

D. E. Gregson Elected Director of Livermore Recreation Board



Donald E. Gregson was elected to the board of directors of the Livermore Area Recreation and Park District in the Nov. 3 election. Seven candidates had filed for the two existing vacancies. One of these candidates

was an incumbent, who was re-elected.

Don joined Sandia as a staff member in 1952 and transferred to Livermore in May 1957. He was appointed section supervisor in November 1958 and division supervisor in December 1959. Presently, Don supervises Preliminary Analysis Division at SCLL.

Before coming to Sandia, Don attended Iowa State University, Ames, Ia., where he received his Bachelor's degree in electrical engineering in 1952.

While living in Livermore, Don has been active with the Little League and in the First Presbyterian Church.

He is a member of the American Institute of Test Engineers, the Institute of Electrical and Electronic Engineers, and Eta Kappa Nu.

ECP Funds to Agencies Now Total \$167,982

With only one more month remaining in the 1964 contribution period, Sandia employees have given a total of \$167,982 to the Employees Contribution Plan so far this year. ECP funds are distributed to the United Community Fund and seven other agencies. As the October checks, totaling \$14,474, were mailed, the following distribution had been made:

	Oct.	Year to Date
United Community Fund	\$11,796	\$136,242
American Cancer Society	723	8,436
Bernalillo County Heart Association	593	6,966
Nat'l. Arthritis and Rheumatism Foundation	188	2,191
N.M. Society for Crippled Children and Adults	535	6,203
Cerebral Palsy Ass'n. of Bernalillo County	101	1,172
National Multiple Sclerosis Society	188	2,191
Muscular Dystrophy Ass'n. of America	202	2,350
Reserve Fund	144	1,670

To Extend Water Line From Sandia's Area III To Coyote Test Field

The Atomic Energy Commission will call for bids next week to extend the main six-in. water line from Area III to Coyote Test Field. The project will include laying approximately 5500 ft. of six-in. water line and additional service lines to Bldgs. 9927, 9950, and 9970. Also included in the project is the installation of miscellaneous interior plumbing, fire hydrants, and a meter pit. Work is to be completed within 60 days after the contractor is notified to proceed by the AEC. Plant Engineering Department project engineer is C. R. Mills.



SANDIA CORPORATION
PRIME CONTRACTOR TO THE ATOMIC ENERGY COMMISSION
ALBUQUERQUE, NEW MEXICO • LIVERMORE, CALIFORNIA

LAB NEWS

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Water Jet Catapult Provides New Test Capabilities in Area III

Preliminary testing and evaluation of Sandia Laboratory's new water jet catapult are nearly completed, according to project engineer Robert L. Henderson of Facilities Design Division (7311).

The catapult, located in Area III, creates a high pressure jet of water which propels a test carriage down a short length of track at speeds approaching 400 ft. per second.

"Our tests so far indicate that the catapult will perform as designed," Bob Henderson says. "Scheduling of test units should begin within a month. The water jet will provide velocities up to 400 ft per second on 3000-lb. test units."

Key features include a 36-in. diameter plenum chamber containing a piston with a maximum stroke of eight and one half ft., four air accumulators which provide the air to activate the piston, and a 180-ft. sled track in front of the chamber.

The accumulators, connected to the chamber by means of a fast-opening valve, have a total capacity of 280 cu. ft. of air held at a maximum pressure of 3500 lbs. per sq. in.

The piston ejects a five-and-one-half-in. jet of water from the chamber at 600 to 700 ft. per second. The jet enters an opening (Pelton-type bucket) in the rear of the sled and emerges from another opening after a turn of about 135 degrees.

WATER JET CATAPULT in Area III undergoes preliminary testing. Large plenum chamber at left contains the piston, fired by a sudden release of compressed air, which pushes a jet of water through a five-and-one-half-in. nozzle. The jet stream of water propels a sled down a 180-ft. track at velocities approaching 400 ft. per second.

A full stroke of the piston will discharge about 60 cu. ft. of water.

The jet exerts a maximum of 250,000 lbs. force on a stationary sled.

The sled will strike a 200,000-lb. steel and lead block at the end of the track, or with the block removed, the sled will be braked suddenly, causing the test item to fly forward into concrete, dirt, or water. The block will be covered with cushioning materials of varying types of thickness in order to simulate the various shocks a weapon might encounter during handling or delivery.

The catapult differs from other impact test facilities in several respects—it provides greater velocity of test units than that achieved by drop towers, but less velocity than rocket sleds.

Other parts of the facility include an equipment building, an assembly and control building, a 10-ton crane for moving test items from the assembly building to the sled, and a remote control building for use during tests of items containing explosives.

More than a year in construction, the new catapult is a \$570,000 addition to Sandia's Area III environmental testing facilities. Plant Engineering Department project engineer for the construction of the facility was C. M. Morrisett.

Sandian Who Serves

Service Club Member Helps Promote Program for 'Your Gift of Sight'

"Your gift of sight" is the slogan being used by the Lions Clubs of New Mexico in encouraging donations to their eye bank and research foundation. One of the strong supporters of this new venture is Sverre Johannesen, a charter member and present secretary of the Paradise Hills Lions Club.

The Lions' Sight Conservation Committees have been active for years in directing help to the blind and in offering means to prevent blindness. The eye bank was established in Albuquerque to make available to all patients (free of charge) eye tissues required by eye surgeons to perform the corneal grafting operation. If a donated eye is diseased and cannot be used for grafting, it is carefully studied in research to help find causes and cures for blindness.

Estimates are that 20,000 blind Americans need corneal transplants to see; more than 200,000 persons need corneal grafts to treat corneal disease and to prevent corneal blindness.

"To donate your eyes to the Lions Eye Bank after death, an authorization notifying your next-of-kin and your family physician of your desire must be filled out," Mr. Johannesen noted. "The request should not be included in your will since immediate action after death is necessary."

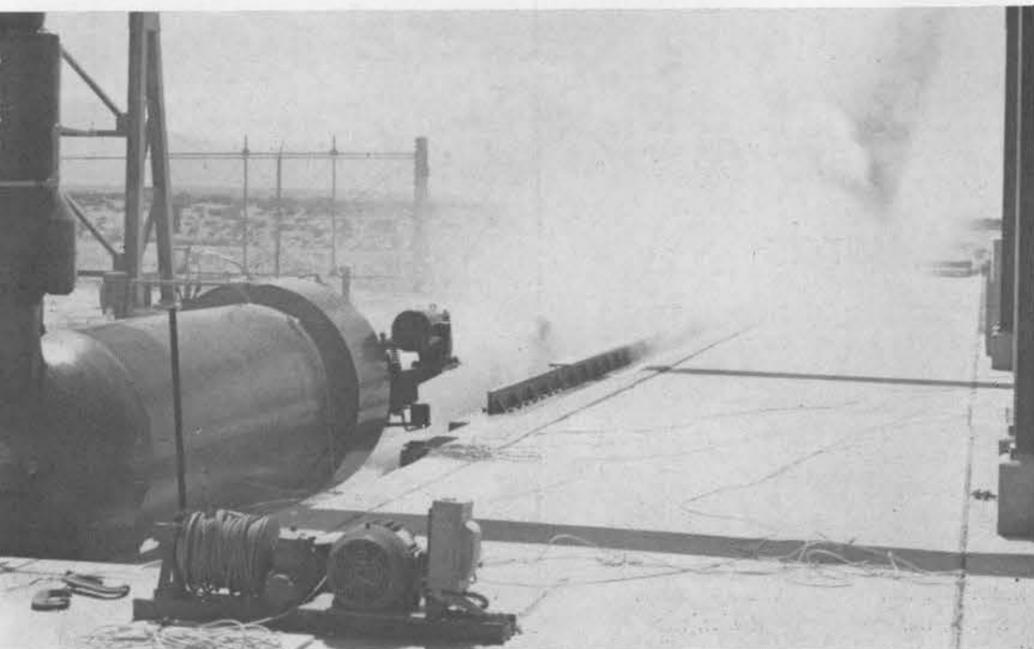
For further information, Mr. Johannesen may be reached at tel. 898-2398.

PLAN FOR PROGRESS guest speaker at Sandia Laboratory was Dr. H. R. Northrup of the Wharton School of Finance and Commerce, University of Pennsylvania. S. P. Schwartz presided over the Sandia Laboratory meetings of all supervisors. The meetings were held to explain Sandia Corporation's Plan for Progress Agreement with the President's Committee on Equal Employment Opportunity, its objectives, and methods Sandia is using to attain the objectives. A similar meeting was held at Livermore Laboratory at which B. S. Biggs presided.

Sandia Eligible for Nat'l Safety Council's Award of Honor

On Nov. 22, 1964, Sandia Laboratory employees completed 91 days without a reportable disabling injury. "During this period 3,349,995 hours were worked, making us eligible for the Award of Honor from both the National Safety Council and the AEC," says L. M. Jercinovic, Safety Engineering Department manager. "This is the first time since January 1963 that Sandia Laboratory has qualified for such an award."

"No one person or group is responsible for the achievement," Jerry says. "It has been made possible only through the combined efforts of every employee. However, it is what the record represents, rather than the record itself, of which we should be most proud."



"YOUR GIFT OF SIGHT" is the slogan being used by Sverre Johannesen of Sandia and other New Mexico Lions Club members in getting donors for the organization's Eye Bank.

Editorial Comment

It's Christmas Project Time

Each year the **Lab News** issues a reminder on the subject. Each year, apparently, the reminder is less necessary.

It's all about the special Christmas custom at both Livermore Laboratory and Sandia Laboratory. Instead of sending Christmas cards to friends seen almost daily, the money saved by not purchasing cards and postage is used to provide a Christmas for those who otherwise might not have one.

That's where the fun begins—and continues throughout the entire Christmas season.

Individual organizations will be getting names of needy families from churches and welfare agencies. Food, clothing, toys, and household equipment will be collected for them.

Sandia Corporation Unions will again sponsor a Christmas party for youngsters at Riverview Elementary School.

Reports will be made in later issues of the **Lab News** on the undertakings of the season. They will be extensive, heartfelt activities, and in most cases there will be little desire for publicity on the part of the benefactors. And, if the experience of previous years still holds, the whole operation will be carried out with minimum fuss and flurry.

It all started a number of years ago when someone said, "Don't expect a greeting card from me this year, I'm giving the money to the needy." That was all it took. The Christmas spirit in hundreds of persons carried on from there.

How To Buy Job Insurance

Call your insurance agent. Ask him if he has job insurance. He may mention life, health, accident, disability, retirement, or some other kind of insurance, but he won't have job insurance.

There are about 70 million Americans gainfully employed today and none of them can buy a policy insuring continuity of employment. All, however, can increase the possibility their employment will be lasting. This is a type of insurance purchased by performance rather than by policy.

Job insurance for Sandia Corporation employees strengthens according to their own contribution toward attaining company objectives.

And what can each of us do to help attain these goals?

We can buy a good bit of job insurance by completing every assignment in a top-notch manner. If we produce the highest quality product for our customer, do so with economy in money and time, and in the process work securely and safely, we are giving this desired top-notch performance.

We can come even nearer that job insurance by maintaining good oral and written communications, working together harmoniously, and working with a minimum of unscheduled absences.

Too, we can more nearly attain job insurance by keeping abreast of modern technology through continuing education. This may be done by formal classwork at colleges and universities, by participation in professional organizations, and by using Sandia's training programs. Don't forget self education—the more we read and the better material we read the more we learn. Employees may improve their technical and shop skills in the same way.

It all sums up to this: If we wish to attain the best job insurance possible, we can do it through accepting the Company problems as our personal problems, and the Company reputation as our personal reputation.



FIFTH ANNUAL SYMPOSIUM recently presented by the New Mexico Section, American Society of Mechanical Engineers, was attended by some 235 engineers, faculty members, students, and others. Among the attendees were (l to r) W. J. Jackel, Vice President and General Manager, ACF Industries, Inc.; J. C. O'Hara, Assistant General Manager, ACF Industries, Inc.; and G. A. Fowler, Vice President, Development, Sandia Corporation. Banquet speaker for the symposium was Dr. John Hornbeck, President of Bellcomm, Inc., who discussed "Bellcomm and the Apollo Program."

ASME Activities Help Engineers Keep Pace With New Information

"The purposes of the American Society of Mechanical Engineers are numerous," C. L. Carpenter, vice-chairman and program chairman of the New Mexico Section of ASME, says. "They may be considered a part of a larger general purpose—that of providing an atmosphere for growth of engineers."

The 5th Annual ASME Symposium, "Aerospace Frontiers in New Mexico," presented by the New Mexico Section and the University of New Mexico, was a realization of that larger general purpose.

The session provided a means by which engineer members of the New Mexico Section of ASME, members of other engineering societies, students, and faculty members could broaden their knowledge of New Mexico aerospace research and development activities.

"A symposium of this sort also presents a means for engineers to meet and exchange ideas with others in their professional fields," Mr. Carpenter continues. "In addition, it presents experts in certain fields. Dr. John Hornbeck, President of Bellcomm, Inc., was one of these experts."

This year's symposium was typical of those sponsored by the New Mexico Section of ASME for the past five years. It provided a meeting ground for 235 people including 50 students and 20 faculty. Approximately 85 Sandia engineers attended various sessions. In addition, the sessions attracted more than 60 persons who were not members of ASME.

Nationally, ASME regularly presents meetings for its members in selected cities throughout the country. "We've encouraged the presentation of local symposiums. These provide a selected activity, close to home, and meet the professional needs of local membership," Mr. Carpenter says. "This idea is spreading to other sections in the region. The New Mexico Section is one of several sections comprising Region VIII. E. H. Draper, Sandia's Vice President, Development, is vice president of Region VIII

which includes ASME sections in New Mexico, west Texas, Colorado, Wyoming, Utah, Idaho, and Montana.

"We're particularly pleased to have had such a positive student response at this year's symposium," Mr. Carpenter continued. "The Section continually encourages student attendance at reduced costs at symposiums and meetings. Annually, the Section holds a meeting in March to judge student papers and presentations to be entered into competition at the Student Regional Conference. Cash prizes from Section funds are awarded to winners in line with the New Mexico Section policy of encouraging student participation in ASME activities."

The officers of the New Mexico Section, ASME, besides vice chairman C. L. Carpenter, include Joffre Myers, chairman; W. A. Gardner, secretary; Charles Runyan, treasurer. The directors are Gene Copeland, Lowell Martin (ACF), James O'Hara (Plant Manager, ACF), and Capt. David Jones (AF Weapons Laboratory).

ASME provides 27 divisions of professional interest. Full members can select five of these to obtain current information from ASME on a regular basis and may attend the professional division meetings held on these subjects. Applied mechanics, heat transfer, management, aerodynamics, and machine design are examples of the divisions.

The Section usually holds nine meetings a year and one or two field trips. At times, the meetings are held jointly with other engineering societies. The Nov. 17 meeting will be held with the American Society of Quality Control and the American Institute of Industrial Engineers at the Coronado Club.

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P. A. Nicovich
4412
Nov. 22, 1949

10 Years

Nov. 21 - Dec. 4

Marguerite T. Bureta 3411, Walter R. Eden 4512, Clinton J. Henry 1431, Robert G. Newman 1124, Thomas F. Lonz 4136, Alvin E. Kaping 4332, Ray L. Harrison 7223, Howard E. Sloane 2413, John H. Barnum, Jr. 1322, Gail B. Ward 3463, Esther G. Moya 4433, Geraldine M. Costello 7623, Richard Lee Davis 1432, Robert E. Marsh 1632, and Hazel C. Minter 7250.



George H. Mauldin
1313
Nov. 21, 1949



James H. Lindell
1513
Nov. 21, 1949



Lois P. Kelley
4422
Nov. 21, 1949



William W. Peters
4511
Nov. 21, 1949

15-Year Service Awards



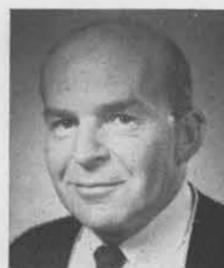
Jack R. Spence
4335
Nov. 25, 1949



Eaton H. Draper
1000
Nov. 26, 1949



Fred F. Eichert, Jr.
4410
Nov. 28, 1949



Vincent W. Hansen
7442
Nov. 28, 1949

**SANDIA CORPORATION
LAB NEWS**



ALBUQUERQUE, NEW MEXICO • LIVERMORE, CALIFORNIA

Editor: Robert S. Gillespie
Sandia Corporation, Albuquerque, New Mexico

Editorial Offices
Sandia Laboratory
Albuquerque, New Mexico
Employee Publications
Bldg. 610
Tel: 264-1053

Livermore Laboratory
Livermore, California
Public Information
Bldg. 912
Tel: Hilltop 7-5100, Ext. 2395

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Engineer Registration an Indicator Of Attitude, Technical Competence

On Dec. 5 the State Board of Registration for Professional Engineers and Land Surveyors will give its semi-annual examinations in Albuquerque and other cities—an event of importance to all engineers seeking recognition on a professional level.

R. W. Henderson, Vice President, Weapon Programs, is serving a five-year term as a member of the board. His background as an engineer; his active participation in engineering societies and technical groups on both state and national levels; his awareness of coming trends; and now his close association with the testing mechanism resulting in registration of Professional Engineers gives him strong thoughts on the importance of this step.

"With our own engineers," he states, "the main benefit to Sandia Corporation is the fact that the employee has gone the 'extra mile' in wanting to succeed in his profession. Becoming registered as a Professional Engineer is an indication of a man's attitude as well as his technical competence. From a management standpoint, it is another indicator of the depth of quality of our staff.

"To the engineer, registration is an indication of quality, insurance on his college investment of time and money, and possibly a ticket to livelihood at some date in the future. Registration is being increasingly recognized by the 50 states as a control on the quality of engineering practice; and the longer a man has been away from the university campus, the harder it becomes to pass the qualifying examinations. With the present national trend, the probability is small that a man will work a lifetime as an engineer without having to be licensed."

Under state law, an engineer employed by Sandia Corporation or similar company is not required to be registered to practice his profession as long as he "performs only the engineering services involved in his employer's business, provided that neither he nor his employer offer engineering services to the public." Government engineers are similarly exempt from the registration law but are being urged by their organizations to seek registration in the state where they are employed. In most other instances registration is necessary and an unregistered engineer working for a consulting firm must have his work certified by an officer of the company who is a registered engineer.

The purpose of the Board of Registration is to improve professional engineering standards, administer state engineering registration laws with the help of the Attorney General's office, facilitate interstate registration of engineers, and define and maintain the qualifications for registration. The members are appointed to the board by the Governor and all are registered Professional Engineers.

"One of the board's toughest jobs is the preparation of the examinations," Mr. Henderson explains. "The questions must be fair, yet of a quality to probe the indi-

vidual's depth of knowledge. Appointment of a member to the board takes into consideration his background and specialty. Among the present members are a consulting engineer, a petroleum engineer, a member of the state engineer's office, and the dean of an engineering school. With this diversified membership and the assistance of consultants, we can be sure that the questions are representative of the state-of-the-art and adequate to probe depth of engineering capability."

In May, when the eight-hour exams were last given, 26 out of 54 persons successfully completed their test.

The Professional Engineer applicant is normally faced with two tests to determine his knowledge of engineering principles and his working ability with this knowledge. The first test, the Engineer-in-Training (or fundamental) examination, is usually taken by an engineering student as he nears graduation. A degree in engineering is not a mandatory requirement, but very few can pass the exam who have not had four years of college-level work. Since the New Mexico Engineering Practice Act was revised on June 7, 1957, applicants who graduated from an approved curriculum in engineering from an accredited school prior to that date are not required to take the fundamental examination.

Mr. Henderson points out that this Engineer-in-Training test is a close parallel to the British system of comprehensive examinations which cover four years of study. "It is a test in depth of the basic engineering fundamentals the student has learned in school," he says.

To assist engineers who did not take the first exam concurrent with finishing college studies, the Albuquerque Chapter of the National Society of Professional Engineers and the University of New Mexico annually sponsor a course covering a review of mathematics and the fundamentals of engineering as preparation for the Engineer-in-Training examination.

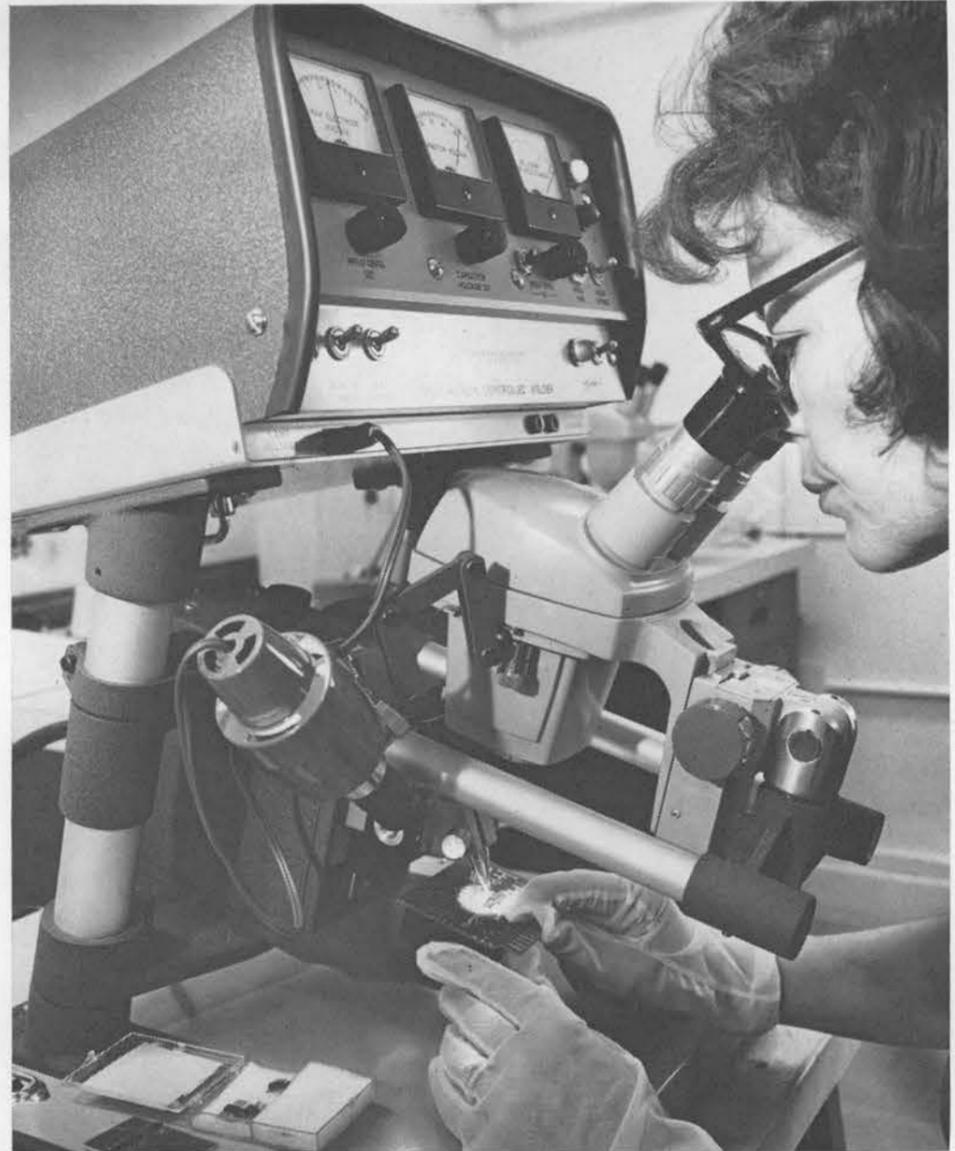
The second test, the Professional Engineer examination, cannot be taken prior to the completion of four years of engineering activity at the professional level following graduation and concentrates on engineering practice. It includes questions in ethics and engineering economics, but is comprised mainly of a choice of typical practical problems slanted to the engineer's particular field of specialty. New Mexico does not differentiate between the various engineering classifications (electrical, civil, mining, aeronautical, etc.) in granting registration; it is left to the integrity of the Professional Engineer to practice only in the areas in which he is proficient.

"The professional examination requires months of review by applicants," Mr. Henderson notes. "Frequently a group of engineers planning to take the exam will work together in refresher courses, but home study is also possible. There are numerous books available which include compilations of typical examination questions and answers."

Successful completion of the Professional Engineer examination qualifies the applicant for registration. It should be noted that New Mexico has reciprocity agreements with 48 states regarding recognition of the standards required here for registration of Professional Engineers.

Registration also qualifies an engineer for membership in the National Society of Professional Engineers, a partisan group which is actively interested in legislative matters regarding the practice of engineering and in promoting the engineering profession. In turn, NSPE urges its members to belong to at least one of the various technical societies in their specific areas of interest.

Mr. Henderson has been a member since mid-1962 of the Professional Engineers Conference Board for Industry, Inc., which was established by NSPE to develop definitions of areas of research of value to the improvement of the engineering profession. The board has initiated surveys by national opinion-gathering organizations on such topics as changing trends in registration laws, unionization, engineering school curriculum, and the interacting roles of management and engineers. A current project, of interest to many, is consideration of a national computer-operated catalogue which would aid in dissemination of bibliographical engineering information to all potential users in a timely way while at the same time preventing a duplication of effort.



MICROSCOPIC AID is required by Virginia Miller in positioning a printed circuit so that the leads of a tiny component can be welded in the proper location to create an integrated circuit. Parallel gap welding is the method used.

Even Smaller Electronic Systems Possible by New Welding Process

A method of metal joining which makes possible an entire printed circuit system no larger than a single circuit is being utilized by Sandia Laboratory's Printed Circuitry Section.

The technique is called "parallel gap welding." Previously, a number of printed circuit cards (sub-systems) would be interconnected by different means to become the system. The finished product would take up about seven and one half sq. in. of space. Now, a single printed circuit forms the base. Upon it are placed "bugs"—tiny commercially-manufactured components with different functions—which make possible any desired system through use of various combinations. Computer-type circuits are possible, as well as re-numerative or logic functions. Section supervisor N. A. Cordova expects the next generation of the Vela detection satellites to use these new integrated circuits.

Some changes have been necessary. The copper cladding on ordinary printed circuit cards is not compatible with the gold-plated Kovar lead material on the bugs. Now the glass epoxy laminate cards are coated with Kovar, nickel, or Inconel.

"Unfortunately, the leads are not yet standardized in size, which complicates the welding process," Mr. Cordova said.

Miniature welding equipment is not new, having been used by vacuum tube manufacturers for some time. However, the concept of parallel gap welding and the machines to accomplish it are new. Normally, welding electrodes are placed on opposite sides of the materials to be welded. The electric current passes in a straight line through the materials, melting and fusing them together.

In parallel gap welding, the electrodes are placed side-by-side on the lead and the current passes through the materials in a U-configuration. The latest parallel gap welding machines have a dynamic welding range and automatically compensate for variations in thickness and width of the leads.

Old printed circuit systems required one to one and one-half hours per circuit to assemble. Resistance-type of weld, required by the integrated systems, is accomplished in a matter of seconds.

"The advantage of the integrated system is the difference in size and weight of the package—always a primary considera-



INTEGRATED CIRCUIT MODULE for the Vela Hotel detection satellite is displayed by N. A. Cordova, supervisor of Sandia's Printed Circuitry Section. Raised rectangles on the printed circuit board are components of different functions which can be combined in many ways to form a desired system.

tion in systems for space-bound instrumentation," Mr. Cordova continued. "Prototype systems are undergoing temperature, vibration, and acceleration environmental tests to determine reliability, and all indications to date are that the integrated systems are probably more reliable than conventional circuits. Usually when there is less mass there is less trouble."

Welcome Newcomers

Nov. 2-13

Albuquerque	
Robert F. Armstrong	4543
*Mary R. Dey	3126
Paul A. Hayes	4574
*Mary B. Heckler	3126
Patricia J. Holzhauser	1125
Dorothy L. Kreitzer	2551
Margaret H. Riordan	3126
Gaye Lee Romesberg	4413
Richard E. Rogers	4121
Wyoming	
David M. O'Keefe, Upton	1311

*Denotes rehired

Vera B. Reed to Retire from Sandia End of November

Vera B. Reed of Design Definition Section A VI will retire the end of November after 13 years at Sandia.

Mrs. Reed received her first training in drafting from the Iowa State Highway Department in the early 1920's. She moved to Santa Fe in 1934 and lived there until coming to work for Sandia.

"I try my hand at a lot of hobbies," she said, but admitted a preference for bridge and gardening. Mrs. Reed will continue to live at 4708 Haines NE. A married son also lives in Albuquerque.



Nuclear Radiation

— what is it?

Scientists know that work with nuclear radiation is accompanied by a certain amount of hazard. This risk is balanced against the benefits made possible by its use. Man has demonstrated his ability to work safely with nuclear radiation. The safety record for personnel working inside AEC contractor plants has been, in the words of Dr. Glenn T. Seaborg, Chairman of the AEC, "phenomenally good."

Part III

Why is uncontrolled nuclear radiation, like uncontrolled electricity, dangerous?

The body is composed of tiny, living cells. Some cells are always dying and being replaced as part of natural processes or from such causes as sickness, heat, cold, or absorption of harmful chemicals. Exposure to radiation in sufficient amounts also kills cells, chiefly by changing the nature of their chemical constituents. Large amounts of radiation can also change the chemical make-up of body fluids so that they can no longer fulfill their functions, or even become harmful.

People become ill from over-exposure to radiation only if too many cells are damaged or destroyed at one time or are destroyed continuously by radioactive material lodged inside the body's insensitive tissues over a long period of time.

The effect of radiation depends on both the kind and the amount of radiation received.

Fortunately, scientists know from long observation and experience the effects of high doses of radiation on people.

The biological effect of radiation is measured by a unit called a "rem," which is an abbreviation for "roentgen equivalent man." This is an arbitrary amount of radiation effect, just as an inch is an arbitrary amount of distance.

Here is a table showing the effects of various levels of highly penetrating external radiation, such as that from gamma rays and neutrons, when received by the whole body in a short time, such as a 24-hour period.

... Up to 25 rems—no detectable clinical results.

... From 25 to 50 rems—possible slight blood changes, but no detectable clinical effect.

... From 50 to 100 rems—possible nausea and fatigue; temporary blood changes and possibly some injury, but no disability.

... From 100 to 200 rems—nausea, vomiting, fatigue, and reduced vitality; depression of nearly all blood elements. Nearly all individuals would recover in three to six months.

... From 200 to 400 rems—symptoms similar to those above, with some immediate disability. Some persons would die within two to six weeks.

... From 400 to 500 rems—fatal to about 50 per cent of those involved.

... From 600 rems up—fatal to nearly all individuals.

In the entire history of the atomic program, fewer than a score of people have been exposed to more than 100 rems of whole body, penetrating nuclear radiation.

Scientists know that large doses of highly penetrating radiation also are likely to have some delayed adverse effects.

These include an increase in the likelihood of some genetic effects and such ailments as leukemia, bone tumors, or thyroid cancer; and shortening of the life span.

There is less agreement as to the effect of small, but continued, or "chronic," whole body exposure to external radiation.

Some scientists believe that at or below some very low "threshold" levels of ex-

posure no damage from radiation exposure occurs.

Others believe that any amount of radiation exposure has some adverse biological effect although it may be impossible to demonstrate this.

So far, we have been talking about the highly-penetrating nuclear radiation of gamma rays and neutrons.

What about the less penetrating radiation of alpha and beta rays?

Alpha rays represent virtually no hazard to people as sources of external radiation because of their inability to penetrate the outer layers of the skin. Beta rays represent a somewhat greater external hazard since they can penetrate the skin and cause radiation burns and other damage.

All kinds of radioactive material present a hazard if taken within the body either by swallowing, by breathing, or through a cut. Radiation from such materials is absorbed by body tissues as in the case of radiation from external sources. The radiation dose from a given quantity of radioactive material in the body is greater than that from the same material outside the body because distances from source to tissues are less and shielding afforded by the skin and other possible materials is absent.

No matter what the type of radiation, however, the Federal Radiation Council—established by the President for advice and guidance on this subject—has taken the position that all unnecessary exposure to radiation should be avoided.

And it is on this philosophy that the Atomic Energy Commission's control over all sources of nuclear radiation in this country is based.

How Radiation Is Controlled

More than 6000 individuals and groups throughout the United States are licensed for the use of radioactive isotopes in medicine, industry, and agriculture. More than 2000 hospitals and medical groups, for example, use these new, helpful servants in diagnosis and treatment of disease.

Some 300 nuclear reactors are operable in the U. S. In addition to those producing substantial amounts of electric power for civilian use, reactors are employed for teaching and training students in nuclear science, for testing materials, for the irradiation of materials and other purposes.

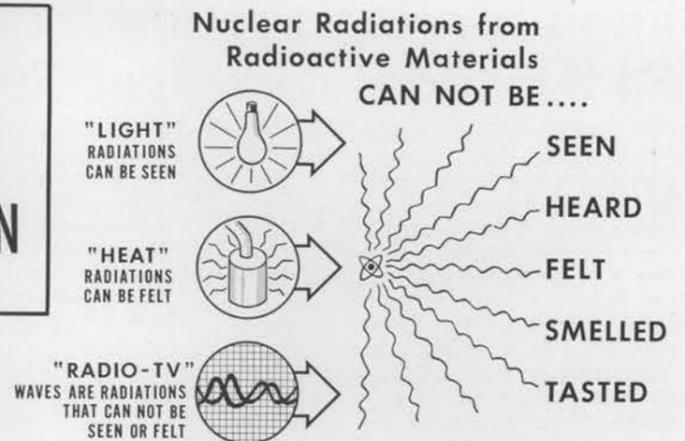
Nearly 130,000 people are employed today in the atomic industry, which includes both private installations and laboratories and plants operated for the Atomic Energy Commission by private contractors.

Control of the radiation generated in all these activities is the concern of the Atomic Energy Commission, which was created by Congress and authorized to oversee the development, use, and control of atomic energy so as to make the maximum possible contribution to the general welfare.

The Atomic Energy Commission thus sets, on the basis of Federal Radiation Council recommendations, standards for the handling of radioactive material, and for operations involving radiation so that both workers in the atomic industry and the general public are protected.

Under a law passed in 1959, individual states may share in this responsibility

FACTS ABOUT RADIATION



NUCLEAR RADIATIONS are STREAMS OF FAST FLYING PARTICLES OR WAVES WHICH COME FROM THE NUCLEI, OR CENTERS, OF UNSTABLE ATOMS

provided their radiation control programs are adequate to protect public health and safety.

Atomic Energy Commission control, incidentally, is limited by law to radiation from atomic energy activities. The agency has no control over the use of x-rays or radium.

As a primary step in controlling nuclear radiation, the Atomic Energy Commission has established limits of exposure for all who are directly employed in atomic activities or who handle sources of radiation in connection with their employment.

Under these standards, levels are set for the amount of exposure from external nuclear radiation to the entire body and to parts of the body for both certain periods and for an individual's lifetime. "Permissible levels" for radioactive concentrations in water and air also are established.

Workers in the atomic industry are not permitted to have more than a limited amount of exposure per year—an amount deliberately set much lower than any which might be expected to cause detectable physical impairment, even though continued for a long time.

Atomic industry workers wear film badges that record any exposure to radiation and a careful record is kept on the total exposure of each individual throughout the period of his employment. Surveys have shown that average levels of exposure experienced by these workers actually are well below their yearly limits.

Where individual members of the public are concerned, the Commission requires that no activities shall expose anyone to more than a tenth of the very low level set for atomic workers.

To make sure that standards for nuclear radiation exposure for both atomic workers and the public are not exceeded, rigid rules are laid down for all phases of radiation activity including the use of radioisotopes, and the design, construction, and operation of nuclear reactors. Moreover, checks are maintained to see that these rules are followed to the letter. If, despite precautions, radiation accidents do happen, they are reported immediately to the Commission and are investigated promptly.

Radiation Record

What has been the record in this regard?

Within the AEC's contractor operations, only 35 lost-time accidents have been attributed to radiation exposure of workers out of a total of 7376 lost-time accidents from all causes from 1943, when the nation's first atomic program began, to the end of 1963.

Of the 35 workers taken off the job because of exposure to radiation, 21 showed prompt symptoms of over-exposure but recovered with no known ill effects. Eleven showed no clinical symptoms of over-exposure.

Only seven radiation-related deaths have occurred to date.

The first took place at the Atomic Energy Commission's Los Alamos Scientific Laboratory, Los Alamos, N. Mex., on Aug. 21, 1945. Two men were exposed to massive doses of radiation during a research operation and one of them died. In a second and similar accident, eight workers were exposed to high levels of radiation at Los Alamos on May 21, 1946, and one died.

A third death occurred at Los Alamos in 1958 when one worker was fatally ex-

posed to high radiation when plutonium suspended in an emulsion in a 225-gal. tank inadvertently started up a chain reaction.

In the only nuclear reactor fatality, three men were killed at the AEC's National Reactor Testing Station in Idaho on Jan. 3, 1961, as the result of an accidental start-up of an experimental reactor.

The seventh fatality occurred in Rhode Island in July 1964, when an industrial worker received a massive dose of radiation in a criticality accident.

"In more than twenty years of operation of the nation's atomic energy program," declares Dr. Glenn T. Seaborg, Chairman of the Atomic Energy Commission, "there has not been a single accident that has caused any known injury to the public outside of AEC or licensee plant areas, and the safety record of personnel working inside AEC contractor plants has been phenomenally good."

"This safety record is no accident, but the result of very careful analysis and control at every stage of nuclear activity—an analysis and control, incidentally, that are continuing and will be continued without abatement."

Thus, while nuclear radiation is accompanied by a certain amount of hazard, this risk must be balanced against the benefits made possible by its use if a judgment is to be made on its desirability as a new force in our society today.

On the basis of the U. S. safety record to date and of the growing number of applications in which nuclear radiation either surpasses what can be done by conventional means or opens the door to new achievements, the case for it looks good. It looks, indeed, as if the new force of nuclear radiation, as in the case with the once-feared force of electricity, now is here to stay.

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LAB NEWS

NOVEMBER 20, 1964

Take Note . . .

The Coronado Club has been selected for the Dec. 5, 4400 Christmas party. Buffet for the Saturday night dinner-dance will start at 6:30. Music by Rex Elder will be provided from 9-1. Tickets are now available through section representatives.

Members of the Coronado Ski Club will meet Monday, Nov. 23, in La Cana Room of the Coronado Club at 7:30 p.m. Speaker will be Robert Nordhaus, an officer of the Sandia Peak Ski Area, who will discuss New Mexico ski areas. Included in the program will be a film of New Mexico ski attractions. Persons interested in ski club activities are invited.

Qualifying examinations for prospective PhD degree candidates in physics and astronomy at the University of New Mexico will be held Monday, Dec. 14 (written part), and Dec. 15 (oral part). Further information may be obtained from Dorothy Mohart of University Relations Division, tel. 264-5957.

Central-Eubank Traffic Problems Met by Best Equipment Available

The intersection of Central Ave. and Eubank Blvd. is familiar to many Sandia employees and so is the intersection problem of traffic delays.

Associate Traffic Engineer C. Robert Wolfe of the City's traffic department reports that there are more vehicles at this intersection during peak hours than the physical width of the street can handle. Thus the traffic tie-ups.

The problem is being met through use of the finest control equipment available. Engineer Wolfe describes how it works:

"The type of control equipment existing at this intersection is what is known as a volume density traffic actuated controller. The underlying principle of volume density control is a constant process of balancing the demand on a street having the green light against the accumulating demand on the street having the red light.

"There are three factors that operate concurrently to limit the extension of the green light during heavy traffic volume periods. These three factors are: 1. The time vehicles have waited against a red light. 2. The number of accumulating vehicles at the red light. 3. The density of the vehicles having the green light.

"If either the number or the time increases for vehicles waiting on the red indication, the allowable gap spacing for vehicles on the street having the green indication decreases. This means that a greater requirement is placed on the green street vehicles as far as gap spacing is concerned in order that they may retain the green indication. The maximum dial which controls the maximum green timing is set at 90 seconds, the highest which the manufacturer has provided. If vehicles move in such a manner that a vehicle is passing over a lane detector once about every two and one half seconds, the green right of way can be maintained up to 90 seconds."

The City Traffic Department has frequently observed traffic at the corner. Engineers note that after the light has been green for about 40-50 seconds, gaps begin to appear between cars. This means that the light will be activated to red by traffic

on Central Ave. prior to the 90 seconds it is possible to hold the light green for Eubank traffic.

The Traffic Department depends on Sandia employees to inform them of equipment malfunctions occurring at the intersection. Employees are requested to call Employee Benefits and Services Division, tel. 264-5354, when such problems occur.

Sandia Speakers

Following is a list of speakers, titles, and places of presentation for recent talks by members of Sandia Corporation.

K. G. Overbury of Physical Standards Division, "Highlights of AEC Calibration," Fifth Annual ANAF Calibration Conference, Oct. 27, Columbus, O.

Edward S. Roth, Advanced Manufacturing Development Division, "Zero MMC Tolerancing," New England Regional Meeting of the Standards Engineers Society, Nov. 6, Windsor, Conn.; "Survey of Modern Inspection Methods," Inspection Workshop of the Portland Section, American Society for Quality Control, Nov. 21, Portland, Ore.

R. L. Kruse of Computer Mathematics Division, "A Normality Relation for Lattices," American Mathematical Society Meeting, Nov. 14, Los Angeles; "A Characterization of Rings in which all Subrings Are Ideals," American Mathematical Society Meeting, Nov. 27-28, Evanston, Ill.

L. W. Brewer of Industrial Hygiene Section, "Evaluation of Solvent Exposure by Breath Analysis," Rocky Mountain Section of the American Industrial Hygiene Association, Oct. 30, Colorado Springs, Colo.

M. I. Weinreich of Technical Libraries Division, "Maximum Translating Efficiency," Fifth Annual Convention of the American Translators Association, Nov. 20-21, Philadelphia, Pa.

D. R. Morrison of Computer Mathematics Division, "Cones," University of New Mexico, Nov. 10; "Library Automata," University of California on Dec. 1, and Stanford University on Dec. 2.



GOLF CHAMPS—Jim Leonard, center front, admires the President's Cup which he won as top golfer in the Sandia Employees' Golf Association. At right is Larry Woodard, runner-up. Standing, second row, are members of the SEGA championship team. From left are W. D. LaCoss, L. P. Robertson, E. L. Jacobs, and George Cosgrove.

Boating Club Members Planning Nautical Thanksgiving Holiday on Lake Mojave

Thanksgiving brings to mind a gathering of family and friends around a dining table loaded with the traditional "turkey and trimmings." To a group of Sandians this Thanksgiving will be a gathering of family and friends on a lake shore with tents and boats as background, plus the traditional "turkey and trimmings."

About 50 people, members of the Los Huajolotes Boating Club, are leaving Albuquerque Nov. 25 for a Thanksgiving outing at Lake Mojave, Ariz. The group will travel caravan style. Three cars will maintain radio contact to keep them together and report any difficulties they might encounter on this 1200-mile round trip.

Activities at the lake will include water skiing, fishing, cruising, a nightly bonfire and songfest, and the Thanksgiving dinner.

Sandians taking the trip include Walt Westman who is commodore of the club,

Margaret Reese, Wanda Cupp, Mr. and Mrs. Robert Schowers, Bob Lassiter, and Ruth Bontrager. Also accompanying the group will be a writer and photographer from the staff of *Sports Illustrated*. The magazine plans a future article on the club and their trip.

The club encourages family participation in water sports. Persons interested in membership may contact Walt Westman, tel. 255-6094.

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LAB NEWS

NOVEMBER 20, 1964

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

SECRETARY DESK w/glass enclosed shelves, \$65; antique clock, over 100 yrs. old, \$35. Welker, 299-1179.

BICYCLE, girl's 20" wheels. Worden, 256-9594.

'51 FORD coupe deluxe, new tires-paint, OD, \$165. Whitlow, 344-1991.

HARMONY ELEC. GUITAR, w/amp.; National steel guitar, both brand new; take over payments on new set Encyclopedia Americana. Simon, 265-0967.

FIRESTONE 6.50x16 6-ply nylon truck tire, less than 300 miles of use, \$20. Nafziger, 299-2492.

7.65 mm MAUSER, partially sporterized, \$25; Lyman 310 hand reloading set for 7.65 mm or 308 Win., \$10. Peterson, 298-4097.

SELL OR TRADE: Colt .22 "Challenger" automatic pistol. Glover, 298-7302.

'58 PONTIAC CHIEFTAIN, PS, \$500. Underwood, 299-2535 after 6.

CORRALES HOME on one acre, 3 fireplaces, 3-bdr., electric kitchen, corral, double garage, independent efficiency apt. Swiss, 898-2083.

'60 LLOYD station wagon, miniature German car, air-cooled engine, \$350. Banos, 268-1695.

LEONARD FREEZER, 18 cu. ft., 630 lbs. capacity, 4 to 5 years old, white, upright, \$135. Visbeck, 298-0380.

1 PR. HEAD SKIS 215 cm (7 ft.) long, w/Cubco bindings, \$80. Cotter 256-0326.

25-GAL BUTANE TANK w/regulator \$25; '55 Chev. 4dr. sedan, stick shift, R&H, make offer. Salazar, 255-1301.

3-BDR. HOUSE, walled yard, cash to present GI loan (4 1/2%) or \$400 down to new FHA loan. Sisson, 299-4217.

'51 CHEVY station wagon, used as camper; standard Woodstock typewriter, \$10. Henry, 1933 Truman NE, 255-2536.

SKIS, new Kneissl Combi's and used matching spare w/Marker toe pieces and lift cable release, \$75; size 9 1/2 used boots, \$10. Begeal, 255-2244.

MISC. PARTS for Volvo B-16 engine. Wilson, 298-0049.

'63 VOLKSWAGEN SEDAN, \$1300. Stang, 255-0693.

11-FT. Westinghouse refrig. w/large freezer compartment, 220 volt, \$100 or best offer. Pickel, 242-2436.

'57 1/2-TON Chevrolet pickup w/camper, 4-spd. trans., V8 engine, \$600. Trujillo, 299-4911.

'56 FORD 2-dr., T-Bird engine. Costello, 299-0563.

LIVING WIG, champaign blond w/carrying case, \$65. Foor, 298-4980.

MERCEDES BENZ 190-SL '59 HT sport coupe, Michelin steel cord tires, \$1975, trade for Ford or Chevrolet. Smitha, 299-1096.

LARGE BABY BUGGY, two years old. Elbert, 9006 Cordova NE, 298-2204.

FRIGIDAIRE REFRIGERATOR, 9 cu. ft.; play pen w/pad; baby bed w/mattress; baby travel bed. Harris, 299-0213.

'55 OLDS SUPER 88 4-dr. HT Holiday, PS, PB, w/w, R&H, new tires-brakes-front end overhaul and battery. Frasier, 299-6933.

RELAX-A-CIZOR, all accessories including facial beauty band, \$90. Blaz, 299-3063.

2-BDR., pitched roof, walled yard, NE, FHA appraisal \$9600, equity \$1550, make offer, assume loan or refinance. Schornick, 298-3151.

CORNET w/mutes, \$75. Hayes, 298-4682.

'55 GMC 1/2-ton, 4-spd. Hydromatic, heavy duty rear bumper, steel bed, complete rebuilt engine and transmission. Robinson, 256-2903.

SELL OR TRADE: Triplex, \$8500 equity, North Valley near schools, church, shopping center. Montoya, 299-5738.

CARPET, 10'x14' wool, maroon. Bridegam, 268-1973 after 5:30.

'55 NINE-PASSENGER FORD station wagon, \$250; typewriter, \$35; five year old grey mare, gentle with children, \$150. Shock, 877-3728.

PHOTO EQUIPMENT: Honeywell strobe, trays, light stands, etc. Belden, 299-3867.

GARAGE SALE: odds and ends of furniture, lamps, etc.; swing set, slide, bicycle (girl's), misc. items, sale starts 8 a.m. Nov. 21, 8406 Haines, NE, Hanes.

'57 VOLKSWAGEN, one owner, \$495. Foster, 282-3975.

APPENDIX REGISTERED QUARTER HORSE, mare 4-yr. old, Sorrel w/flaxen mane and tail, well schooled, good for pleasure or performance. Bushmire, 256-6754.

10' DANISH SOFA, beige, cost \$400, sell for \$200; walnut and glass oval coffee table, cost \$104, sell for \$52. Dusek, 299-7087.

LARGE CUSTOM HOME, 2100 sq. ft., carpeted, landscaped, \$26,900, down negotiable, 2904 Alcazar NE. Cotton, 299-2237.

GO-CART, 2-3/4 HP engine, \$60. Vanvickie, 299-1240.

'64 PONTIAC Catalina convertible, power, \$3250. McAlees, 299-6098.

HOUSEHOLD FURNITURE; '57 Ford station wagon; baby furniture; table saw with jointer; station wagon mattress. Hitchcock, 298-2682, 1042 Marcella NE.

2 1/2 ACRES with house, on S. Highway 10. Judd, 282-3914.

THOR MANGLE, \$25; radiator for '56 Chry., \$20; bicycle training wheels, \$2. Windham, 256-9455.

11.1 FT. REFRIGERATOR w/freezer compartment; '63 Pontiac Bonneville Vista, 27,000 miles, PB, PS, factory air, new tires, white interior-exterior. Spencer, 298-5061.

6-CYL. '63 Comet block, \$70; 16" TV, \$20. Doriguizzi, 298-4295.

DIVAN, dark brown, 48" ends, 72" center section, cushions zippered; drum table, cherry, 26" diameter, 24" high, make offer. Reimer, 256-2522.

CAMERA, ROLLEICORD, twin lens reflex w/f3.5 lens, carrying case, light meter, 4 filters, adapters, lens hood, flash equipment, 24-exposure kit, \$75. Goens, Box 224 Cedar Crest, N.M., 282-3492.

KAY ELECTRONIC GUITAR, dual pickup, w/amplifier. Rea, 299-9315.

FULL SIZE BED, mattress, box springs, best offer. Clark, 243-0180.

LARGE DOG HOUSE, \$10; student desk, blond, \$10. Kochmann, 299-5133.

BONA ALLEN SADDLE, 15" seat, hand tooled, leather covered stirrups, \$80. Taylor, 256-3774.

AUTOMATIC WASHING MACHINE, Westinghouse, \$40. McIntire, 298-6145.

'63 CHEVROLET PICK UP, 1/2-ton, 292 cu. in. engine, 4-spd. transmission, Posi Traction, 6-ply tires. Tessler, 344-1843.

POODLE, miniature female, AKC registered, has shots, \$39; dining set, 6 chairs, sabled oak, \$69; gasoline tank, \$5. Winblad, 344-3109.

'59 MERCEDES BENZ 190 sedan, \$1100. Akin, 299-4242.

35 MM SLIDE PROJECTOR, Revere No. 444, 300w, manual w/pre-viewer, f/3.5, 5 in. lens, \$25. Stevens, 299-6086.

2 PAIR LEVI'S, new, size 32w, 35lg., \$6. Milligan, 243-2429.

SANTA FE Super Chief streamliner electric train set, (American Flyer), w/transformer, \$25; trombone w/music stand, \$60. Gorney, 299-8901.

'60 OLDSMOBILE, AC, fully powered. Ryan, 256-1546.

MANKIN 3-bdr., 1 1/4 bath, DR, single garage, drapes, stove and refrigerator, 353 Glorietta NE. Miller, 298-0249 after 5:30.

'50 FORD. Miller, 268-7539.

NATIONAL NC-303 amateur receiver for AM-CW-SSB, \$225, will consider trade for camera and accessories, or what have you. Bauer, 255-7774.

ORGAN, CONN, double keyboard, blond finish, \$750. Crosby, 299-1549 after 5.

LIONEL TRAINS, breaking up large set, engines, cars, accessories, track. Griffin, 298-7071.

TRADE: '59 CHEV. station wagon, for Travel Trailer or camper. Ross, 867-2413.

GRETSCH STEEL GUITAR w/amplifier, \$125; girl's English racer bike, 3-speed, \$20. Neubaer, 298-5275.

'59 GMC one-ton pickup. Kern, 265-1042.

HOLLYWOOD DOUBLE BED; Craftsman heavy duty subre saw; girl's 20" bicycle; patio copper screens. Calvery, 255-9545.

DRAPES, white fiberglass, 78" high, total width 400", \$30; 3 traverse rods, \$5 ea. Pope, 816 Val Verde SE, 255-6702.

'64 SAAB 850GT, red, new 4/2/64, 4000 miles, \$2200. Class, 298-6062.

LARGE 3-bdr., 1 1/2 bath, landscaped home near Montezuma and Fatima schools and University, 1327 Bryn Mawr Dr. NE. Ager c/o Hutchins, 255-2464.

BABY CRIB, 6-yr. size, w/mattress, \$15. Habing, 299-8061.

'22 MAGNUM/20 gauge Magnum over under combination gun, deluxe model, \$50. Krenz, 298-0619.

'63 4-DR. CORVAIR MONZA, automatic, new tires, push-button radio, \$1600 or take over payments. Dale, 268-9543 after 6.

'63 PONT. Catalina, 2-dr., HT, PS, PB, R&H, AC, \$2600 or best offer. Wiley, 298-3400.

BICYCLE, girl's 20", \$7. Egan, 298-0196.

MODERN HIGH CHAIR and baby stroller. Morris, 920 Kentucky SE, 256-0152.

MOVIE CAMERA, Kodak Brownie, fixed f/2.3 lens w/type A filter and leather carrying case. Wilde, 344-6079.

EMERSON TV-radio-phonograph combination, mahogany cabinet, \$100. Kohut, 298-0695.

'55 CHEVROLET, recent paint job, rebuilt engine, six, stick, \$350. Schneider, 299-3769.

HOTPOINT REFRIGERATOR, 9 cu. ft. Clark, 299-6410.

CRIB, Storkline, maple finish, w/mattress, \$25. Tenbrink, 299-0679.

15 TUBE RCVR Heathkit "Mohawk" SSB, CW, AM, \$299.95 new, take \$199; 90-watt all-band XMTR-CW-AM, globe chief 90A w/modulator, VFO, \$58. Mosley vert. antenna, \$15. Bassett, 898-1840.

'59 FORD CUSTOM 300 V8, 4-dr., \$575 or offer. Otero, 256-6597.

ENCYCLOPEDIA, 22 volume set, \$20. Denny, 268-0004.

'64 YAMAHA TRAILMASTER 80, 1828 June NE. Andrews, 299-4701.

BABY BATHINETTE, aluminum frame, \$10; baby high chair, \$6; potty chair, \$2.50. Fite, 255-6943.

20-WATT MONO AMPLIFIER and matched FM tuner, Knight, \$40 for the pair. Berger, 298-4234.

CAST IRON CIRCULATING HEATER, \$25; lavatory, \$10; shallow well pump, needs rewinding, \$10; 50-ft. 6" chain mesh fence w/posts, \$20. Ash, 243-1869.

VW LUGGAGE RACK; baby crib; bathinette; spring horse. Strawderman, 299-7548.

GAS REFRIGERATOR, Servel, 11 cu. ft., large freezer across top, \$35. Fairley, 299-0161.

CHROME DINETTE SET, grey formica top table w/extra leaf and six chairs, \$35. Binford, 299-2167.

KITCHEN AID DISHWASHER, portable, Webb, 298-8139.

UPRIGHT COKE MACHINE, \$75. Mortensen, 299-7477.

'64 PROOF SETS, trade for 1955 thru 1958 or small date 1960 proof sets. Smith, 268-1228.

19' TRAILER, Shasta, '59, sleeps 6, self-contained, gas and/or electric refrigerator, hot water heater, electric brakes. Wright, 909 Washington NE, 255-2625.

DRAPERIES: patterned, neutral background, pair-92"x92", pair-124"x92", single-116"x92", range receiver, BC-1206. Schwoebel, 268-6440.

O'KEEFE MERRIT gas range, \$20; Frigidaire 10-ft. refrigerator, \$25; 18 ft. ladder, \$5. Burgess, 299-2070.

ATLAS TIRE, 60% tread left, w/w tubeless, 7.50x14, \$8. Wesnak, 265-4765.

LIONEL ELECTRIC TRAIN, "0" gauge, extra track, accessories, \$45. Claassen, 255-4347.

'63 FORD COUNTRY SEDAN STATION WAGON, 6 pass., 4-dr., Cruisematic, R&H, PB, PS, AC. Weldon, 255-8313.

BLOND coffee, step and corner tables; 13-lb. Lady Brunswick bowling ball. Romero, 344-0302.

BASENJI PUPPIES, AKC registered, African dogs that don't bark, either sex available. Weart, 298-0614.

CORNER TABLE, step table, modern style, \$30; 2 modern lamps, \$5; gray, wool carpeting, w/pad, approx. 15'x20', \$30. Everett, 299-6057.

'54 MORRIS, large compact car, needs battery, \$89; roto tiller, needs motor, \$45; '56 Chev. automatic transmission, \$35. Villella, 299-6261.

'59 CHEVY PICKUP, 4 speed, new tires, \$650; '41 Ford pickup, 1-ton, V8, 4-speed, \$100. Hutchinson, 268-6295 after 5.

ELECTRIC RANGE, GE w/oven timer, apartment size, \$25; single bed, maple bookcase headboard, \$15. Wolben, 299-8481 after 5.

PORTABLE WATER AIR COOLER \$15. McDonnell 268-7502.

MEAT SLICING MACHINE, used once, \$10; large Homart air conditioner. Hawes, 8905 Lexington NE, 298-8461.

WANTED

CURVED DOOR HUTCH; wrecked foreign car. Pritchard, 268-9618.

A UNIVERSITY Cobraflex or Electro-voice T25-A, 8HD. Haymond, 299-4909.

RIDE from Copper and Adams to Bldg. 800. Piraino, 255-5126.

RIDERS wanted, any feasible route from 14th SW to Bldg. 880, 892, 860. Huston, 243-2563 after 6.

BICYCLE, 20" boy's w/training wheels. Schwoebel, 268-6440.

CARE of one child in our home, 5 days a week, preferable below age 3. Moss, 4911 Kathryn Cr. SE.

AQUARIUM 10 or 15 gal. capacity. Denny, 268-0004.

WANTED TO RENT: completely furnished apt. or house, Dec. 20 to Jan. 20, responsible elderly couple, references if required, NE Heights. Burks, 268-5613.

FOR RENT

FOR LEASE, 3-bdr., den, double garage, built-ins, carpeted, 3 miles from Base, lease one year or longer, \$150/mo. Rose, 298-4597.

3-BDR., garage, pullman bath, family room, stove and refrigerator, \$115/mo., unfurnished. Hitchcock, 298-2682.

FOR LEASE: 3-bdr., den, 2 fireplace, 2 carport, 2 bath, central heat, very imaginable extra, water and garbage paid, \$135/mo. Roth, 243-7049 or 242-4636.

2-BDR. unfurnished apt., near Base, stove, refrigerator, water and garbage paid, \$75/mo., year lease discount. Villella, 299-6261.

3-BDR. HOUSE w/fireplace, carpeted, drapes, 1 1/4 baths, stove and refrigerator if desired, water and garbage paid, \$135/mo. Rowland, 299-7472.

LOST AND FOUND

LOST—12 keys on ring w/tag "150." LOST AND FOUND, tel. 264-2757.

FOUND—Car keys in leather case, bolo tie w/10 year SC emblem, man's green jacket, 2 keys No. 2A7, heavy duty electric cord, man's blue plaid shirt, man's tan sweater. LOST AND FOUND, tel. 264-2757.



SYMBOL OF TONOPAH'S HISTORIC PAST is this giant pulley or sheave which now rests at the base of a tower where it was once used to winch up ore cars from the silver mine below. Town of Tonopah stretches to the south and west.

Sandia's Tonopah Families Find Life Different in The Last Frontier

Sandia Corporation has brought a bit of the new west to the town of Tonopah, Nev., but the "old west" atmosphere of the community remains. Tonopah is one of the few true frontier towns left in the country.

Despite a few frontier hardships still remaining (more on this later) Sandia Corporation families who have lived in the Nevada town have found the experience exciting, unique, and pleasant.

Tonopah is a town that wouldn't die when mineral deposits of the area gave out. Jim Butler found silver near the site now occupied by the town on May 19, 1900. By August of that year he had staked out several claims in the area and soon the rush was on.

Within a few years Nye County (where Tonopah is located) was mining \$10 million

HOME OFF THE RANGE for H. D. Moody, Optical Measurements Section, is this house in Sandia housing area on outskirts of Tonopah.



MODERN SCHOOL, only a block from Sandia housing area, provides Tonopah school children with up-to-date educational facilities. School was completed in 1961. President of the school board is Haskell V. Jacobs, Special Facilities Section, Tonopah Test Range.

yearly in precious metals. By 1904 gold too was being taken from the ground and the town flourished to the point that a narrow gauge railroad connected it to the Southern Pacific Railroad.

Mining began tapering off about 1914 and only recently has there been increased activity. Tonopah and neighboring communities reverted to semi ghost towns, catering to local ranchers and a few tourists. Remains of the mining boom are still seen in the area.

All was quiet in Tonopah until 1942 when the Army built an air field near the town. Then in 1957 the Air Force set up a radar station. A test program for the Regulus II missile with launchings from Edwards Air Force Base and impact in the Tonopah area brought activity to the town.

Sandia first used the area for tests in 1956. On Nov. 1 of that year Sandia was granted a temporary permit to use a local site which occupied about seven times the area of Salton Sea Test Base.



Today, there are 35 Sandia families living in Tonopah, and two live in Bishop, Calif.

They find in Tonopah just about what they would find in any small town. They also have found additional advantages and a few disadvantages. But, as Bob Statler, former supervisor of the Tonopah Range Operations Division, says, "Tonopah was my home for four years. It was a good place to live. My youngsters flourished. I made friends among the many fine residents of Tonopah."

Tonopah is remote. It's a 207-mile drive south to Las Vegas. Reno is 247 highway miles away. Residents say they are close enough to the bright lights, and they point out that they are close to some of the best hunting and fishing country in the nation.

"Within a hundred miles of Tonopah there are a couple dozen fishing streams," Bob Statler reports. "And you don't have to go any farther to get into big game country."

The Sierra Nevada Mountains are about 120 miles away and one of the country's finest winter resorts, Death Valley, has its northern tip 70 miles from Tonopah.

To further the point that Tonopah is a typical town one can picture the business district. There is a bank, a drug store with two registered pharmacists, a department store, half a dozen clothing stores, several grocery stores, and two medical doctors. Two television stations' programs are brought into town and made available on a rental basis.

Tonopah has a hospital and has voted bonds for a new hospital to replace the old one. The town has a new school building, six churches, three hotels, and six motels, four of which are new. The Independent Telephone Company was one of the first in the west to provide complete direct distance dialing.

"Look at any town and you can find some reasons for not living there," Bob Statler says. He lists some disadvantages to Tonopah life—lack of metropolitan atmosphere, limited shopping facilities, high cost of utilities, and considerable distance from a city.

The AEC provides homes for employees at Tonopah Test Range. There are 18 four bedroom homes and 18 two bedroom homes available. Employees are taken to work in the morning and returned at night by bus.

Climate of the area makes it a hay fever sufferers paradise. The town is high, 6000 ft., and dry. Only a few inches of moisture are measured yearly. Winter low temperatures average about 20 degrees with an occasional drop lower and infrequently a cold snap will drop the mercury to zero. In the summer, average highs are 85 to 90 degrees. There is some wind, much like Albuquerque, but little if any flying dust. Pollen count is about zero.

Qualified employees who would like to be considered for lateral transfer to Sandia's Tonopah Test Range should contact their supervisors. Presently a staff member

ABANDONED ORE LOADING FACILITY on outskirts of Tonopah forms frame for nearby Nye County Courthouse. Spouts where silver ore once poured into carts are silhouetted at top of picture.



MOUNTAINS SURROUND Sandia housing on the southwest edge of Tonopah. Slightly more than half the Sandia families in Tonopah live in this housing, which includes both two and four bedroom units.

electrical and four staff assistants electrical are being sought for work at the range.

Sandians who have lived in the West and appreciate its opportunities for outdoor life and scenic wonders will be pleased with Tonopah—the town with a past, present, and future.

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LAB NEWS

NOVEMBER 20, 1964

Sandia Providing Part-Time Members For UNM Faculty

While a large number of Sandia Laboratory employees are attending the University of New Mexico on a part-time basis other employees may be found lecturing before a class of students.

The majority of the part-time teachers are instructors in English. They include W. F. Carstens, Jim L. Fife, R. S. Gillespie, W. N. Dehon, T. B. Heaphy, Lee F. Parman, and J. G. Wallace.

The other Sandia employee-instructors include Stoughton Bell, Paul Waltman, and W. J. Zimmer, visiting lecturers in mathematics; Bernhard Weinberg, lecturer in electrical engineering; Fred Carleton and Alan D. Swain, associate professors of psychology; Luther W. Rook, assistant professor of psychology; and S. H. Peres, lecturer in the Community College.

Lynn E. Castle, a retired Sandia Corporation employee, is serving the university as a psychometrist and counselor.

Sandia's Safety Scoreboard

Sandia Laboratory:

96 DAYS
3,360,000 MAN HOURS
WITHOUT A
DISABLING INJURY

Livermore Laboratory:

90 DAYS
468,000 MAN HOURS
WITHOUT A
DISABLING INJURY