



PLANS for ASQC conference to be held in Albuquerque Apr. 10 were discussed at a recent meeting of conference planning committee held at Sandia Base Officers' Club. Attending were (l to r) Bill Evans, AEC, Finance; John Haskins, ACF, Program; Tom Harrison (2561-1), Co-chairman; George Hawley (2561-3), Co-chairman; Brooks Bell (2112-2), Publicity; and W. B. Fears (2134-1), Arrangements. Conference will stress quality control techniques.

Conference to Study Quality Control Techniques And Profit Improvement

The American Society for Quality Control and the University of New Mexico will sponsor a day-long conference at the Student Union Building, UNM, on Apr. 10. The conference will emphasize the role of quality control techniques and equipment in profit improvement.

S. P. Schwartz, President of Sandia Corporation, will make the welcoming address at the conference; and Tom L. Popejoy, President of the University of New Mexico, will be the luncheon speaker.

Other participants in the conference program will include Dr. Gayle McElrath of the University of Minnesota, who will discuss quality control responsibilities in improving profit. Richard B. Rossmiller and Arnold Young will display some \$100,000 in inspection equipment and will discuss optical gaging techniques.

A. D. Swain (1443-2) will discuss "Men vs. Machines" at the conference; L. W. Rook (1443-2) will participate in a panel discussion; and T. P. Conlon (2561-3) will discuss "Process Start and Control Chart."

Co-chairmen for the conference are T. D. Harrison (2561-1) and G. O. Hawley (2561-3). J. W. Moyer (7253-4) and B. W. Bell (2112-2) are serving on Publicity; W. B. Fears (2134-1) is handling Arrangements; and H. G. Jeblick (2341) is serving as Advisor on Inspection Matters.

Further information on the conference is available from William Evans, AEC, tel. 298-0867.

H. L. Hodges Earns PhD in Chemistry From U. of Arkansas

A PhD degree in chemistry was awarded Howard L. Hodges (7411) during January commencement at the University of Arkansas.

His doctoral dissertation was "Radiochemical Determination of Strontium 89, Strontium 90, and Barium 140 in Nuclear Debris."

Mr. Hodges' BA degree was earned at Hendrix College (Ark.), and his MS degree at the University of Arkansas.

He has been with Sandia Corporation since last November.



Summer Hours

Summer working hours will be in effect at Sandia Laboratory Monday, Mar. 16. Employees on regular shifts will report to work at 7:30 a.m.; the day will end at 4:30 p.m.

Regular noon hours from 12 until 1 p.m. will remain unchanged.

Sandia Livermore Laboratory working hours remain unchanged.

Sandia Papers to Be Presented at Meeting of American Physical Society

A number of technical papers written by Sandia scientists will be presented at the American Physical Society meeting to be held Mar. 23-26 in Philadelphia, Pa.

The papers to be read and their authors are:

"Optical Studies of Oxygen-Defect Complexes in Germanium" by Ruth E. Whan (5311).

"Low Temperature X-Irradiation Damage in Indium Antimonide" by F. L. Vook and G. W. Arnold (both 5311).

"Thermal Conductivity of Low Temperature Electron Irradiated GaAs" by F. L. Vook.

"Studies of Radiation Damage in Silicon Avalanche Diodes" by F. M. Smits (5310).

"Energy Dependence of Neutron Damage in Silicon—Theoretical" by H. J. Stein (5312).

"Energy Dependence of Neutron Damage in Silicon—Experimental" by F. M. Smits and H. J. Stein.

"New Color Center Bands in the Alkali Halides" by C. B. Pierce (5151).

"Pressure Dependence of Ferroelectric Properties of Rochelle Salt" by G. A. Samara (now on military leave of absence from Division 5132).

"Triplet Excitons in Anthracene Crystals" by R. G. Kepler (5323). The paper is based on work done by Mr. Kepler when he was with DuPont.

SANDIA CORPORATION

LAB NEWS

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

VOL. 16, NO. 6 / MARCH 13, 1964



BOOKS, CHARTS, DIAGRAMS, FORMULAE, and a liberal helping of exams and quizzes are the inheritance of Sandia's Electronics Apprentices during four years of training. These six men surrounding T. A. Allen, supervisor of Apprentice Section 4233-2, have completed training. For the full story and at-work pictures, see Page Six.

R. P. Baker Named Representative on ISA Executive Staff



Members of District VIII, Instrument Society of America, have elected R. P. Baker (2441) to represent them on the national ISA executive staff.

The action was taken during a meeting in Oklahoma City in February. Mr. Baker will take office next October for a two-year term.

Mr. Baker is currently serving as vice president of District VIII, which is composed of New Mexico, Colorado, Oklahoma, Kansas, Missouri, and part of Kentucky.

SPHERE OF SCIENCE will be open tomorrow morning for employees and their families from 9 a.m. until noon. George Wayland, left, and Austin Glover, both of Community Relations Division 3143, will be on hand as guides. "The Sandia Story" movie will be shown at 9:15, 10:00, 10:45, 11:30 a.m.



AEC Presents Award To Livermore Lab For Safe Operation

The Atomic Energy Commission has awarded Livermore Laboratory its fourth award of merit in recognition of 1,265,697 man-hours worked without a disabling injury. The record was achieved by Sandia Corporation employees at Livermore for the period beginning Apr. 11, 1963, and ending Dec. 30, 1963.

Accompanying the award was a letter to B. S. Biggs (8000), from W. Lee Hancock, Area Manager, Sandia Area Office, ALO, AEC, which read in part:

"Our records show that you previously received the Award of Honor and three Awards of Merit. It is upon safety performances such as these that the Commission relies to maintain its leadership in industrial accident prevention.

"You and your employees have my congratulations for having attained such an outstanding record." Mr. Hancock said that Kenner Hertford, Manager, ALO; General Manager A. R. Luedecke; and the Commission also extended congratulations.

(Editorial Comment)

The Question: Who Understands Whom?

"We depend on each other. This requires that we exchange our ideas freely and constructively, so that we can understand each other well. We need understanding between companies, between departments, between bosses and their people . . . We need communication not only to understand others but to understand ourselves."

—Frederick R. Kappel
Chairman of the Board
American Telephone and
Telegraph Co.

* * *

It may seem strange to say that the need for better communication exists between people who see each other daily. Yet it is remarkable that there are many instances when better communication would have prevented a misunderstanding or would have avoided an offense, real or imagined.

Communication isn't just a matter of words, spoken or written. It's as much a matter of what you do as what you say. The power of example is stronger than the power of words. "Do it like this," is easier to understand than "read this: it tells you how to do it."

A good communicator always has the goal of doing an even better communications job. By words and by precept, he shows that he can be trusted, that he means what he says, and does what needs to be done the way it should be done.

The good communicator listens. By listening, he communicates not only to people, but with them. Because communication, the success-producing kind of communication, is a two-way street.

Sandia's success depends on the people in it, and it also depends on how well we manage to convey to each other information necessary to this success. Communication lets us understand others. It also helps us understand ourselves.

The Transmitter, a publication of Chesapeake and Potomac Telephone Companies, in first printing the words on which the above discussion is based, reported: "It may seem strange to say that the need for better communication between telephone people, whose very business is communications, exists."

Communication problems are not limited to telephone company people. They are universal. In fact, it seems strange that with most people knowing communication difficulties exist, they continue to be part of the problem rather than contributors to its solution.

Take Note . . .

Members of the Coronado Ski Club journeyed to Red River recently for a series of downhill and junior races and other events, including a torchlight ski parade down the mountain. Several Sandians and their children received prizes for the events, which were sponsored by the Red River Ski Area.

"The weekend was one of the most successful in the Club's history," Bill Lemmon (1414-2), president of the Club, said.

The next meeting of the Club will be at the Coronado Club at 7:30 p.m., Mar. 16. Representatives from Crested Butte, Colo., will present movies of the Crested Butte ski development, and door prizes will be awarded.

* * *

Mr. and Mrs. W. A. Gardner (7300) are parents of a new daughter, Donna Marie, age 3½. Donna Marie was adopted into the Gardner home Feb. 14. The Gardners have three other children.

* * *

The Coronado Club will feature a "New Orleans Night" on Mar. 21, with music provided by McCloskey's Dixieland All-Stars. Dancing will be from 9 p.m. to 1 a.m.

A buffet will be served at 6:30; prices are \$2.60 for members and \$3.60 for guests.

* * *

Army CWO Joseph P. Duffy, son of Mr. and Mrs. J. E. Duffy (he's in 2643; she's in 2343), received three Oak Leaf Clusters simultaneously to the Air Medal, at Ft. Rucker, Ala., recently. He received the award for meritorious achievement while engaged in aerial combat support of ground forces of the Republic of Vietnam during his recent assignment in Vietnam.

PAGE TWO

LAB NEWS

MARCH 13, 1964

Experts Carry Message On Science to Students In New Mexico Schools

For the fourth year, Sandia Laboratory personnel are participating in the New Mexico Academy of Science's Visiting Scientist Program, designed for students in schools scattered throughout the state.

The program offers a listing of 78 scientist-speakers from Sandia Corporation, Los Alamos Scientific Laboratory, all universities in New Mexico, Holloman AFB, and White Sands Missile Range.

The requesting school may ask the speaker to talk on a particular topic or one of general nature. Sometimes the scientists are asked to help set up science curricula, to brief the science teachers, or to solve specific laboratory problems.

Joseph A. Schuffle, New Mexico Institute of Mining and Technology, director of the program, said that the talks have proved to be a fertile ground for ideas and to have a fine influence on students. On the other hand, the program enables the working scientist to get some idea of the difficulties encountered in teaching.

During January, Albert Goodman (7434) and Robert Gentzler (7243) visited Young Jr. High School in Santa Fe; George P. Steck (5425) spoke at Clouderoft High School; and N. C. Anderson (7434) was invited to Sacred Heart High School, Clovis.

Other Sandians who participated in the Visiting Scientist Program during the previous two months were Irving Auerbach (5153), Fred A. Gross, Jr. (9130), M. M. Karnowsky (1124), D. R. Morrison (5426), R. R. Prairie (1443), Bruce Van Domelen (1124), Marcel Weinreich (3421), and William J. Zimmer (1443).

Public Information Division 3141 cooperates with the Academy of Science each year in polling Sandians who might be interested in participating in the program.

Sandian Who Serves . . .

R. A. Quelle Helps New Mexico Advisory Committee on Aging

This is another in a series of articles describing the community activities of Sandia Corporation employees.

Many Sandians take professional skills and knowledge of their jobs into affairs of the community through their memberships on advisory boards of city, county, and state government.

R. A. Quelle of Benefits and Services Division 3122, Sandia Corporation's retirement counselor, makes use of a unique area of specialization to serve senior citizens of New Mexico. Bert is a member of Governor Jack M. Campbell's Advisory Committee on Aging. He is currently serving as a representative for the committee coordinating a survey of facilities and services available to older persons in Bernalillo County.

Results of the survey will serve as a basis for future planning by the New Mexico Department of Public Welfare, State Employment Service, and other agencies.

The survey will determine the extent of medical care, housing, social welfare services, employment possibilities, religious activities, educational facilities, and leisure time activities available to senior citizens.

"The Bernalillo County survey will serve as a model for the entire state," Bert says. "Our experience here will be reported to other AAUW chapters conducting the survey in other New Mexico counties."

New Mexico currently has 55,000 residents over 65 years of age and 12,000 of them receive old age assistance, Bert says. Within Bernalillo County, 2500 senior citizens are receiving old age assistance.

Bert has served on the State Advisory Committee on Aging since 1961. He was a delegate to the White House Conference on Aging the same year. He has served as vice chairman of CASA (Coordinated Action for Senior Adults).

"Retirement plans, government agencies, part-time employment, private and public nursing homes—these things are important for the general welfare of our senior citizens," Bert says. "The survey will certainly point up improvements that can be made in these areas. In addition, the survey will reflect to older persons the seeming new concern of all of us for those in the later years of life. More people are living longer and this factor is contributing to our overall population growth. Social change is taking place. Many people feel that our culture places too much emphasis on youth.

"Too often, our old people are forgotten and placed outside the mainstream of life. One of the most important things to people of any age, and more so to those over 65, is to feel needed and useful," Bert says.

"The later years can be golden years," he continues, "and all it takes, basically, is for someone to care and come calling. Agencies can never replace the friendship of neighbors or the concern and care demonstrated by relatives. It benefits both ways," Bert says. "The wisdom of age can be of great value to youth."



PLANS INVENTORY — R. A. Quelle (3122), a member of the Governor's Advisory Committee on Aging, talks with Margaret L. Hopcraft about a forthcoming survey of Bernalillo County facilities for meeting the needs of senior citizens. Mrs. Hopcraft is a member of the American Association of University Women which will be conducting the survey.

Sandia Speakers

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

C. E. Land, G. W. Smith, and I. D. McKinney (all 5136), "Polycrystalline Ferroelectric, Multi-Remanence Memory Elements," 1964 Institute of Electrical and Electronics Engineers International Convention, Mar. 23-26, New York City. Mr. Land will make the presentation.

D. N. Bray (8122-1), and H. J. Jensen (8151-1), "Simple Submicrosecond Transient Sampling Technique," 1964 Institute of Electrical and Electronics Engineers International Convention, Mar. 23-26, New York City.

T. B. Sherwin (3141), "Role of Sandia Corporation," orientation for wives of Sandia Base personnel, Feb. 25 and 27.

D. J. Jenkins (3130), "Problems Facing the Albuquerque YMCA," Rio Grande Kiwanis Club, Mar. 5.

J. A. Schatz (5426), "The Busy Beaver—A Preface to Computability," Manzano High School Math Club, Mar. 10.

M. I. Weinreich (3421), "Introduction to Slavic Languages," Russian language class, Sandia High School, Mar. 2.



Billie Hensley (8212-3)

Take a Memo, Please

Remove the hazard and you prevent an accident.

SANDIA CORPORATION LAB NEWS



ALBUQUERQUE, NEW MEXICO • LIVERMORE, CALIFORNIA

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The Story of Sandia

As early as 1945 the post-war fate of nuclear weapons development was being discussed. Activities formerly contained at Los Alamos were transferred to Sandia Base and the famous "Z" Division was founded on the site presently occupied by Sandia Corporation. Author F. C. Alexander continues his Story of Sandia.

Part II

While preparations for the event that would hasten the end of World War II were taking place, Hartley Rowe, technical adviser to the Army Chief of Staff, recommended that a Los Alamos group be organized to handle future weapons-development engineering and bomb assembly. Dr. Jerrold Zacharias, who had been active in the radar group in the Massachusetts Institute of Technology Radiation Laboratory, was selected to head this new organization which was called, after the first letter of his name, the Z Division. This Division was to be the forerunner of Sandia.

The Z Division was formed late in July 1945, and on Aug. 6 the first atomic weapon used in combat, a Little Boy, was dropped on the Japanese city of Hiroshima. On that same historic day, Dr. Zacharias wrote to Dr. Oppenheimer, offering some thoughts on the Z Division. In his memorandum, Dr. Zacharias predicted that the Division would grow—prophetic words!—and proposed that the Z-2 Assembly Group (largely military people) move to Oxnard Field with a few other elements of the Division.

One week after the Japanese surrender, Dr. Oppenheimer convened a round-table conference to discuss the future work of the Z Division. The conclusions of this group, which were later approved by General Groves, were that the Division should continue work and should design new weapon models in cooperation with the X (Explosives) and G (Gadget) Divisions of Los Alamos. Z personnel concerned with assembly activities then moved to Albuquerque to commence this work, and procurement specialists of the O (Ordnance) Division accompanied them to redirect deliveries of bomb material.

On Sept. 19, 1945, General Groves directed the Los Alamos commanding officer to proceed with construction at "Sandia Base" of a guard building and storage facilities, and to renovate some existing structures for administrative and laboratory use. The use of the term "Sandia Base" in this directive should be noted, as it is apparently the first official recognition of the name that had been occasionally used since Air Depot training days. Ultimate delivery points of Little Boy and Fat Man parts were changed from Los Alamos to Albuquerque, and in a few cases the unofficial local address of Oxnard Field was used. However, some of these orders were misdirected to Oxnard Field, Calif. Eventually the Sandia nomenclature became universally used.

Sandia Base Activities

The surrender of the Japanese and the end of World War II brought changes to the Z Division as Dr. Zacharias returned to MIT and was replaced by Roger S. Warner, Jr.

The few personnel then located at Sandia Base began the task of identifying usable pieces of Little Boy and Fat Man weapons that had been left over from wartime contracts; a difficult task, as it was performed without definitive blueprints or specifications.

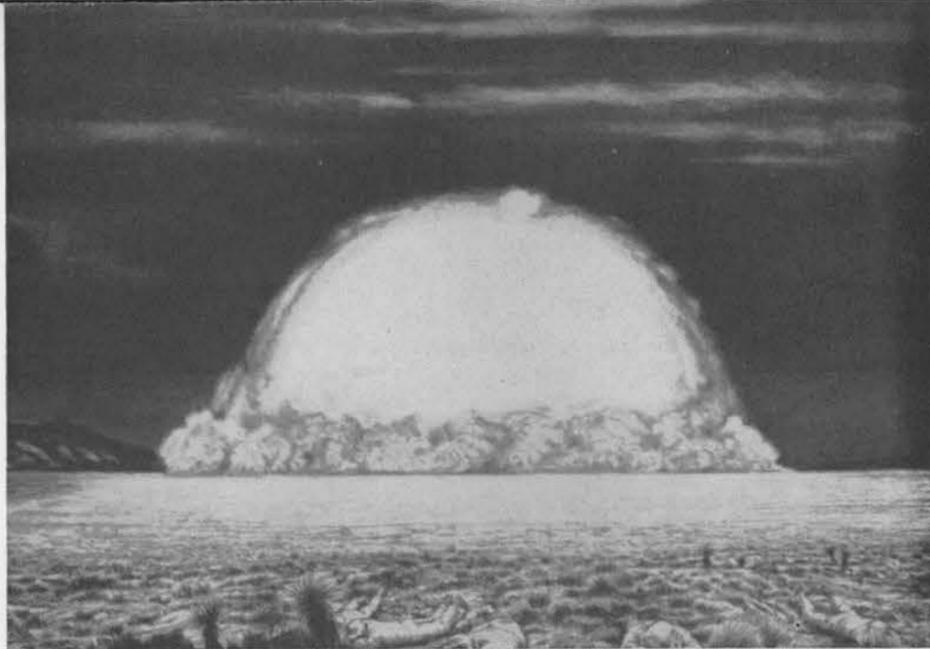
The 509th Bombardment Group was moved from Tinian to Roswell, N. Mex., in late 1945, and some of their B-29's became available for operation at Kirtland. It was thus logical to transfer the Airborne Testing group (Z-1A) from Los Alamos to Sandia Base, and a survey was made of bombing ranges near Albuquerque that had been used during the war. Z Division representatives selected a range identified as S-1. This Practice Bombing Range was located chiefly within the Iseta Indian Reservation and stretched over a wide valley contiguous to the Rio Puerco. The area was about 25 miles southwest of Sandia Base, and was situated within the triangle formed by highways US 66 and US 85, and NM 6. The range was called the Los Lunas Range by the Z Division, and the initial use was for ballistic testing.

A water supply failure at Los Alamos in the winter of 1945-46 hastened the transfer of additional Z Division person-

nel to Sandia and, as these people moved down from the Hill, shortages in living space developed. Sandia Base had many barracks, but few family houses, and the City of Albuquerque offered little vacant housing of any kind. Kirtland Field was then being deactivated, and arrangements were made for temporary use of 50 family units at that location. In April 1946, sixty prefabricated houses were moved to Sandia Base from the Hanford Works of the Manhattan Engineer District.

In the meantime, the position of Sandia Base in the over-all weapons picture was being analyzed. It began to be felt that Sandia could be completely separated from Los Alamos, and a Hill conference of civilian and military representatives was held May 2, 1946, at which it was decided that Sandia Base would be an ordnance activity administered by the Military. The Manhattan Engineer District representatives attending the meeting reported that a Table of Organization to provide a military staff for Sandia had already been submitted to the War Department for approval. The Sandia group was to be called the First Engineer Special Battalion, would include civil service and military personnel, and would handle assembly, field test, stockpile operations, and surveillance work.

Manhattan Engineer District personnel at Los Alamos subsequently reported to Washington headquarters that the civil service group was being built up at Sandia Base and that an atomic battalion could be activated upon selection of a military



JULY 16, 1945, 5:30 a.m., Trinity Site, New Mexico, a plutonium device was fired. The nuclear age opened with a spectacular display and an implication of things to come. Several persons now with Sandia Corporation were witnesses to the test. From their accounts Technical Artist Terrence Clark drew this sketch of the memorable event.

leader. Thus, on July 29, 1946, Colonel Gilbert M. Dorland was assigned to Sandia Base as Commanding Officer of both the Base and the 2761st Engineer Battalion (Special). As its first job, this Battalion took over the Z Division high-explosive work then being done at Kirtland.

This trend toward military control of Sandia activities subsequently was reversed by the passage of the Atomic Energy Act, when it became apparent that the civilian AEC was to absorb much of the Manhattan Engineer District. The Z Division agreed to do ordnance work; high-explosive work moved under control of the Division in late 1946.

Z Division included assembly of Fat Man and Little Boy bombs (still using military personnel to a large extent); design at Los Alamos of a new Fat Man weapon which was to be called the Mark IV, together with an intensive study of fuzing and firing components; ballistic studies of various weapon shapes; and the design of an airborne weapon assembly laboratory later code-named Project Chicken Pox. A decision had been made that a sea-level bombing range was required, and takeover negotiations were in progress to secure the Naval Auxiliary Air Facility at Salton Sea, Calif.

Z Division administrative activities were at this time carried out in the face of

some difficulties. Procurement, for example, was hampered by delay. This delay was caused partly by separation of the project from headquarters at Los Alamos, partly by the use for security which required the use of code terms and movement of purchased material through several intermediate transfer points, and partly by general restrictions on funds pending activation of the AEC.

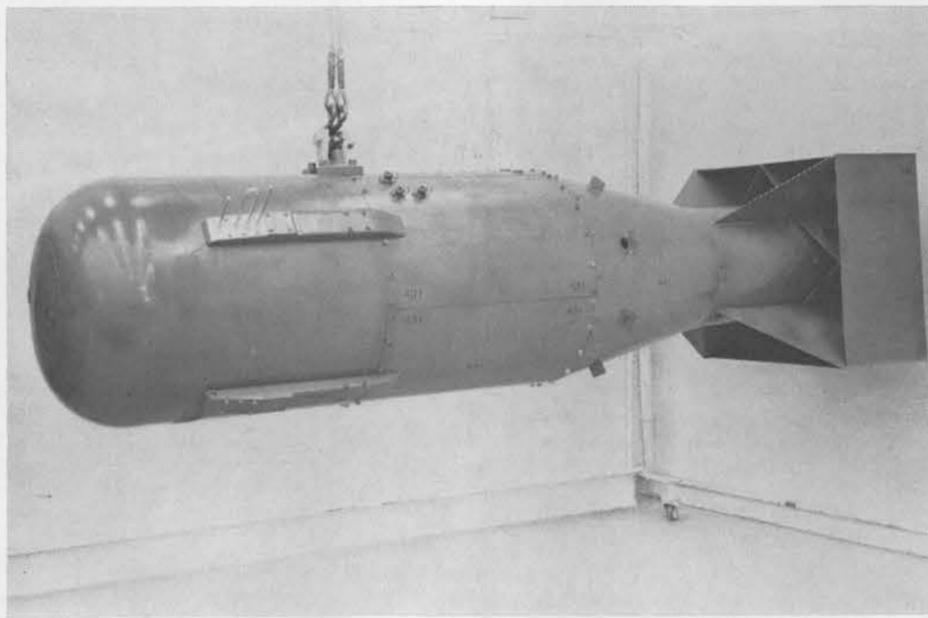
Hiring and retention of personnel posed other problems. The public debates about the atomic bomb, together with the immediate postwar mood of reaction against war, had raised serious questions in the minds of many individuals as to the propriety of engaging in armaments work. Housing conditions on the Base and in Albuquerque added further complications as did the low salary structure of the Division. As a result, few people joined the Project who had not formerly been associated with the Manhattan Engineer District or its contractors.

Some discussion was held regarding a possible relocation from Albuquerque of the Z Division, in the belief that ordnance engineering should be completely separated from Los Alamos activities. The AEC, however, decided to retain the operation at Sandia Base, and, in the spring of 1947 the Hanford Housing area was augmented by 100 units which were moved from Fort Leonard Wood, Mo., to ease the housing problems.

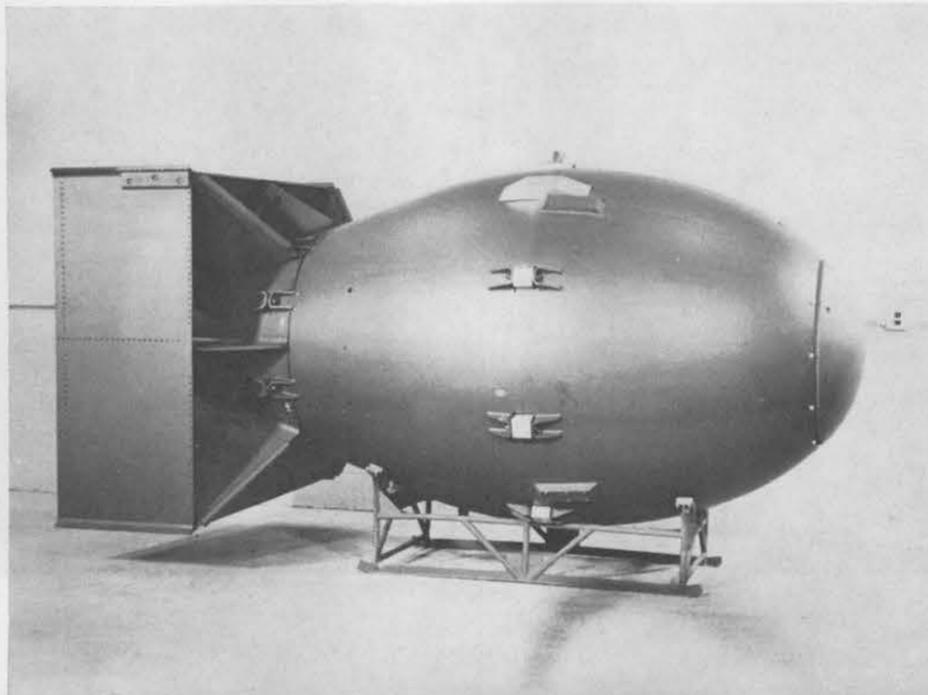
The increasing tempo of activities at Sandia required new facilities and buildings. Attention was therefore directed toward designing a building for mockup work, preparing floor plans for a headquarters building, and planning a personnel office and motor pool facilities. A consolidated shop building was suggested, and the ground work was laid for an over-all engineering survey of the entire Tech Area (the Z-Division area on Sandia Base) with construction priorities assigned to major new structures.

Z Division now sought additional employees and many people were interviewed. It was difficult, however, to build up the staff rapidly. Candidates had to be administratively cleared through Los Alamos and required extensive security investigation. This was performed by the Federal Bureau of Investigation and, being thorough, took considerable time. Some applicants for work, however, could not afford to wait several months before being placed on the payroll. As a partial solution, it was proposed that a special location on Sandia Base be set up outside the Tech Area, and that personnel in process of clearance be stationed there to perform unclassified tasks. This suggestion encountered security objections, but eventually, agreements were reached under which two such work areas were established; one in which to manufacture unclassified boxes and crates, and another in which to perform clerical functions for the architectural firm then engaged in the engineering survey of the Tech Area.

The AEC appointed Carroll L. Tyler as the first Manager of the Santa Fe Directed Operations Office in July 1947. An AEC office was established at Sandia Base. Major L. E. Kyser was temporarily placed in charge of this office and was succeeded by the first permanent official, Charles M. Huntington, Deputy Manager for Sandia of the Santa Fe Directed Operations Office.



ON AUG. 6, 1945, a gun-type U-235 bomb called Little Boy (similar to illustration above) was detonated over Hiroshima, Japan. On Aug. 9 an implosion-type plutonium bomb known as Fat Man (similar to below) was exploded over Nagasaki. Japan surrendered five days later.





SECTION SUPERVISORS Carl Drew (4632-1), left, and Richard Miller (4632-2) are studying floor plans in anticipation of acquisition of new equipment. Behind them to the right is electrical measuring test equipment; to the left is equipment for environmental testing of passive components. In a room to the rear, electrical equipment is calibrated to secondary standards.

How Long Will It Last? What About Performance? This Lab Finds Out

"Here in one location we have equipment and instrumentation to evaluate the reliability of certain electronic components under a variety of environments," said W. O. McCord in describing the work of the two Life and Performance Laboratories in his Division 4632.

The two sections, headed by Carl E. Drew and Richard A. Miller, test capacitors, resistance elements, inductors, connectors, and other "passive" (non-amplifying) components.

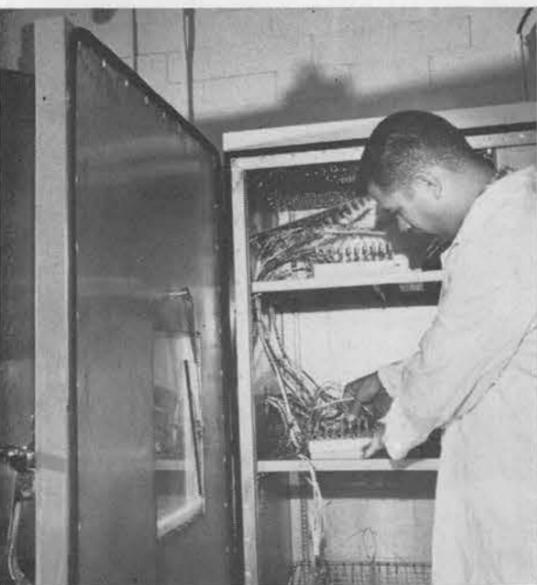
About 95 per cent of the labs' requests come from design (mostly 1432 and 1313) and manufacturing development organizations. They may ask that the components be tested to Sandia product specifications or military specifications. Or, there may be experimental "over-tests" on components to determine existing capabilities. "Life" testing is done when an item is put under a specific test until it breaks down.

The number of samples averages about 50, but a recent request involved "life" testing of 2250 resistors. Right now, the division is getting ready to test cables for 1432. The procedure will have to be developed as the work progresses—and "cables" in this sense can be anything from one wire with an insulating sheath or

wrapping to co-axial and multiple conductor cables. In addition to tests to determine electrical characteristics, mechanical traits will also have to be checked out: such things as deterioration of the wire when it is bent to less than certain radii, amount of stretching, and aging of insulation material.

In the near future, a newly-developed digital electrometer will be installed to measure the insulation resistance of capacitors and certain other components. Design engineers are interested in changes occurring in dielectrics under extreme temperatures or other conditions. (Testing for effects from shock or vibration is done for the division within 7300, and information obtained is added to the written history which follows each component through the series of tests.)

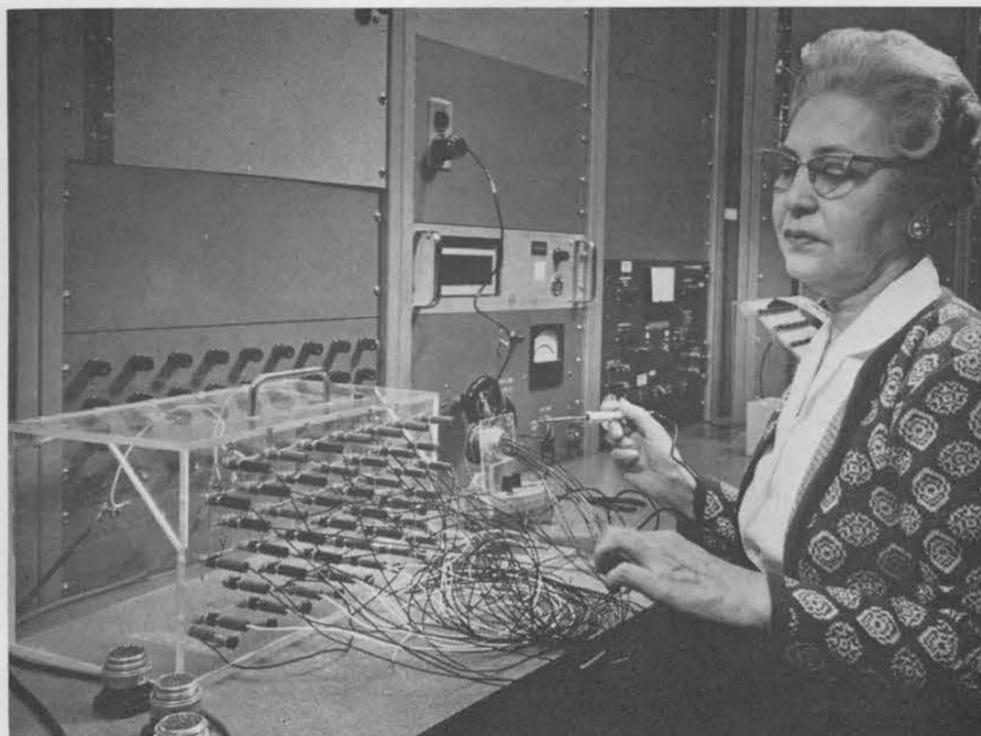
MULTIPLE CONTACT CONNECTIONS are undergoing high potential tests by Berta Guest (4632-1). In early stages of development, there is a continual testing when a deficiency shows up and after each tentative design change until the unit accomplishes its purpose.



ROQUE FELICIANO (4632-2) is preparing a set up for testing the resistance of resistors to moisture. Humidity can be varied from fine spray to a "soak" test as some design difficulties are only found under full moisture conditions. Resistors may be tested while in the humidity chamber or before and after immersion.



A "PRINT OUT" on the progress of indefinite run tests on resistors under power loads is being studied by Ormand Williams (4632-2). Electrical loads can be applied, along with temperatures up to 195° F.



REPEATED TESTING to determine the contact and engaging forces in connectors is the purpose of this machine, operated by Gerry Hinman (4632-2). The mechanical design of connectors is important to the reliability of nuclear weapons. The force necessary to engage and the energy required to disengage individual conductors is measured through electrical transducers, and is recorded on strip charts.



A TRANSFER STANDARD is being used by Harold Badersted (4632-2) to calibrate a voltmeter.

How Safe is A Nuclear Reactor?

There are now nearly 300 reactors operable or under construction in the United States. Since 1942 there have been only 18 accidents involving nuclear chain reactions. The AEC believes that nuclear power reactors may be safely operated and that in the unlikely event of accident, public health and safety would not be endangered. This is the final article of the series on nuclear reactor safety.

Part III

Because of a desire to increase its understanding of what might happen in a reactor accident and to develop information for ever-safer reactor design, the Atomic Energy Commission has deliberately destroyed reactors at its National Reactor Testing Station in Idaho.

A Commission reactor named BORAX-1, used for research on the stability and safety of boiling water reactors, was destroyed on purpose on July 22, 1954, in the first such test. Since then some 2000 tests under abnormal operating situations approaching accident conditions have been conducted in four reactors at the station. The tests were carried out under a program known as SPERT—for Special Power Excursion Reactor Tests.

SPERT-1 was placed in service in 1955 as the first of these four reactors. One of its cores was deliberately destroyed in a series of tests which began on Oct. 24, 1962, and ended on Nov. 5, 1962. Scientists who watched the event from a control room half a mile away have gained valuable information from studying photographs, radiation measurements and other data from the experiment.

On Nov. 10, 1963, a different type of core was subjected to increased energy levels in the SPERT-1 reactor without major damage to either the core or the reactor itself. Preliminary results show that with this type of core, which used fuel typical of that used in civilian power reactors, it is extremely difficult to generate a hazardous, runaway nuclear accident.

In addition to these studies, the AEC's nuclear safety and research development program includes studies of chemical and physical effects associated with fuel melt-downs, continuing studies on reactor containment, and studies of the behavior of radioactive materials in the environment. All have contributed significantly to nuclear reactor safety.

The same Commission emphasis on safety accorded reactors, incidentally, is accorded all other phases of the atomic energy program including the processing of radioactive ores and materials, their fabrication, transportation and use, and the collection, storage and disposal of radioactive waste materials.

As a result, the Commission and the contracting companies which carry out much of its work have been several-time winners of top national safety awards.

U.S. Reactor Safety Record

Including the 14 power reactors mentioned at the beginning of this article, nearly 300 nuclear reactors now are operable or under construction in the United States.

They embrace all types of reactors, including those used for the production of material for weapons and approximately 80 research and teaching reactors located at as many American colleges and universities.

U.S. reactor-operating history dates back more than 20 years to the first successful nuclear chain reaction achieved under the stands at Stagg Field at the University of Chicago, in December 1942.

What has been the safety record of U.S. reactors to date?

Altogether, some 18 accidents involving nuclear chain reactions have occurred in experimental reactors and "critical assemblies" at remote Commission sites. Critical assemblies, as distinguished from power, production and research and teaching reactors, are extremely low-powered nuclear facilities capable of sustaining a chain reaction and used for test purposes.

Here is a summary of fatal accidents that have occurred in reactors and critical assemblies since the Nation's atomic energy program began.

Three men were killed in a reactor accident at the AEC's National Reactor Testing Station in Idaho on Jan. 3, 1961.

The men were working atop the SL-1, a small prototype reactor the Army was developing for use at remote military instal-

lations. The reactor had been shut down for maintenance work. It is believed that one or more of the men drew out the central control rod too far.

The result was an uncontrolled nuclear excursion that caused an instantaneous explosion of steam from water within the reactor. Two men died immediately from blast effects. The third died about two hours later from a head wound.

All of the men received high exposure to radiation and high levels of radioactivity were recorded in the reactor building after the accident. Only low-levels of activity were recorded outside the building, however, despite the fact that the reactor, an experimental one in an isolated area, was not enclosed in a containment structure as is the case with civilian power reactors.

Two fatal accidents have occurred at critical assemblies. Both of these accidents involved nuclear weapons work rather than power reactor research and development.

The first took place at the AEC's Los Alamos Scientific Laboratory, Los Alamos, N. Mex., on Aug. 21, 1945. Two men were exposed to high-levels of radiation during operation of a fast plutonium critical assembly being used for research purposes. One of them died.

A second and similar accident occurred at Los Alamos on May 21, 1946. Eight workers were exposed to high-levels of radiation on this occasion and one died.

Today, this kind of experimentation is done by remote control so that no one can be exposed to radiation in the event of an accident.

1958 Accident

A sixth death caused by an accidental chain reaction, but not properly classifiable as a reactor or critical assembly accident, occurred at Los Alamos in 1958. One worker was fatally exposed to high radiation when plutonium suspended in an emulsion in a 225-gallon tank inadvertently started up a chain reaction.

There have been no U.S. nuclear civilian reactor accidents which have caused loss of life or endangered public health and safety. Nor has any nuclear fatality occurred in the long operating history of U. S. military or production reactors.

"The safety records achieved by the AEC and its contractors are achievements justifying great pride and satisfaction," declares Dr. Glenn T. Seaborg, chairman of the Atomic Energy Commission.

"The firm and established place which safety has always held in all nuclear activities is primarily responsible for our habit of winning top national and Presidential safety awards."

"Actually," adds Dr. T. J. Thompson, member of the AEC Advisory Committee on Reactor Safeguards, "the atomic energy industry is the first in which the regulation of safety in the industry was set up concurrently with the development of the industry."

"The development of the airplane, for example, certainly preceded the development of air safety regulations . . .

"In the case of atomic energy, however, safety was one of the chief considerations from the very start. In general, accidents which have occurred have been of a relatively normal industrial sort."

How safe, then, is a nuclear power reactor?

No absolute guarantee of the safety of a reactor can ever be given any more than safety can be guaranteed in the operation of any commercial plant, including those generating power by conventional means.

The AEC believes, however, that, with safety uppermost in mind in every phase of reactor activity from design to actual operation, nuclear power reactors may be safely operated under all normal conditions and that even in the unlikely event of an accident, public health and safety would not be endangered.

It believes the safety record of U.S. reactors to date is evidence that this is so.



WINNER'S TROPHY from recent NHRA Winter Meet in Phoenix is now the proud possession of Roy Mullin (4412), who took first place in Class "C." Leather jacket, mask, goggles, and helmet protect the race driver.

Roy's 'Mullin Special' Wins First in Class At National Competition

On Feb. 9, Roy Mullin (4412) added another trophy to an already outstanding collection. He won the Class "C" Trophy at the Winter National Meet of the National Hot Rod Association in Phoenix, Ariz.

While he's collected some 46 trophies with his cars in recent years, Roy hadn't previously won first in his class at a national competition.

The winning car, the "Mullin Special," is the memory of a '24 Ford roadster, decked out with 10 years' assortment of transmission gears, synchromesh, short axles, aluminum-magnesium wheels, and chrome-moly frame. It is "souped-up" with a '46 Ford engine, Edelbrock heads and 4-carburetor manifold with Stromberg 97's, Shafter flywheel, and Howard camshaft (custom ground).

Roy drove the car in six runs. In the last run, just before winning, he lost his clutch.

"A drag race is an acceleration race, run from a standing start for a quarter of a mile," Roy explains. "Only two cars are involved in each run. They race down two lanes, from 30 to 40 ft. apart.

"At the end of each lane is an electronic elapsed-time clock which the car shuts off as it passes a finish point. It's the elapsed time that pays off." Roy's elapsed time was 12:54 seconds; his opponent's, 12:80



RESERVE FUND of the Employees' Contribution Plan was allocated last December by the ECP committee. The fund bought wheelchairs, walkers, crutches, and other equipment for the Arthritis and Rheumatism Foundation. George Wayland (3143), ECP

secretary, chats with Mrs. Hazel Carpenter who is using one of the new wheelchairs at the Arthritis and Rheumatism at Bataan Hospital. The reserve fund, a total of \$1676, aided needs of nine agencies.

Service Anniversaries 15 Years



Yale H. Knox
3463
Mar. 16, 1949



Gordon L. Harvey
1313
Mar. 21, 1949



Raymond E. Arvidson
2121
Mar. 21, 1949



H. H. Patterson
1530
Mar. 22, 1949



T. L. Pace
7435
Mar. 27, 1949



Henry A. Moleculeski
2633
Mar. 29, 1949

Six More Sandia Laboratory Apprentices Complete 8000-Hour Electronics Technician Training Program



PRINTED CIRCUIT technology forms a large part of electronics apprentice's training, and circuit theory occupies a large part of his study time out of hours. Louis Sanchez (4233-2) examines a typical circuit. He's been at Sandia for four years, and came to the Apprenticeship Program from Documents. He's one of six graduates of the Electronics Course.



WINDING a transformer core, Fidelino Carrillo (4233-2) carefully hand-turns copper wire on winding machine in Transformer Shop. In addition to transformer and capacitor theory, he learned to prepare coils of any conceivable type, from tiny, donut-shaped helical coils to kilowatt-sized transformers. He began his Sandia career seven years ago, and came to the Electronics Apprenticeship program from Assembly Section 4233-1. He's one of six graduates.

Apprentice Candidates Sought for Two Sandia Laboratory Programs

Candidates are being interviewed for two Sandia Laboratory apprenticeship programs which may start next fall. Employees interested in applying for the machinist and electronics four-year program should contact Personnel Development Section 3152-2, tel. 264-5868. Deadline is May 1.

The programs provide about 8000 hours of on-the-job and classroom training leading to journeyman status for successful participants.

On-the-job training in the shops will be given in-hours. Apprentices will be rotated by schedule within the general organization for various types of experience required for their training. Shop theory classes will be conducted in-hours in the classroom or laboratory.

Related academic subjects must be completed in an out-of-hours class enrollment. These courses include subjects such as mathematics, mechanical drawing, shop theory, physics, metallurgy, and plastics.

Last September, John E. Hager (4233-3) graduated from Sandia's four-year Electronics Technician Apprenticeship Program, the first enrollee to have completed the course. On Mar. 1, a second class of six additional personnel graduated.

The new technicians are Lee Amador, James Carmody, Fidelino Carrillo, James Lujan, Alvin Plant, and Louis Sanchez (all 4233). T. A. Allen, supervisor of Transformer Section 4233-2, is also supervisor of the Electronics Apprentice Shop. "The class worked hard during the course," he commented recently, "both on the job at Sandia and during out-of-hours classes and training periods."

The successful completion of the course requires some 8000 hours of training, including approximately 860 hours of classroom theory (studied in-hours); approximately 440 hours of related subjects like math, physics, and drafting (studied out-of-hours); and approximately 6700 hours of shop skills such as electronic fabrication, inspection methods, and printed circuits. The students spend about eight hours of home study on course subjects each week.

The course was developed by a special committee made up of representatives of the Company and Metal Trades Council. Frank Dausses of Technical and Trades Training Division 3132 commented that the course is one of the most comprehensive electronics training programs offered by industry in the U. S. "Academic requirements during the student's progression through the course are high," he said, "and the subject matter covered is, we think, much more comprehensive than that presented in other electronics training programs."

The members of the graduating class who came to take the course are from several occupations at Sandia. Two are from Documents Section for example; another came from Printing Section 3462-3; another came from Labor Support Division 4575. All the students took a wage loss to enroll in the program.

The next class of electronics technicians will be graduated in a year and a half. Currently, three other classes are progressing through the course.

There are usually some 50-60 applicants for the program. A battery of comprehensive tests reduces this number, however, and a review committee recommends enrollees on the basis of personal interviews and test results. "Anyone can apply for the course," Mr. Allen concluded. "It offers a unique opportunity for Sandians interested in the field of electronics technology."



MYLAR STRIP AND METAL FOILS are wound together on this machine to fabricate an electrical capacitor. Lee Amador (4233-2) learned to operate such equipment with a variety of materials, as well as to prepare miniature coils, capacitors, and other components with specialized manipulating devices. Time spent in learning shop techniques was offset by hours of theory study. Lee came to the Electronics Apprenticeship program from Documents organization. He's been at Sandia Laboratory for five years.



X-RAY TUBE was completely rebuilt in Physical Electronics Section 4233-4. Jim Carmody (4233-2), a member of the graduating class of electronics apprentices, examines handiwork in Bldg. 834 "white room." Theory of electron tube, as well as hours of shop training, were part of Jim's apprenticeship. A Sandian for eight years, he came to the program from Accounting.



USING ONE OSCILLOSCOPE as a comparator, Alvin Plant (4233-3) calibrates another oscilloscope in electrical standards laboratory. Complete training in secondary standards calibration techniques is part of Electronics Apprenticeship Program. A Sandia employee for six years, Alvin came to the program from Janitor Services Division.



CHECKING OUT a relay life tester built by electronics apprentices, James Lujan (4233-2) uses a volt-ohmmeter. In addition to their study of the theory and assembly of electronic equipment, apprentices learn to operate a variety of electronics test equipment, and to interpret test results. A Sandian for six years, Jim came to the program from Sandia Laboratory's Printing Section.

Livermore Laboratory Construction Estimated at \$1.66 Million in 1964

The construction calendar at Livermore Laboratory is packed full of building projects for the coming year, estimated to cost \$1,663,000. Included are additions to existing buildings, one new building in Area 8, and construction of a pneumatically-actuated sled track in Area 8. A third addition, an enclosure to house the Laboratory's 16-ft. centrifuge, was completed in Area 8 in February.

This month the construction work is scheduled to be completed on a low bay addition to the east side of the model shop building (913) to provide additional shop and laboratory facilities. The new addition is scheduled to be occupied by Aug. 15 when the final finishing work, scheduled to start Apr. 10, is expected to be completed.

The construction contract, let a year ago, calls for a 24,000-sq.-ft. (gross area) addition to house the following functions: high pressure laboratory, photography laboratory, transducer calibration laboratory, welding shop, sheet metal shop, mechanical inspection, electrical inspection, tool crib, electronic fabrication, and a production tester laboratory.

Finishing work will include construction of steel test cells, a gas bottle storage shed, air conditioning and lighting modifications for the high pressure and photography laboratories, completion of partitions, ceilings, floor coverings, and installation of electrical outlets. Estimated cost of the project's finishing work is in the range of \$105,000-\$125,000.

Project engineer for the addition is J. G. Harter (8221-1).

Construction of a two-story addition to the engineering building (912), providing a gross floor area of 25,100 sq. ft., is expected to be finished about the middle of June. Work began on the \$660,117 addition in July 1963. Project engineer for the addition is R. E. Wilhite (8221-1).

Work is expected to get under way in June on the construction of an explosive components environmental facility in Area 8. The preliminary estimate is set at \$129,000. Concrete and masonry block structure will contain 2050 sq. ft. gross area, and will contain four concrete test cells for exposing small explosive charges to environments of shock, vibration, acceleration, and temperature. Also included will be a data control room and a small equipment room for assembly of mechanical and electrical equipment. The facility will be partly below ground and will be barricaded from adjacent explosive facilities. Completion of the facility is expected in November 1964. Plant Engineering project engineer for the building is L. B. Bedinger (8221-1). Test Department project engineer is Lloyd Myers (8123-1).

In June, work will begin on the construction of a facility to house an 18-in. pneumatically-actuated sled track to be installed at the south end of test building 972 in Area 8. The track portion of the facility will extend 105 ft. south of the building, ending at an impact area to be constructed at the terminus of the track.



ROTC CADETS from Brigham Young University, visiting Sandia Base last week for a briefing from Field Command, Defense Atomic Support Agency, also toured Sandia Laboratory's Sphere of Science exhibit and saw "The Sandia Story" movie. Twenty-six cadets were included in the visiting group.

Total cost of the facility, including construction and equipment, is estimated at \$193,000. Test Department project engineer is Ben Fisher (8123-1). Plant Engineering project engineer is W. H. Keltner (8221-2). A 250-lb. sled will be fired by compressed air (1000 psig) to provide a terminal velocity of 300 ft. per second.

In addition to the above projects, design work has begun on a 1500-sq.-ft. addition to test building 973 in Area 8 for additional laboratory space. A preliminary estimated cost of the proposed addition is \$47,000. L. B. Bedinger is project engineer.

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LAB NEWS

MARCH 13, 1964

SHOPPING CENTER

CLASSIFIED ADVERTISING

Deadline: Friday noon prior to week of publication unless changed by holiday.

RULES

1. Limit: 20 words
2. One ad per issue per person
3. Use be submitted in writing
4. Must be home telephone numbers
5. For Sandia Corporation and AEC employees only
6. No commercial ads, please
7. Include name and organization

FOR SALE

BEDROOM SUITE, light veneer, 4 pieces, large mirror on dresser. Donaldson, 255-8987 after 6 p.m.

2-BDR, SE Heights, AC carpeting, built-in range and oven, near buses, schools, shopping. Sell at FHA appraisal. Mann, 1300 Hermosa Dr. SE, AL 5-8049 evenings.

PICKUP, 1/2-ton, 1955 Chevrolet, 4-speed, 6-ply tires, \$435. Baca, 255-8452.

'60 FORDOMATIC, V-8, 6 pass., 4-dr., white country sedan, \$1050, no trade. Logan, 299-0252.

'60 RAMBLER station wagon, 4-dr., man. trans., R&H, factory AC, \$200 below book. Bush, 268-8120 after 5:30 p.m. or weekends.

FIESTA SWIMMING pool, 3-bdr., den, fireplace, 1 1/2 baths, \$3000 down, \$124 a month. Bourne, 299-0788 after 7 p.m. or all day Sat. and Sun.

'61 OLDSMOBILE F-85, 4-dr. deluxe, Hydramatic, AC, PS, new tires and license, \$375 under NADA retail at \$1395. Adams, AL 6-7265.

ACCORDION, 18" keyboard, \$180. Bradshaw, 268-8708.

3-BDR., separate dining room, heated workroom, Bandelier school, \$12,000 total. Rudeanu, 506 Bryn Mawr Dr. SE, 256-2380.

COTTONWOOD tree, about 6" diameter, owner will help dig it, \$5. Summers, AX 9-4674.

RCA-VICTOR, 4-speed hifi, blond console-tone cabinet, \$35. Kopp, AM 8-9087.

3-BDR, Roberson, pitched roof, family room, w/fireplace, carpeting, built-in range, dishwasher, disposal. Sellers, 298-2608.

FOLDING FIREPLACE screen and utensil stand w/poker, brush, and shovel in polished brass. Miller, 298-2850 after 5:30 p.m.

SIMMONS BABY bed, high chair, bathnet, and walker, \$15. Bailey, 298-5131.

'62 CRAFTSMAN mobile home, 50'x10', early American, 2-bdr with Murphy bed, new carpet, AC, Dunbar, Vu-Moor Village, Highway 422.

HIFI AM/FM tuner, \$30; green venetian blinds, cornice board, and end drapes for 90"x62" window, \$10. Vivian, 299-1785.

GOLF CLUBS, Spalding Robert Jones, three woods with covers, 2 through 9 irons, and putter. Set used once on driving range, \$100. Klecotka, AX 9-8198.

GERMAN shepherd dog, 2 years old, black/tan/silver, \$125. Randle, Placitas.

MANKIN 3-bdr. home, landscaped front and back, \$11,500 FHA, \$350 down. Halliday, 299-5859.

GIBSON guitar, case and amplifier, \$100. Barnfield, 256-6972 after 5 p.m.

'56 CHEVROLET, 6, 4-dr., std. transmission heater, low mileage. Wall, 344-4408 after 5 p.m.

GROUNDING grid linear amplifier, 2-813 tubes, all bands, complete with power supply, cabinet, and antenna relay, \$100. Welker, 8510 Flower Pl. NE, 299-1179.

HOTPOINT electric range, two ovens, deepwell cooker, make offer. Ream, 299-2076 after 4:30 p.m.

PICKUP, 1955 GMC, 4-speed, 1/2 ton, R&H, custom aluminum canopy, new tires. Mauldin, 1101 Kentucky SE, 255-8356.

'63 COMET, custom 4-dr., 170 cu. in. engine, 4-speed, R&H, other extras, under warranty, NADA book price. Fisher, 298-0526.

'62 VOLKSWAGEN Calthorpe camper, 53 hp engine, rear heater, sway bars, sleeps 2 adults and 6 children. Roller, 299-4661 after 5 p.m.

'57 FORD country sedan wagon 292, V-8, OD, \$450. Shadel, 299-5537.

DINING ROOM SET, dark mahogany, 6 chairs, table and buffet, needs minor refinishing, \$145. Rivera, 298-5307.

TWO BEDROOM suites of limed oak, original cost over \$500, sell for \$189. Gilbert, AX 9-9141 after 2 p.m.

'55 CHEVROLET Bel Aire, 4-dr., 6 cyl., w/Powerglide, R&H, salmon and grey twotone, 3 pr. seat belts, \$350 or best offer. Nelson, 298-0720.

MANDOLIN, new, pitch pipe, and instruction book, \$15. Mackay, 298-1972.

'61 OLDSMOBILE dynamic 88, 4-dr. Holiday HT, AC, PS, PB, R&H, 4 seat belts, \$1995. Campbell, 299-4830.

WASHER, Norge automatic, \$35. Hawk, 1821 Florida NE, AL 6-6264.

AMBASSADOR Olds trumpet, \$65; 8' Marine plywood row boat, \$20. Reaton, 298-3865.

'59 TR-3 convertible sport roadster, Sebring white, new rear and side curtain windows, w/tires, OD, tonneau cover, make offer. Kobs, 1213-C Girard SE, 255-6828 after 5 p.m.

GRAND CHAMPION Southdown ram, 4 years old. Renfro, 264-3373.

UPRIGHT PIANO, \$200 or equivalent value in tape recording equipment. Breitenbach, 268-7900.

3-BDR, 1 1/2 bath, utility room, attached garage, 20'x30', den, fireplace, walled yard. Lopez, 9609 Mather Ave. NE, AX 9-0941.

MATCHED SET Haig Ultra registered irons, 2 thru 9 plus wedge, \$75. Johnson, 298-1011.

'62 TEMPEST station wagon, less than 14,000 mi., factory air, radio, luggage rack, white, at Credit Union Blue Book. Vinson, 255-6962.

CIVIL WAR MUSKET, 1842 cap and ball, \$65; several old Colt revolvers for sale or trade. Smitha, 299-1096.

2-BDR. HOME, 4809 Trumbull SE, hw/floors, fireplace, carpets, drapes throughout, new roof, walk-in closets, landscaped. Noel, 298-2142 after 5 p.m.

MOSSMAN RESALE, 3-bdr, den, drapes, a/c, 1 1/2 bath, built-in stove, carpet, 1 block school, \$800 down FHA. Schowers, 268-1530.

MOTOR, 117VAC, 600 watts input, \$5. Anderson, 264-5057.

ARGUS C-3 35-mm camera w/carrying case, flash attachment, gadget bag. Love, 299-0956.

'58 CHEV. V8, Power-Glide, 4-dr., two-tone, air conditioned, \$750. Baca, 264-2406.

ROLL-AWAY BED, 3/4 size, \$10. Shepherd, 299-9066.

TWO LOTS, 70x120', Panorama addition next to Duncan Foot Hills Estates, \$1605 each, terms available. Miller, DI 4-8253 after 5:30 p.m.

POLAROID CAMERA, model J-66, complete w/leather carrying case. Crumley, AX 9-5293.

LAUNDRY TUBS, double, white enamel, work table cover, \$10; new plastic cover for wringer washer, \$1. Thayer, 299-3127.

NEXT DEADLINE FOR SHOPPING CENTER ADS Friday Noon, Mar. 20

SELL OR TRADE: T-Ford body, 1920, elec. Hawaiian steel guitar without amplifier, make offer. Pritchard, 268-9618.

'51 FORD COUPE, 6-cyl., \$100 or best offer. McDowell, DI 4-9292.

'54 CHEV. Belair 4-dr. sedan, automatic transmission, R&H. Gruber, 298-6466.

FIVE TIRES w/rim for Chevrolet, 17.5-800 8-ply Goodyear, or trade for 600-16 6-ply. Jacobs, 877-2701.

GASOLINE MOTOR, 1 1/2 hp, Clinton, just overhauled, \$16. Gubbels, 298-3528.

TRAILER HOME, 48x10' 2-bdr., sacrifice. Alsop, Country View Rd., SW, TR 7-4419.

3-PIECE walnut bedroom suite, mattress and springs, \$75; '55 Pontiac HT coupe, R&H, \$295. Wilson, 298-0049.

RUG, 8'x9', wool, w/pad light color, needs cleaning, \$10; Dumont 21" table model TV, blond wood cabinet, needs repairs, \$30. Duvall, 299-8744.

DX-40 TRANSMITTER, 75 watts in-put phone & C.W., make offer. Boultinghouse, 298-3458.

'56 FORD 2-dr., recent overhaul, four in floor, new snow tires, battery, tag, etc., low mileage. Gary, 256-7325.

'60 VOLKS SEDAN, original owner, 24,000 miles, extras, \$1195; '60 Opel sedan, extras, low mileage, \$565. Browning, AX 9-6384.

'63 CORVAIR SPYDER, 4-speed transmission, radio, Positraction, special suspension, \$2250. Judd, 299-6536.

'58 WHITLEY MOBILE HOME, 10'x50', a/c, 3-bdr., tub w/shower, many extras, \$500 below Bluebook. Beeson, 247-2744 or 255-3249.

'56 GMC V8 Suburban, 3-seat carryall, 4-speed manual shift, \$785. Kassens, 299-5436.

MINIATURE POODLES, 2 months old, w/registration papers, \$50. Arvin, 243-6286.

KENMORE automatic top-loader washer, new agitator, needs minor repair and drain hose, \$15. Frye, 268-9724.

CAMERA AND LENSES: Arus C-3 f3.5 lens, close-up lens, \$12.50; Tele-Sandmar 100 mm f4.5 Argus C-3, \$15; Wollensak 135 mm f4.5 enlarging raptor, \$30; Wollensak 50 mm f2 Fastax raptor, \$25. Mattox, 268-5554.

'64 THUNDERBIRD, 3000 miles, PS, PB, R&H, \$4175. Stiver, AM 8-5170.

3-BDR. MOSSMAN, 1 1/2 bath, complete electric kitchen, screened porch, furnace, a/c, fireplace, carpet, drapes, FHA \$18,250. Meyer, 256-0042.

'62 MONZA, 4-speed, white sport coupe, \$50 below book or trade for pickup camper. Westman, 255-6048.

3-BDR. HOME MOSSMAN Landaire model, 1 1/2 bath, drapes, carpet, double fireplace, landscaped, 2819 Dakota NE. Bustamante, AM 8-0532.

3-BDR. HOME, beam ceiling, parquet floor, drapes, sprinklers, walled, landscaped, \$800 under FHA, 1127 Propps NE. Ri-aoli, AX 9-0835.

MOTORCYCLE HONDA "50" sports model, w/extras; 2 pair of air's and bob's ice skates, size 2 & 5 and 3 & 6. Johnson, 299-0006.

'59 CHEV. 1/2-ton pickup, 6-cylinder, 4-speed, \$775. White, 268-9447.

'32 MODEL "B" FORD pickup, completely original, sell or trade. Young, 255-8193.

WOMEN'S CCM flaire skates, size 5, \$12. Whitlock, 298-6638 after 5:30.

DINETTE SET, maple table and 4 chairs, \$40. Gray, 256-1560.

ROBERSON 3-bdr., 1 1/4 bath, den, fireplace, carpeting, hw/floors, 2-car garage, pitched roof. Schultz, 298-2731.

.22 RIFLE, single shot, \$9; slide projector, 35mm. manumatic, 300 W, \$23, Hi-fidelity stereo tape recorder, VM-722 4-track, portable, \$138. McIntire, 298-6145.

CUSTOM HOME, deluxe Chapman 3-bdr., 1 1/4 bath, landscaped, 9707 McKnight NE, new FHA commitment \$18,000, \$800 down. Atkinson, 299-3250.

ANTIQUA WALL TELEPHONE, oak finished, all internal, external parts, \$15. Lambert, 344-9012.

'53 WILLYS 4-wd pickup, \$450. Miller, 299-9247.

WORLD WAR II issues of Life and Look magazines; Dec. 1919 copy of National Geographic magazine. Gonzales, CH 7-1916.

'62 PHILCO 30" pushbutton electric range, \$125. Smith, 256-0375.

'57 PORSCHE-SUPER, completely rebuilt from frame up, new engine, new brakes, new paint, new tires, \$1995 total price. Denison, 255-3535.

CORNER LOT 100x135' R-2 w/650-sq.-ft. house at 202 Texas NE, \$6400. Benischek, AL 6-7869.

3-BDR., 1 1/2 bath home in all brick neighborhood, near Winrock and Fair Plaza shopping centers, \$15,950. Stark, AM 8-8674.

ELECTRIC RANGE, year old 30" Westinghouse w/continuous controls, timer, etc. Trauth, 299-2176.

'63 DART model 270, 4-dr. sedan, light blue, 8000 actual miles, \$1975. De-Haan, 344-4805 after 6 p.m.

SELL OR TRADE all or any part of Maytag automatic washer model AMP. Stuart, 299-9190.

RAMPHONE professional clarinet, \$100; GE 11' refrigerator, \$85; Winchester pump .22 WRF, 200 rnds. ammo, \$40; submersible water pump, \$12. Scott, 298-1554.

STEREO TAPE RECORDER, Sony 464-D four track, 2-speed, in carrying case. Moore, 255-7891.

PORTABLE TV, '60 Philco 17", \$40. Long, 264-1109.

HAM RECEIVER, Heathkit Mohawk, late model w/single sideband, \$185. Kroth, 521 Texas SE.

STORKLINE CRIB and mattress, drop sides, maple finish; baby stroller, folds. Forsythe, 299-2785.

SELL, LEASE OR RENT: 3-bdr., 1 1/4 bath, carpeted LR, hall and entry; fireplace, built-ins, disposal, utility room. Peterson, 299-4714.

SELL OR TRADE: H-type reloading press w/mounting bases, priming posts; Pacific powder scale w/weights, all for \$21.50; 7-12 power zoom binoculars, \$35. Westfahl, 298-4716.

'55 FORD SHOP MANUAL and set of spark plugs for same, \$5. Shea, 255-8092.

TIRE AND RIM: 900-14—Oldsmobile, 1 ea.; 2 ea. 15" split rims for 1/2-ton Chev. pickup. (6 lugs); 1 pr. 2000-lb. overloads for '61 Chev. 1/2-ton pickup. Reese, 255-4288.

MATCHING BLOND DOUBLE BED, dresser, chest, \$40; 90" wide single draw drapes, \$15, must sell. Wycoff, 299-1833.

TRIPLE DRESSER, limed oak, formica top w/attached mirror, \$50; Sears' Ranch Oak bedroom set w/bookcase headboard, double bed, box springs, 5-drawer chest, \$75. Kubiak, 256-1513.

'62 MIDGET MG, 5 new tires, new battery. McMaster, 268-8062 after 5:15 p.m. weekdays, and after noon on weekends.

AUTO AIR CONDITIONER, less than one year old, \$170. Scebold, 299-6091.

POCKET BILLIARD TABLE, full size, slate top. Dal Porto, 299-7063.

2 AIR LIFT BAGS for '63 Buick; 2 five-gal. butane bottles and 2 butane regulators. Ernst, 268-9414.

BOY'S BICYCLE 20": Hot Point automatic washer; General Electric Vacuum cleaner; miscellaneous floor tile; swing set. Houghton, 1413 Guaymas Pl., 299-3386.

BILLIARD TABLE, folding legs, \$60, two HO gauge scaled model train sets in metal and wood construction. Barber, 299-4287.

ONE BLACK Astrakhan fur jacket, size 14, \$75 or best offer. DiGuseppi, 298-4087.

DSB-100 TRANSMITTER, 100 watts P.E.P., 50 watts AM and CW, 755A VFO, Globe VOX, all for \$85; National NC-303 receiver, \$249; roll-top operating console, \$39. Bauer, AL 5-7774.

MEN'S MATCHED SET of Spaulding Top Flite golf irons, 2 through 9, plus wedge. Foster, 256-3659.

DISHWASHER, \$24.95; Jigsaw, \$9.99; 5 hp gasoline engine, \$24.95; 8 hp outboard, \$99; 10-gal. milk can, \$3.95; Coleman Lamp, stove. Pliner, 256-1907.

WANTED

HOME for medium size dog. Hawk, 1821 Florida NE, AL 6-6264.

LARGE SIZE TRAMPOLINE or will trade 2 place Go-Cart for good trampoline. McCullar, 299-0638.

JOIN CAR POOL from Princess Jeanne Park (Lomas and Claudine) to Bldg. 880. Wilson, 298-0049.

JOIN or start car pool from vicinity of Carlisle and Central. George, 265-0117.

RIDE from 4121 Goodrich NE to Bldg. 880 or vicinity. Dodds, 344-6662 after 5:30 p.m.

WOULD LIKE TO TRADE my power reel mower w/broken handle for a good push mower, will care for 1 or 2 children in my home, by the week. McCoach, 298-5960.

HOUSEKEEPER with sense of humor to care for 4 pre-school children plus five in school from 7:30 until 3:30 Mondays through Fridays. Mother recently had heart attack. Stromberg, 255-6131.

RIDE from 313 Mesilla NE to vicinity of Bldg. 880 or 887. Keller, 255-9805.

MONO F.M. TUNER or plain F.M. radio. Baxter, DI 4-7601.

USED CONCRETE bit blocks; 4" sewer pipe, 8" form lumber; 16-20" extendable ladder; crow bar; small mortar bucket. Collins, 268-3612.

BINOCULARS, 8x40 or 8x35 Carl Zeiss pre-WWII. Cericola, AX 8-2426.

FOR RENT

UNFURNISHED 2-bdr. and den SE Heights, a/c, \$95/mo. Chavez, AL 5-5461 or AX 8-5091.

NEW 1-BDR., unfurnished apt., carpet, drapes, individual patio, forced-air heat, garbage disposal. Palomas and Zuni, \$95. Hughes, 255-4628.

CLEAN ROOM, private 3/4 bath, home in Hoffmantown. Boice, 299-3260 after 5:30 p.m.

WITH OPTION TO BUY, 3-bdr. 1 1/2 bath, att. gar., family room, a/c, living-hall carpeted, 15x15' bomb shelter, \$125/mo. Beadersted, 298-4590.

3-BDR. HOUSE, built-in range and oven, NE location, \$110/mo., water, garbage paid. Patterson, 299-6590.

LOST AND FOUND

LOST—Keys on old-fashioned key ring, man's brown felt hat, man's turquoise and silver ring, Std. Oil of Texas Credit Card, man's polaroid sunglasses w/ black plastic frames, turquoise & coral Zuni earrings, man's brown leather glove, brown mechanical pencil, ladies' Elgin watch—yellow gold case—Spield band. LOST AND FOUND—Ext. 264-2757.

FOUND—Pearl and agate earring, 5 keys on small metal ring, rosary case, Parker grey ballpoint pen, brown RCA memo pad case. LOST AND FOUND, ext. 264-2757.



Sympathy

To T. W. Anderson (1533) for the death of his father in Silver Spring, Md.
 To D. R. Weldon (3222) for the death of his father in Albuquerque, Feb. 23.
 To H. O. Berlier (4514-1) for the death of his father-in-law in Albuquerque, Feb. 23.
 To John L. Sullivan (4575-1) for the death of his father in Albuquerque, Mar. 4.
 To W. M. Winfrey (7221) for the death of his father-in-law, W. D. Durham, in Glendale, Calif. Mr. Durham was well known to many Sandians.

Two Sandia Men Are Elected ACS Officers

Two Sandians have been elected to office in the newly-formed New Mexico section of the American Ceramic Society. Robert Dungan (1113-3) will serve as president, and Robert Lefevre (5135) is the secretary-treasurer. The society was organized in 1898, and now has 26 sections.

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 LAB NEWS
 MARCH 13, 1964

Sandia's Safety Record

Sandia Laboratory
 HAS WORKED
 840,000 MAN HOURS
 OR 24 DAYS
 WITHOUT A
 DISABLING INJURY

Livermore Laboratory
 HAS WORKED
 271,000 MAN HOURS
 OR 49 DAYS
 WITHOUT A
 DISABLING INJURY

PRESENTATION of Meritorious Service Award to Carter D. Broyles (5413), was made Mar. 9 by Lt. Gen. H. C. Donnelly, USAF, Director, Defense Atomic Support Agency. The award was made to Mr. Broyles for "exceptionally meritorious civilian service" to the United States while serving with the Weapons Effects and Tests Group, Field Command, DASA, during the period from Sept. 15, 1961 to Aug. 15, 1962. During this period, he was Scientific Director and Deputy Program Manager for Operation Marshmallow. The award, signed by Secretary of Defense Robert McNamara, was effective Feb. 14, 1964.

Life Expectancy — Statistics Confusing, Yet Promising

Medicine has established the fact that the longer you live, the longer you can expect to live. But the statistics used in proving the fact can be misleading.

When we say that the expectation of life today is 69.7 years, for example, we mean that a new-born baby is expected on the average to live to that age. This figure accounts for infant deaths, as well as for those who die later in life.

But this "expected age at death" increases with age.

For example, by the time you reach age 20, the effect of childhood diseases has been eliminated; hence, you can be expected to live longer . . . to about 72 years.

If you survive to age 65, you can be expected to live for about 14.3 more years; and if you reach age 70, you're still good, on the average, for about 11.3 more years.

The increase of life expectancy at birth is due to the elimination of childhood diseases and infant mortality. And the total mortality is so low in childhood and early adult life that if all causes of death were eliminated in the first 25 years of life, the expectation of life at birth would be increased only three years.

The margin on life is still being pushed back, but future progress in increasing longevity will depend on science's ability to cope with chronic and degenerative diseases like cancer and heart disease. Cures for these diseases may be just around the corner — long before most of us have used up the margin we now have.

And consider for a moment how much more fortunate we are than our grandparents were . . . or than we were in our childhood.

Congratulations

Mr. and Mrs. M. F. Stewart, III (4432-3), a son, French Stewart, IV, Feb. 20.
 Mr. and Mrs. G. W. Stone, Jr. (7424-2), a son, Stephen Walter, Feb. 21.
 Mr. and Mrs. J. E. Tapia (3428-2), twin boys, Peter and Paul, Feb. 21.
 Mr. and Mrs. G. J. Hurley (2323-1), a daughter, Rhonda Sue, Feb. 22.
 Mr. and Mrs. L. D. Gillette (7252-1), a daughter, LaRae Ellen, Feb. 25.
 Mr. and Mrs. R. H. Chavez (3463-1), a son, Raymon Martini, Feb. 25.
 Mr. and Mrs. D. B. Hayes (5412), a son, Douglas Lewis, Feb. 25.
 Mr. and Mrs. J. M. Portlock (7435), a daughter, Sandra Lynne, Feb. 29.

That May Be The Trouble! We're Not Even Getting Through

When two-way communication — the transfer of ideas between people — breaks down, confusion results. There is misunderstanding—sometimes even hostility.

Because this two-way communication greatly affects the way people perform their jobs in an organization, industry — including the Bell System — has been focusing more and more attention in recent years on the importance of this give-and-take in daily workday communications. One series of experiments — conducted for Bell Telephone Laboratories by Professor Alex Bavelas of the Massachusetts Institute of Technology — graphically demonstrated the role of two-way communication in tackling a problem situation.

Here is the way the Bavelas experiment, involving repeated tests, was carried out:

In each test, six people were divided into pairs. Each of the six was given a set of dominoes. The dominoes of one person (A) in each group were placed in a specific pattern; the dominoes of the other person (B) in each group were unorganized. "A" was instructed to tell "B" by telephone how to set up his dominoes in the same pattern, but with this difference:

In Group 1: "B" could not talk or respond to "A" in any way. Result: none of the "B's" got the pattern right.

In Group 2: "B" could only indicate by pressing a buzzer that he did not understand the instructions of "A," who was allowed to repeat the instructions. Result: some of the "B's" got the pattern right.

In Group 3: "B" could talk to "A." Result: all of the "B's" got the pattern right. When interviewed after the tests were completed, the "A's" in Group 1 thought that the "B's" could not be very bright if they could not understand simple instructions. The "B's," on the other hand, thought that the "A's" meant well but didn't know how to explain things.

The Group 2 participants expressed similar views but not quite as strongly.

Only the Group 3 people — who had been permitted full two-way communication — felt happy about the experiment.

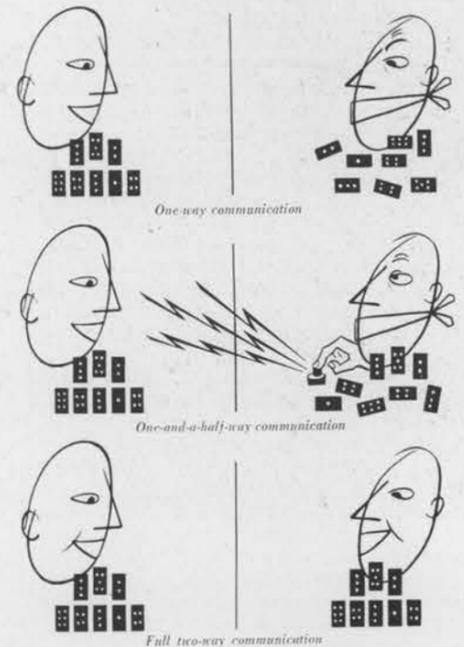
In Sandia Corporation's work, as in most other businesses, employees are called upon to communicate and understand matters that are far more complex than domino patterns. That is why good two-way communication is so essential.

If, perhaps, employees in their everyday working relationships would ask themselves two questions — "Am I getting through to him? Do I understand what he really means?" — there would be greater success in keeping the two-way channels open and flowing.

T. A. Allen Earns Vocational Teaching Certificate in N. Mex.

T. A. Allen, supervisor of Transformer Section 4322-2, has received a Vocational Teaching Certificate from the New Mexico State Board of Education. Certification was effective in June 1963.

T. A. is a member of the Advisory Board on Electronics Vocational Training for Bernalillo County, and has worked with the state board for some time.



Public Schools Presents AEC Suppliers Course Prepared by Sandia

A Sandia Laboratory employee is teaching a course in the Albuquerque Public Schools; the students are Atomic Energy Commission suppliers.

This cooperative effort was made possible by the State Department of Education, Sandia Corporation, and the Albuquerque Public Schools.

The class is Concepts of the True Position Dimensioning System and uses a programmed text prepared by Sandia Laboratory. Instructor is Al Bridegam (4412), a member of the project team which developed the textbook.

The text introduces new symbols and concepts for relating parts to a three-plane reference framework. This system will be used in drawings of all AEC integrated contractors.

Thirty-seven students, representatives of 32 suppliers from the Albuquerque area, are currently enrolled in the five-week course. An additional 106 students are on the waiting list for the class.

The class meets Tuesday and Thursday evenings at Highland High School.

AL BRIDEGAM (4412), center, helps representatives of a local supplier with programmed textbook, "Concepts of the True Position Dimensioning System." Class for suppliers is held at Highland High School through the cooperative efforts of Sandia Corporation, State Department of Education, and Albuquerque Public School System. Students are O. M. Wensley, left, and Gerhard Heckman, right, both with Machine Products, Inc.

