintenance costs.

The solution, while apropos for suburban Detroiters, may be somewhat impractical for Sandia Corporation workers in Albuquerque, because answers to traffic problems depend largely upon local conditions.

But the fact of the matter remains: journey-to-work problems can be worked out by providing a cheaper, faster, more convenient, and less irksome ride.

The director of the city-owned Albuquerque Transit System is convinced it can offer Sandians just that with a system similar to the one employed by the Chrysler men. The proposal is what Thomas Burke, director of public transportation, calls a "bus pool."

Mr. Burke's recommendation would make it possible for Sandians living in the same general neighborhood to "charter" a city bus for the ride to and from work each workday.

The buses would operate apart from regular service on a sort of "charter" basis. Each would be routed through a predetermined neighborhood, stopping to pick up riders at street corners near their homes.

Passengers then would be whisked non-stop to work.

The reverse would be true at night.

Mr. Burke said cost of the service would be determined by the number of riders per vehicle, and schedules would be mapped out in accordance with distances to be covered. He listed the rate for a 35-45-passenger bus at \$2.50 a week per person. It would be \$3.25 weekly for a 30-34-passenger bus; \$4 for buses having a capacity of 25-29 persons.

The Lab News, in cooperation with the Transit System, is publishing a questionnaire in this issue to test the demand for such a program. Responses to the accompanying questionnaire will be studied to sound out feasibility of the proposed "bus pool" plan.

1. In what area of the city is your home located?  
a. NE b. SE c. NW d. SW
2. If a "bus pool" were to operate between your neighborhood and Sandia Corporation, would you utilize the service, provided it was sufficiently fast, convenient, and economical?  
a. Yes b. No
3. What is the maximum number of blocks you would be willing to walk between your home and a bus stop?  
a. One b. Two c. Three d. Four or more
4. What is the maximum number of minutes you would be willing to spend on the bus between home and work, one-way?  
a. 10 b. 15 c. 20 d. 25 e. 30 f. 35 or more
5. What is the maximum weekly fare you would be willing to pay for "bus pool" transportation to and from work?  
a. \$5 b. \$4 c. \$3.25 d. \$2.50 e. Other (\$.....)
6. Other comments: .....

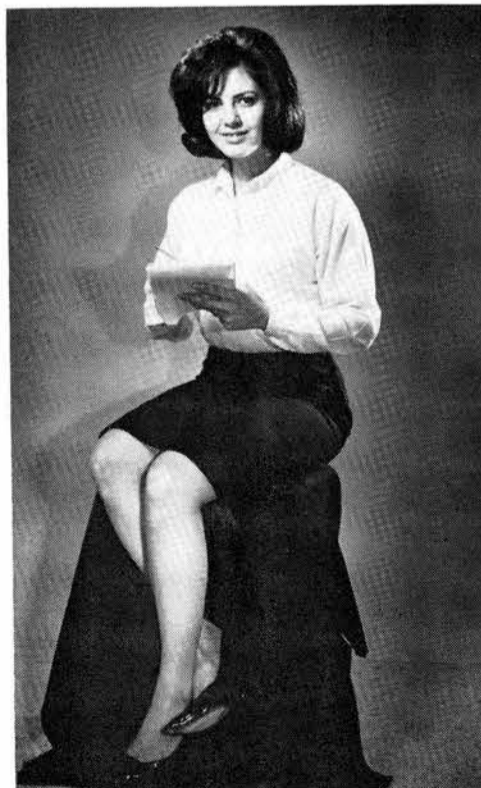
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PLEASE CLIP AND SEND THROUGH COMPANY MAIL TO:  
Sandia Lab News  
Organization 3142  
Bldg. 800, Rm. 112

### Bids Received for Relocation of Sandia's Pendulum Facility

Apparent low bidder for a \$37,973 construction project in Tech Area I is the Blumenthal Construction Company of Albuquerque.

Work provides for construction of an addition to Bldg. 892, relocation of a pendulum tower facility from Bldg. 880 to the new addition, and exterior site improvements.



Leni Buchanan (3126/2564)

### Take A Memo, Please

Take a fresh approach to safety: a second look at ordinary items used every day might disclose a hazardous condition.

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## Sandia's Safety Scoreboard

**Sandia Laboratory:**  
53 DAYS  
1,855,000 MAN HOURS  
WITHOUT A  
DISABLING INJURY

**Livermore Laboratory:**  
230 DAYS  
1,177,000 MAN HOURS  
WITHOUT A  
DISABLING INJURY